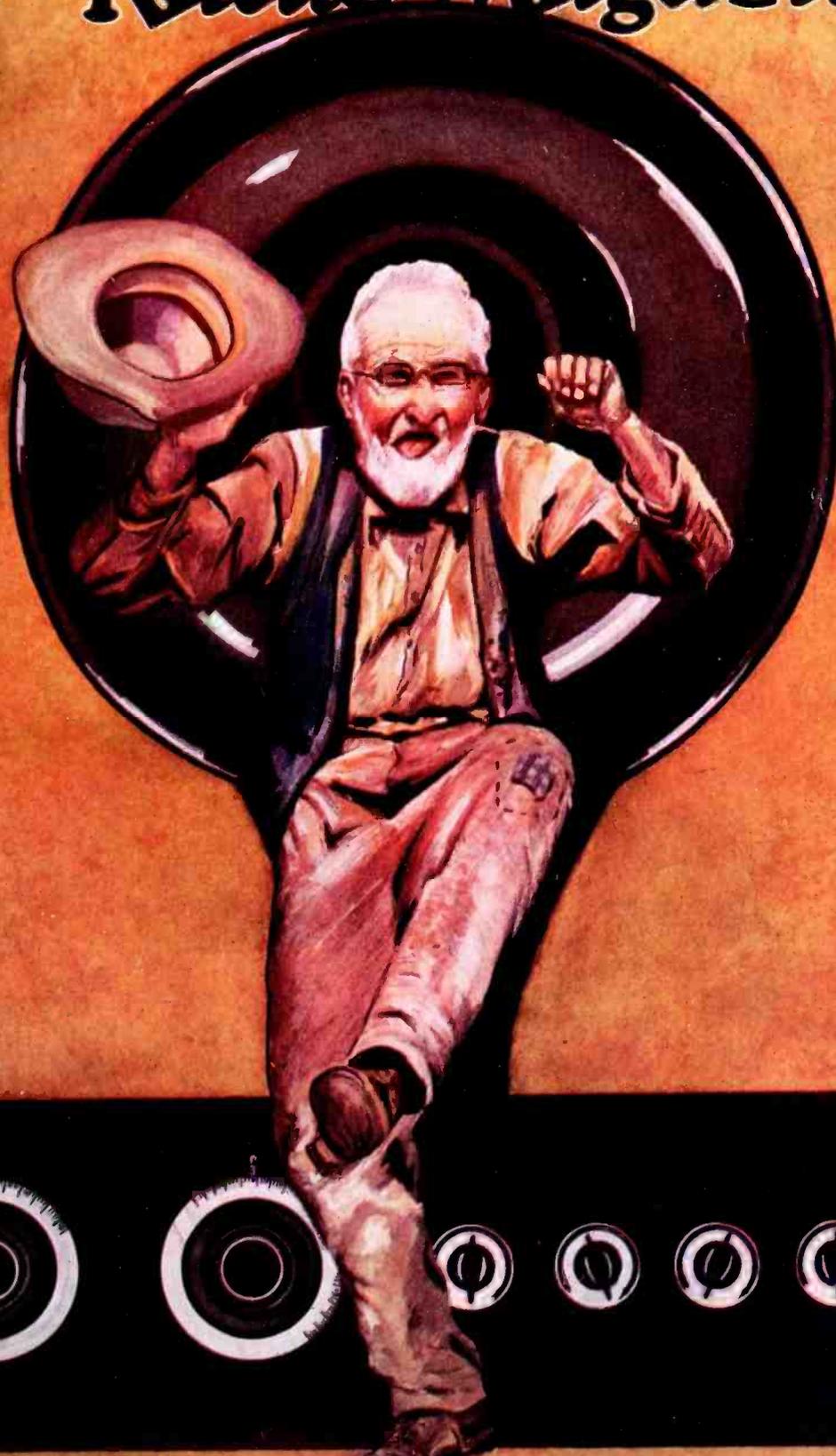


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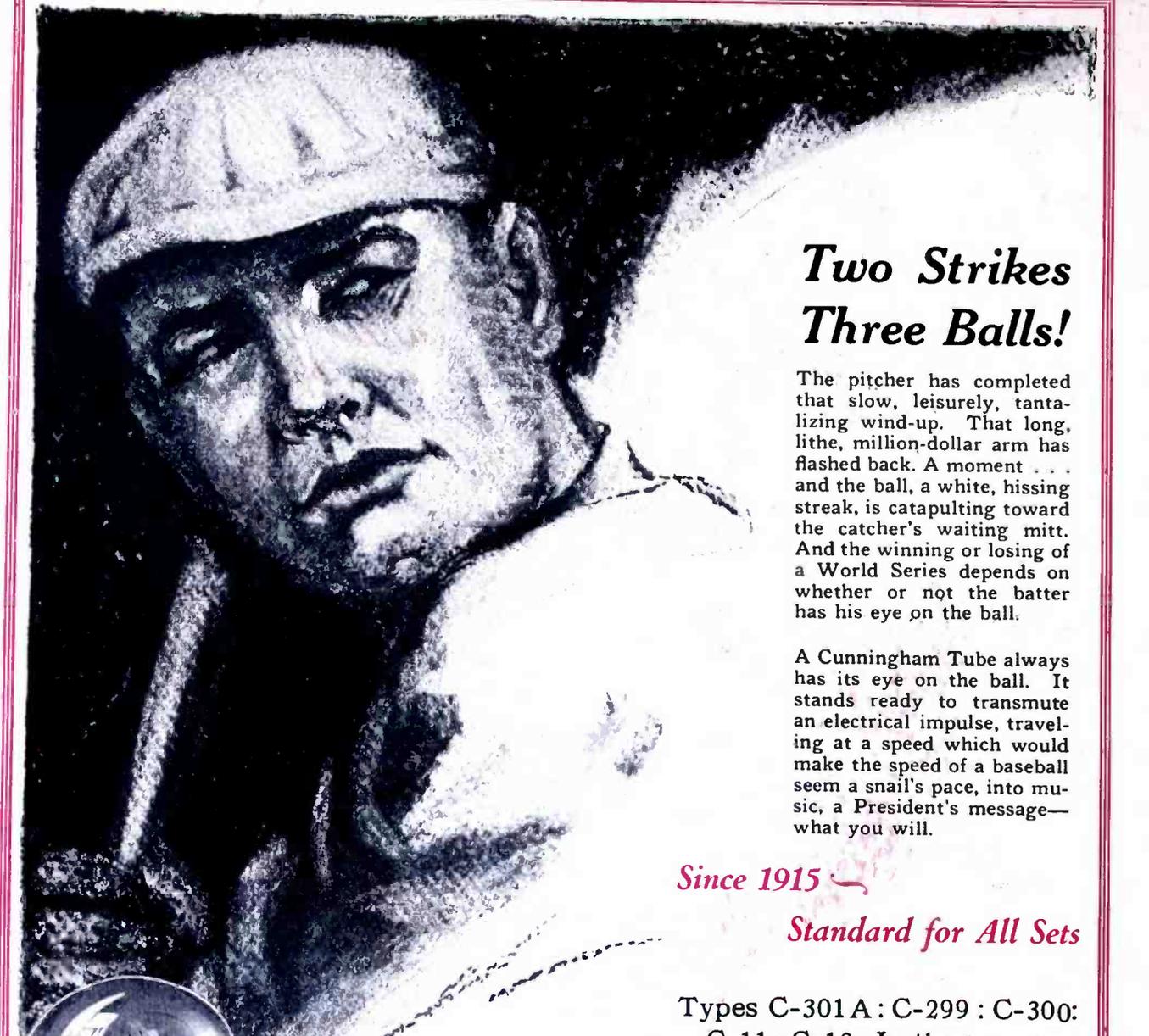
5 CENTS

Wireless Age

The Radio Magazine



50



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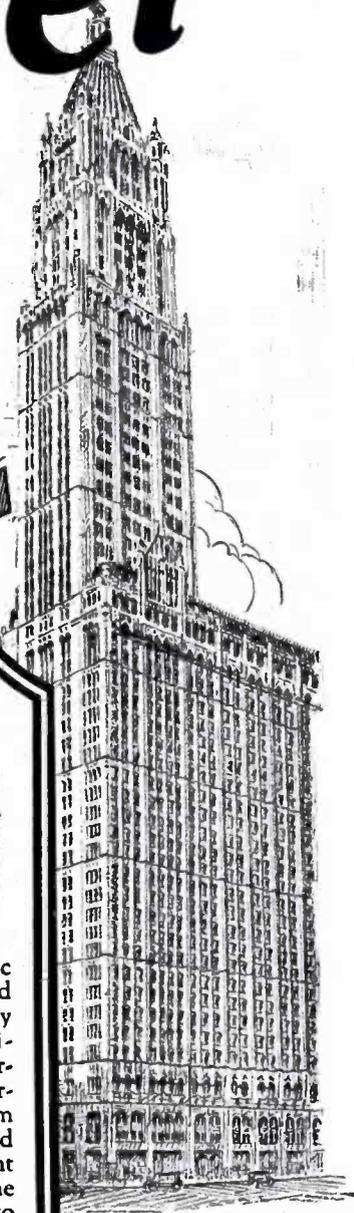
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Wireless Age

The Radio Magazine

Vol. XII

No. 8

May, 1925—Contents

Cover Design, By F. Reed	-	-
Editorial	-	6
London Talks to U. S., By J. Eddy	-	9
Quality and DX with 5-Tubes, By R. A. Bradley	-	12
Horns, By Dr. John P. Minton	-	14
"D-Coil", By K. M. MacIwain	-	17
Ail, By Dr. Max Talmey	-	18
A Real One-Control Receiver, By S. F. Finkelstein	-	20
Cross Word Contest, By Helen F. Dittus	-	22
Aerials, By William F. Crosby	-	23
Low-Loss Coils, By K. M. MacIwain	-	24
Broadcast Impressions, By Ed Randall	-	25
Radio Cabinets, By H. P. Strand	-	26
A Radio Star Interviewed, By J. Addy	-	28
World Wide News, By C. S. Anderson	-	31
Giant Radio Lab., By W. T. Meenam	-	32
Radio Tempers the Tornado, By Albert Laird	-	33
"How-do-you-do?", By Ann Lord	-	34
The Voice from the Cabinet, By Laurie York Erskine	-	36
N.T.G. Speaking: "Ready Boys? Let 'er Go!", By Golda M. Goldman	-	40
Education via Radio, By Mrs. Christine Frederick	-	42
The H. I. in Broadcasting, By Dorothy Brister Stafford	-	44
Mr. T. P. Alley, By Earl Reeves	-	45
KHJ, KFI, KNX, KJR, KGO, KPO, By Dr. Ralph L. Power	-	46
WGR Ensemble, By Lloyd S. Graham	-	48
Television a Reality, By Theo. M. Sowards	-	49
Appliances and Devices	-	50
The Greenland Radio Stations, By O. Lund-Johansen	-	52
Amateur Stations of the United States	-	77
Broadcasting Station Directory	-	79

Your Authors

LAURIE YORK ERSKINE (The Voice From the Cabinet) is the author of the famous "Renfrew" stories. In one year Mr. Erskine wrote "The River Trail" and "The Laughing Rider." He is also the author of "The Confidence Man," "Valor," and "In the Event of Death." "The Voice from the Cabinet" written especially for Wireless Age—The Radio Magazine, is an attempt to do a worth-while short story that has its locale in the living room of any ordinary American home. You will agree that he has succeeded beyond your expectations after reading the story.

ED RANDALL (Broadcast Impressions) is a native of Rancho de los Bollnas y Tomales, Marin Co., Cal. He graduated from California School of Mechanical Arts in 1907 and the College of Mechanics at the University of California in 1912. As civil engineer he had charge of harbor improvement works in Seattle, San Francisco, St. Pedro, San Diego, Galveston, Hampton Roads, Chesapeake Bay, Newark Bay, Plymouth, S. Boston, and as an outstanding caricaturist he has done work for a number of newspapers and magazines, as follows: New York Daily News, New York Evening Globe, Evening World, Yachting, Industrial Digest, Commerce, Finance and Industry, Playthings, Iron Age, Hardware Age, Progressive Grocer, Groceries Retailer, Talking Machine World, and Wireless Age—The Radio Magazine.

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 C. S. Anderson, Managing Editor R. A. Bradley, Technical Editor

Because certain statements and expressions of opinion from correspondents and others, appearing in these columns from time to time may be found to be the subject of controversy in scientific circles and in the courts either now or in the future and to sometimes involve questions of priority of invention and the comparative merits of apparatus employed in wireless signaling, the owners and publishers of this magazine positively and emphatically disclaim any privity or responsibility for any statements of opinion or partisan expression if such should at any time appear herein.

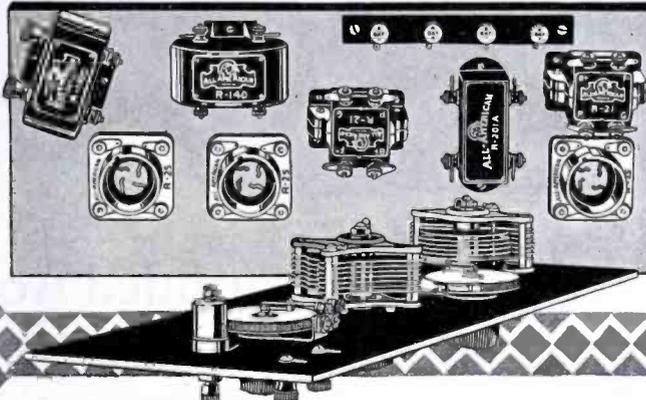
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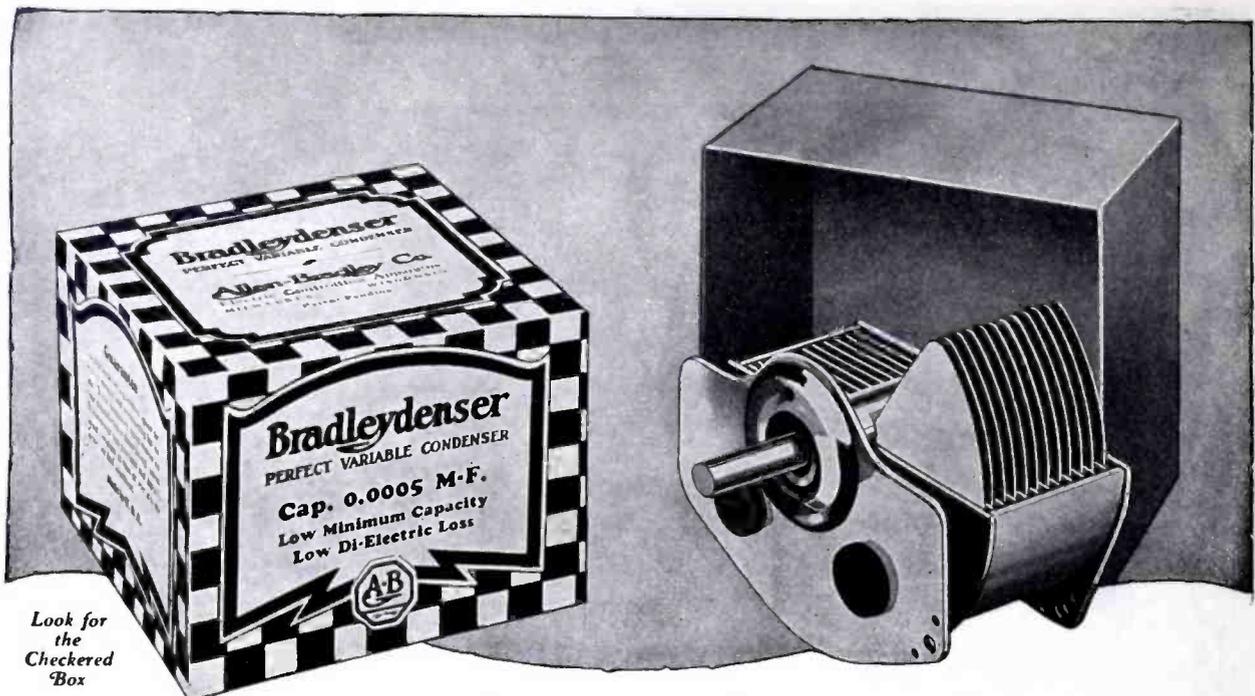
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Look for
the
Checkered
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The Bradleydenser is a low-loss condenser with many distinctive features that insure long life and high efficiency. For instance, the brass stator and rotor plates are soldered at all joints. The plates cannot become loose, corrode at the joints or work out of alignment. The rotor is mounted on a long sleeve bearing that supports the rotor plates without the use of an outer end-plate. Therefore, the di-electric material is reduced to two small buttons. This means low loss and sharp tuning.

The stator plates are protected with a dust cap that can be detached without tools. The minimum capacity is extremely low, and body capacity effects are greatly reduced. The entire design makes for the highest efficiency in radio receivers.

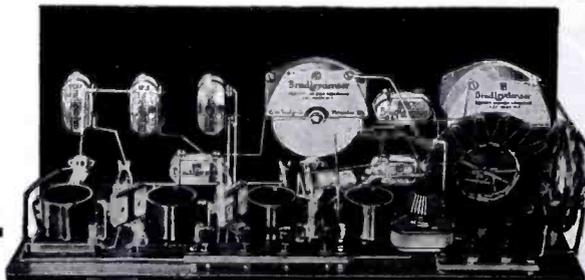
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Editorial Chat

“HELLO America! This is the Hotel Savoy Orchestra broadcasting from 5 Savoy Court, London, England, Station 5XX.” Thus into existence came the first practical, public demonstration of International Radio Broadcasting. And it happened only recently—What will the near future bring? Already there is talk of television and movies by radio, and WIRELESS AGE—The Radio Magazine, this month tells you something about that, but more particularly in “London Talks to U. S.,” does it present the possibilities in International Re-Broadcasts. Step along with the times and inform yourself about this wonderful work.

Radio Fiction

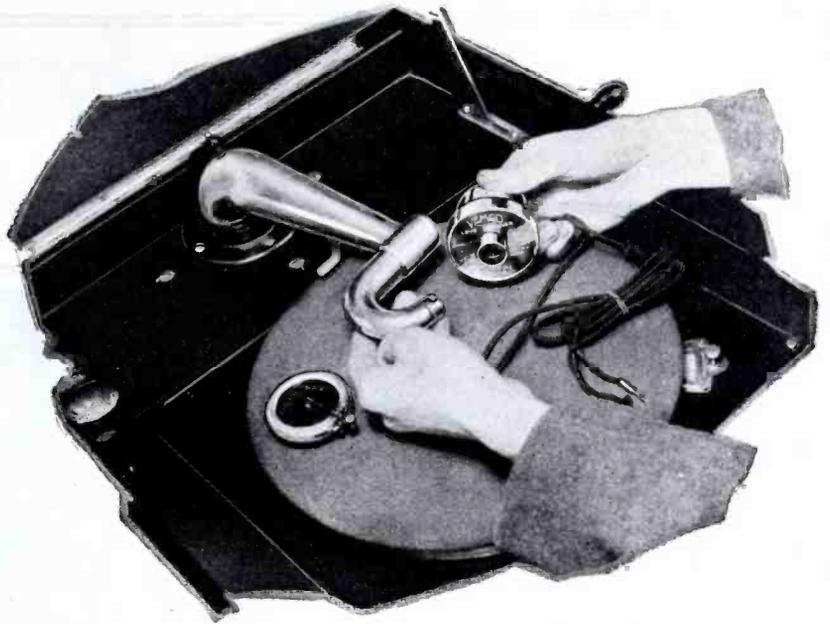
WIRELESS AGE—The Radio Magazine, has created a standard in radio fiction stories—our readers tell us so—this month Laurie York Erskine, well known boy’s adventure story writer, in the “Voice from the Cabinet,” tells you a keenly interesting mystery tale without leaving the comfortable environment of a typical American home—and radio does NOT solve the mystery either.

Serious—Entertaining—Humorous

“Radio Tempers the Tornado,” describes how, in modern days, cataclysms of nature do not entail the suffering and damage that formerly had to be endured. In the recent tornado organized relief measures were effective within less than 24 hours, mainly because of radio—WIRELESS AGE is happy to be able to present this picture. The “How-do-you-Do?” man who conducts by radio, a lost and found service is worthy your attention, and then turn to “N.T.G.” to learn about one of the most popular announcers as determined by public contests and letters. Ed Randall too, in his “Broadcast Impressions” will stir your risibilities and then, for variety, you can turn to “The H. I. in Broadcasting,” which Dorothy Brister Stafford insists you will want to read every month. The Pacific Coast Stations are doing their bit and Dr. Power tells you about it, and Lloyd Graham does the same thing for the WGR ensemble.

Technical

“Loud Speaker Horns” is Dr. Minton’s contribution this month and he tells you all about radiation and reflection. R. A. Bradley’s “Quality DX 5-Tube” set will go big—we’ve heard it work—and he tells you how easy it is to construct. Another “D-Coil” made by one of our readers and what it has done simply bears out our former praise of this receiver. Don’t overlook the “One-Control Receiver,” “Aerials,” “Low-Loss Coils,” “Radio Cabinets” and the WIRELESS AGE regular features. The WIRELESS AGE family is increasing rapidly so don’t fail to keep informed about its activities. —THE EDITOR.



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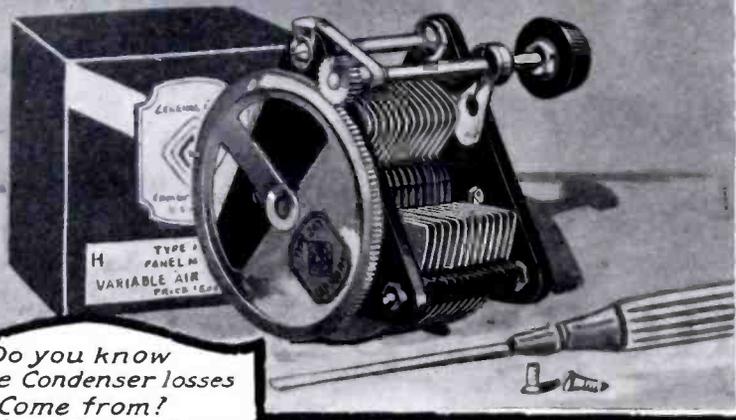
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Come from?*

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Eddy current losses occur in metal end plates and the condenser plates themselves. While not so serious as resistance losses, they increase with the frequency, and therefore should be kept as low as possible.

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The design of General Radio Condensers is based on scientific facts and principles, not on style and fancies.

Specially shaped plates always in perfect alignment give the uniform wave-length variation which permits extremely sharp tuning.

Rotor plates are counterbalanced to make possible accurate dial settings.

In 1915 the General Radio Company introduced to this country the first Low Loss Condenser, and ever since has been the leader in condenser design.

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*Licensed for multiple tuning under Hogan
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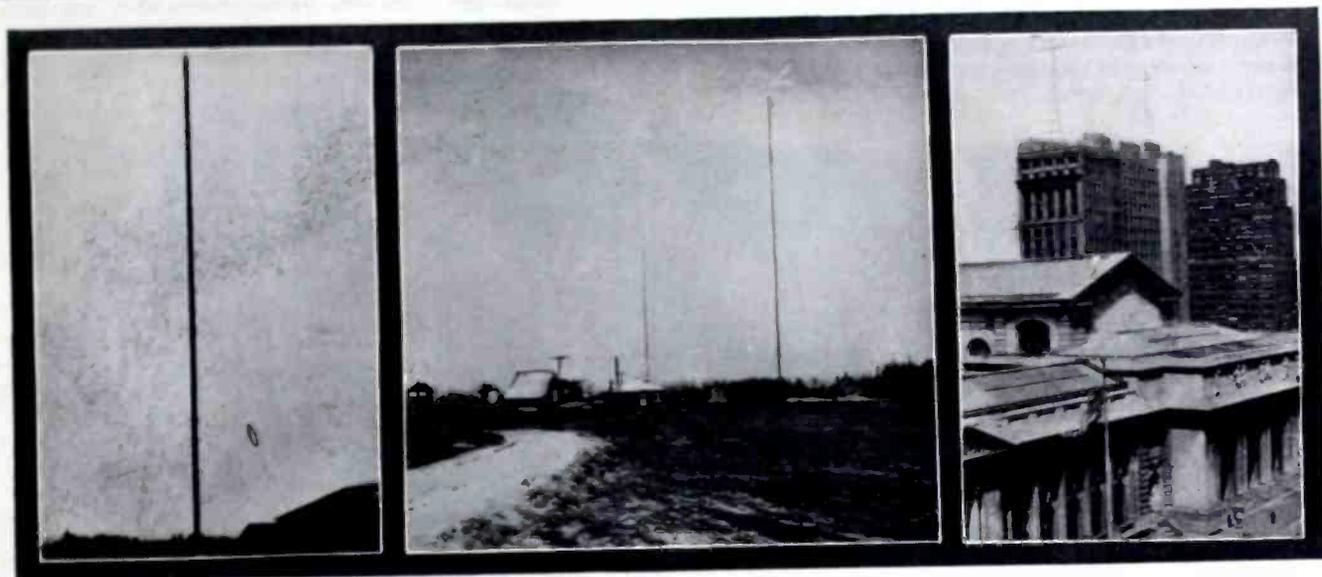
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Quality Parts



The links in the international broadcasting system—antennae of 5XX, England, IXAL, Belfast, Me. and WJZ New York

London Talks to U.S.

International Broadcasting

By J. Eddy

NOW I have been in radio more or less since I was 'knee-high to a grasshopper,' and many is the spinal column thrill I've had out of the game. There was the first radio signal I ever picked up—what if I did have only a piece of two-by-four wound with enamel wire instead of an eight-tube superheterodyne; what if it did turn out to be only the stock ticker in the corner saloon instead of the Brooklyn Navy Yard? The first time there came over home-made coils the faint piping note of the then famous alternator at Nauen, Germany, the first time signal, the first SOS, the first radio telephone signal picked up—back in 1915—always in those days thrills seemed to lie waiting around the corner for that died-in-the-wool radio nut, myself.

Indeed, so fond were my memories of the older days in radio that until recently I was in the habit of exclaiming to such as would listen, "Yes, but to be perfectly honest, old fellow, the

good old radio days are past. You know as well as I that there are too many in the game now. All these high-power broadcasting stations with programs scheduled weeks in advance and everything coldly organized—there's no kick in it any more. The days of thrills are gone!" And, like as not, if the other chap had also been interested in the game as it was in the old days, there followed a sad handshake and silent tears.

The other night—it was Saturday, March 14—the job that had weaned me from radio led me into the broadcasting rooms of WJZ in Aeolian Hall on Forty-second Street, New York. It was the eve of the first serious attempt at transoceanic broadcasting, and WJZ, from Carl Dreher, engineer in charge, down to ebon-hued Alvin, who wears a janitor's uniform and knows more about how a broadcasting station is run than any other man I can think of, was agog with it. In more ways than one there was "something in the air."

What with all six telephones ringing at once, two powerful loud speakers going full blast with the Hotel Savoy Orchestra music announcers in full evening regalia hanging magnificently around with absolutely nothing to do, and even Al busy answering incoming phone calls, I confess that then and there I realized my error—the days when radio could yield me a Big Kick were not gone. Indeed I scarcely exaggerate when I say that to me this story of the instantaneous transfer of music and words from a ballroom in the heart of London to the aerial towers of WJZ, and thence into millions of American homes is as truly romantic as the story of Guglielmo Marconi and the three faint dots that told that the Atlantic Ocean had been spanned without wires to Cape Sable that night back in 1902.

Several months ago the Radio Corporation of America sent a group of young engineers up to Belfast, Maine, and small romance was there in the

proposition for them. It was bleak mid-winter. The company had, up there, an antenna system ten miles long, ordinarily used for the reception of signals in transoceanic radio telegraph work. Waves many thousands of meters long were received, not radiophone, but the dots and dashes in which commercial messages are handled.

These engineers, however, were instructed to see what could be done in the way of reliable reception from the shorter wavelength stations on the

this radio chain. And the Van Cortlandt Park station was linked with WJZ in the heart of New York by a leased wire of the Western Union Telegraph Company, just as Radio 2LO in London and the 25,000-watt station at Chelmsford were tied up by wire.

It was five-forty-five on the evening of the fourteenth and Julius Weinberger and Raymond Guy, radio engi-

and women in evening clothes dining, drinking and dancing, and in the center of it all the silent little black box called a microphone.

With their receiving apparatus tuned to 112 meters, Weinberger and Guy listened for the sounds which were to be picked up at Belfast and re-transmitted. Finally came the faint murmur of a distant voice. Then, unmistakably, the syncopating strains of a jazz band.



The control room of the Radio Corporation of America, station WJZ through which the London programs were rebroadcast to millions via WJZ, WGY and WRC

other side that were transmitting music and speech, in particular the experimental station 5XX of the British Marconi Company at Chelmsford, a town some sixty miles out of London, sending on 1600 meters. The Belfast station was assigned government call letters—IXAL.

IXAL was only a link in the chain that Dr. Alfred N. Goldsmith, Chief Broadcast Engineer of the Radio Corporation of America knew would eventually span the Atlantic with voice and music. Already well-equipped listeners-in on both sides had, by virtue of ingenuity and patience and imagination, picked up recognizable signals from across the ocean, but now plans were being laid for something that would be big enough to benefit the general public.

At the test laboratories of the Radio Corporation of America at Van Cortlandt Park South and Saxon Avenue, New York City, was another link in

neers, were leaning intently over their apparatus in the Van Cortlandt laboratories. The setting sun was casting its last shadows through the haze of an early spring afternoon in New York; in London midnight approached.

As everyone knows today, nightfall brings with it an added power to the faint radio impulses that will often carry them many times farther than during daylight hours.

Already it had been dark six hours on the other side of the Atlantic. Weinberger and Guy, over their assemblage of coils and tubes and condensers, motor generators and switches, visualized a contrasting scene eight hundred miles to the northeast—not a large brick building in a great city, but a little affair on a barren plain near the Maine coast; and, beyond that, three thousand miles to the eastward, another great city, with bright lights and rumbling traffic, somewhere in the midst of it a brilliant ballroom, men

It was now all a question if the operators at IXAL in Belfast, and if Weinberger himself, could tune in the faint sounds loud enough above the crackle of the ever-present atmospheric to be "put on the air" at WJZ. As dusk fell, that is as a larger and larger portion of the intervening Atlantic sank into the darkness of night, the faint sounds grew strong. Soon there could be no question about it. At last the word came from Dr. Goldsmith, the engineer to whom the inception and success of the experiments are attributed—"Go to it!"

It is a few minutes later downtown in the grillroom of the Astor Hotel, Freddie Rich, conductor of one of Broadway's dance orchestras, finished leading his players through a number, bowed in response to the flurry of handclapping, then turned to the broadcast operator in charge of the control unit and microphones by means of which Rich radiates regularly Saturday

nights at six. He demanded, "Haven't I got the air yet?"

"Not yet, Freddie."

Another number was played through. Rich waxed impatient. The operator, with an irritating smile, told him, "They're putting another orchestra on the air!"

"How come?" It was more of an expostulation than a query, for Rich scented a rival.

"The Savoy Hotel Orchestra in London, England, is now broadcasting from WJZ," was the momentous reply; and Freddie was left to console him-

to be concentrated. A barrage of telephone calls over half a dozen trunk lines lent clamorous atmosphere to the occasion. No sooner was a receiver hung up than the bell would be at it again.

"Yes, suh; sho' am one busy evening!" said janitor Al after convincing an excited fan at the other end of a wire that yes indeed it was London, England, he had been listening to. Pulling forth a square yard of handkerchief tinted a dark and dangerous orange Al proceeded to mop his sombre brow.

When Right was told that he was wrong—that the distortion was due to the music's being re-broadcast from London—he seemed to think that a studio attendant was trying to spoof him, and hung up in a huff.

For the millions of listeners within range of WJZ, WGY and WRC the highest moment of the evening came at seven o'clock when "Big Ben" in Westminster Abbey tolled off the English midnight. I don't know much about what they call "showmanship" in broadcasting, but I should certainly like to compliment the Britisher who



The Hotel Savoy Orchestra broadcasting a program from London that was rebroadcast throughout the United States

self with the reflection that distance, especially when there are 3,000 miles of it, lends enchantment.

It did not take New York and environs many minutes to realize that there was certainly something in the air. All over the East families sitting down to dinner in the new American habit of "Radio while you eat" heard out of their loud speakers the startling words:

"Hello America! This is the Hotel Savoy Orchestra broadcasting from 5 Savoy Court, London, England, Station 5XX," followed by recognizable Broadway song hits rendered almost as satisfactorily as Freddie Rich himself could have done.

From six o'clock until seven-forty the re-broadcasting continued.

Up at WJZ where one might have supposed there was nothing much going on save the movement of a number of invisible ions inside of vacuum tubes and the rotation of a motor generator or two, the excitement of the entire broadcast-listening fraternity seemed

"Some ob de gol darn fyoolishest questions what they asks me!" he complained. "Nor that ain't all. One ol' dame say she know Mayor Hylan an' is gwine come up heah an' hev me discharged caze I didn't not put in the newspapers 's how I was agwine to broadcast London!" Affairs weighed heavily on Al's shoulders.

Just then both telephones in the reception anteroom started clanging. Keith McCloud, the well-known pianist and musical director at WJZ, was going over an act with two broadcast artists. The popular "A. O. N." was very busy borrowing a match to light a cigarette he had just borrowed. Picking up a receiver I heard:

"Hello, hello! WJZ? Is that WJZ? . . ."

"Well, now, listen, WJZ; I am Mr. Right. Get me? Right! Now I have such and such a set and I tune in on you people every night. Now I just want to put you wise to something—your apparatus is on the blink. The music isn't as clear as usual—"

had this idea of putting a microphone in the belfry of that famous edifice at the city end of London Bridge.

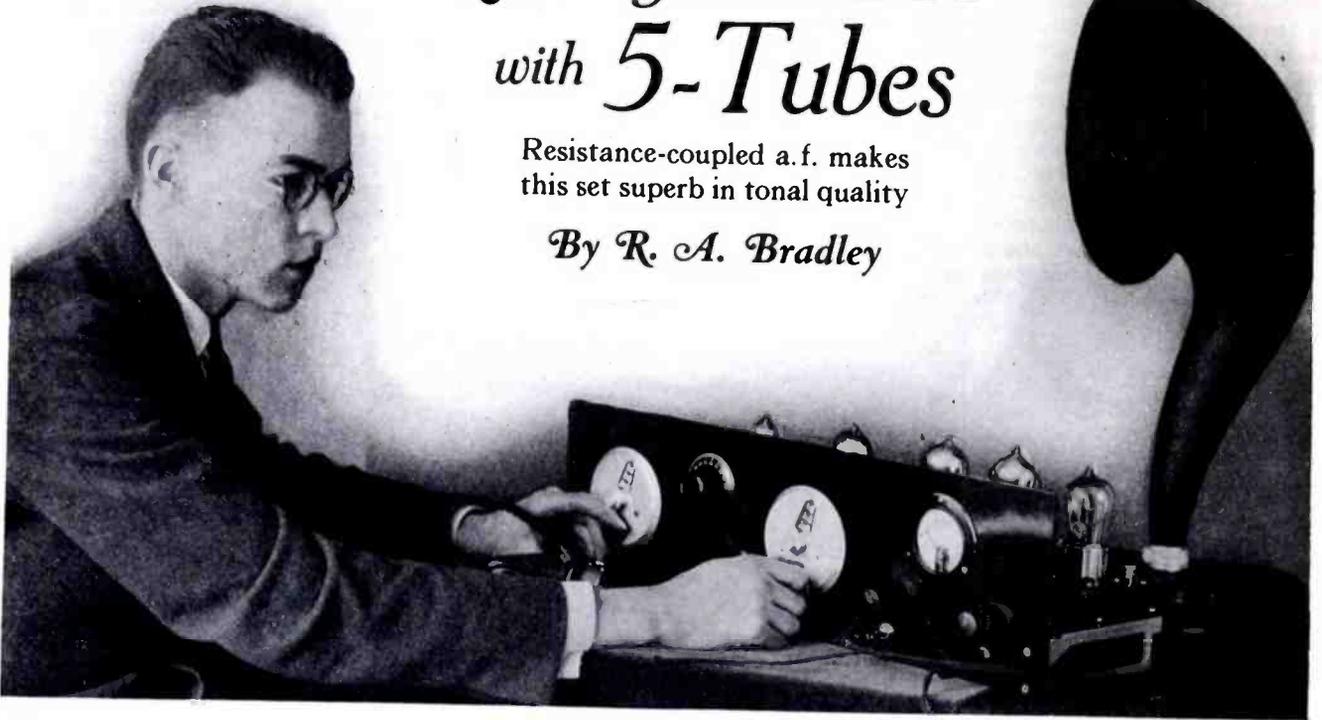
It tolled off the end of an epochal day in radio, and, I am ready to believe, in the history of relations between the English-speaking nations.

When the genius of our radio engineers has brought the two sides of the Atlantic into nightly contact so that the cultural ideas of either are available in the millions of homes of both by the simple process of switching on radio tubes, then there will remain small room for misunderstanding and discord. True, such a vast amount of research remains to be done before international broadcasting can be perfected that the men who conducted this first thorough test are loath to predict the length of time it will take. But it is not too much to expect that European concerts in Mid-Western homes and Chicago dance music in Riviera villas will be common-place occurrences before two more years pass by and that will mean cultural changes too.

Quality and DX with 5-Tubes

Resistance-coupled a.f. makes
this set superb in tonal quality

By R. A. Bradley



ONE can't delve far into radio receiver development without coming to the conclusion that tuned radio frequency must be used for knife-like separation of stations and a lower static-signal ratio, and that regeneration applied to the detector tube is the only way to obtain the ultimate in sensitivity. To combine them means employing tuning units of careful design to secure successful operation while those of careless design will give troublesome instability.

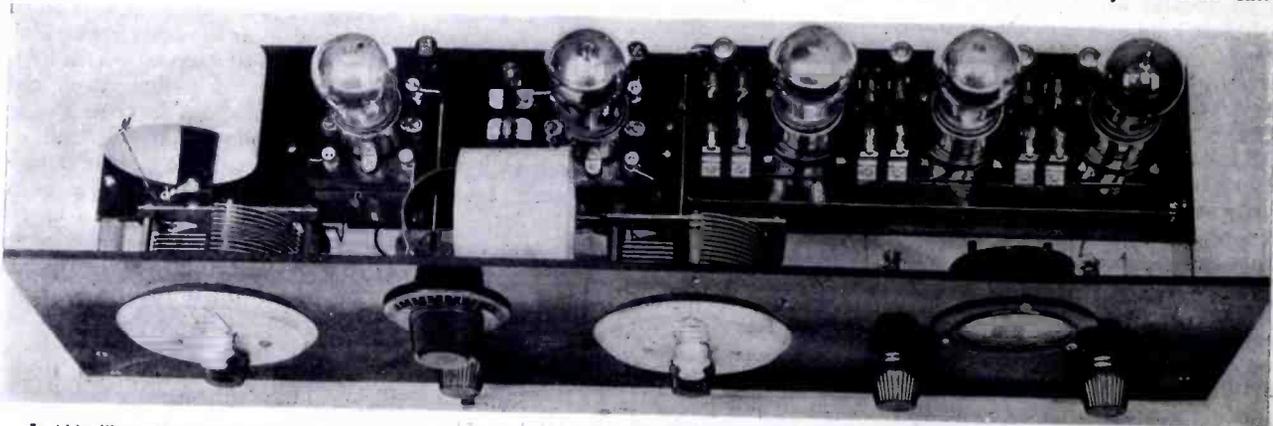
In the December issue we presented a receiver which proved to be almost as popular and as efficient as the now nationally known "D-Coil." This set incorporated the radio frequency stage ahead of a regenerative detector and was in reality a "DX-Go-Getter." It certainly brought in the far-away stations in fine shape.

We have here a receiver very much like the DX-Go-Getter which we have designed, constructed, torn down and rebuilt, until now in its finished form, it is a set certainly to be proud of. The tuning units are so designed that the set is easily made stable over the entire broadcasting range and this stability remains constant and is entirely independent of the regenerative detector and its tickler feedback, which is essential to the set's correct operation.

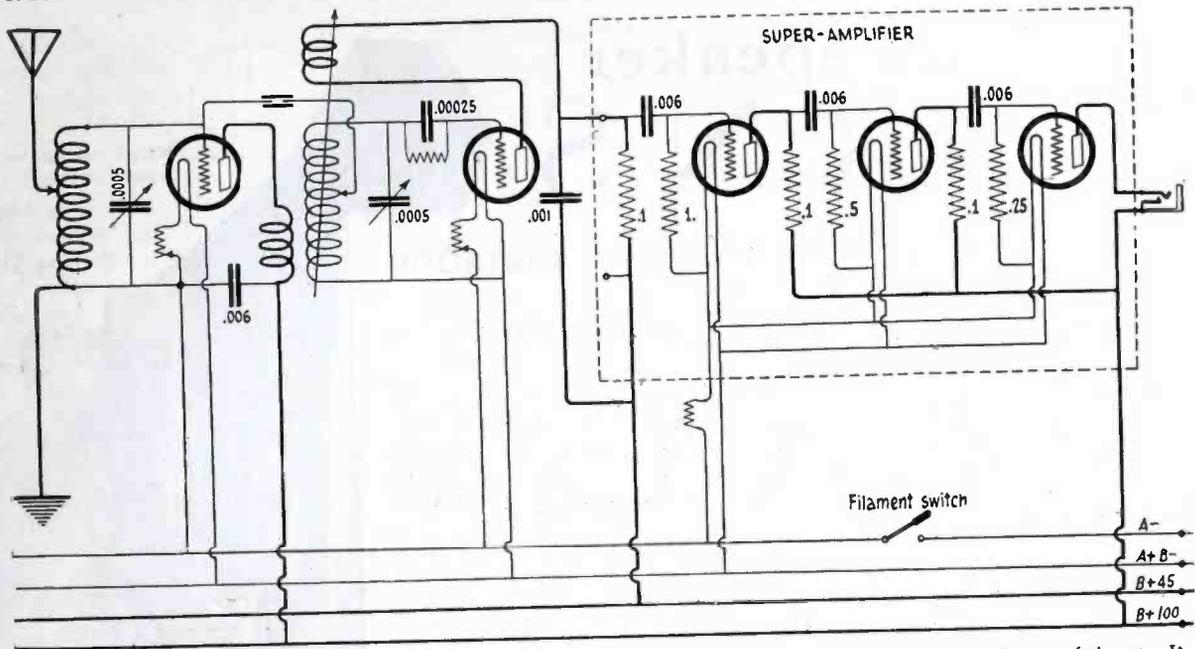
The tuning units which include the antenna tuning coil and the detector coupler unit are very novel in their construction and likewise very efficient. These coils are wound in a plain solenoid form from which all dielectric has been removed and the coil supported by two thin Bakelite strips. The coils are not doped with varnish,

but a moisture-proof cellulose compound which renders the finished coil very strong and does not materially add to the very low distributed capacity of the winding. These coils are so placed in the receiver that there is no mechanical coupling between them, thus preventing any feedback between the radio frequency stage and the detector. The slight capacitive coupling inherent in the tube base, elements and socket is easily counteracted by a small neutralizing condenser which once adjusted can be forgotten.

One outstanding characteristic of this receiver is its superb tonal quality obtained by the use of the super-amplifier, a three stage resistance coupled audio frequency amplifier in one unit, which is placed on the sub-panel. The amplification secured with this type of amplifier is certainly all that can be



In this illustration only two or three connecting wires are visible. All leads carrying radio-frequency currents are run above the sub-panel and all A and B battery leads are run beneath.



The Super-amplifier is shown in this diagram surrounded by dotted lines. See what few connections there are to the rest of the set. It means merely connecting up a two-tube receiver

asked and the reproduction is perfect. It is economical in B battery consumption and its only disadvantage, if it could be called such, is the necessity for a third tube.

Tuning this receiver is much simpler than the conventional three-dial tuned R.F. receiver as we do not know of anyone with the necessary three hands for the proper manipulation of this latter type of receiving set. The two condensers are tuned to nearly the same dial setting and the tickler is adjusted only for bringing up volume, a procedure which, of course, follows the immediate tuning-in of the station. The tickler setting remains fairly constant throughout the entire waveband showing unusual care in the design of this coil alone. Volume can be controlled to a great extent by the tickler. When this proves insufficient the rheostat controlling the resistance-coupled amplifier can be turned down for less volume. But this is not to be espe-

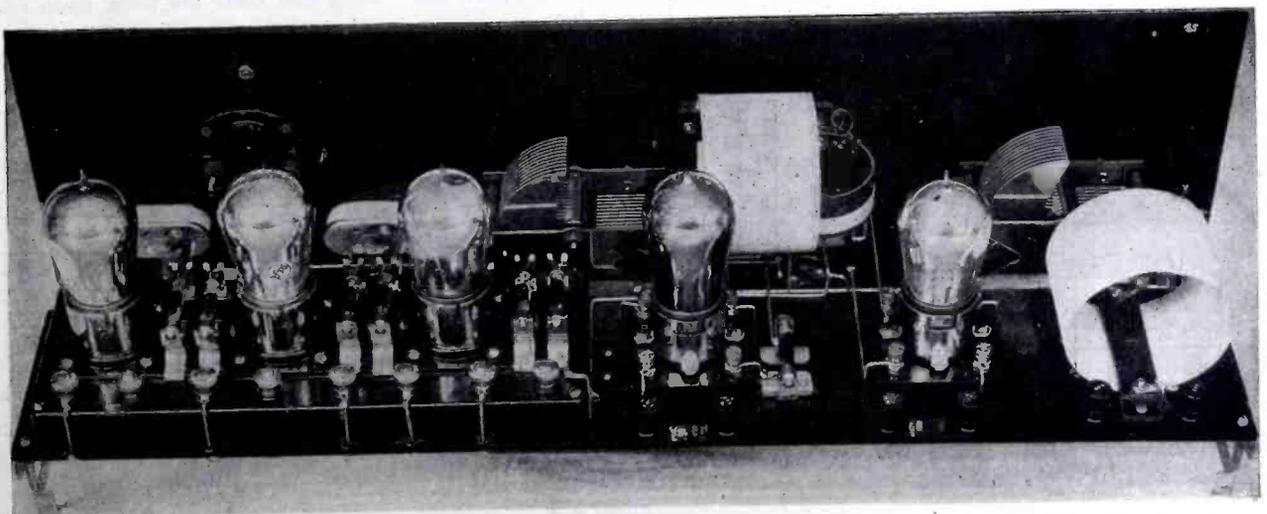
LIST OF MATERIALS

- One Silver Antenna Inductance Coil
- One Silver Detector Coupler
- Two Silver .0005 mfd. variable condensers
- One Daven Super-Amplifier complete.
- Two Ultravernier Dials
- One 0-15 Jewell Voltmeter
- One Knob for tickler control
- Two Howard Standard Sockets
- Three Bradleystats
- One Bradley switch for filament control
- Two Pacent filament lighting jacks
- One Neutralizing condenser
- One .001 mfd. Dubilier fixed condenser.
- One .00025 mfd. Dubilier fixed condenser
- One .006 mfd. Dubilier fixed condenser
- One 4 megohm Daven Grid leak
- Six Eby binding posts
- Two Benjamin Panel brackets
- One 7 x 24 Radion Panel
- One 4 1/4 x 24 Radion Sub-Panel

cially recommended as it is advisable to burn the tubes at the voltage rating where they seem to operate best, which is the whole reason for including the accurate reading voltmeter in the set. This is a Jewel Voltmeter reading from 0 to 15 volts. It would perhaps be better to have a scale reading of 0 to 7.5 so that finer graduations might be had in the vicinity of 5 volts, where the tubes generally operate best. The UV-201A's, which we used in the resistance-coupled amplifier, we found gave best results at 4.25 volts—three-quarters of a volt below the rating of the manufacturer.

Under-burning your tubes like this considerably lengthens their lives. The positive lead of the A battery runs directly to one side of the voltmeter, and to the other terminal is fastened a flexible lead, with a spring clip attached, so that the voltage across any individual tube may be had at any

(Turn to page 30)



The battery connections to the receiver are made to the binding posts on the sub-panel, not to those on the amplifier. These latter posts are connected to the battery leads running under the sub-panel

Loud speaker HORNS

Characteristics of reflection and radiation

By Dr. John P. Minton

IN OUR preceding article we discussed the acoustical performance of straight pipes; described the method of testing loud speakers with great precision, and discussed the acoustical characteristics of straight conical horns. We saw that straight pipes are very efficient resonators and within certain narrow frequency limits, corresponding to the fundamental tone, these pipes sometimes may increase the sound energy ten thousand times. Outside these narrow frequency-bands no increase in sound energy is brought about by the pipes. For these two reasons alone straight cylindrical pipes are wholly unsatisfactory for a loud speaker horn.

Horns of many varied shapes have been designed and any one of these is better than a straight pipe for a loud speaker. One reason for this is that horns have less pronounced resonant properties than pipes. If the reader will recall the heights of the most prominent peaks of the curves shown in the last article, he will see that in no case do these heights extend to more than three or four times the heights of the adjacent minima. "Three or four" is a long ways from "25 to a 100" as observed for pipes. Consequently, horns will give a more uniform response at the various frequencies than pipes will and for radio reproduction are, therefore, superior to pipes.

Between the horn peaks, the response caused by the horn exceeds greatly that caused by straight pipes.

This is shown by the curves in the preceding paper. This is another reason why horns give a more uniform response than pipes and are more satisfactory for radio reception than the latter.

We saw in our last article that sound is reflected from the opened end of a pipe or horn back into these sound devices. Because of this phenomenon of end reflection resonance is built up which increases the total sound intensity. However, reflection of sound back into the pipe or horn tends to prevent the escape or radiation of this sound out into the surrounding space. If this reflection could be entirely eliminated or avoided, then more sound would escape into the outside air. Such a horn would be a good radiator, so to speak, of sound energy. What is lost by the absence or diminution of resonance is regained pretty largely by increased radiation, as we call it. Let us give some curves for loud speakers which have straight conical horns in order to see the significance of these two factors; viz., resonance and radiation.

In figure 1 are shown four curves for horns one foot long, but with final openings of different sizes. The initial opening in each case was $\frac{5}{8}$ of an inch. These final openings, as indicated in the figure, varied from $2\frac{1}{2}$ to 8 inches. The reflection of sound back into the horns from their large ends was greatest for the smallest horn and least for the largest horn. Consequently, resonance will be most pro-

nounced with the smallest horn and least with largest horn. On the other hand, the radiation of sound should be least for the smallest horn and most for the largest horn. Large sound radiation means no sharp peaks in these response curves, while small sound radiation (and therefore strong resonance) means sharp peaks.

Let me say, parenthetically, that both the diaphragm and horn peaks show up in these curves. If a horn and diaphragm peak should by chance be at the same frequency, then the sound would be unusually loud at this particular frequency. This would prove unpleasant and we always avoid this where possible to do so. We observe that there are three main resonant regions in connection with the fourth curve (d) in figure 1. These

Dr. Minton testing loud speaker horns

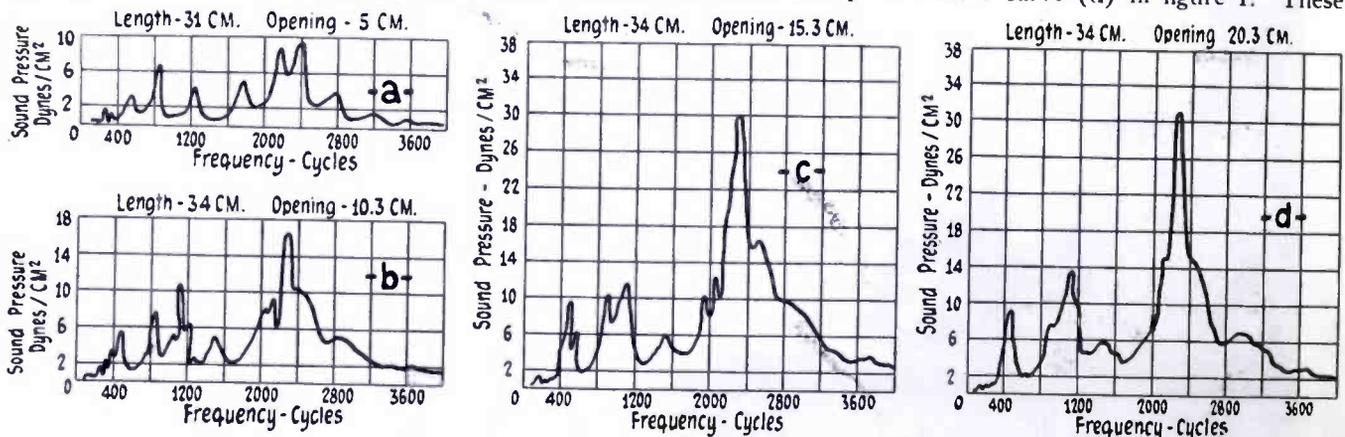


Figure 1

are at 500, 1100 and 2300 cycles and they are due to the diaphragm. In fact, there is so little reflection from so large an opening that resonance cannot build up. Hence, there are no horn peaks at all, which shows that a loud speaker need not necessarily have the so-called "horn-resonance." Writers are incorrect in their statements that horns are objectionable because of resonance, if they mean all horns. The diaphragm peaks, as explained in our March installment are due to different modes of vibration. The three mentioned above, which show up in these curves, are first, the fundamental node, second, one nodal diameter and third, one nodal circle as illustrated in figure 2.

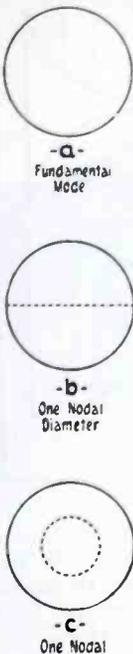


Figure 2

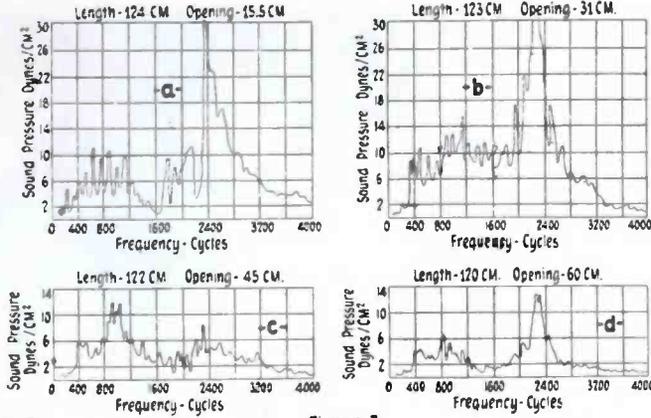


Figure 3

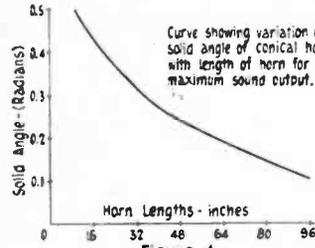


Figure 4

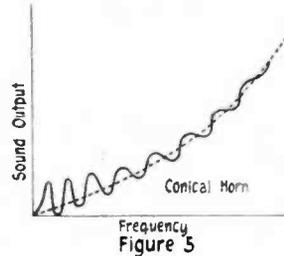


Figure 5

Now, if we observe closely the curves shown in figure 1, we can observe just these things mentioned. The small horn shows sharp peaks while the big horn shows small, negligible, horn peaks. The sound output from the two intermediate sizes is greater than that from the two extreme sizes. That is, these two factors, resonance and radiation, when exerting their united influence give the maximum total sound output at the intermediate sizes. Hence, there is an optimum size, or solid angle, as we call it, for which the sound output averaged for all the various frequencies is a maximum. This is an important law in loud speaker design and its establishment was of much benefit.

We also established another important law in connection with these tests on conical horns. A comparison of the curves for the four-foot horns shown in figure 3 with those for the one-foot horns (figure 1) illustrates this second law. We first compare the curves shown in figure 3 and see that the horns with the 6-inch and 24-inch openings are less efficient for loud speaker horns than the two intermediate sizes. Hence, there is an optimum solid angle for this group of four-foot horns. We find that the longer the horns, the less is this solid angle. In fact, if we select the optimum size for each of the various lengths, we

find that the solid angle gets smaller and smaller as the lengths increase. The exact relationship is shown by the curve in figure 4. By means of the acoustical law represented by this curve we can specify the solid angle for best acoustical results for any length of conical horn we choose to use. You may be interested to know that this is the first time such a curve has ever been published and the reader is obtaining the most recent results of our research in this group of articles.

We not only can determine the optimum angle for any given length, but we can also determine the optimum length for a conical horn from our curves. In other words, we have de-

termined completely the physical constants which are necessary for us to design a conical horn which will give better results than any other conical horn, no matter what its shape or solid angle may be. The layman can comprehend the significance of such a statement for it removes all elements of uncertainty in our work and assures the purchaser of the best possible horn of this type. This optimum horn has a length of five or six feet and a final opening whose diameter is 12 to 15 inches.

I presume the reader would like to know why such a long horn is required. The

answer to this question is simple enough to comprehend, but perhaps not quite so easily arrived at. Hence, we give here the result of the reasoning we went through to get the conclusion. The sound radiated by a loud speaker unit along a conical horn, which extends so far from the unit that no sound energy is ever reflected back into the horn, becomes more and more the smaller the solid angle of the cone. If, however, we make the angle too small and the neck too narrow, this law is broken down and the radiation becomes less for further decrease in the solid angle. Having now settled on the solid angle for a very, very long horn, we must cut it off at some point where there will be enough reflection from the large end to build up resonance and thus further intensify the sound. This opening is found to be from 12 to 15 inches and the solid angle such as to give a horn length of about five or six feet. Both larger and smaller openings for this length will produce less sound output—the former because of insufficient reflection and the latter because of too great a reflection.

I don't say, of course, that a straight conical horn of the dimensions stated above for the optimum sound output is the best horn. All I say is that it will give the largest sound energy when averaged over the entire frequency range. If we are more interested in quality than in loudness, then we must take unusual precautions and exercise

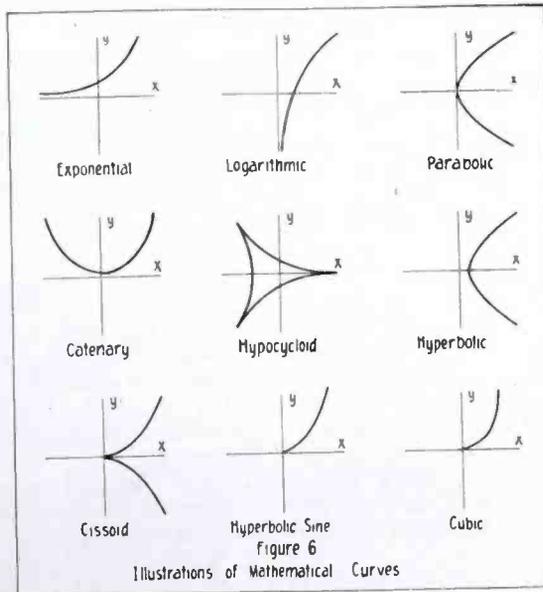


Figure 6
Illustrations of Mathematical Curves

our ingenuity to produce a horn which will eliminate resonance or at least cut it down to a negligible factor. Then, for this resonance we substitute a maximum amount of radiation obtainable. To secure this condition the writer must refer the reader to his article on "The Performance and Theory of Loud Speaker Horns," August, 1924 issue Proceedings of the Institute of Radio Engineers.

I believe the theory of this phase of our subject is too complicated to be understandable by the average reader. However, in figure 5 are two curves. The dotted curve represents the sound radiation at various frequencies along a straight conical horn. The solid curve represents how the radiation curve is modified by the presence of horn resonance. When we remember, as stated in our April contribution, that the ideal curve for a loud speaker is a straight horizontal line it is evident that even the pure radiation loud speaker is not perfect, although it is superior to one with marked resonance. It must be perfectly clear to any one, who has read these articles, that the advancements we have made in the art of loud speaker production has come about after a considerable amount of scientific study and experimentation.

Before passing on to consider other shapes of loud speaker horns it is worth while to recall to memory that theoretically the loud speaker horn peaks should occur at regularly spaced frequency intervals. The peaks should be larger over the initial or low frequency register than over the higher register. That is, the ratio of maxima to adjacent minima should be larger over the range covered by the fundamental and the first few overtones than for the higher region. This ratio may be as high as three or four for the region of the fundamental, but it should approach unity (1) for the higher frequencies. A reference to the curves shown in figures 1 and 3 will show both of these effects quite clearly. For example, in the case of the four-foot horn, the peaks should be about 135 cycles apart. This is seen to fit the experimental curves nicely. Furthermore the peaks should be located at about 200 cycles, 335, 470, 605, 740, 875, 1,010, etc., cycles. That is, each succeeding peak is ob-

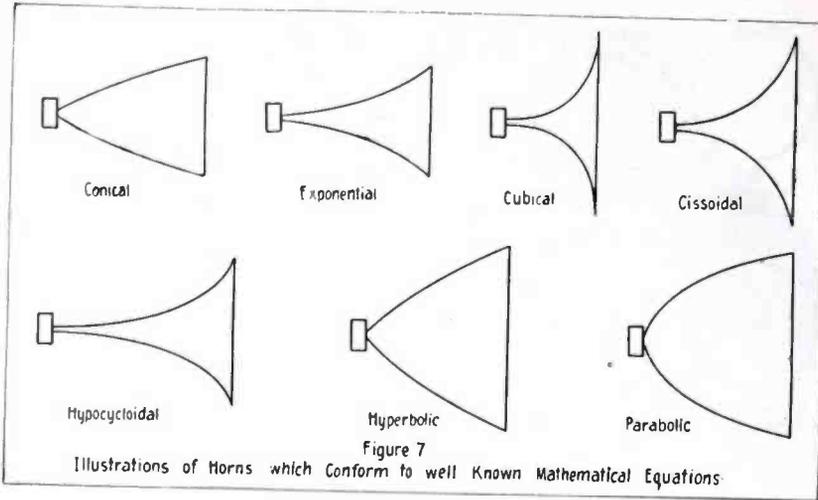
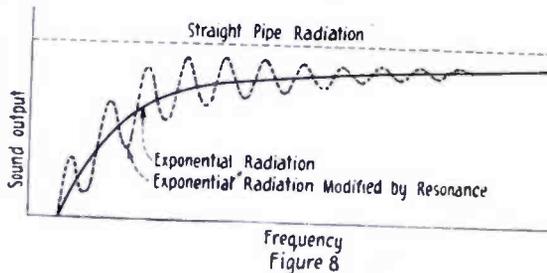


Figure 7
Illustrations of Horns which Conform to well Known Mathematical Equations

tained by adding 135 to the preceding one. The experimental facts fit very nicely these theoretical predictions. This theoretical law can be applied quite accurately to any loud speaker horn and we can predict with much certainty its actual acoustical performance without even resorting to any tests, whatever. This is a valuable asset, of course, for it saves much valuable time and effort.

Let us, now, go over to a consideration of horns of other shapes.

In mathematics we have certain well known curves to which names have been given for purpose of identification. Here is a list of some of them: Exponential, parabolic, hyperbolic, logarithmic, sine, cosine, tangent, cotangent, catenary, cycloid, square, cubical, trochoid, etc., etc.



In figure 6 are shown a group of these curves. They follow, or are determined by certain, well defined mathematical equations. When applied to a loud speaker horn, these laws determine the manner in which the area changes as we advance from the small end to the large end of the horn. The sketches shown in figure 7 illustrate cross sectional views of some of the horns as they would appear if constructed in accordance with these laws. These shapes are very interesting and the results obtained with some of them, I imagine, would be highly stimulating to the imagination.

In our work, of course, we should

preferably deal with shapes such as here illustrated in order that we may have a mathematical basis upon which to study the results. Other shapes can be studied but no doubt those represented by well known mathematical laws will give results which are interpretable and, no doubt, their performance will be as good as (and probably better than) that for any of the unknown "guessed at" shapes.

The first of these horns to be considered will be the exponential one. In the photograph shown herewith an exponential horn is seen at the top of the picture. Its cross sectional shape is hexagonal, made so for the purpose of ease of construction. For this reason we coined the word "Hexponential" to identify it, although the word does not describe it. These exponential horns have been used for several years past, but the theory of their performance has only recently been worked out by the writer and independently by Dr. Slepian and Mr. Hanna of the Westinghouse Electric and Manufacturing Co. The results of the labors of these last two authors are published in the 1924 Proceedings of the American Institute of Electrical Engineers, while the results of the writer were published in the 1924 Proceedings of the Institute of Radio Engineers.

The radiation of sound from an exponential horn follows a different kind of a law than that for a conical horn. This is to be expected for their shapes are quite different, as is shown in the photograph where a large exponential horn is shown at the top and a long conical horn is shown to the left of the writer's picture. In the case of the exponential horn, the radiation of sound at the various pitches is indicated in figure 8 by the solid curve. The horn will not radiate any sound energy at all below a certain definite frequency. This frequency is known as the cut-off frequency for the horn and is indicated by the point, f. It was shown by the dotted curve in figure 5, that the conical horn continued to radiate sound down to zero frequency where it ceased to radiate, naturally. Below the cut-off frequency, then, of an exponential horn the conical one is a superior radiator and the intensity of the low frequency

(Turn to page 66)



“D- COIL”

Here's a commendable layout of this remarkable WIRELESS AGE Receiver

By *K. M. MacIlvain*

I sent him a circuit diagram of the direct coupled radio-frequency type of receiver using “D”-Coils.

Then he went ahead and constructed the set, allocating the apparatus in the way that he thought was most efficient as well as artistic, and I must say that it is the best “D”-Coil layout that I have seen to date.

The panel lay-out in particular is very good. Three of the large dials are located on the shafts of the tuning condensers. One of the large dials is on the shaft of a .00025 mfd. variable condenser which is used as a blocking condenser in the second stage of radio-frequency amplification. Making this condenser a variable element in the circuit lends a little more flexibility to adjustments. This tuning dial is the second from the right.

The three smaller dials in the center of the panel are on the shafts of

the filament control rheostats. One is in the detector circuit, another in the radio-frequency amplifier circuit, and the third is in the filament circuit of the audio-frequency amplifier tubes.

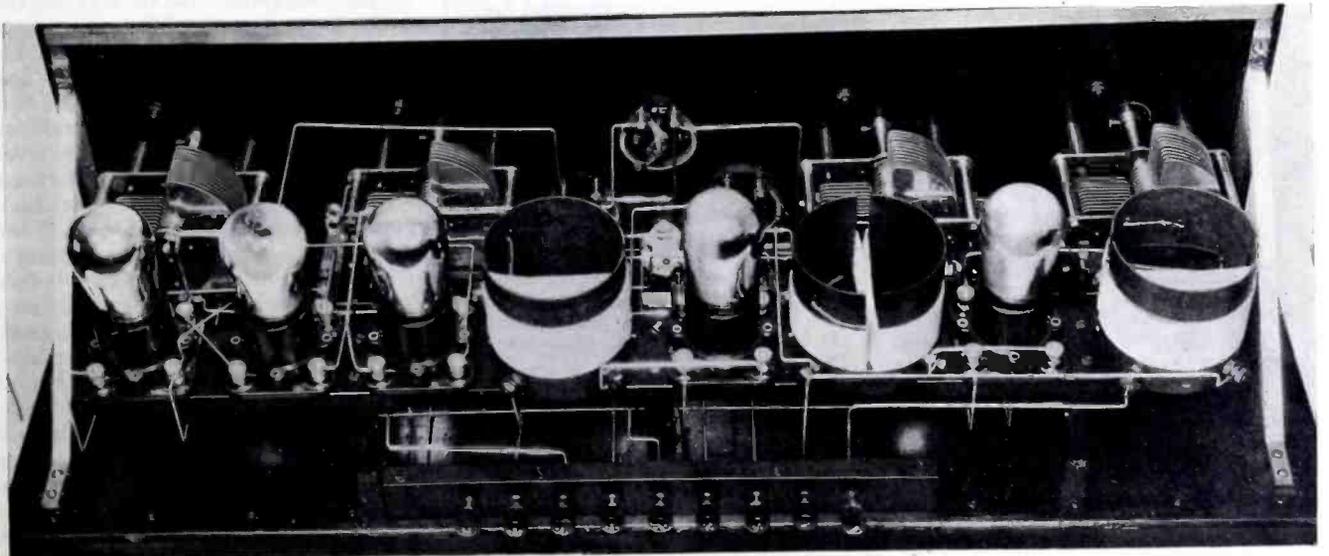
The little pilot lamp that you see in the center of the group of filament control dials is connected across the filament supply leads and gives you a visible indication of the fact that the tubes are turned on. This is simply a flashlight bulb inserted in a socket behind the panel and a suitable resistance is connected in series with it to limit the current through it so that it won't burn out too quickly.

This is a very appropriate element in a receiving set, because there are many instances where the set may be tuned to a particular station and the operator of the set may leave the room for a few minutes.

(Turn to page 30)

THE accompanying pictures are of a “D”-Coil Receiver that was constructed by Professor E. B. Rollins of the Tufts College Engineering department, Tufts College, Mass.

Some time ago my old friend and instructor wrote me that he would like to build a “D”-Coil Receiver and asked me if I would send him a schematic diagram showing the latest developments in this popular circuit.



Rear view of Professor E. B. Rollins' “D-Coil” receiver

AIL

The relationship
of Ilo to the In-
ternational Lan-
guage Problem

By Dr. Max Talmey

Much correspondence has brought out the fact that there is a widespread desire among radio fans to decide the merits of Ilo for themselves. They can only do this by being told what will be done with this Auxiliary International Language if it becomes recognized among radio societies as the only growing auxiliary language.

The argument which has hitherto appealed to a majority of radio clubs, has been "has this or that scheme a majority of radio users in its favor"? This is now being displaced—after news of the refusal of the English Radio Club convention to adopt Dr. Zamenhof's scheme—by a new standard. This standard requires exactness of expression, ability to follow European languages closely in translation and the spirit to take the amateur into its confidence by forming new expressions.

It is well illustrated by the fact that Dr. Talmey as Hon. President of the North American International Language Society which has reserved the right to work out new Ilo words when needed, without permission from the central "Academy" in Europe—has enriched the language with more than 200 words and prefixes. These are not official and need only be tried out by the amateur.

No period of stability—where discussion is interdicted—will help transoceanic radio code or speech. The international word "brodkastar" is a good illustration of this. It was used, because it is needed. There are synonyms developed by O. C. Koos and radio amateurs in Europe, but these only enrich the language.

Our readers will soon be able to decide whether improvement or standardization on forms, offers the best ultimate solution of a logical, rich and simple A. I. L.

Dr. Talmey and Dr. Koopman, Librarian of Brown University, are both Honorary Presidents of the "N. A. I. L. S." and have enlisted linguistic educators in Columbia, N. Y. U. and Harvard in support of the new A. I. L. features.—EDITORS.

IT HAS been mentioned in our preceding article on the Auxiliary International Language (AIL) that all solutions of the International Language problem, particularly the projects of Dr. Zamenhof and of Ido, were deemed unfit for the role of the AIL by the Committee of the Delegation. Its preliminary decision read as follows (Compte rendu, pp. 25-26):

"The Committee has decided that none of the languages submitted for examination can be adopted with modification. . . . It has named a Permanent Commission with the task of studying and fixing the details of the language which will be adopted."

Reasons of expediency, however, induced the Committee to give to the final decision a wording apparently favorable to Dr. Zamenhof's project which was "adopted in principle under the reserve of modifications to be executed in the sense defined by the report of the secretaries and by the project of Ido." (Compte rendu, p. 26).

Those wise enough were not misled by this decision. For "adoption in principle" is merely a polite form of rejection, which, in this case, had been made even stronger by explicitly adding that "modifications in a certain sense" would be executed. Through "modifications" an object may be created in which one would look in vain for traits of the one "adopted in principle."

Language inventors up to 1907

Fred Smith, studio director of WLW, broadcasting one of a series of Ilo lessons



knew very little about the logical principles which must prevail in the construction of the AIL and which we shall treat more in detail in a future article. This is the reason why their devices could not withstand scrutiny, but failed in spite of initial practical successes when criticism was brought to bear upon them. The Permanent Commission,

however, was well informed about those principles and applied them strictly in carrying out the task entrusted to it. Since it also resorted to extensive and radical "modifications," the result of its labors, the Language of the Delegation (LD), was an entirely new system differing greatly from all preceding solutions of the International Language problem and from its faulty basis, the projects of Zamenhof and of Ido. The combined painstaking work, extending over many years, of a number of serious able students of the International Language problem, such as Dr. L. Couturat, Paul de Janko, B. Joenssen, Prof. O. Jespersen, Prof. L. Pfaundler, Dr. Ignatz Hermann, the writer's humble self and others, has gradually developed the present Ilo out of that system; "removing" (see below) it still further from those projects.

Nobody has ever maintained that Ilo is reformed Solresol, Nov-Latin, Volapük, etc. But well-meaning Ilists themselves, concerned chiefly about the propaganda for Ilo, often assert that the latter is the simplification of Dr.

Ilo Lessons Broadcast

DURING the fall of 1924 WLW of the Crosley Radio Corporation promoted an eight-week course of lessons in the international language, Ilo. Fred Smith, studio director of WLW, conducted the classes. Some 450 students enrolled. It is safe to say that many thousands listened regularly.

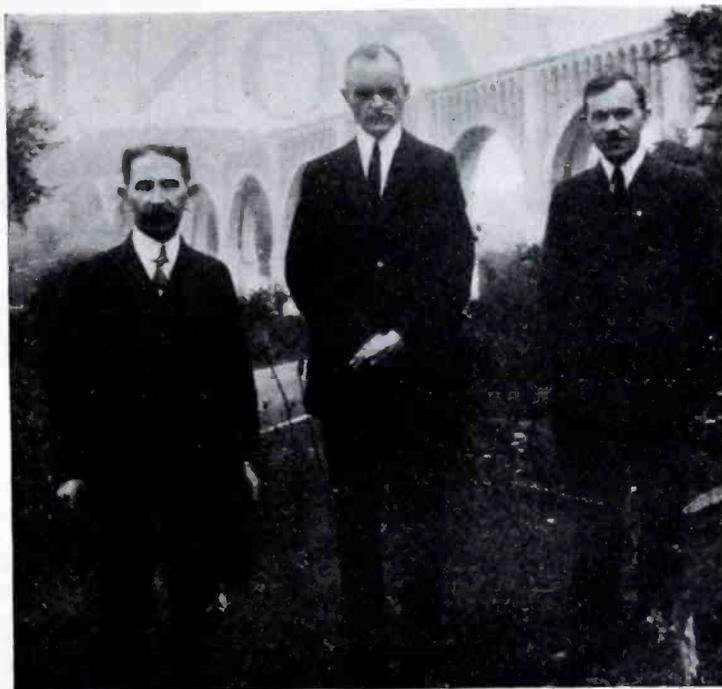
This experiment indicated three things: in the first place it proved that language may be taught successfully by radio. The second thing we learned was that Americans in general are not yet keenly interested in the daily life, and, consequently, the daily language of nations far away on the other side of the ocean. But radio broadcasting is developing with such phenomenal rapidity that it is easy to imagine the early arrival of the time when international broadcasting will be as common as national broadcasting. When this day comes it must bring as a companion a common language, and so far as our experience teaches us, the most acceptable of languages for this particular use is Ilo.

Zamenhof's project. Thereby they are doing the cause of the International Language idea in general and of Ilo in particular more harm than good. For a system derives more detriment than benefit from being represented as having close relation to another system which has been discredited in the eyes of the public through the judgment of the most capable experts on the whole subject.

For the proper information of the public the above assertion needs some examination. The vocabulary in all modern solutions of the International Language problem conforms more or less to the principle of internationality, which requires that the words of the International Language should be as much as possible international; i.e., common to the principal living languages, and that no word may be arbitrary. Zamenhof's system violates that principle extensively. Nearly 40 per cent. of its total vocabulary flagrantly conflict with it. Nov-Latin, Universal, etc., and especially Neutral, are in harmony with our principle to a far greater extent. It follows that if Ilo be at all the simplification of some previous system, it would be more justified to call it "Simplified Neutral." This view was also held by Dr. Couturat, as stated in our preceding article. The original international words common to both Ilo and Zamenhof's project do not justify, therefore, representing the former as the simplification of the latter.

Another common feature is the derivation of words by affixes. This idea is not original with Dr. Zamenhof, but occurs in the works of much earlier authors (Schipfer, 1839; Pirro, 1868.) Finally, the third common characteristic, which consists in making the parts of speech recognizable at first glance through invariable endings, has been employed by language inventors long before Zamenhof (Faguet, 1765; Rudelle, 1858; Eichhorn, 1887). Of the fourteen grammatical endings of Ilo only eight occur also in Zamenhof's device, and three of these have already been used by Faguet as far back as 1765; another one, -e for the adverb is Latin and Neutral; a fifth one -o for the nouns is very common in the Romance languages. The linguistic details original with Dr. Zamenhof and contained also in Ilo are, therefore, but very few, namely, three grammatical endings and a small number of affixes. In every other respect there are between his system and Ilo differences so substantial and numerous that the two systems are very distinct one from the other, as distinct, for instance, as French is from Italian or Spanish, although, like these languages, those two systems resemble one another a great deal, owing to a large number of common roots.

The project of Ido contains to a great extent the same faults as that of Dr. Zamenhof. They have been almost done away



Dr. M. Talmey, Dr. L. B. Woodcock and A. Rostrum on an occasion when conversation was held exclusively in Ilo

This seems to be the proper spirit of development in order to avoid making mistakes permanently ineradicable by too many followers at the early stages. It is all the truer for radio terms.—Ed.

Ilo is being more and more improved. This holds true, in particular, with the improvements proposed by the writer in the last few years (Temi, Raporti) and practically applied by him and his correspondents who are able Ilists, foremost among them being Dr. L. B. Woodcock of Scranton, Pa., whose delightful letters in advanced Ilo are apt to convince any student that those improvements are making a real, highly efficient language out of the work left unfinished by its pioneers through the cruelty of fate.¹

The assertion that the language of the Delegation was the simplified project of Zamenhof was justly repudiated by his followers. This is what they used to say in this respect without mincing of words (Progr. II. p. 749): "This is a ruse to mislead the faithful ones: the Language of the Delegation has nothing in common with Zamenhof's system, and is an entirely new language which no-wise deserves the name of the latter." If this be true of the Language of the Delegation it is certainly more true of improved Ilo.

Enthusiastic Ilo propagandists who make the above wrong assertion merely misunderstand both the sense of the final decision of the Committee and the similarity between Ilo and Zamenhof's device. The former has been clearly explained by Dr. Couturat (Progr. II. p. 277).

There are two systems in language construction. In one the gender of the words, in the other their grammatical rôle is made recognizable through endings. The second system has been employed by Dr. Zamenhof, and the Committee also preferred the system of grammatical endings. Thereupon

1. Dr. Couturat died through an automobile accident in the fall of 1914 at the age of 45. The excellent linguist and best Ilo writer of his time, Paul de Janko, died at Constantinople during the war, and Prof. L. Pfaundler at Graz in 1919; etc.

(Turn to page 27)



O. C. Roos, President "RAILS" and General Manager the "N. A. I. L. S."

O A Real CONTROL ONE—C Receiver

A three-section condenser makes possible tuning a five-tube set with one control

By Sidney E. Finkelstein

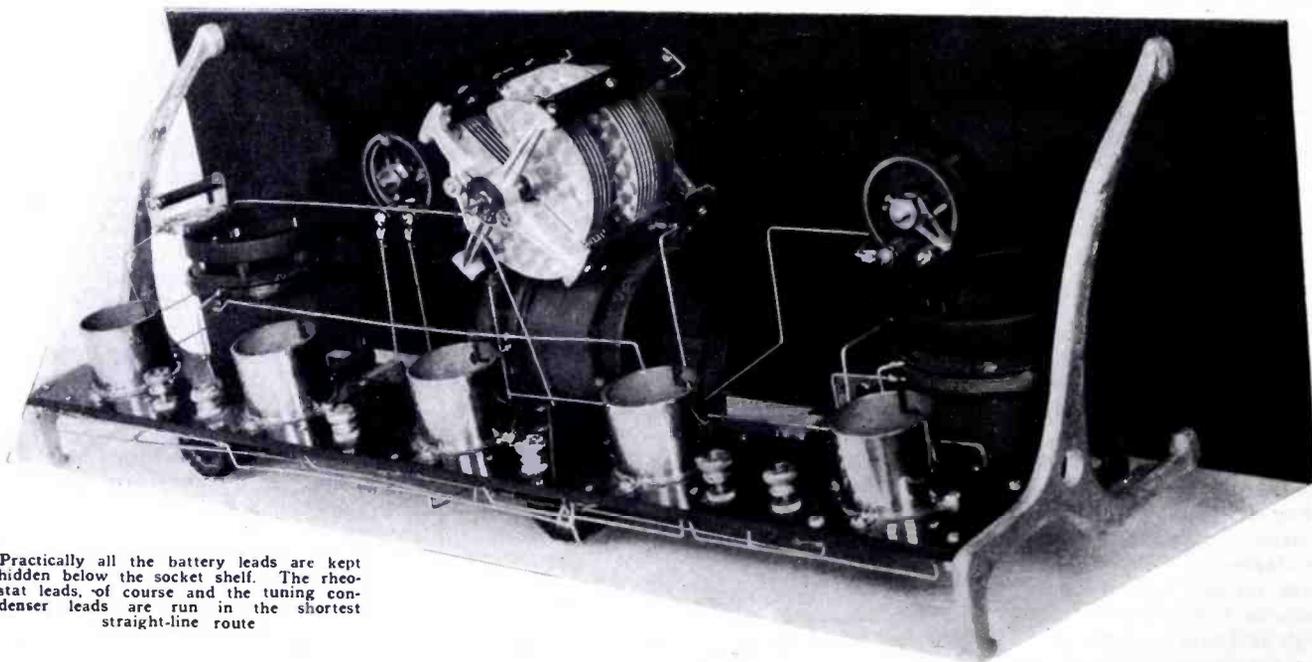
A. M. I. R. E.

THE most popular type of receiving set today is the tuned radio-frequency receiver and to date there are many varieties. All follow the same fundamental circuit principles. When two stages of tuned radio frequency are employed and the construction details are in keeping with good engineering practice, all the points that make up a good broadcast receiver are available.

MATTER OF DESIGN

This feat was not accomplished as easily as might appear, but after considerable work on the part of engineers it has been made possible. The one controlling factor in producing a receiver with one control is the design of the radio frequency coils and the variable condensers. The variable condenser must be low-loss and must be a precision made product if it is to

member of the coils. They are wound on quartzite rods which are held between two rings of hard rubber, thus forming a cylindrical cage. With this type of winding form the coil is virtually supported on air and only makes contact with glass, which is one of the best of high frequency insulators. The windings are so designed that no centralizing is necessary, thus simplifying the construction of the set.



Practically all the battery leads are kept hidden below the socket shelf. The rheostat leads, of course and the tuning condenser leads are run in the shortest straight-line route

This type of receiver possesses selectivity, volume and faithfulness of reproduction, but has one disadvantage, that is expressed by many who already have a set of this kind, and that is the customary three dials for tuning. Because of this disadvantage many fail to obtain the best that is in their set, as they do not seem to be able to master the manipulation of the three dials. In the radio receiver described below, a great step toward the refinement of the tuned radio receiver has been taken by reducing the tuning controls to one.

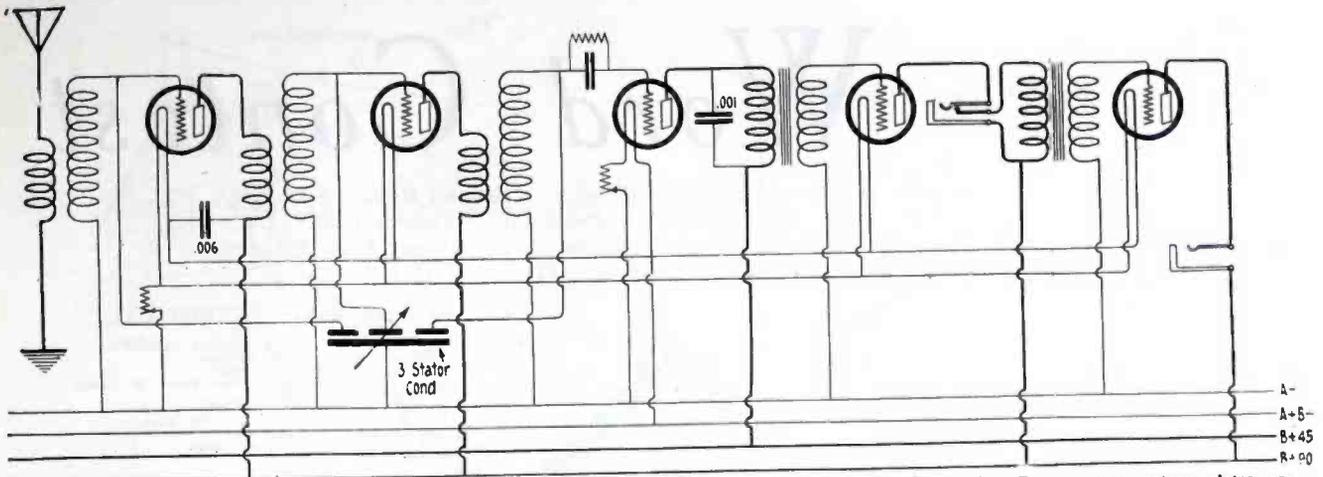
function properly. The one used in the set below is really three condensers in one, that is, there are three separate sets of condenser plates. The three stator sections are insulated from one another, while the rotor plates are on the same shaft. This unique construction insures that the three condensers are synchronized, thus tuning each portion of the circuit alike.

The radio frequency coils are also very important in this set and have been designed to possess the highest possible efficiency. These coils embody a new idea in the supporting

PARTS REQUIRED

Probably the most important unit for this set is the Bruno "Three-in-one" variable condenser, and since there is but one type of this condenser on the market at this writing, the radio fan should not go wrong in selecting the right one. The radio frequency coils described above are made by the same concern and are designed to be used with the special condenser.

In order to build the set as shown in the accompanying illustration, new five "gang" sockets will also be required. The audio transformers



This shows how the triple-stator variable condenser tunes the three radio-frequency transformers simultaneously. The common rotary plates are connected to the negative A battery

should be of high quality, as well as the rest of the material listed:

- One panel, 9x24 inches.
- Two 20-ohm rheostats.
- One five-"gang" socket (or five standard sockets).
- Three Bruno non-oscillating R. F. coils.
- One Bruno ultra-vario condenser (three in one or four in one).
- One audio transformer (5-1 ratio).
- One audio transformer (3-1 ratio).
- One double circuit jack.
- One single circuit jack.
- One grid condenser (.00025 mfd.).
- One gridleak (2 megohms).
- One battery switch.
- Two special brackets for sub-panel and "gang" sockets.
- One micadon (.00025 mfd.).
- Six binding posts.

CONSTRUCTION

The panel layout is exceedingly simple, there being but one control. Thus it is possible to give the panel a simple and dignified appearance. The special tuning condenser should be mounted in the center of the panel, from left to right and just above the centre from top to bottom. The two rheostat dials are placed one on each side of the master tuning dial, these being on the horizontal centre line. The jacks and battery switch are placed in line about

two inches from the bottom. This arrangement is very striking and is a departure from present layouts.

Next, the coils and sockets and transformers are mounted in the rear of the panel. This may be accomplished by using the customary base-board or by the use of special brackets and sub-panels, which is well worth the extra work and is the way recommended by the author.

WIRING

Needless to say, the filament circuit is the first to be wired. Care should be taken to get the polarity of the filament leads correct, as this is so often overlooked by the radio fan. After this is done, it is a good plan to test this circuit by connecting the filament battery to the set and inserting a tube in each socket to make sure rheostats, battery switch and socket contacts are all right.

Proceed with the rest of the wiring, making sure to connect the radio frequency coils correctly. The antenna tuning coil, or first radio frequency coil, is the one with the largest number of primary turns (eight turns). It should be remembered that the grid return leads from each coil are connected to the rotor of the condenser, which is a common connection for each stage.

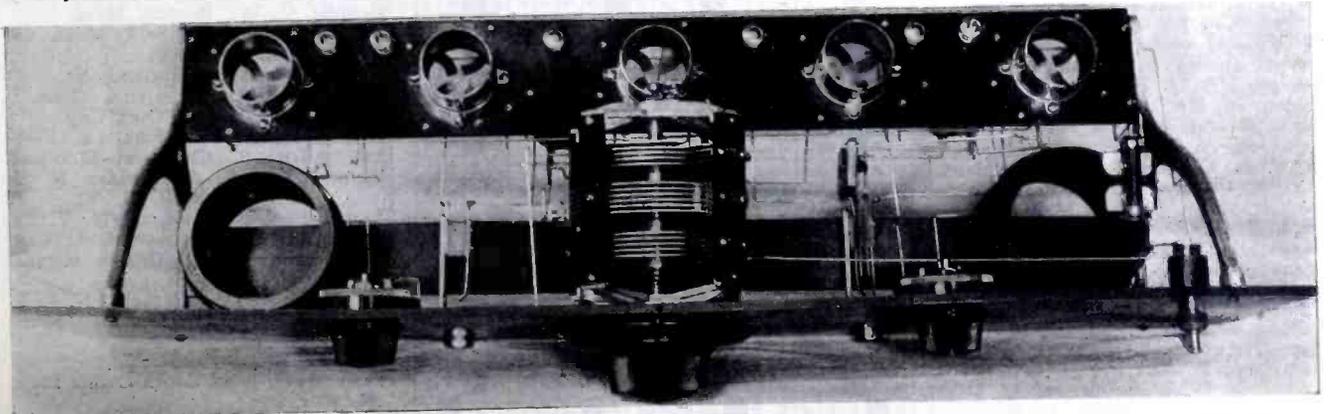
In wiring the sockets, the arrangement that makes wiring easy is to make the extreme right socket, when looking at the rear of the set, the first radio frequency socket. The centre socket should be for the second stage of radio frequency and the one on the extreme left end the detector. That next to the detector is for the first stage of audio frequency and the remaining socket serves as the second stage of audio frequency amplification.

It will be found that this arrangement makes the wiring exceedingly simple, and if done in a workmanlike manner will present a fine appearance. Well soldered joints should be made, using only resin core solder and a hot soldering iron.

RECHECK CONNECTIONS

When the work on the set is finished, go over the wiring and check it carefully with the circuit diagram and see that each lead is correct. This done, connect the batteries to the set. "B" battery voltages should be forty-five for the detector and ninety volts for the remaining tubes. Six volts are used for the "A" battery when 201A type tubes are used.

There are no tuning directions necessary as there is but one dial to turn. Rotate this tuning dial slowly and then log the stations that come in.



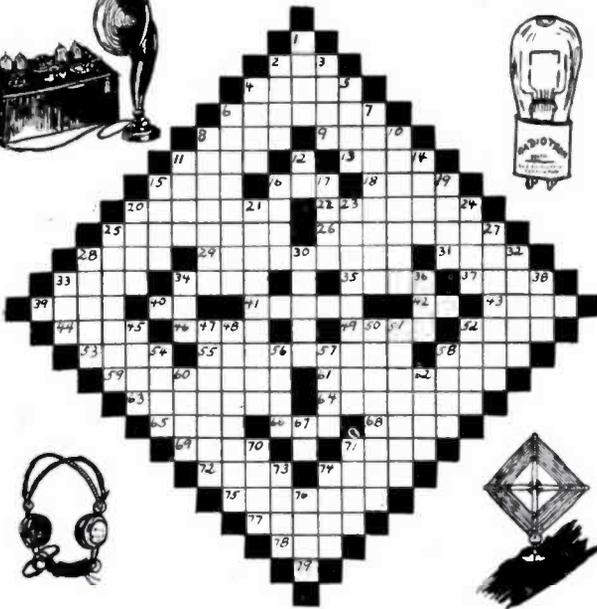
An excellent view of the completed receiver showing the relationship between the instruments mounted on the panel and the tube sockets on the sub-panel

Cross Word Contest

First Prize—3-tube Wireless Age Radio Receiver. Second Prize—Two 201A Radiotrons. Third Prize—Pair Brandes Headphones. Fourth Prize—Hammarlund Condenser. Fifth Prize—Accuratune Dial. Next Five Prizes—Annual subscription to WIRELESS AGE—THE RADIO MAGAZINE.

HORIZONTAL.

- 2—Insect
- 3—European blackbird
- 6—Existing in name only
- 9—Japanese coin (Pl.)
- 9—The twelve Gods
- 11—Upright
- 13—Prepare for publication
- 15—Saucy
- 15—To cut with an axe
- 18—Girl's name
- 20—Introduction to a book
- 22—Hackney-coaches (Fr.)
- 25—One who tells
- 26—Aerials
- 28—Left side of a ship
- 29—Collector of electrical energy
- 31—Excavates
- 33—Alike
- 34—Possessive Pronoun
- 35—Employs
- 37—Stupefying drug
- 38—Facts granted
- 40—Belonging to
- 41—Completeness
- 42—Printer's measure
- 43—Acid taste
- 44—Surrender
- 46—Da Dit Da Dit; Dit Dit Dit; Dit Da Da Dit; Dit Da Dit
- 49—Extent
- 52—Pigments used in painting
- 53—Dress (Pl.)
- 55—An American swan
- 58—Lead wire inserted in circuit
- 59—Total impedance in circuit
- 61—Absurdity
- 63—Toothed
- 64—First circuit
- 65—Judicial sentence of condemnation
- 66—Attempt
- 68—Attend (Fr.)
- 69—Private school (Colloq. abbr.)
- 71—Prefix meaning before
- 72—Frozen vapor
- 74—Cut into cubes
- 75—Shaving the crown of the head
- 77—Auxiliary electric circuit
- 78—Nothing
- 79—Code for Paid Itadio Message



VERTICAL.

- 1—South American republic
- 2—Lays a wager
- 3—Girl's name
- 4—Place where money is coined
- 5—Facility
- 6—One who makes a will
- 7—Sends out ether waves
- 8—Upper face
- 10—Genuine; honest
- 11—Title
- 12—Exist
- 14—Aquatic bird
- 15—Dit Da Da Dit; Dit Da Dit; Dit Da Dit; Da Dit; Da
- 16—Collection of cattle
- 17—Broadcasting station in Alabama
- 19—Iranian language of ancient Persia
- 20—Cut away
- 21—To put together radio parts
- 23—Non-conductor of electricity
- 24—Uttered
- 25—Wandering; pastoral
- 27—Self-exaltation
- 28—Father (Latin)
- 30—Bar
- 32—Short interval
- 33—Ancient privilege to hold court
- 34—High Frequency Current
- 36—Body of water
- 38—Sooner than
- 45—Exclamation of wonder (Obs.)
- 47—Part of motor at rest (Pl.)
- 48—Embellishment
- 50—Confidence
- 51—Religious recluse
- 52—Earnestly employed
- 54—Moved quickly
- 56—Encounter
- 57—See unexpectedly
- 58—Evaluated by ignition
- 60—Da; Da Dit; Da Da Da; Dit Da Da
- 62—Barrel or cask
- 67—Keyly prepaid radiograms (Code)
- 70—Without means
- 71—Breezy; gay
- 73—Dit Da Da; Da Dit; Dit; Da Dit
- 74—Composed of two
- 76—Glide or slide

DIAMOND CROSS

Composed by
Helen F. Dittus

Prize Conditions—Correct solutions accompanied by the best 50-word letters suggesting improvements in WIRELESS AGE will be awarded prizes in their respective order as specified above. The editor of WIRELESS AGE—THE RADIO MAGAZINE—will judge the letters on the basis of practical value, style and legibility. Closing date May 15. Solution will appear in June and winners in July.

MARCH WINNERS.

- Abbott, L. S., Pompton Lakes, N. J.
Anderson, Geo., Millington, N. J.
Becker, Otto R., Milwaukee, Wis.
Blakeley, Kenneth F., Rockford, Ill.
Bongura, Mrs. N., Jamaica, L. I.
Brink, Harvey, Round Lake, N. Y.
Brodhead, E. F., Galveston, Tex.
Burritt, L. B., Waterford, N. Y.
Coleman, A. E., Watervliet, N. Y.
Dayton, Mrs. W. B., Bloomville, N. Y.
De Hays, William, Elkhart, Ind.
Devine, Charles H., Roxbury, Mass.
De Vizio, Joseph, Bronx, N. Y.
Diehm, Dewey S., Coatesville, Pa.
Dooley, Mrs. J. F., Albany, N. Y.
Dugan, A., Mechanicsville, N. Y.
Earle, Mrs. J. P., New Haven, Conn.
Eckerson, A. A., Rutherford, N. J.
Entwistle, Olga E., Wollaston, Mass.
Farwell, Oliver P., New York City.
Fetcher, Clair, Detroit, Mich.
Ford, R. O., New York City.
Foster, W. S., Montclair, N. J.
Frank, James, Jr., New Haven, Conn.
Granum, J., East Lansing, Mich.
Haines, Clyde T., Baltimore, Md.
Haring, Walter S., Yonkers, N. Y.
Herr, Henry, East Rutherford, N. J.
Johnstone, R., San Francisco, Cal.
Kelsey, E. P., Watervliet, N. Y.
Lanckton, H. W., Perry, N. Y.
Long, H. H., Chicago, Ill.

SOLUTION TO APRIL PUZZLE

Winners will be announced in
June WIRELESS AGE

R	E	P	A	S	T	A	M	M	E	T	E	R	D	I	R	E	C	T
E	B	I	P	E	D	L	A	T	E	R	P	A	C	E	S	E		
F	S	T	O	P	I	C	T	H	E	D	R	I	E	D	N	S		
O	T	D	T	E	A	R	S	E	S	O	A	R	S	T	A	T		
R	O	O	F	E	L	E	C	T	R	I	C	I	T	Y	T	I	M	E
M	I	N	O	R	S	P	A	R	D	O	N	E	L	V	R	E	D	
C	O	R	A	L	T	R	I	L	V	G	D	O	R	E	D			
C	R	A	D	I	O	E	M	B	E	R	S	O	U	N	D	C		
O	E	Y	I	E	L	D	S	A	S	C	O	L	D	S	M	R		
V	R	N	O	N	C	E	A	T	E	A	D	D	S	D	A	Y		
P	R	O	N	G	C	O	N	T	A	C	T	P	L	V	G	S		
L	O	T	R	E	A	R	Y	E	T	C	O	R	E	B	I	T		
E	R	N	A	G	O	Y	A	R	T	H	R	E	A	T	C	A		
R	R	A	P	I	D	P	A	Y	E	E	T	A	K	E	N	L		
L	A	T	H	S	E	R	R	C	N	R	M	E	T	A	L			
T	O	G	A	S	T	R	O	T	H	O	O	K	R	E	S	I	N	
A	B	E	L	T	R	A	N	S	F	O	R	M	E	R	S	A	L	E
L	E	D	C	H	E	S	S	V	S	P	E	E	D	L	A	W		
O	S	A	L	O	N	E	A	S	P	S	L	A	I	N	C	E		
N	S	W	A	R	D	S	L	E	E	P	S	P	E	N	D	L		
S	O	L	E	M	N	P	R	E	S	A	G	E	S	T	E	R	N	S

MARCH WINNERS.

- Lopez, Lester, Buffalo, N. Y.
Meagher, Elizabeth L., Miami Beach, Fla.
Michels, Clarence E., Hampton Falls, N. H.
Mochary, Dennis, Bronx, N. Y.
Mohn, Leon J., Elmhurst, L. I.
Morrison, D. W., Midvale, N. J.
Munson, Leroy J., Ft. Edward, N. Y.
Murphy, Mrs. C. W., Westfield, N. J.
Nicholls, G. W., Boston, Mass.
Obrey, Amos, Springfield, Mass.
Orre, E., Bronx, N. Y.
Paul, A. W., West Rutland, Vt.
Peck, Miss Inez M., Lyme, Conn.
Phillips, D. V., New York City.
Pohl, J. A., New Orleans, La.
Pray, Alfred R., Cleveland, O.
Rooney, Mrs. A. A., Buffalo, N. Y.
Ryan, John, Wynskill, N. Y.
Sharpe, Fred S., Flushing, N. Y.
Sprague, H. M., Trenton, Ont., Can.
Spring, Harold A., Grand Rapids, Mich.
Ten Eyck, A. C., Elizabeth, N. J.
Van Name, C. Eldredge, Port Richmond, S. I.
Walz, L., Brooklyn, N. Y.
Wickersham, John, South Ozone Park, N. Y.
Wolverton, Dr. W. C., Linton, N. D.
Zeh, Arthur P., Beacon, N. Y.

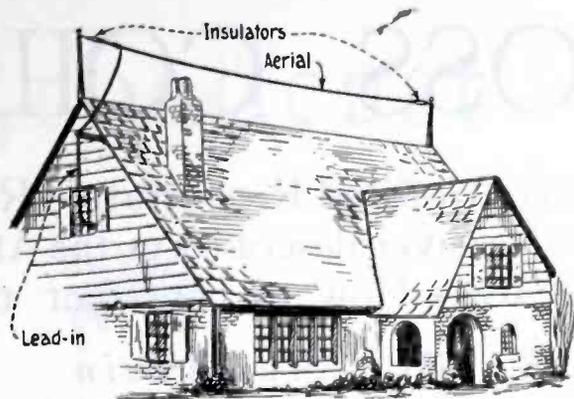


Figure 1
THE OUTDOOR AERIAL

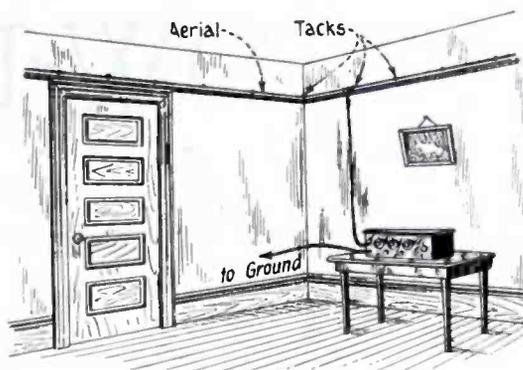


Figure 2
THE INDOOR AERIAL

AERIALS

By William F. Crosby

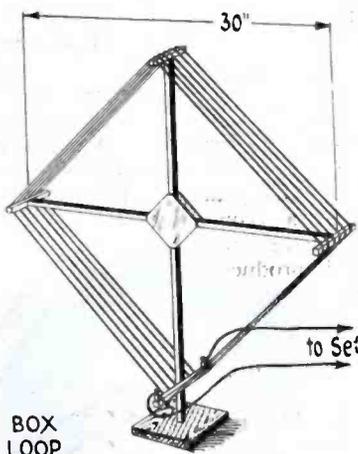
Outdoor
Indoor
and
Loop

AN AERIAL is frequently the most neglected part of the radio fan's equipment and yet it is probably one of the most important units in the whole outfit. A glance at any of the roof tops in a city will show just how little attention is paid to the aerial after it has once been put in place. Apparently many of these have been completely forgotten with the result that poles are bent and wires sag in a way which is sometimes positively dangerous to pedestrians. In one or two cases poles have come down in wind storms, injuring people in the street and a recent case in the Bronx led the landlord to put a ban on all aerials on his buildings. The result was that many innocent fans were made to suffer for the shortcomings of only one of their number.

It is just as easy to make a good job of the aerial and at the same time it will give far more satisfaction to know that it is going to stay in place no matter what happens. Quite frequently the sagging aerial will change its characteristics to such an extent that signals from distant stations will fade in and out quite badly. This is due to the change in tuning caused by the aerial wire swaying back and forth.

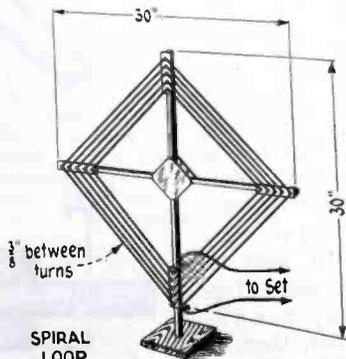
There are only three different kinds of aerials, outdoor, indoor and loop. Each seems to have many variations and every one has its particular use.

Let us take up the outdoor aerial first. It is generally the most satisfactory with any radio set with the exception of those receivers which are especially designed for loop work. Contrary to the general opinion, al-



BOX LOOP

most any kind of wire may be used in such an aerial. The writer has carried on experiments along these lines and, believe it or not, on a one-hundred-foot aerial made of galvanized iron wire, size number sixteen, KGW in Portland, Oregon, was heard on a one tube regenerative set!



SPIRAL LOOP

Of course this was a freak pure and simple and it could never be duplicated again no matter how we tried.

This, naturally, might lead one to believe that galvanized wire is the best for an aerial, but if this is so, it is against all the theories of radio and, in the long run, better results will probably be obtained with a copper aerial. Usually number fourteen bare copper wire will stay up the longest and give the best service. The stranded wire, so popular, has to be put up quite carefully, because it is so flexible, that connections will pull out, unless soldered.

Gold plated aerial wire is, in our estimation, one of the useless things of radio. Silver is generally given credit for having the lowest resistance, with copper only a little higher. Gold, on the other hand, comes considerably above even the copper. Gold has only one advantage, and that is that it does not corrode, but we believe that the added resistance will more than offset any advantages to be gained by the non-corrosive feature.

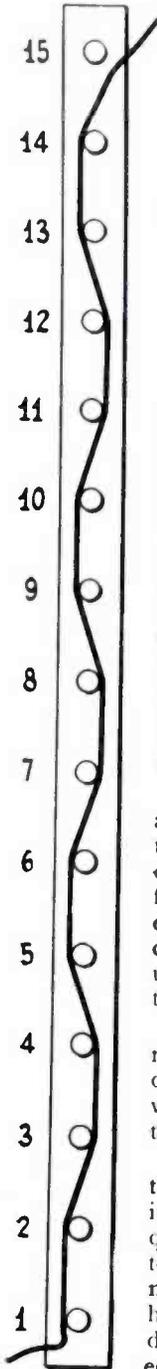
The ideal aerial for all around work appears to be a single strand of number fourteen hard drawn copper wire, one hundred feet in length and reasonably high. The higher aerials are usually credited with picking up more static than the lower ones, but they are better for extreme distance work. An aerial of this kind should extend in a straight line with the lead-in from one end. The aerial which has several bends in it, together with the lead-in from the center or somewhere

(Turn to page 60)

LOW-LOSS COILS

for the Direct Coupled Regenerative Radio Frequency Receiver described in the APRIL WIRELESS AGE—How to construct them

By K. M. MacIlvain



IN THE last issue of this magazine, I described a radio-frequency receiver having direct coupling in the input circuits of the first two radio-frequency amplifier tubes. This feature was augmented by the introduction of regeneration in the plate circuit of the first tube instead of in the detector plate circuit as is usually the case.

The purpose of this article is to tell something of the inherent characteristics of bona fide low-loss coils and to explain the method of constructing the coils used in the above mentioned receiver.

There are two fundamental facts about radio-frequency coils that we should know right at the start.

1. Metallic objects in the field of the coil will increase its radio-frequency resistance, due to the fact that said metallic objects will have eddy-currents induced in them and these eddy-currents will absorb power from the circuit.

To prove this, just try one simple experiment. When you have your receiver in operation, tune in a station and put it on the loud speaker. Then take a pen-knife or a pair of pliers and insert either in the center of the magnetic field of one of your tuning coils. When you note the decrease in output volume it should convince you of one thing and that is that "metallic objects in the field of the coil will increase its radio-frequency resistance," although I don't know whether you will be satisfied about that "eddy-current" theory or not.

It might be well to note right here, also, that power losses are a direct

function of the resistance. Power losses increase directly as the resistance is increased.

Now to cite the second fundamental fact that we should know.

2. Insulating materials in the field of a coil will increase its radio-frequency resistance due to "dielectric absorption."

So you see, it is not metal alone that should be kept out of the field of a radio-frequency coil, but dielectrics as well. It may be that you don't know what the term, "dielectric absorption" means, so for the benefit of those that are not satisfied with mere terms alone, I will just give you a short description of its meaning.

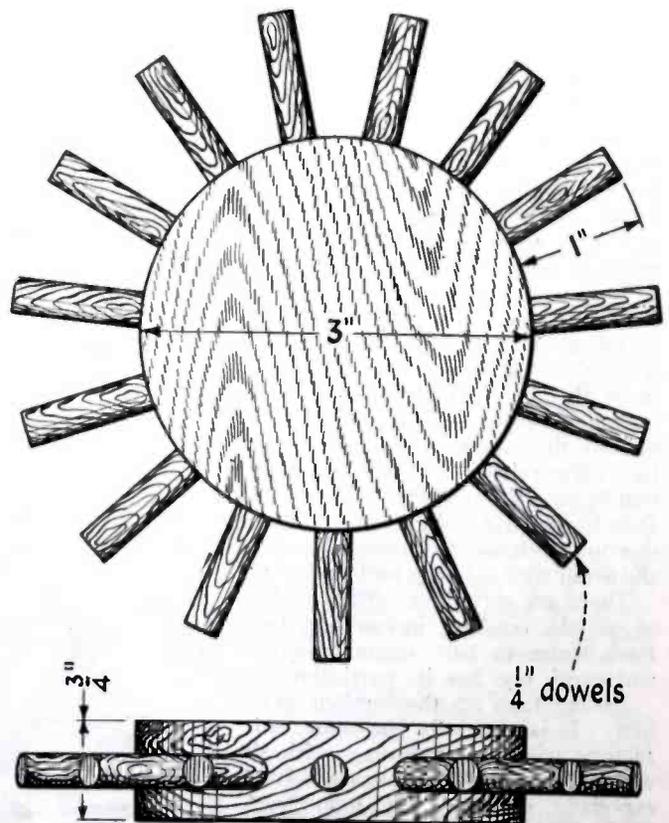
Every substance is a conductor of electricity, at least to a slight extent, but some substances are far better conductors than others. A substance in which a constant electric field produces only a slight flow of electricity, is called an "electric insulator" or a "dielectric." Due to the fact that all dielectrics are imperfect from an insulation standpoint, they will, when placed in the field of a coil carrying currents of radio-frequency absorb energy from the circuit. If they were perfect, they wouldn't. This is what is termed "dielectric absorption."

What we want in the field of our radio-frequency transformer, then, is a 100 per cent.

dielectric, namely, a substance through which it is impossible to set up a continuous flow of electricity by the application of a constant electric field. That is what we want, but sad to say, it is something we cannot have for the very simple reason that no such substance exists. Free space may be considered a perfect dielectric and in accepting this conclusion we do not contradict the statement which starts this paragraph. Free space is not a "substance" and differs from a "substance" in that it does not contain electricity. All substance contains electricity.

From the foregoing analysis we see that we want a coil wound on a perfect dielectric and we want to keep all imperfect dielectrics out of the field of said coil. The perfect coil, then, should be a self-supporting coil,

(Turn to page 68)



The form used in winding the coils

Broadcast Impressions

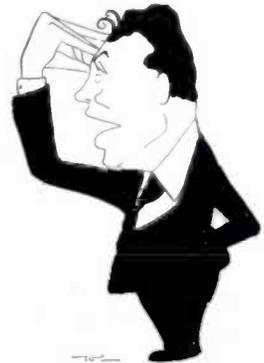
By Ed Randall.



Joseph Pasternack, Director of Victor Concert Orchestra, broadcast from Station WEAF



Ethyl Hayden, singing "Mighty Lak a Rose" in Eveready Hour of Music, broadcast from a chain of stations



Wilfred Glenn, singing the "Rosary" at Eveready Hour of Music, broadcast from WEAF and a number of other stations



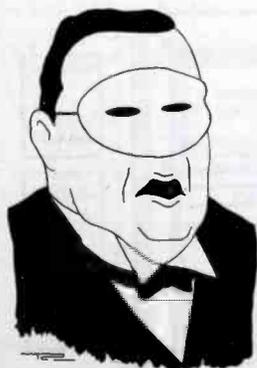
Chas. Harrison, singing "The Quest" in Eveready Hour of Music, broadcast from Station WEAF and eight other stations



Reinald Werrenrath, genial and robust baritone, sang the "Gypsy Love Song," "On the Road to Mandalay," and the prologue to Pagliacci, in the concert by the Victor Talking Machine Co. Mr. Werrenrath is of the Metropolitan Opera Co., a graduate of New York University and a member of Psi Upsilon. At college he was a star swimmer and he still is



Rose Bryant singing "The Little Toy Dog" in the Eveready Hour of Music, by Ethelbert Nevin, broadcast from WEAF



"The Man in the Silver Mask," tenor soloist with the Silvertown Cord Orchestra—His name is never divulged, and he comes masked to the studio in a closed limousine; even the announcer being kept in ignorance of his identity



Max Jacobs, leader of Orchestra, Eveready Hour of Music, by Ethelbert Nevin

RADIO CABINETS

By
H. P. Strand

How to build an artistic housing for your receiver, loud speaker and batteries

THIS article is intended for those who have a fair knowledge of woodwork and a little cellar or attic shop and the general tools usually necessary in such a place. The writer made the cabinet described, under those conditions the stock for the main parts of the cabinet being milled out to size by the local mill, which gives accuracy to the start of the job. It is made entirely of mahogany. To economize so called "shorts" can be obtained at a much less cost per foot than regular lengths. One inch rough stock by widths up to 15" was selected, and some 3" or 2" stock for the corner posts and milled down to $\frac{3}{4}$ " for panels, $\frac{5}{8}$ " for doors, $\frac{3}{8}$ " for top rails, $\frac{3}{16}$ " for cover top and $\frac{1}{4}$ " square for corner posts.

All stock can be cut to size by the mill except cover top, top rails and doors, and these had best be fitted by hand later.

The first process is to dowel the side and back panels to the corner



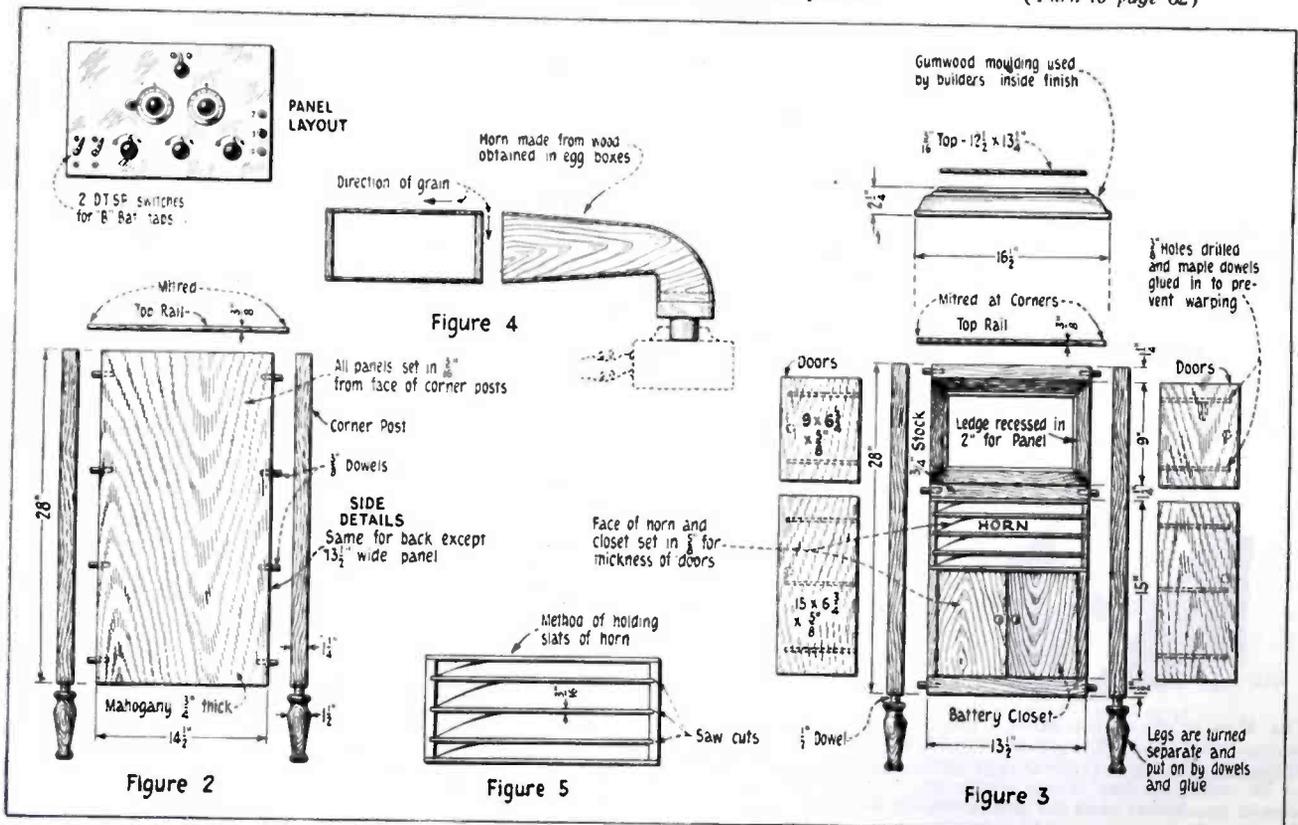
The finished cabinet

posts. This can best be done by driving short brads, at the four places where the dowels are to go, about half way in and cutting off, leaving about $\frac{1}{4}$ " out. Now place corner post up to meet brads using a $\frac{3}{16}$ " piece for a guage to set panel back from face of corner post that much, and when all is ready give edge of panel a sharp blow to make brad impressions on corner post, and after pulling out brads you will find the exact places to bore your holes for the dowels. Use a sharp $\frac{3}{8}$ " auger bit for this and be sure and bore the holes straight. This operation can be repeated on all four sides, and then the dowels and hot glue can be used to advantage. Figure 2 and 3 give an idea on arranging the parts.

When the three sides and the front rails have been doweled, glued and clamped, put it away to set for a day.

The next job is the $\frac{3}{8}$ " top rail, $\frac{1}{4}$ " wide, that finishes off the top. This is glued and bradded down, mitring the corners and slightly rounding the edges, $\frac{3}{16}$ " projecting

(Turn to page 62)



Constructional details of the radio cabinet

Auxiliary International Language

(Continued from page 19)

the sympathizers of the doctor in the Committee argued that if that system were adopted, it would be unfair not to mention his project in the final decision. Through "such moral and sentimental arguments they succeeded in obtaining the wording of the known decision. This explains in which sense the Committee adopted that project; it means that the Committee has adopted the system of grammatical endings." It cannot be expected that enthusiasts should understand all this. They take the decision at its face value.

Considerable similarity is bound to exist between Ilo and Zamenhof's project because of the large number of Romanic roots common to all modern solutions of the International Language problem. They all resemble one another very much on this account. Between Ilo and

that project the resemblance is still greater because they have in common some affixes and grammatical endings. The enthusiasts do not know all this; they simply notice the great resemblance and therefore honestly believe that Ilo is a simplified project of Dr. Zamenhof.

A few phrases and sentences that may occur in everyday life will best show the relation of these two systems to one another. See the three-column text below.

Finally we shall give an illustration of Ilo by translating into it an exquisite piece of English literature. It will be seen that the beauty of the original is fully preserved in the translation, which is possible only with improved Ilo, but with no other system. This is another important feature distinguishing the former from all previous solutions of the International Language problem.

The reader is reminded to look up the rule of grammar and pronunciation given in the preceding article shortly before the illustration.

English	Ilo	Zamenhof's Project
1. All this.	Omna co.	Chio tio-chi.
2. All those whom.	Omna ti quin.	Chiujn tiujn kiujn.
3. Always and everywhere.	Sempre ed omnube.	Chiam kaj chie.
4. Until here and no further.	Til hike e ne plu fore.	Ghis tie-chi kaj ne pli malproksime.
5. For even here you make a mistake.	Nam mem hike tu facas un eroro.	Char ech tie-chi ci faras ero.
6. For you forgot all this.	Nam tu oblivis omna co.	Char ci forgesis chion tion-chi.
7. Do you live here?	Ka tu lojas hike?	Chu ci loghighas tie-chi?
8. Do you know all your lessons of to-day?	Ka tu savas omna tua hodierna lecioni?	Chu ci scias chiujn ciajn hodiaujn lecionojn?
9. She just learned everything.	El jus saveskis omno.	Shi ghus sciighis chion.
10. For her voice seemed to change.	Nam elua voco semblis chanjar.	Char shia vocho shajnis shanghighi.
11. Does she always blush?	Kad el sempre rediskas?	Chu shi chiam rughighas?
12. She had the most lovely little white dainty feet which a beautiful girl can ever have.	El havis la maxim gracioza mikra blanka pedeti, quin un bela puerino ever povas havar.	Shi havis la ploj graciajn malgrandajn blankajn piedetojn kiujn bela knabino nur povas havi.
13. But she was all nude and therefore she wrapped herself up in her thick long hair.	Ma el esis tote nuda, e pro to el envolvis su en sua densa longa hari.	Sed shi estis tute nuda, kaj tial shi envolvis sin en siajn densajn longajn harojn.
14. Many competent people are convinced that many changes and improvements of the language are desirable and even necessary.	Multa kompetenta liudi esas konvinkita, ke multa chanji e boniorigi di la linguo esas dezirinda e mem necsa.	Multaj kompetentaj personoj estas konvinkitaj, ke multaj shanghoj kaj plibonigoj de la lingvo estas dezirindaj kaj ech necesaj.
15. It is perhaps possible to solve all these problems differently.	Esas forsan posibla solvar omna ica problemi altre.	Estas eble eble solvi chiujn tiujn-chi problemojn alie.
16. The letter of the professor received from the secretary by the scholar through a messenger brought only an indistinct explanation of the difficulty.	La letro di la profesoro ricevita fro la sekretario da la dicipulo per un senditu bringis nur un neklara expliko di la defacilezo.	La letero de la profesoro ricevita de la sekretario de la lernisto per sendito alportis nur neklara klarigo de la malfacileco.
17. Chloral hydrate and chloroform are chemicals justly liked by all physicians and surgeons.	Kloral-hidrato e kloroformo esas kemiaji juste prizata da omna mediki e kirurgiisti.	Hhloral-hidrato kaj hhloroformo estas hhemiajhoj ghuste shatataj de chiujn kuracistoj kaj hhirurgiistoj.
18. Mentally blind, somehow or other, are all those who, having read all these plain everyday phrases and sentences, do not see at once that Ilo is very distinct from the project of Dr. Zamenhof and immensely better and superior.	Mentale blinda, ule od altre, esas omna ti, qui pos lektir omna ica simpla omnadia frazi e zaci, ne vidas statim, ke Ilo esas tre distingita fro la projeto di Dro. Zamenhof ed imense boniora e superiora.	Spirite blindaj, iel au alie, estas chiujn tiuj, kiuj, post kiam ili estas legintaj chiujn tiujn-chi simplajn chiutagajn frazojn e frazojn, ne vidas tuj, ke Ilo estas tre distingita de la projeto de Dro. Zamenhof kaj treege pli bona kaj supera.

La navo sur la sturm-pulsata maro

The Ship on the Stormed-Tossed Sea

da Washington Irving, Skiso-libro.
by Washington Irving, Sketch Book.

La sturmo kreskis kun la nokto. La maro esis flogata

The storm increased with the night. The sea was lashed

ad enorma konfuzezo. Esis un pavorplena, depresanta

into tremendous confusion. There was a fearful, sullen

sono di moveganta ondi e ruptita maramasi. Abismo

sound of rushing waves and broken surges. Deep

renkontris abismo. Kelkafoye la nigra amaso di nubi

called unto deep. At times the black volume of clouds

supere semblis dislacerita da erupti di fulmino, qui tresayis

overhead seemed rent asunder by flashes of lightning, which quivered

alonge la spumifanta tempestondi, e rendis la sucedanta

along the foaming billows, and made the succeeding

obskurezo duoble terorigiva. La tondri streptis super

darkness doubly terrible. The thunders bellowed over

la sovaja dezerto di aqui e verdis ekizata e prolongata

the wild waste of waters, and were echoed and prolonged

da la monta ondi. Kande me vidis la navo rulanta e

by the mountain waves. As I saw the ship staggering and

precipitata inter ica mujanta kaverni, semblis mirakloza,

plunging among these roaring caverns, it seemed miraculous

ke ol riobtenis sua equilibrio, o retenis sua natokapablezo.

that she regained her balance, or preserved her buoyancy.

Olua yardi plunjadis aden la aquo: olua pruo esis preske

Her yards would dip into the water: her bow was almost

obrulta sub la ondi. Kelkafoye un impendanta maramaso

buried beneath the waves. Sometimes an impending surge

semblis pronta destruktar ol, e nulo altra kam un habila

appeared ready to overwhelm her, and nothing but a dexterous

movo di la guvernilo prezervis ol fro la shoko.

movement of the helm preserved her from the shock.

The first Radio Lexicon in French, English, Spanish, Italian, German and Ilo is the work of John Nordin of Finspong, Sweden, Kurt Feder of Frankfort (Main) Germany and Mr. Roos. It may be obtained from the latter by writing him care this publication.

A Radio STAR

Madeleine Mac Guigan,
violin virtuoso of the air

interviewed
By
J. Addy



Miss MacGuigan in various poses

WHEN you tune in on the eloquent strains of Miss Madeleine MacGuigan's violin tonight from WEAF, or tomorrow from WJZ, or another day from WOO, don't be misled by the facile announcer into taking for granted that she is a sweet young thing who knows only how to draw a rather smooth bow and pluck an occasional G string. Of course, Miss Madeleine does know how to pluck and bow—and that consummately, and Miss Madeleine is young and sweet. But there's more to it than that, you know.

Behind the exquisite music that comes to us out of the ether on the nights when she plays for her large radio audience is a life short, but crammed with experiences. In fine, her music glows with life because the girl who plays that music has lived. Not many young ladies of the twentieth century can tell of long ocean voyages when scarcely out—or into!—short skirts, of fiery—and vain—wooings by Hungarian noblemen, of duels inaugurated for one's mere favor, of gypsy innamoratos; and, in a different world, of long concert tours, of triumphs as soloist to world-famed symphony orchestras, and last but not least, of a star position in the newest of artistic fields, radio broadcasting.

Umsteen years ago in the hamlet of Monaghan on the Emerald Isle a baby girl was born to an American mother and an Irish father. Linked in her were the vivacious charm of Old Erin, the initiative of the New World, so that at the early age of five years the girl decided she would be a great musician. From the tutelage of the village fiddler she graduated to a conservatory in Dublin.

Fictionists are fond of uniting long-separated chums by radio. Things that ought to happen in books have a way of occurring in real life to Madeleine MacGuigan. Here is a letter she found in her mail the other day.

Throgg's Neck,
New York.

My dear Madeleine,

I take great pleasure in writing to you to let you know that at last

I have a radio and have heard you play the violin over the air from Station WEAF from the Mark Strand Theater. I have seen your name and picture in the paper many a time, and was always wishing for the time that I could hear or see you again after all these years.

Now you are wondering who is writing to you. Well, I wonder if you would remember me. Of course you were a little tot only seven or eight years old when I left Monaghan. I am, or was, rather, Louie Kelly, and went everywhere with my twin sister, Lena. We lived in Market Street. Many a time was I in your home in Glasscough Street. I was taking violin lessons from Mr. Rocks at the time you were, and well I remember your dear mother saying, "Madeleine will be a great violinist some day."

Her words came true, for you are certainly a wonder. I have started my oldest boy with violin lessons, and I only hope he will be like you.

Wishing you all success,
from Mrs. O'Connor, formerly
Louie Kelly, of Monaghan, Ireland

As a little girl in pigtails, and wielding a violin almost as big as herself, Madeleine made her first public appearance as a musician. All she now recalls of this momentous event was that the kind ladies all clapped and her mamma was very, very proud.

The elder MacGuigans, just before the outbreak of hostilities in 1914, decided that, after all, America was the place for them. So we see Mistress Madeleine, blossoming now into charming young ladyhood, vivifying the mortuary city of Philadelphia with herself and her music. But not for long.

Another trip across the Atlantic; and this time, past the great rock of Gibraltar, and on across the Mediterranean, she and her mother traveled.

Quaint Buda-Pesth, in Hungary, the land of the folk who "enjoy life with tears in their eyes," was their destination. Hubay, famous teacher of the violin, lived there. Mrs. MacGuigan had to return to her family in the United States, but Miss MacGuigan stayed on, and perhaps in this country of hills and woods and gypsies, of officers and mountebanks and comic-opera

princes, learned things outside her music or her school books.

"I love to walk in the woods, where little gypsy fiddler boys grow on the very bushes and follow you endlessly until you give them a few pennies to run away; and where every few feet you come upon a cozy inn," Miss MacGuigan told me. Then, "The young men of Hungary, to say nothing of the old, are a very amorous lot. They are terribly persistent and ingenious, and cannot possibly believe you when you would tell them No.

"One day I was sipping tea in one of the cafes where you eat and drink at little tables on the sidewalk instead of inside. A dashing young man saw me, seated himself opposite me, pulled a notebook from his pocket and commenced to sketch. Every once in a while he would look up, study my face as if in deep contemplation, chew his pencil stub, and—got at it again. It got to be so embarrassing that I was blushing furiously. I left, though I was rather fascinated by him. Where he got my name I can not imagine, but a day or two later I received a letter reminding me of the little event, and begging me in most pathetic terms to end his anguish by marrying him.

"Another time I was strolling along with a girl friend of mine, a school mate, when a young officer brushed against me as if by accident, then proceeded to make a gallant and long drawn out apology. Finally we got away from him. I have always suspected that it was my girl friend who gave him my name; at any rate, I received a passionate love letter the next day. The lieutenant insisted that I meet him somewhere. I happened at the time to number among my real friends a boy of twenty, whom, as I was a very young woman, you know, I regarded as a big, strong man, one who could advise and protect if I happened into a difficulty. I showed him the letter and asked him what I should do.

"Upon reading it he grew red in the face. Perhaps he himself liked me better than I had ever let him tell me—I do not know. At any rate, he pocketed the letter, and without a word took his leave.

"That evening he called on me.

"'Meine Fraulein,' he announced, with his chest puffed out, but his face terribly pale, 'Meine Fraulein,' the matter is arranged!"

"'What is arranged? What on earth do you mean?'" I asked.

"'Tomorrow,' he said, 'and you shall know the outcome. I wrote the scoundrel a note giving him the choice of sabres or pistols at thirty paces.'"

Miss MacGuigan stopped abruptly at this point. Anxiously I asked what had been the outcome of the duel. I



The versatile Miss Madeleine as the "Gypsy Fiddler" in "Salome of the Tenements"

thought I detected a note of disappointment in her voice as she replied:

"The challenge was never answered."

American men are not quite like this, Miss Madeleine finds. They have a way of their own of going about it, as some of her fan letters rather keenly attest. Here are a few words picked more or less at random from a letter that is almost as long as this article. The poor chap had heard her way down in New Orleans, had seen her picture in the paper, and—succumbed.

"You are enchanting, alluring, be-

witching, graceful, seraphic, exquisite, delightful, captivating, physical and magnificent womanhood . . ."

Envy the stars their stacks of letters, but thank the Lord you don't have to read them all!

"People have some stupid ideas," Miss MacGuigan told me, changing the subject. "They say, 'It is too bad you don't sing over the radio, and tell jokes, for then you would get your personality across to all the people that listen to you.' Now I think that persons who talk like this never could have listened

(Turn to page 76)

Quality and DX with 5 Tubes

(Continued from page 13)

time. The filaments of the amplifier tubes are controlled by one rheostat, and the filament of the detector by one, and the filament of the radio frequency tube by another. This was found to be the best arrangement and gave the best results.

RANGE

WE WERE certainly pleased with the way this receiver brought in distant stations. Its most spectacular performances were WGY of Schenectady at noon time with good strength and WFI Philadelphia about the same time. As anyone knows, in the vicinity of New York, DX in the day time is out of the ordinary to say the least. Mid-Western stations can be relied upon for loud speaker volume through local broadcasting. The dials can be calibrated quite accurately and if tubes and batteries are not changed the same station may be brought in repeatedly at their regular dial settings.

Its very great selectivity was conspicuous while the set was in operation in the heart of the "congested air" of the metropolitan district. With four stations operating full blast, within a radius of two miles—all 500-watt stations, this receiver just stepped right out and brought in the distant ones without a whisper from local interference. We consider selectivity paramount in a receiving set and certainly there is no better place to demonstrate a receiver's ability or shortcomings in that respect than in our laboratory. If we can't tune out WEAF on 492 meters entirely and bring WOC on 484 then that receiver is not up to par. Perhaps we should not say "par" here as too many of the lower class receiving sets are not capable of that degree of selectivity. However that is our own personal par and we govern ourselves accordingly. Try as we would we could not make this five-tube set more selective than our "DX-Go-Getter" of December, 1924 fame—but why make tuning a task? We can reach limits in this respect beyond which it is not desirable to go.

How To BUILD IT

IN BUILDING a set of this type it is absolutely necessary to procure all the requisite parts before starting the construction. The apparatus on the sub-panel should be mounted and fastened to the sub-panel according to the illustrations. The resistance coupled amplifier is placed to the extreme right of the set and nicely fills up this end of the sub-panel. On this shelf must go the antenna tuning coil, the radio frequency tube socket, the detector grid condenser, the detector socket and two by-pass condensers—

the last mentioned—on the under side of the panel. These are mounted as close as possible to the leads to which they are connected, and it is much better to bolt them through the sub-panel by means of two 6-32 screws where they will be fixed, than to have them hanging in the air supported only by bus wire.

If the set is constructed exactly like the original it will be found to be very steady and able to withstand considerable rough treatment. In reality it can stand more hanging around than should be accorded any respectable radio set. This rigidity is to be desired as it makes for accurate calibration of your dials and an assurance that the set will always operate. The constructor will do well to lay in a supply of 6-32 machine screws and nuts, of various lengths from $\frac{1}{2}$ " to $1\frac{1}{4}$ " which will be of valuable assistance in the assembly process. Place everything upon the sub-panel that is to eventually be there and locate your apparatus so that best connections and shortest leads may be obtained. When this arrangement is found center punch all holes and then start drilling. After the holes are drilled, mount all your apparatus on the sub-panel, then on either end of the sub-panel fasten the two excellent additions to the radio constructor's equipment, the two Benjamin panel brackets.

In the past three or four years of the radio art there has been no greater need than for just such a piece of apparatus as this panel bracket. We have used wooden baseboards and fastened the panels to them and we have used hard rubber or bakelite sub-panels fastened by a cumbersome angle bracket which would have served better supporting the Brooklyn Bridge and we have used pieces of brass bent in the shape of an inverted Q—all this improvisation when the Benjamin panel bracket was all that was needed. The all around efficiency of the set is increased perceptibly by the use of a sub-panel such as this and by fastening everything down ship-shape.

PANEL

NO SCALE drawings will be necessary for drilling and laying out the panel as the illustrations are excellent. The apparatus on the panel includes the two variable condensers, the detector coupler unit, the three Bradleystats, the two jacks, voltmeter and filament lighting switch.

Following our usual practice, a center line is drawn the full length of the panel and fixes the "up and down" position of the two variable condensers. The jacks and filament switch are mounted $1\frac{1}{4}$ " up from the base of the panel equally distant from each other, and the detector coupler is mounted so that the shaft centers between the

two variable condensers and approximately $2\frac{1}{4}$ " down from the top of the panel.

Of course you must remember to connect the rotary plates of the variable condensers to the filament side of the circuit and the stator plates to the grid side of the circuit. The detector jack is not necessary and may be omitted if desired. The amplifier jack has extra springs for automatic filament lighting of the resistance coupled amplifier. If the detector jack is used it is inserted in the B battery lead running from the input posts of the resistance-coupled amplifier to the B battery binding post of the set. The jack merely breaks this circuit when the phone plug is inserted and closes it again when the phone plug is removed. Remember when using resistance-coupled amplification immediately after a detector tube that it is necessary to use about twice the detector voltage as one would ordinarily use with transformer amplification. The 100,000-ohm resistance forming the input to the amplifier cuts down the effective voltage on the plate of the detector tube and to compensate for this a higher voltage must be used. This amounts to about 45 volts for a UV-200 and 45 to 67 volts on a UV-201A. This receiver has given us keen pleasure in constructing and it DOES WORK.

D-Coil

(Continued from page 17)

While he is gone the station in question may sign off and when the operator comes back into the room he may forget that he has left the set turned on and the cover being down, he doesn't notice that the tubes are lit. If there is a little bug lamp on the front of the set like Professor Rollins has, it will be evident immediately that the tubes are on.

The interior view of this receiver shows the tubes and the coils mounted on a little platform at the rear of the assembly. The bus-bars carrying the "A" and "B" battery potentials run along under this platform.

The audio-frequency transformers are also located under this platform, directly under the audio-frequency amplifier tubes. The terminals for antenna, ground and battery connections are all mounted on a piece of bakelite at the back of the set. There is an opening cut in the case so these terminals protrude through the rear when the case is in place, leaving them easily accessible.

A careful study of the lay-out that Professor Rollins has created should give us all some mighty good suggestions for the next receiver we build or even for revamping the old one.

World Wide News

By C. S. Anderson

Managing Editor of WIRELESS AGE

Dr. Latour's Patents—Hearst-Schenck Radio Chain—Radio Hits Florence—South Africa's Stations—Radio Millenium League—New Station for Australia—French Invention Stands Tests

Dr. Latour's Patents

LICENSES to use the Latour patents have been acquired by the American Telephone and Telegraph Company, the Radio Corporation of America, the Postal Telegraph Company and the Freed-Eisemann Radio Corporation. Dr. Latour estimated these agreements would have a capital value of more than \$1,000,000.

Hearst-Schenck Radio Chain

WILLIAM RANDOLPH HEARST and Joseph M. Schenck, moving picture producer, have combined to erect a chain of four broadcasting stations, stretching across the United States, whose daily program will be available simultaneously to every radio fan in the country, according to an announcement made through Universal Service. New York, Chicago and Los Angeles have been selected as three of the cities where the radio stations, to cost \$1,000,000 in all, will be located. The fourth city has not yet been chosen.

Radio Hits Florence

ONE after another the old world cities have been succumbing to the spell of wireless; and now Florence, Italy, has taken radio to its heart. It was only a short time ago that a station was erected there

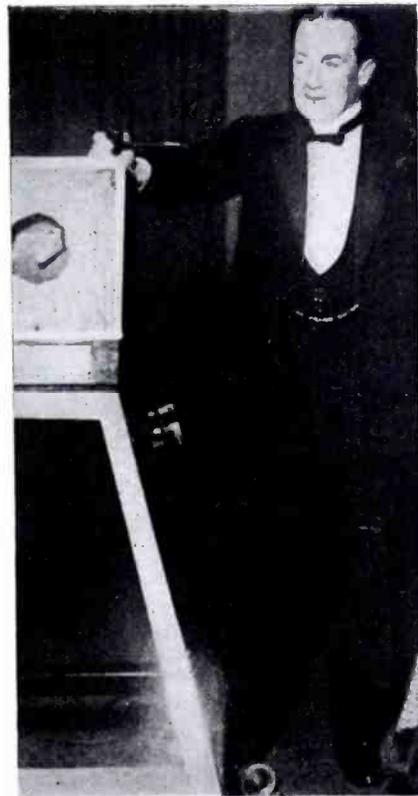
by the Italian Broadcasting Company, while Rome was too far away to be of general interest; but the number of listeners-in is now increasing by leaps and bounds. The Company has now issued regular time schedules for broadcasting in Florence; and this seems to be one of the main causes for the stimulated interest which grew slowly at first.

South Africa's Stations

SOUTH AFRICA has made a habit up to now of figuring in the current wireless news as a party to long distance reception and transmission records; but it is interesting to note that this distant part of the British Dominion has developed extraordinarily in the broadcast field as well. Three stations have been in operation there for some time, at Cape Town, Johannesburg, and Durban, and now two more have been added. The new stations are gifted with the remarkable names of Slang Kop and Walvisch Bay.

Radio Millenium League

AN unsuspecting London daily has found that millennial plans are far easier to start than to handle; and now they are calling for help. A few days ago it was decided to form a Wireless League to do everything for Britain in a radio way that



Premier Baldwin broadcasting an appeal for the Y. M. C. A. through station 2LO

should be done; and a notice was run in the paper inviting everyone who owned a receiving set in Great Britain to join. The response has been so great that the newspaper offices have been fairly swamped with applications for membership and an appeal has had to be sent out asking the fans to please wait until the league officers can dig themselves out from under the ocean of letters.

New Station for Australia

PLANS have been laid by the Queensland Government, in conjunction with Amalgamated Wireless, Ltd., for the erection of a broadcasting station at Brisbane. The station, which will be a "Class A" broadcaster, will be provided with a 5 KW transmitter.

French Invention Stands Tests

THE entire elimination of parasites in the transmission of wireless messages, and secrecy in transmission as well, have at last been attained by the new apparatus developed by M. Charles Verdan. Some time ago M. Verdan made the claim that he had accomplished these two results, and now the official tests, just completed by the Administration des Postes, Télégraphes, et Téléphones verify all that he has said.

The invention, which is attached to the Baudot apparatus, permits the latter to function by the Hertzian waves just as if it were operating over telegraph wires. The apparatus acts as a filter so that the parasitical currents are eliminated.

The P. T. T. experiments were between Nice and Ajaccio, Corsica, and have just been completed with entire success.



Viscount Shimpeo Goto, former Home Minister and Foreign Affairs Minister of Japan, who is now President of the Tokyo Radio Broadcasting Bureau, listening in at his office



The extensive antenna system at Schenectady, N. Y.

Giant Radio Lab.

The 53-acre radio transmitter laboratory of the General Electric Co. — Some problems of radio transmission

By *W. T. Meenam*

STEEL towers and wooden masts, interconnected by wires and anchored in concrete or by cable, are sprouting all over the field in which the General Electric Company is erecting a giant radio transmitter laboratory. Among the masts which hold a variety of antenna systems, are large and small buildings in which radio specialists will seek to solve some of the problems of radio transmission.

The fifty-three-acre laboratory is located six miles south of the city of Schenectady, the home of WGY. In this laboratory the engineer will endeavor to find means of improving transmission quality and reliability, and he will test theories of static and fading, in the hope that these twin terrors of radio listeners may be banished.

The antenna structures include three towers 300 feet high arranged in the form of a triangle. From these steel masts almost any type of antenna may be strung capable of operation between 600 and 3,000 meters. A fourth steel tower, 150 feet high, may be connected to any of the trio of masts for work on wavelengths from 200 to 600 meters. In addition to the steel towers there are numerous wooden masts for antenna systems for experimentation on wavelengths from 15 to 200 meters.

In the largest building, constructed

of steel and brick, will be housed the main power plant. Space is provided for two additional experimental transmitters.

The power plant includes a number of high-powered rectifiers for converting the alternating current supply into a direct current source with a maximum voltage of 30,000. In addition to the rectifiers there will be direct current and alternating current machines for filament energy, biasing and for low-powered amplifier operation. The space allotted for the two experimental transmitters is sufficient for equipments rated at a maximum of from 50 to 100 kilowatts. The power building also includes a dark room for the development of oscillograms and a fully equipped storage battery plant. Here also is located a central pumping system which provides circulating water for all transmitters. This water supply is used for the water-cooled power tubes.

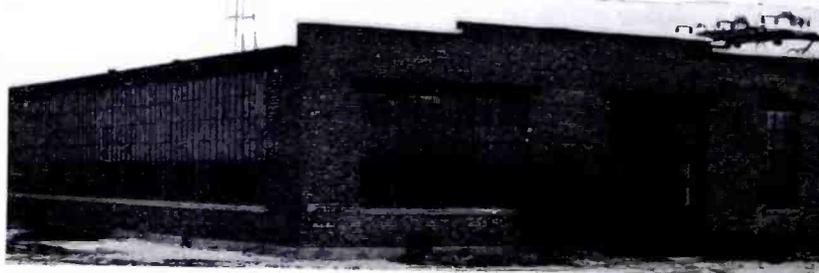
The main power house is connected by cable for the transfer of power to several smaller buildings constructed of wood. These buildings will be used for the development of particular types of transmitters and must be located a distance from other equipment. Very small buildings are located at the foot of the steel towers and in these will be housed the tuning systems for particular types of antenna.

Due to their familiarity with receiving equipment most people interested in radio think of an experimental radio laboratory as a room in which radio receivers, associated circuits and apparatus are developed. In fact many amateurs experimentally inclined have, on a small scale, a receiving laboratory of their own.

In general, most people, due to lack of contact with transmitting equipment, fail to realize that radio transmitters are just as important as receivers. The research, development and design of the two lines of equipment, while essentially different, are quite dependent upon one another.

Experimental transmitter work, especially if high power is to be used, is beyond the scope of the amateur on account of the space and equipment required. The cost of establishing and maintaining an experimental transmit-

(Turn to page 73)



The building where research work in transmission is conducted

Radio tempers the

TORNADO

By
Albert Laird

Relief measures hurried forward in the recent catastrophe by means of radio

HAD a doubt ever existed as to the practical value of radio this doubt is removed when one views the miraculous aid that radio gave the victims of the tornado which swept over the Middle Western states of Missouri, Illinois, Indiana, Kentucky and Tennessee on Wednesday, March 18th.

We still have radio for entertainment and for pastime in the home. It furnishes us with market and weather reports for use in our daily business; but this is only a faint hint of its constructive and educational possibilities. Socially, radio circles the globe and back, many times over in one night. We use to travel far and pay money for entertainment that yielded us far less pleasure than we now receive over the air through our ear phones or loud speaker without leaving our fireside.

But it remained for a great catastrophe to awaken the world to the practical utility and human helpfulness of radio. In an incredibly short time a tornado crossed the southern regions of Missouri, Illinois, Indiana, Kentucky and Tennessee leaving the heart of these states paralyzed, torn and bleeding.

Men, women and children were swallowed up in death as their houses crashed about their ears, and fell before the furious onslaught of this terrific tornado. Telephone, telegraph, railroad and highway service, which a moment before functioned perfectly, with hardly an instant's warning were completely wiped out. Public utilities, churches, schoolhouses, business blocks were splintered and twisted in one endless scrap-heap. The crashing lightning, the over turned stoves, and the high wind resulted in dreadful fires which completed the havoc that the tornado had already wrought.

In ordinary times long hours would have elapsed before any semblance of assistance could have been organized and sent to the scene. But through radio the news was instantly spread throughout all the adjoining states. Immediately doctors, nurses and public

STORM IS 19TH OF TORNADO DISASTERS IN U. S. SINCE 1884

Yesterday's storm was the nineteenth such disaster since 1884. Following is a list of the worst storms since that time

Feb. 18, 1884—Six hundred killed in southern states

April, 1892—Forty killed in Kansas.

June 14, 1892—Fifty killed in Minnesota.

June 20, 1893—Sixteen killed in Kansas river valley.

Sept. 20, 1894—Seventy-five killed in Iowa and Minnesota.

May 27, 1896—Five hundred killed in St. Louis and East St. Louis.

March 30, 1897—Three-fourths of the town of Chandler, Okla., destroyed

May 9, 1905—Thirty killed at Marquette, Kas.

May 11, 1905—One hundred and thirty killed at Snyder, Okla.

March 2, 1906—Twenty-five killed at Meridian, Miss.

April 24, 1908—Five hundred killed in Mississippi, Louisiana, and Alabama storms.

June 5, 1908—Twenty-seven killed in southern Nebraska and northern Kansas

March 13, 1913—Heavy damage and loss of life in Illinois, Indiana, Tennessee, Louisiana, and Texas.

May 26, 1917—One hundred lives lost in tornado that swept Coles county, Illinois.

March 28, 1920—Thirty killed in and near Chicago. One hundred and thirty dead in seven other states.

April 25, 1923—Nearly 100 killed in Oklahoma.

July, 1923—Sixty-three killed at Pomeroy, Ia.

The most recent storm disaster was at Lorain, O., on June 28, 1924, when 67 persons were killed and scores injured during a heavy wind which swept the southern shore of Lake Erie. The property loss was placed at \$25,000,000.

officials forgot their daily routine and began the important task of organizing relief measures. Special trains were hurriedly loaded with supplies and dispatched to the devastated areas. Other trains equipped for cooking, sleeping and hospital use followed the supply train and almost before the smoke had cleared away from the wreckage, medical relief, hot food, bedding, clothing and temporary housing were made available to homeless hundreds.

The response was prompt, for radio had brought a realization of this disaster home to thousands who would have read mere newspaper reports of it more or less casually.

Such a catastrophe as this writes itself indelibly for generations upon the human mind. The Chicago fire, the Iroquois Theatre disaster, the sinking of the Eastland have written themselves into the memory of those in the Middle West states. But in modern times nothing so colossal as the loss of life and property brought about by this tornado has been known by people in this country.

The only pleasant thought in connection with this catastrophe has been the fact that radio has made it possible to alleviate pain and suffering many hours in advance of the time other methods of communication would have made possible.

More than \$10,000 was raised by radio in Chicago alone, on the same afternoon the storm struck. Programs were cut into and in many cases discontinued in order to turn over to the broadcasting stations the work of appealing for help. That and keeping the outside world informed of the progress of relief measures, and the task of acquainting the public with the names of the dead and the injured continued throughout the afternoon and night.

On the fateful night of the storm radio started to work in character of a youngster. In the cold gray dawn of the following morning, it emerged from the storm ridden area begrimed and fatigued, but a full grown man.

“HOW-do-you-do?”

Meet the original “How-do-you-do” man, and learn something about the unique service he renders

By *Ann Lord*

DO YOU know what the “How Do You Do” song is? Well, it’s a song of greeting and salutation over radio which is proving a wonderful medium through which friends and kindred, lost to each other are being reunited.

When you tune-in on the different Chicago stations and hear world criers announcing rather proudly, “This is station ABC and you are now listening to John Doe, the original ‘How Do You Do’ man,” you begin to wonder how this can be true, since so many “How Do You Do” men claim to be the original.

Then when you investigate the facts laid before you in reference to the “How Do You Do” song, you will readily see that the public has forced it into each broadcasting station. A great many men, women and children, have in some unknown place, a lost relative; through radio, the “How Do You Do Man” is the connecting link.

In Chicago alone, there is a list of seven “How Do You Do” men. Either through legal rights or popular demand, these men are nightly forced to go on the air with additional verses to the already long “How Do You Do” song.

Heart after heart crying out for lost ones—and in some cases finding them through radio—and in other cases being cheered on by word from someone who has known of the lost person. This confusion about the authorship of “How Do You Do” song has not been settled until now—and to be accurate, I must say a final decision is now pending in the courts of Cook County.

But everyone is satisfied about the assured outcome. Harry Geise, is the only man who has received royalties from the song. Phil Flemming, a singing partner appearing with Harry Geise at the time he first sang the “How Do You Do” song, has claimed a part of the royalties and this claim has resulted in throwing the matter into the courts.

The other singers using the song make no further claims than, “The ‘How Do You Do’ song was first introduced from station WLS.” “I origin-

THE STORY OF THE ‘HOW-DO-YOU-DO’ SONG

By HARRY GEISE

During the latter part of April, 1924, a certain gentleman and myself were booked to sing at the Sears Roebuck Station, WLS at 6:30 in the evening. At 6:00 P. M. that night, this gentleman and myself conceived the idea of writing a little original ditty to sing to the staff at the Station. We wrote six verses about the different members of the staff, including one verse to London, England, while at my office, which was then at the Loop End Building. We immediately went over to WLS and put on the song.

We were introduced that night on the air as having originated a new song, the “How Do You Do” song, being sung for the first time to the radio audience, by the composers. The requests were so tremendous that we repeated the song about ten minutes later. The song continued to mount in popularity, and we approached a member of the Ted Brown Music Corp. to publish it. We were informed, however, that the song was not commercial, and that it could not be published. Time went on and this gentleman and myself broke up the partnership, he obtaining a new partner, and they went under the name of the “How Do You Do” Boys. I kept on using the song at WEBB, WTAY and occasionally at WGN. This gentleman and his partner were using it, and Ford and Glenn at WLS were singing it every night.

Eventually there was such a demand created that this member of the Ted Brown Music Co. took it upon himself to publish the song, claiming he was re-publishing the old, old “How Do You Do” song with new verses.

No contract was given me, but with the assistance of Jerry Sullivan, Director at WQJ they were forced to make a compromise settlement and give me a contract.

Beginning in the spring of 1923 I became a “Bug” after listening to the mid-night programs, and visited the KYW Studio, going on the air from this station. I gave up my music store and went into the radio game to entertain the public.

Now I am at WQJ, having made connections with that studio, on June 8th, 1924, as Assistant Director, Accompanist, Assistant Announcer and entertainer.

ally announced the “How Do You Do Man,” said Quinn Ryan, now crier for WGN. All these statements are true, according to the seven “How Do You Do” men, and it came about in this manner.

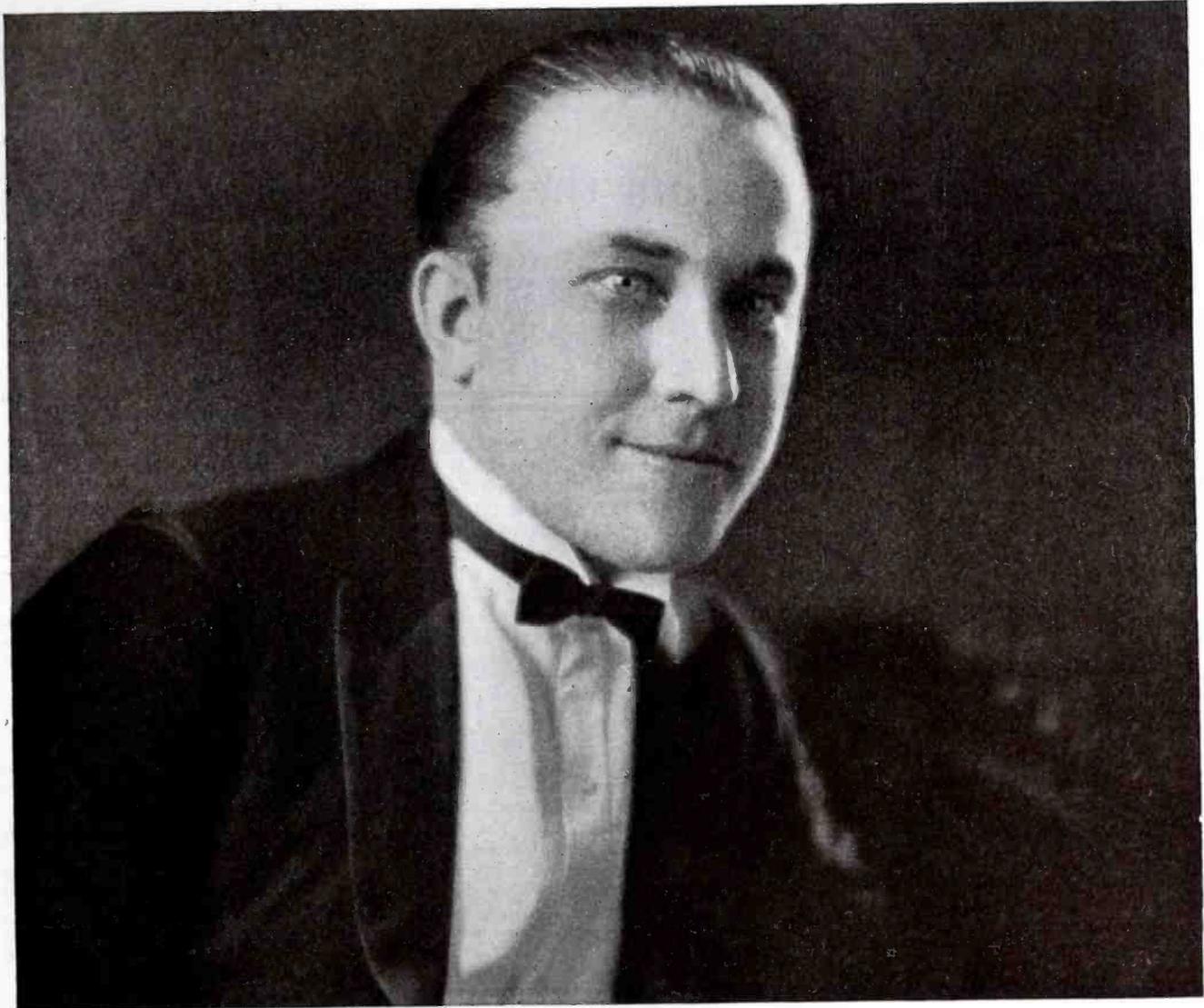
In the spring of 1923, Harry Geise became a radio enthusiast after visiting the KYW studios—Chicago’s pioneer station. He delivered an original entertainment which was so successful that he decided to give up his music store and go over to the radio.

Mr. Geise was walking northward on Michigan Avenue, toward Monroe Street one afternoon a year ago this month planning a program for the opening night for station WLS. As he strolled aimlessly along, an old friend of his came up from behind, slapped him on the shoulder and exclaimed, “Greetings and salutations,” as men will? He explained that since he had accumulated a nice fortune, he had been spending a lot of time and money chasing around over Missouri, Kansas, Oklahoma and Arkansas searching for his elderly father and mother from whom he had run away when a mere lad. This gentleman, whom we shall call Jack Lowell, because that is not his name, had heard about the radio and suddenly exclaimed, “I wonder if you can help me find my folks over the radio?”

There isn’t a thing about this that happened by accident, chance or caprice. It started because Jack Lowell wanted to make amends to the father and mother whom he left on a lonely farm in his younger days. Jack had hated the farm and its solitude. He feared the purple shadows, the dark pines, and the lonely valley. As his parents succeeded at farming they moved farther inland. This for some reason was distasteful to Jack, and he made up his mind to go to the largest nearby city, where the lights were never out. He came to Chicago.

“Mother and Dad were never much on reading newspapers or magazines,” he continued, “but if I could run an advertisement in a seed catalog, I’d be apt to locate them the first week.”

Harry Geise promised to see what



Harry Geise, the original "How-do-you-do" man

could be done about locating the old folks over the radio. Arriving at his office, Mr. Geise talked over the matter with his singing partner, Phil Flemming. Feeling that they had better practice on the staff before trying it out on the public, they composed six verses to a tune called "How Do You Do Mr. Johnson." The words gave the "air audience" a pretty good idea of what was going on in the station and what each member did. One verse even was dedicated to distant London. In a few hours they were on the air again, by popular demand and from coast to coast was heard Jack Lowell's request begging for word from a lonely old man and woman somewhere on a farm—a prosperous son was searching for those dear to him and yearning for the chance of caring for them in comfort for the rest of their lives.

The "How-Do-You-Do" song was born that night. Harry Geise and his singing partner, Phil Flemming sang it for the first time on the opening night at broadcasting station WLS

announced by the popular bachelor of "Uncle Walt" fame, Quinn Ryan. Afterwards, Mr. Flemming became associated with another singing partner and they began to use the song. Mr. Geise became associated with Wendell Hall, with whom he has written nine successful popular songs. The demand for the "How Do You Do" song, however, increased. As it was the opening feature originally broadcast from WLS through its usefulness and popular demand it became necessary for Ford Rush and Glen Rowell, the "lullaby twins" to sing it, and so that's that. There's a grain of truth in everybody's statement, and except for the crossing of wires—no, I must retract that, this is a wireless story based on facts—but aside from a little static between stations now and then regarding the matter, each is justified more or less in what is claimed.

Harry Geise admits that he didn't "originate" the song, his manager, Jerry Sullivan in a recent interview gave proof that the original is an old

college song of the 1492 vintage. It is reasonably certain that it started before Harry Geise was born in a little college town in the Middle West and just like the song "Annie Laurie" "How Do You Do" started from a small beginning. It was originally called "How Do You Do Mr. Johnson?" and Harry Geise recast it into a 1942 mould and put it to work.

As an example, few of us probably think of "Annie Laurie" as having existed in real life, but she did. If we go to Dunfries today we may see her "last will and testament" in one of the institutions there. We know that the song begins, "Maxwelton braes are bonnie," and Maxwelton is near Dunfries. Well, Annie Laurie was born at Maxwelton in December, 1682; and today she lies at rest in Dunscore churchyard about which Carlyle often writes in his letters, for he, too, belonged to that district. Annie Laurie had a sweetheart—a certain Mr. Douglas—and it was he who wrote the original

(Turn to page 64)

The VOICE from the CABINET

By Laurie York Erskine

The mystery that was NOT solved by the radio

CIVILIZATION and progress work strange transitions. Twenty years ago Sarnac was a lumber camp. Today Sarnac is the suburb of any great city which the inhabitants of Sarnac may choose for their shopping, visiting and recreation. We don't think anything of running down to Detroit, three hundred miles away, or spending a day or two in Chicago, which is even further. The daughters of no fewer than seven of our families have been educated at Ann Arbor or Northwestern, and one at least can boast of an education in European universities. That is because in Sarnac we have made money out of timber. We continue to live in Sarnac, but the conveniences of travel and the fatness of our pocketbooks make us merely a suburb of all the world.

Kate Meredith was the girl who went to Europe. There she learned just enough of the difference between Sarnac and the rest of the world to be distinctly dissatisfied with Sarnac. The young people of the little town she found lacking in the things of the world which you learn about in European universities. What we considered "society" in Sarnac—a pale imitation of society in Detroit—did not merely bore Kate, it was incomprehensible to her. This was regrettable because Kate was exceedingly pretty and there was not a young man in Sarnac who did not aspire to be her escort to the delectable social functions which filled our season. The only one who made any headway at all, however, was Jack Early, the science teacher at the High School; and he won his way further into her regard than the rest of us because he had taken some courses at the Sorbonne, and of course knew Europe.

Unfortunately Jack fell hopelessly in love with the fair Katherine. Unfortunately, that is, for Jack: because Kate had not been back in Sarnac a year when Rodney Trimble came and opened his office in the opera house block. Rodney not only knew Europe, but he possessed a certain distinction, and ease of manner which far outshone the graces of Sarnac's younger set. He dressed with blithe disregard of middle western ready made clothes, and he spoke with a modulated tenor that suggested Piccadilly without imitating it. He sold bonds and had come to help the retired timber barons of all the little Sarnacs which lie secreted in the Michigan woods to properly invest their money. He achieved this altruistic mission with singular ease. Also he achieved Jack Early's place at Kate Meredith's side.

But we are leaping ahead of our story.

Laurie York Erskine, author of "The Voice from the Cabinet," is the author of the famous "Renfrew" stories.

The success of "RENFREW OF THE ROYAL MOUNTED," led editors and publishers to demand in hysterical chorus for more and yet more books like it; with the result that because Mr. Erskine had thought his boy readers might be interested in some stories about the Mounted Police, he found himself apparently doomed to write about nothing else for the rest of his life. In a single year he wrote "The River Trail," and "The Laughing Rider." He also wrote "The Confidence Man," "Valor," and "In the Event of Death."

"The Voice from the Cabinet" written especially for Wireless Age—The Radio Magazine, is one of several attempts of the writer to prove that he can write a good short story without leaving the living room of an ordinary American home. You can judge for yourself how well he has succeeded.

This story really begins two years after the advent of Trimble. It begins on an evening when Jack Early made his way through the snow covered streets of Sarnac to the large and ugly stone house which represented the fact that LeRoy Meredith had made three million dollars out of timber lands. Jack carried a small parcel wrapped in brown paper. Mrs. Meredith opened the door for him, and her somewhat tired eyes brightened when he entered.

"I'm so glad you've come, Jack," she whispered as he entered the hallway. "You know I can't leave her alone, I really can't."

This somewhat embarrassed Early.

"Oh, she's all right," he murmured cheerfully; and with his paper parcel under his arm, he cheerfully invaded the living room. It was a very large room, and like the house, it was designed for effect. Hand painted murals panelled it, and the furniture suggested the corridors of an expensive hotel. Kate Meredith occupied one of the roomiest of many roomy, overstuffed chairs, and LeRoy himself arose rather sheepishly from an overstuffed davenport. He had been napping.

"Hello Jack!" he boomed.

Early turned from the girl who, having greeted him, stood gazing at him in a

thoughtful, contemplative manner, and shook hands with the older man.

"Come to fix up the ole dofunny?" LeRoy Meredith had lost none of the simple, bluff good nature which distinguished him before he was persuaded to stick that capital R in his first name.

"Yes," replied Early. "We'll get it working tonight, all right." He placed his parcel on the gate legged table.

Thereupon Kate's father sank into a chair and would have embarked on a sociable evening with this young man whom he liked for his straightforward, unaffected manner, but Mrs. Meredith achieved extraordinary signals from the doorway, and he reluctantly arose.

"Well, I guess I better get along upstairs," he murmured clumsily. "Leave you young folks together."

Ignoring the wince with which his daughter received these homely sentiments, he followed his helpmate up the grand staircase which swept about the panelled hall, and retired into a roomful of books which he never read.

"Let me know how it sounds when you got it ready," was his passing adjuration; and Early promised him that he would.

Left alone with the girl, Early turned to her with a smile.

"We'll soon have the old radio in working order," he said gaily, "and then you'll have a vaudeville performance whenever you want to turn the handle."

In a very business-like manner he unwrapped the tools from his brown paper parcel and carried them over to the long cabinet at the end of the room which was Sarnac's second radio set; the first had been installed by Early at the High School.

She followed him with her eyes, thoughtfully, contemplatively dwelling upon him, as though he might hold the answer to a question which seemed to occupy her mind to the exclusion of all else. But this was not for her the expression of the moment. Her eyes had held that far seeing, contemplative look for many months now. It had become habitual with her.

If he was conscious of her gaze he did not betray the fact. His way was a studious one, his manner was infinitely calm, his clean cut features serene. With an almost imperceptible lift at the corners of his mouth, he seemed to smile as he worked at his self imposed job. He did not look at her until he had probed about for some minutes inside the cabinet, and then he turned to her as a doctor might turn to the mother of a child he had been examining.

"Now what would you like?" he asked her whimsically. "The Detroit Symphony Orchestra, or the Roseland Marimba Band? Gabrilowich, or Irving Berlin?"

She came and sat down upon the colorful Ottoman which her father had conceived was fitting to the estate of a lumber baron.

"Jack, you're the kindest man I've ever met," she said. He greeted the serious note of her voice with a smile which parried the compliment she paid him. "But you don't seriously suppose that a new kind of canned music can . . ."

she halted with a shadow of pain in her eyes, at which he frowned. "can . . . take my mind away from him . . .?" She was like a little child who pleaded for something which she could not have. Then she noticed his frown and was immediately penitent.

"But I appreciate it!" she cried. "I do! It's a fine thing if only because it brings you here! I don't know what I'd do if I were left alone!" She arose impetuously from the ottoman and impetuously dragged forward a light chair in which she seated herself close to him. "Mother and dad get on my nerves so!" she confided to him; and there was an intensity of feeling in her voice which caused him to glance quickly and keenly into her eyes. "They seem to be watching me!" she protested. "Always watching me! As if I was crazy or something. And I'm not! I'm not crazy, Jack . . . It's only that I can't forget him! They think that they can do things and take me places to 'take my mind off'!" This she said with elaborate sarcasm. "But they can't do that because my mind isn't 'on' anything. It's just that he is in my mind, and they can't take him out of my mind! Nothing can take him out!"

Early did not seek to interrupt her, he just sat and received all that she had to say to him without betraying the trouble that he felt. He was convinced that this infatuation which filled her mind was the creation of her fancy; the fabric of a romance which her own hunger for it had conceived and nurtured. But he couldn't tell her that.

"I suppose you're right," he admitted. "I suppose nothing can take this out of your mind; but I don't see any reason why you can't listen to the radio." He smiled whimsically. "The radio never took anybody's mind off anything but trouble," he said.

"Last year when Mother took me over to Italy, she thought I'd forget everything," said Kate. And Early noticed that his gentle protest had not so much as inter-



REVERE F. WISTENHOFF

"Now, what would you like?" he asked her whimsically

emotion he permitted her an ever so fleeting glimpse of his percipience. She felt it without understanding it.

"You think that I'll forget!" she cried. "Well, I won't! I shall never give him up! I know what the people of this horrible little town are saying. They say he jilted me and that it serves me right! Well he didn't! Somewhere he is thinking of me and trying to come back and fulfill his engagement with me! I know it! And I'm going to wait for him. This isn't any school girl romance, Jack! It's real. I'm a woman now! And I shall stick to my part of the engagement. Why I can see him now as he sat where you are sitting on the night before he . . . he left. I can remember his face! I can even remember the tone of his

voice . . . !"

"But you can't live all your life with this infatuation!"

Early's voice crashed in upon the silence which followed her attenuated regret with the harsh ring of reality. She started and turned white with astonishment and pain. She stared at him, with mingled anger and distress.

"What do you mean?" she cried.

He clenched his teeth. It had been an outburst of all that he had held repressed since she had returned from that trip abroad. He had not meant to so betray himself.

"I'm sorry, Kate," he cried impulsively. "But that's true, isn't it? You can't go on all your life moping over this man's disappearance!"

She stood erect, disdainful and yet strangely disconcerted. She felt in that moment an uneasy suspicion that not a small part of the legend she had built upon her shattered romance had lain in the devotion and sympathy of this young suitor. She experienced one of those disturbing glimpses of the truth which revealed a peep of how largely her distress for the vanished Trimble constituted a hold upon the devotion of Jack Early. But that glimpse was immediately obscured by the resentment it aroused. Of course she took the resentment out upon Early.

"Yes!" she cried defiantly. "All my life! Oh, Jack! I thought that you understood! I thought that I could rely upon you out of all the rest of them to . . . to respect my feelings!"

rupted the sequence of her thought. "But I didn't!" There was a shade of pride in that. "When Rodney Trimble disappeared from Sarnac, and the days and weeks passed, and we never heard from him again, everyone said he had gone for good. And you know the mean and beastly things they said of him!"

Early nodded. He knew, and although he himself had never mentioned those mean and beastly things, he knew also that there was some foundation for the dark stories which had clouded Trimble's name after his abrupt departure. Trimble, in fact, had been a young man who knew how to pay two different kinds of attention to two different sorts of girl at one and the same time. Early was not alone in his suspicion that the man's unheralded disappearance might have been traced to the complications which are so often the result of such heroic enterprise. But Early did not mention these things because Early loved Kate Meredith so deeply that he was able to divine in her lovelorn devotion to the departed gallant an element of which Kate herself was ignorant. He knew that Kate grieved not for the departure of a lover, but for the dissolution of her romance. Only by grief could she keep that romance alive. So she grieved, without knowing that her grief was wasted on a shadow; that her romance was merely a dream.

Of course a man can't carry a knowledge of that sort into the living presence of the girl he loves without betraying something of it in his eyes. As Jack Early nodded his assent to the girl's outburst of

wooden screen which fronted it. "You have just heard the Rose-land Marimba Band in a series of selections from refined jazz melodies. This has been a great treat to—"

"Turn it off!" she cried "Turn that terrible thing off!"

Early quickly obeyed her.

"How dare you turn on that terrible noise, when I'm speaking to you?" She frowned upon him with snapping, dazzling eyes, and an uneasy premonition that she was going to cry.

"I didn't know it was going off," he pleaded penitently. "I was just fooling with it."

To his horror she answered this with a sudden melting. The angry and rather attractive sparkle of her anger left her eyes which became abruptly filled with an entrancing suffusion of soft, sorrowful twilights.

Then she sank abruptly into her chair and burying her face in an arm which she laid on the back of it, she wept.

"Oh, don't Kate!" he hovered helplessly over her. "I'm sorry! Please don't think that I wasn't listening. . . ." Abruptly he became conscious that he had nothing to be sorry

There was an instant when both of them surrendered to a perceptible thrill as his eyes met hers. She was the first to compose herself.

"I don't think much of that," she said. And her superb poise completely deceived him. He decided that it was not possible that this brown haired girl with her eyes still moist from crying could have felt the same emotion which he had experienced in that instant when their eyes had met.

"Of course you are all eager to hear the orchestra as we promised to broadcast it," the voice of the announcer moved unctuously onward. "But we're going to take a few moments before the program begins to ask your kind co-operation in a matter of serious importance." The voice became suddenly and profoundly grave.

"He talks through his nose," she pointed out witheringly.

"Shall I turn it off?"

"No." She halted him as his hand moved toward the instrument. "Let's hear what the important thing is he's got to speak about." She endeavored to conceal by her casual tone the surrender she was making to her curiosity.

"Politics, I suppose." Early murmured the remark on the heel of the announcer's portentous voice.

"It has been our hope," quoth this invisible master of ceremonies, "that the radio might some day be made a medium of vital usefulness to relieve distress and alleviate the sorrows of this strange thing called life." His tone was now deeply philosophical. "Tonight," he continued, his voice brightening perceptibly as though to convey that all might not be as dark as it is painted. "We believe we have the opportunity of putting this to the test. We are going to ask all our friends to listen in closely upon this acid test of the radio and do all in their power to help us

carry this good work to a successful conclusion. . . ." A pause, dramatic and instinct with suspense. The young man and the girl in that living room at Saranac, three hundred miles from the chamber in which the announcer was speaking, felt themselves under the influence of the peculiar romance with which the sound of

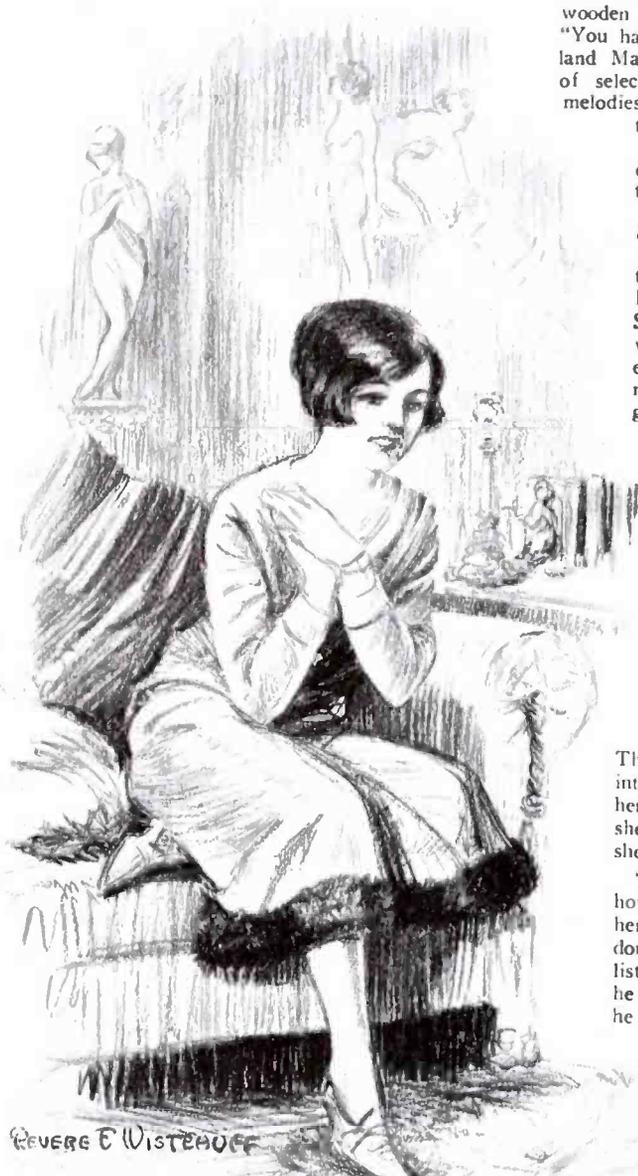
that suspended voice permeated the air about them.

"Standing here at my side," boomed the sure tones of the speaker, "is a young man whose memory has failed him. Three months ago he was taken seriously ill in the lobby of the Tulliver Hotel. Since then he has fought for his life in a hospital bed suffering from a grave and complete nervous breakdown. He is now in seeming good health; his body is strong and his cheek is flushed with healthfulness. In addition to that his mind is in tip-top condition. But—and here, my friends, is the point at which you can be of aid perhaps—his memory is a blank. He can remember nothing of his life before he collapsed in the lobby of that hotel. He cannot remember his name, nor the town from which he came. He believes that his

ior. That he had done nothing to offend her. This was a relief to him, and since she gave no sign of accepting his meretricious penitence, he turned again to the cabinet.

"Listen, Kate," he said. "I'm going to get the Symphony Orchestra." And he became so intent upon the shining disks that he did not see her peep toward him from her dewy hands. He did not detect the mingled pleasure and perplexity which was in her eyes. And he did not notice that she turned about in her seat to gaze at him once more with that thoughtful, contemplative gaze with which all unknowingly she betrayed an interest in him of which she was not yet consciously aware.

When the portentous, baritone voice of the announcer responded to his manipulation of the disks, Early looked up to find her sitting there quietly observing him.



REVERE E. WISTRAND

"Let him speak! Let him speak!" cried the girl to the cabinet

"Why, I do, Kate! You know that . . ."

"But you don't!" she cried. She was determined to make him suffer. "You don't! You're just like the rest of them! You're laughing at me! Yes, you are!" She flung away from him and turned—a picture of Trimble which smirked pleasantly at them from its silver frame upon a carved table.

Early turned in despair to the cabinet and toyed with the disk which controlled the mysteries it contained.

"You're laughing at the very idea that I'm serious!" she continued. "You think it's just a pose! Well, I'll show you! Some day Rodney Trimble will come back into my life again, and you'll find that it has been only circumstances which he couldn't control that have taken him away. Then you'll see! . . . Are you listening to me? You'll see then, that you have done him wrong."

"DOUBLEYOU JAY ELL EMM!" boomed a voice from the cabinet; and she broke off to stare in confusion at the

home was in a small city, but even of that he is not sure. He remembers nothing. And yet it is certain that in some home over this broad land there is a family—a mother, or wife or sweetheart; perhaps there are some little ones—who have lost him and who have given up hope of his return. On some day of the vanished past this man left his home, no doubt expecting to return that very night, only to be swallowed up in the oblivion of this disease which has afflicted him

"Even while I am speaking there is perhaps someone listening to my voice who has grieved for long months and sought in vain for this lost man"

Early, glancing quickly up from the carpet which had held his gaze, saw suddenly that the man's words were all too true. Kate Meredith was hanging upon the sound of that voice with a singular fire in her eyes. Here indeed was some one who had already visualized who that lost man was. Early perceived with alarm that the girl's romantic nature had already prepared her for the conviction that this lost one must be the vanished Trimble. He divined that to her mind fate was now playing out the last act of her romance. She hung on the voice from the cabinet as ancient devotees must have hung upon the words of the Delphic oracle. Catching his glance, she smiled with her eyes and breathed a command through half opened lips.

"Listen!" she murmured.

"And now this man is going to speak to you," declared the announcer. "He has consented to come here this evening and broadcast his voice over the length and breadth of this land in the hope that it may reach some loved one who will recognize it as the voice of he whom they are seeking. If there is anyone who does this—"

"Oh, why doesn't he let him speak!" The girl sat tensely on the edge of her chair. Her fingers gripped the arms of it. Her bright eyes were glued upon the cabinet from whence came that smoothly flowing voice.

" . . . if any of my listeners recognize his voice, I am authorized to say that this station will be ready and willing to pay the fare of this forgotten man back to the hearth which claims him; and we'll see that he is properly escorted to his destination"

"Let him speak! Let him speak!" cried the girl to the cabinet; but the voice from the cabinet proceeded without a break in its suave accents. Early for his part could only watch the girl.

"Now I won't hold you in suspense any longer," quoth the oracle. "You can all understand the importance of this thing the radio is about to execute under the auspices of station WHKY. I am now going to give my place at the microphone to this man who has forgotten who he is. I thank you."

There followed a moment of electric silence. Early found that he had so far fallen victim to the thrall of this strange situation as to feel his forehead, damp with sweat. The room seemed unbearably hot, and the sight of the girl, sitting tensely expectant with shining eyes, did not alleviate his discomfort. For he knew in that moment the pleasure and security he had derived from Trimble's disappearance. He

loved this girl, and he had felt keenly the ease with which Trimble had displaced him at her side.

A few discordant, grating sounds proceeded from the cabinet, only to be replaced by an infinitely faint and halting voice. And Early, who with cool and scientific complacency had accepted this ethereal intercourse of the radio as a thing of mechanical precision, knew for the first time with what magic he had dealt. Without any tangible means of conveyance here was a voice speaking in his ear; the voice of a man hundreds of miles away was appealing to a hundred thousand homes for the place in one of them which fate had stolen from him.

As Kate Meredith strained every faculty for the faintest hint of the accents she so ardently desired to hear, Early sat dumbfounded and tortured by the menace to his happiness which thus came uncannily out of thin air from far distances. The voice of an invisible man.

"He speaks so faintly," murmured the girl. And certainly the pale shadow of a voice which emerged from the cabinet amply justified her plaint. So faint it was, and so infinitely halting in its cadences that it seemed like a voice from another world. Then, as if in response to the girl's complaint it rang suddenly louder and more firmly. The speaker had been turned to the microphone.

" . . . I cannot remember that," came the new, firm tone.

Kate Meredith threw herself back in her chair, her eyes wide, her lips a little parted.

"I don't think of anything I can say," continued the voice. "Because there isn't anything I can talk about, and it seems queer to stand here and speak to a piece of machinery . . . like talking to yourself. They tell me that thousands of people are listening to me, and that if I talk a while there is a chance that someone who knows me will recognize my voice . . ."

There was an unconscious pathos in the plaintive sound of those words. Early, hearing them, frowned in sympathy for the speaker. But for the girl who sat so tensely opposite him

there was something more than pathos in the words she heard. The voice was a soft and rather musical tenor, and there was in it a peculiar inflection; a drawling head note which is seldom heard in Michigan.

"I only hope that there is something in it," continued the speaker. "To live on like this is like living in a nightmare . . ."

It was a cultivated, distinguished voice. It had a singular refinement, a certain polish.

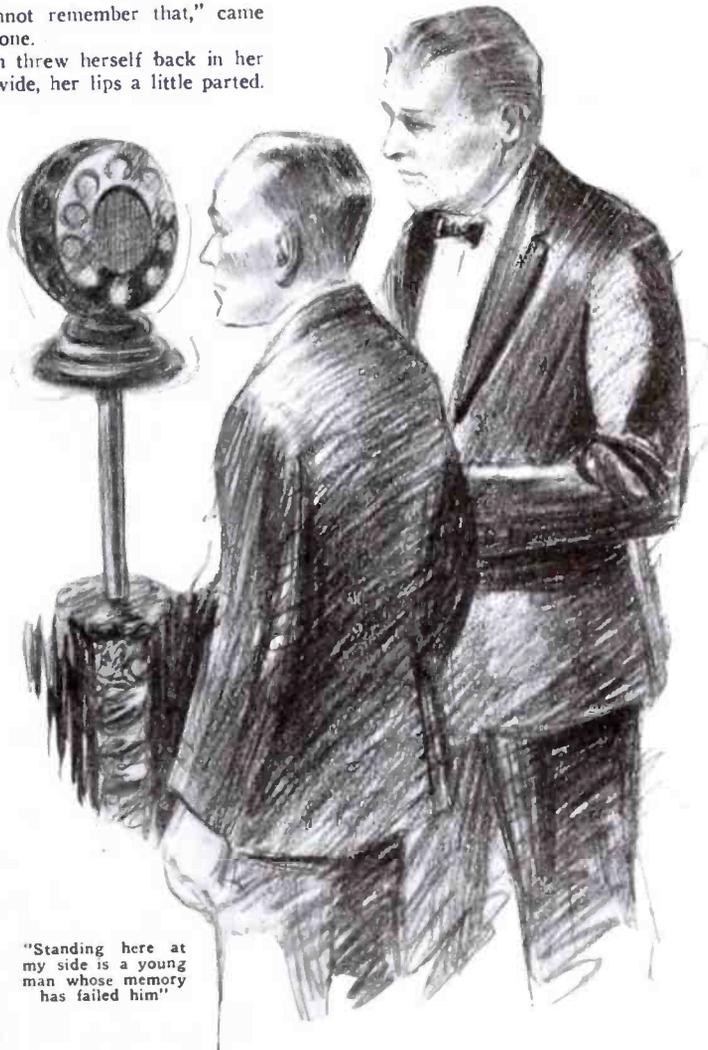
"It's Rodney!" she cried out suddenly. "It is, Jack! It is! I can see him now as he sat here. I can hear every little inflection!" She was on her feet, crying out her discovery with a shrill, high excitement which had something of hysteria in it. "Go to the telephone Jack! Ring them up! Get to them! Get to them! That's Rodney Trimble talking to us now!"

The voice droned on, but Early had no ears for it now. He had leapt to his feet, thrilled to the marrow by the discordant note with which she had broken her tense silence. He put an arm about her.

"No!" Don't lose control of yourself! Kate! Listen to me! You are mistaken. You're over-excited. That might be the voice of almost any man in the world. You must control yourself."

"Don't touch me!" she cried. "Oh, can't

(Turn to page 70)



"Standing here at my side is a young man whose memory has failed him"

N.T.G.

Speaking:
"Ready Boys?
Let 'er Go!"



"N. T. G." with his Airedale "Rhode Island Boy"

WHN's

popular announcer
as he is in real life

By
Golda M. Goldman

NILS THOR GRANLUND!
The name alone takes us into the far spaces of the north, where the surges of the sea beat against the shores and the great wide spaces lie bare under the open skies. It is neither the name nor the inheritance that one might expect as a back-ground for the famous N. T. G., whose name has come to mean the personification

must have laughed as he looked down, not so long ago, on the little village, on the boundary line between Sweden and Lapland, and saw his tiny, squirming, name-sake! The spirit of his laughter must have gone into the baby who has found his mission in life to be the spreading of smiles and chuckles that ripple out over the world as far as thought and air can reach. But the Thunder God gave him more than the gift of laughter; he gave him an exuberant joy of living, and a daring, adventuresome spirit. He must have said as he looked down on the little snow-covered village, "This child shall travel where the winds go and he shall feel the elements no more than do my own thunderbolts, and far as he goes, he shall rake with him a spontaneous sense of humor that shall prove a boon to all mankind."

The child's father was a baron, and kept a little trading post in the frozen, beautiful country. His mother was a northwoods woman, with eight sturdy brothers and one strong sister. The little community in which they lived was crude, but it developed men and women who could buffet their way through life. Into the trading post so near the Arctic Ocean came the Laplanders with enormous herds of reindeer, ten thousand at a time. They were quite without the knowledge of how to coin the untold wealth which their herds represented. This the baron taught them how to do, and so his trading post was a center for the activity of that vast region. His small son rode around in sledges built like the modern canoe. They were skin-covered and lined with strong woods. The boy would slide inside, lace the coverings around his waist, then all

the deer would go throwing up huge chunks of snow with their hoofs while the sledge skimmed across the frozen surface like the winds themselves.

It is a far cry from a life like this to the black and white velvet studio in Loews State Building, at 45th Street and Broadway, New York City. The life that filled the intervening years was incredibly active. At the age of nine, young Nils was brought to the United States. Until his voyage to



Mrs. Granlund has caught her husband's love of fishing. Here she is off Wickford, a little fishing village of Rhode Island

of Broadway, the concentration of the white lights and the music of jazz writers, but it fits him perfectly for no drop of the Viking blood of his ancestors has been wasted in N. T. G.

How Thor, the God of Thunder,



Little June loves Daddy's Airedale too—and he loves her

America he had never seen the sea, and yet the sea was to become his greatest love. A friend of his father's owned a boat which was going down to Turks Island, near the end of the Bahama group. The nine-year-old boy

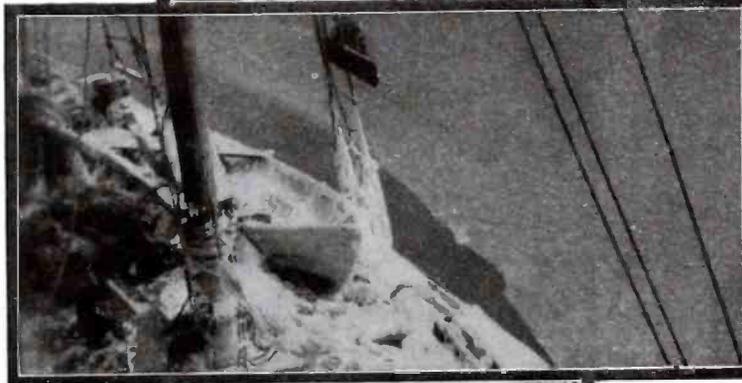
shipped as part of the crew. They went after a cargo of rock-salt to this barren little dot in the Atlantic Ocean. Nils had a very important job. The natives brought huge baskets of the dirty, rocky salt and dumped it into the hold, and into each emptied basket the youngest member of the crew dropped a little coin worth one-fifth of a cent. Five baskets of the heavy stuff the natives brought for a cent and he was their pay-master. Here, too, they bought coral for next to nothing. This was the first of a series of innumerable voyages to South America. In between and during his trips, he attended school. As he grew older he spent his summers on racing vessels in Narragansett Bay and here he made good money. He had been in every hell-hole in South America, where men were killed every two minutes, and now he transferred himself to the society of the Newport millionaires, and became friends with the best of them. At seventeen, amazingly enough, he graduated from high-school, and although he calls his education "sketchy" I understand that in his delirium several years ago it was Greek that he recited.

At seventeen after graduation, he got married with the intention of giving up the sea. He found, however, that he could not make enough money in other lines and that he enjoyed the sea-life too much to give it up entirely so he shipped aboard a Portuguese schooner, the *Louisa Silva*, and fished in the North Atlantic. After several trips his writings became known and he became Sporting Editor of the "New York Tribune."

The years here are crowded. He drove race horses in amateur sprints. He became a boxer and then handled prize-fighters. He wrote sea stories and spent his summers following the sea. He was at the wheel of some of the most famous yachts in American waters. He was friends with Hollis Burgess, and was Skipper on the *Dorothy Q.* With Thomas Fleming Day, America's foremost yachtsman, and editor of the "Rudder," he was to sail to Rome in a twenty-one foot boat but was unfortunately taken ill so that Day made the trip with another crew. Many a yacht he took around Cape Cod on a commercial basis. Canoeing to Block Island, seventeen miles off the coast, was an incident in his life. In the course of his wanderings he discovered the old Convict Ship in Boston harbor. There it lay at the wharf and it's owner had very

little idea of what to do with it. Granlund's imagination centered upon this and he wove around it a romance of Australia, brought the ship to Providence, and sailed it around the Cape. He had the boat on exhibition in Providence when Marcus Loew came to town and so begins a new chapter.

Loew made Granlund Press Agent for "Hanky Panky" and for one month he went on tour doing this work. He didn't like it though. He had to be nice to people whom he didn't care about and so he left, but when he



(Top) "Granny takes the wheel when off shore—280 miles outside of Boston. (Center) A trip during winter in Boston Harbor. (Bottom) N. T. G. landing a 14-foot sword fish that weighed 480 lbs.

drifted into New York, Loew got hold of him again and showed him all his theatres and so for the last eleven years the name of Nils Thor Granlund has come out on all publicity for the Loew Theatres.

To see him today, tall and slim, and

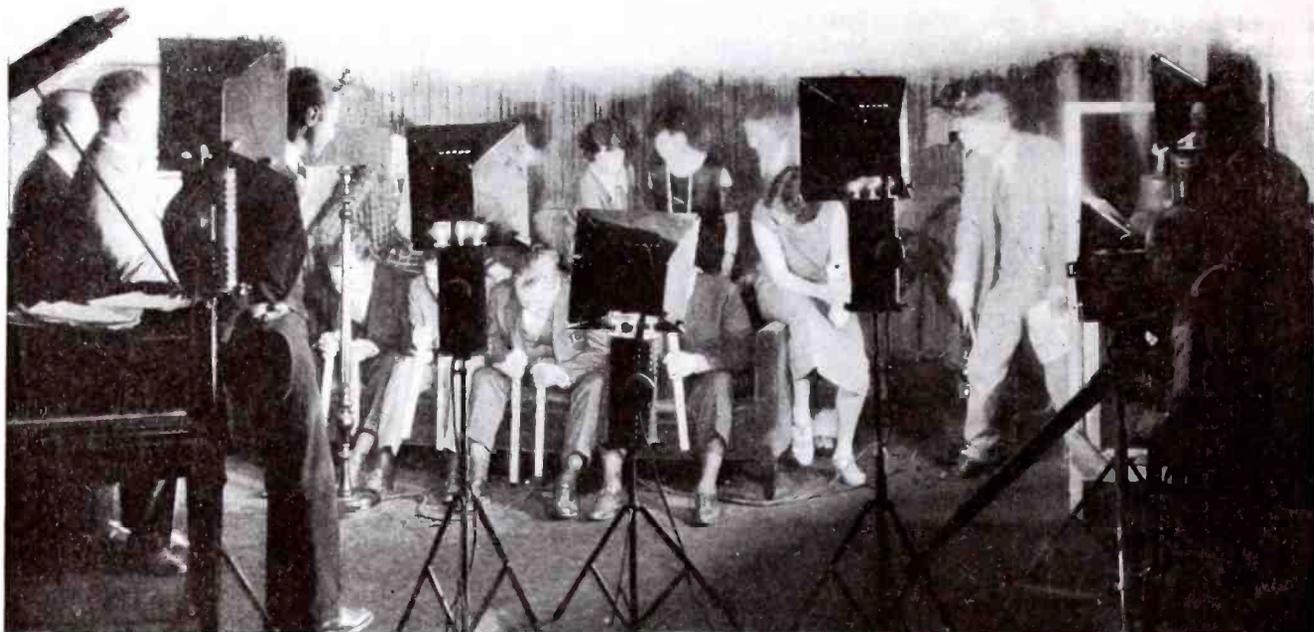
elegant in his perfectly fitting gray clothes, his gray silk shirt, and his gray tie, as much at home before the microphone at WHN as any host in his drawing-room, affable to the great and near-great, with a constant jest on his lips and a spontaneous humor which bubbles all over the world, it is almost inconceivable that his back-ground is what it is. To see him now is to see the personification of civilization and his life has been spent in the wildest places of the earth.

His work with the Loew theatres has shown much real ingenuity. He evolved the system of opening theatres with movie stars which is to some degree responsible for the fact that he is extremely delicate looking today. Three years ago he was taken with appendicitis and peritonitis set in. At that time several Loew Theatres were being opened so he refused to stay in the hospital. He would come out in the morning, direct the opening of a theatre, and go back to the hospital at night. Any temporary improvement was of course overcome. Three attacks took him into four hospitals. The doctors gave him up, but probably the God of Thunder, always admiring the Viking spirit of his protege, protected him and so N. T. G. did not disappear from Broadway.

During this work, of course, he has developed an enormous acquaintance with movie and musical comedy folk and through him hundreds of actors, actresses, song-writers, etc., got their start. Clara Bow, for instance, now drawing one thousand dollars a week, got her first job through "Granny" as did Mary Miles Minter, etc. The walls of his office are covered with photographs of every one from Mary and Doug down.

I referred before to some of his writings. As you tune-in at night you are apt to hear one of his songs being sung, probably by request, as this is one of the favorite numbers of WHN. It is called "Rose of the Evening" and to N. T. G.'s words Al Piantodosi, author of "The Curse of an Aching Heart," etc., wrote the melody. The song is dedicated "to our own Broadway"; or you may have been fortunate a couple of years ago to see a poem called "The Liner Speaks to the Fisherman" in the Ocean Number of the "Mentor." Perhaps you would like to hear N. T. G. tell how this poem came to be written:

"Three years ago in the summer I
(Turn to page 56)



WGY Players running a horse race scene in "The County Fair." It doesn't look much like a horse race, but it sounds like one over the air

Broadcasters
giving
us

E ducation *via* R a d i o

Dr. Frank H. Vizetelly, Dr. Clifford Smyth,
Prof. Godfrey Ludlow, Vitali Koretsky,
and other educators constantly on the air

By Mrs. Christine Frederick

IT HAS long been an established fact that most people learn by word of mouth and by listening, a great deal easier than by reading. Since this is so, I can conceive of no greater boon to education than radio. It has practically taken the English language by the ears and turned it upside down. Nothing since the war has had such a startling effect upon our basis of communication.

One of the most interesting people who have brought to us education from the air, is Dr. Frank H. Vizetelly, LL.D., Litt.D. He is a dictionary and encyclopaedia man — literally; yet he is delighting a multitude of listeners. I wanted to see personally this man of learning who is a feature of the WOR programs. I consider the popularity of his talks a striking sign of the times. A radio reviewer in one of the New York papers has said that "there is nothing more interesting in the whole world of radio than Dr. Vizetelly's

talks on words." He has been bulletined as "the man who never mispronounces a word" and "the person with

the largest vocabulary in the world—455,000 words."

I had rather a definite set of uncomfortable qualms about meeting this dean of lexicographers, feeling that his bookish attitude might overwhelm and intimidate me. But not this word wizard! Back of a barricade of books and papers about his desk in the office of Funk & Wagnalls, of whose New Standard Dictionary he is managing editor. It seemed to me likewise that he was a regular good fellow.

Dr. Vizetelly looks upon words as an artist upon his palette of color.

"The dictionary is the color box of speech," he said, "and speech is the force that sets the wheels of action in motion; it is more than that. It is the medium that steers the ship of human affairs."

"A dictionary is like some great ocean trader—a Leviathan just arrived in port. It is laden with cargo from every land, with the harvest of



Godfrey Ludlow of the WJZ staff and his priceless De Rougemont Stradivarius

every clime. It resembles a vast clearing house where one meets all sorts of men. After all, words are not altogether unlike the persons who use them. In the dictionary we come into contact with a multitude of words that seem like the shadows of men—scholars, dandies, spectacled professors of science, antiquated words, the querulous archeologists grumbling at modern times and men; new words, fresh and like saucy boys just launched into the world with letters of recommendation from some well accredited source; common words; malignant words; bombastic words—the bullish phrases of the braggarts, the affected nobles of recent rank; shameless words—the dwellers in Babylon—that are barred from polite speech; foreign words—travelers who have lost their way.”

I was charmed with the manner in which Dr. Vizetelly brought out this

wizardry—this new invention—radio!”

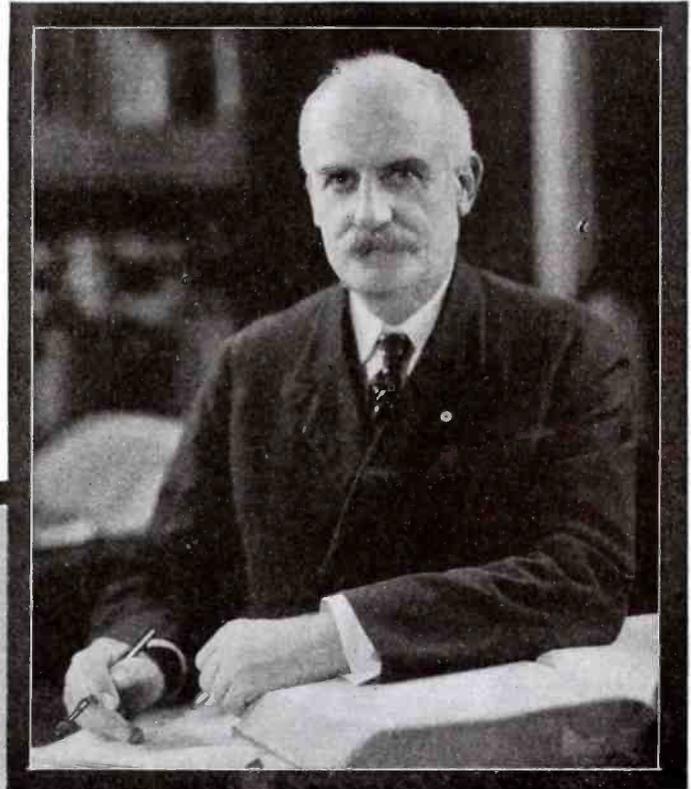
“Radio! Never in the history of science has an invention gripped the fancy and interest of the people as has the magic of the air. Naturally a brand new vocabulary had to spring into being to cope with the shadows of technique in this new field that had to be labeled and expressed.”

“Radio has peppered

mental picture of this charming man who has with good reason been called the “King of Your Vocabulary.”



Dr. Clifford Smyth, Editor, the International Book Review



Frank H. Vizetelly, L.L.D., Litt.D., Managing Editor of Funk & Wagnalls' New Standardized Dictionary

array of words as personalities. I was breathless at being surrounded by so many people I had known so long—yet who remained in the background of my mind to be picked out like a special dress for a special occasion. I wanted to become better acquainted with these fellows whom I really knew back in my unconsciousness.

“Tell me more about words,” I urged Dr. Vizetelly, and he continued:

“One points to the mistakes that we make; another gives friendly advice; a third shows us historic facts; a fourth explains popular tradition. And as we proceed, we dream, and learn language, history, morals, poetry, science, sports, and trades. Where can more be found in any book? Believe me, the romances of all written history are bound within the covers of the dictionary.”

“What?” I asked him, “about air

the whole dictionary with new words from ‘auto-dyne’ to ‘zymo-dyne’ like a charge of buckshot. There are over two hundred words with the prefix ‘radio’ alone which would spread over at least a page of the dictionary. I don’t think it would be amiss to state that the language has been enriched by about five thousand vocabulary terms by radio. The modern dictionary has become almost a code-book of radio. Also the average person has increased his vocabulary through radio. How many? Well, I don’t know—I think the fan—the dyed-in-the-ether variety has enriched his fund of words by at least two thousand.”

“I’ll never miss you over the radio,” I told him as I was leaving, and I knew it was true. I can’t afford to—for in addition to what I could learn, I knew each time I listened there would be a

IN THIS wealth of “larnin” that is so plentiful through the air—almost as plentiful as the very air we breathe, there is an interest in this education to me because it not only gives you “isms” or technical, detailed studies, but also because one jumps from such a “class in words” as I have just outlined by Dr. Vizetelly, to—by a mere turn of the dial—a famous tenor who has just made his debut via radio through WEAF recently. Hearing tenors, however, is not enough for me. I like to see them, and I like to bring them to you, and so here is Mr. Vitali Koretsky, of the Moscow Opera Company. Mr. Koretsky is a product of the Italian School and finished his studies in the Imperial Petrograd Conservatory of Music. He was engaged in the Petrograd Opera and also appeared in opera in Odessa, Kief, Moscow and other large cities of Europe. His repertoire includes twenty operatic roles in five different languages. He has sung before many of the crowned heads of Europe; has given concerts in Constantinople and London. Athens, Paris, Nice, Monte Carlo and many other important cities. His most unusual appearance was a radio program given from Paris and broadcast especially for

(Turn to page 54)

The **H.I.** in Broadcasting

By
Dorothy Brister Stafford

"Down in Park Row's inky grime
Where I used to spend my time,
A-servin' of his majesty, The Press—"

WE HAD a god yclept Human Interest. One Kelley, a red-headed tyrant who reigned supreme on the city desk, was the cult's high priest, and many a sob-sister contemplated a hasty dive off the bridge in an attempt to satisfy his voracious hunger for the Human Interest Story.

Kelley now runs a chicken farm out in Michigan, and if by any chance he owns a radio set, one can imagine the turmoil of his soul as he listens to the wealth of "H. I." pouring from his loud speaker, only to waste itself on the desert air. Life and death, joy and sorrow, quirks and twists of the dizzy round we call existence—all roll out upon the listener in a never-ending medley—surely the strangest conglomeration that has ever assailed the ear of mortal man. Even the cynic admits there is something new under the sun, and pauses in his amused tolerance of an expensive plaything, when some strange, wandering meteor of unfamiliar thought dashes across his orbit and brings him up standing.

△ △ △

DEAR Daisy Dumbunny rendered her verdict the other day.

"We got tired of our radio in a month. It's all the same old stuff, and then it kept Charley from going to the pictures with me."

Poor, dear Daisy! What can she find in the movies to compare to the slices of real life that come to us who twist the dials? We recite a few vagrant memories of a time before we began to make notes—any one of which would have sent Kelley nose-down on a red-hot trail for half a column.

Came this from Texas—"The Smith Drug Company is sending out a call for blood to save the life of a young woman." (Name and address given.) "Any healthy person between the ages of 25 and 40 who will submit to a transfusion, call their store at 118 Main street."

From somewhere south—"Anyone knowing John Robinson, 26" (description followed). "tell him to come home at once. His wife is dead, leaving a day-old baby. Robinson frequents race-tracks and pool-rooms."

A touch of comedy from Memphis—"George Brown, 13, and William Johnson, 14, left home yesterday in a Ford car with red sport body. Notify their parents. They were accompanied by two shot-guns and two hound dogs."

From Detroit—"Our orchestra will now play the Lohengrin wedding march for Miss Gussie Daly and William Betz, who are being married at the bride's home in Toledo."

From Kansas City—A request to search for two brothers, whose parents had been killed in an automobile accident.

From Pittsburg—"We are playing the next number for Mr. J. C. Green, who sailed this morning on the Olympic."

From Canada—"Anyone finding a brief-case lost possibly on Tenth street, containing a marriage license, will confer a great favor on the groom by returning same to 44 Blank street."

From Havana—"One may now ride—leagues on the Ah-vah-na, Coo-ba tram-cars for the small sum of—"

We forget how far or for how much, but it sounded like cheap transportation.

At Christmas time, a father and mother sending greetings to a son somewhere at a mission on Hudson Bay.

To our way of thinking, the outstanding touch of that week, was the catch in the voice of the eminent, old statesman, as he rose to respond to the eulogies of his friends, on the occasion of the dinner in honor of his eightieth birthday. We almost felt it was a shame for the microphone to be there to register every inflection of his emotion as he tried to steady his voice for a dignified response. And yet, we suppose many a dial-twister wondered when Schenectady would finish broadcasting that interminable dinner and give them some jazz!

Sentimental slop? Possibly. But if you're human, the radio will get you.

△ △ △

IT SEEMS to an innocent bystander that much of this hullabaloo in regard to poor radio programs might be cleared up by a little missionary work among the listeners, rather than by the continued harping upon the stupidity of station managers.

If Owney Oleson, of Bird Center, could be restrained from rushing to the nearest Western Union office, and wiring his ecstatic reaction to "Doodle Dee Do," played upon the harmonica from the O. K. Plumbing Shop, the manager of that station might refrain from repeating the offense. The moving picture producer who went on record with the immortal confession that his success was due to making pictures for a clientele with the intellect of a nine-year old child, evidently knew his business; and compilers of radio programs doubtless started out with the same idea. Anyone who thinks that the majority of the stations are not themselves aware of the awfulness of their brand of hokum, should have heard what issued from our parchment speaker the other night.

The studio we privately call "WW," (World's Worst), read a long list of laudatory telegrams, and then, in a perfectly serious voice, the announcer said,

"This is the world's greatest station broadcasting one of its refined, sacred concerts. Tommy Tubbs will now sing, in response to many requests, 'The Old Horse Fly.'"

But do they want better things? Unqualifiedly, yes—after they have heard them. One's insatiable curiosity as to the reaction

of one's fellows to everything under the sun resulted in accurate notes being taken the morning after the fifth Victor concert, when, as you recall, no attempt was made to play down to the listeners—the entire program consisting of standard selections of the highest class, without a single popular number.

The waitress who brought our toast, whispered,

"I'll say that was some swell concert last night. I never heard a woman sing like a bird before."

"Did you listen the entire hour?"

"I'll say we did. I don't know much about that kind of music, but it was great."

The musical critic unfolded his paper.

"Superb," was his comment. "De Luca was in fine voice. But do you suppose it got over?"

The postman, a notorious D-X-er, "Well, my wife was sold on radio last night. She said it was the first whole concert I ever let her listen to. That Italian was great."

The teller in the bank confessed, "I've fallen. Just ordered a radio set. Heard the concert last night, and if that is the kind of entertainment you get, I have been missing a lot."

Tom was shining my shoes.

"Did you hear da nica music last night?" he asked, between rubs.

"Why, have you got a radio set, Tom?"

"Sure. Joos a two-tube. But, my, she come in swell. Like-a they sing in the old country."

(No, Tom is not an Italian. He's a Greek.)

The laundryman, who builds a set a month. "Say, do you know I never turned a dial for an hour. Just tuned in New York and ate it up."

"But did you like the program?"

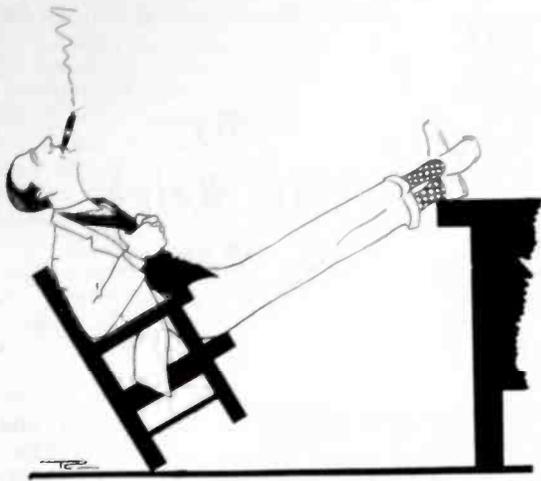
Did we? Well, it was the first night in a long time that I gave Zion City the go by. But I never heard that kind of singing before."

The music lovers—they now frankly fish for invitations to a radio party, when there is a real concert on the air, but it is the reaction of the many who have never had an opportunity to hear good music that causes one to wonder. It seems unnecessary to worry about the future of radio. If the people want the best, as they apparently do, they are going to get it.

△ △ △

DOES the advertising that comes along with radio programs like the lettuce in a chicken sandwich, bother us so muchly? We scarcely think so. One writer waxes warmly indignant over the statistics that the radio public is paying \$1,000,000 per day to listen to advertising. BUT—the publication in which this article appeared carried 99 pages of advertising to 82 of reading matter. The advertising paid for the meat in the magazine, just as it pays for the talent in the

(Continued on page 72)



The trials of
a song-writer

Mr. T. P. Alley

By Earl Reeves

MR. T. P.—otherwise Tin Pan Alley put his feet on his desk, stuck his thumbs in the armholes of his vest and tilted his cigar ceilingward.

He smoked cigarettes in the days before uplift-our-youth magazines began writing him up. He prefers them yet, but a fat cigar was Front.

Mr. T. P. Alley's feet were on his desk because he was Thinking. He needed Front and he needed Thought.

Outside, beyond sound-proof walls, there was much chatter. That was as it should be. In the long room many passed in and out, giving the appearance of busy-ness. An insignificant lad largely embellished in not-too-quiet raiment exchanged persiflage with a pair of pippins. They were flattered. Several times a year he dragged down checks bigger than the Secretary of State gets for a year's diplomacy. His "Hottentot Tot" was a scream. And a ride in an elevator with a West Indian ducky or a trip as far south as the Battery was likely to inspire him to a new Mammy song hit most any time. The pippins were advisedly flattered. He spent painlessly.

Down either side of the room were enclosed cubicals containing pianos and open mouths. In such a setting open mouths do not denote hungry birds—though they may be hungry—but "artists" trying out "hits." The stickier hits go into vaudevillian circles and elsewhere—for us.

Still further back, hidden away—a busy mailing room, from which 23,000 theatres, 17,000 orchestra leaders and 7,000 music dealers get free copies. This eats up a President's salary in a few weeks.

Mr. T. P. Alley was buried in Thought. All this was terribly expensive. For a moment his faith wavered: Barnum did not seem to be right. The public was a — what was that word that had come up out of the Village lately?—oh, yes, Moron. The public wasn't buying. Moreover he

had slipped on a banana, tossed out by some insignificant western house.

A VERY slick lieutenant burst into the room.

"Moron," said T. P.

"Lissen," said the newcomer, passing the insult. He sprang from the unrenovated portion of the Village himself, but "moron" wasn't currency when he left, and he didn't get it.

"Lissen, Boss," he said. "I gotta good one. Ever hear of radio?" This was, oh, ever so long ago—over two years."

"Yeah," said T. P. "Go away. I got troubles."

"Sure, I oughta know: I carry 'em," was the come-back. He held his job by being quick, like that. "You oughta have 'em, spending millions pluggin' songs like you do, and you never thought of radio. W'y, hundreds of thousands lissen at night already, an' its gonna grow. Get your songs sung by wireless. It's the biggest hunk of free advertising y'ever saw."

Mr. T. P. Alley's feet came down.

"Hot Poppa," he said. And wrote that one down quick, so his mechanics could build a musical vehicle around it. Nothing was wasted, here.

II

A YEAR passes. Mr. T. P. Alley sits with his feet on his desk, his thumbs in the armholes of his vest and his fat cigar tilted. He's waiting for his slick young lieutenant to come in and think for him. That's what he's hired for.

He bursts in, waving a paper.

"S-a-a-y, Lissen," he says. "This is moider. It says here they's ten millions lissen to the radio every night. An' the big screams is using our music for nothin'. A prize lotta saps we been."

"Yeah, we're often that," from T. P. A., thinking of overhead, and things. "It's a habit. Break it."

"Sure, that's what I came in for," says the young fella,

pulling the quick stuff that keeps him on the payroll. "We gotta collect, that's all."

"Collect from an ether wave, Son?" says Mr. T. P. Alley, rising to the heights of irony that generally goaded his hirelings into thinking up a good one—worth money in his pocket. "Think again. This is a game of put, this broadcasting, ain't it?—There's no take to it. Everything's give away, ain't it?"

"Sure, boss, but it says here that a hundred and fifty million dollars worth of radio sets has been sold in a year. An' where they's that much money, they's always a way to get our'n. We ought have anyway three to four million outa radio."

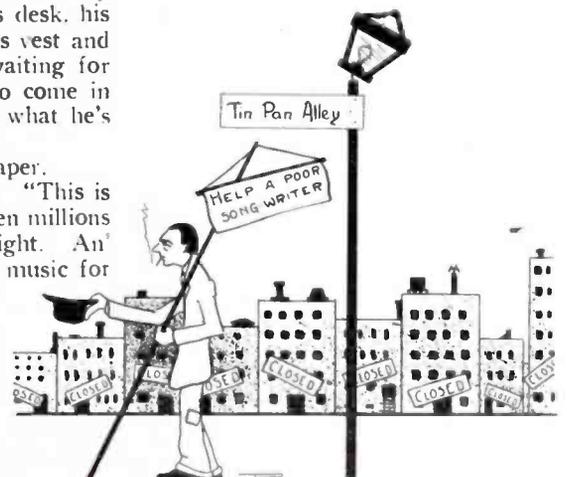
Mr. Tin Pan Alley put his feet on the floor suddenly.

"Torrid Tillie," he said, and writ that one down, quick, for amplification later. "Hop to it. Sic 'em."

III

A YEAR passes, bringing us almost to NOW. Mr. T. P. Alley sits with his feet on his desk and his thumbs in the armholes of his vest; but the bold, tip-tilted cigar has been replaced by a cigarette, which droops. The long room outside is almost quiet.

(Turn to page 73)



Tune into
some of the
feature pro-
grams at

K HJ
FI
NX
JR
GO
PO

By
Dr. Ralph
L. Power

RADIO has been responsible for many things but probably no stranger story has been told than that of Norma Gregg, dramatic soprano, who is once more singing from KHJ and KFI in Los Angeles.

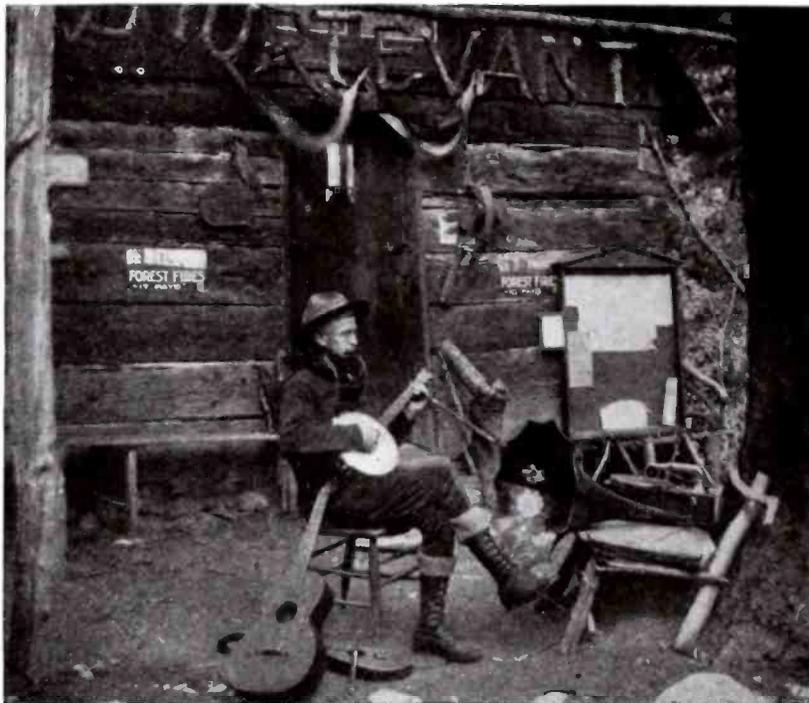
After years on vaudeville circuits Miss Gregg made a study of noses because hers didn't exactly suit her needs and so she had a new one fashioned by Dr. William E. Balsinger, famous Hollywood plastic surgeon. Now she has an imperial nose along the design bestowed by nature on Queen Mary of England.

Norma Gregg has composed some fifty song hits, her most famous number being "Margharita" and many Chinese and East Indian operettas as well. She has composed for Eva Tanguay, Julian Eltinge, Louise Dresser and the late Lew Dockstader. Her best known song hit is probably "Please Don't Forget Me When I'm Gone," which she composed for Eva Tanguay.

Radioland got its greatest thrill in hearing about the farewell nose party held at the home of Rex Goodcell, collector of internal revenue in Los Angeles, the eve before the operation.

The crowning feat of the party was when Norma sang Tosti's "Good-By" in memoriam to the nose that was to be totally transformed the following day. The climax of the party came, however, when a cablegram was received from Fred Duprez, producer of the Manhattan Follies playing in London.

Until the next season, when she will probably go to England, Miss Gregg



Dave Heideman, denizen of forest and stream, spends his life in the Sierra Madre Mountains and tunes in to radio programs to which he adds his own accompaniment on a variety of instruments

will be heard on many KFI and KHJ programs and already radio fans on the Pacific Coast are demanding a personal appearance so they can see the new proboscus.

JACK BAIN'S voice is pretty well known out west. His engagements as vocal soloist with orchestras includes George Olsen's Orchestra in Portland and with the orchestras directed by Paul Ash and Max Dolin in San Francisco.

Five nights a week Earl Gray and his orchestra broadcast via remote control from the Butler Hotel, Seattle, to KFOX and Mr. Bain does the announcing as well as furnishing the vocal refrains for most of the selections.

At this writing he is the only male announcer of this 1,500-watt Seattle station which has a woman as program manager and announcer.

IN THE Sierra Madre Mountains of South California Dave Heideman is

a fire warden and has charge of Sturtevant's Camp during nine months of the year. Thirty-five years ago old man Sturtevant located his claim and the original log building, now the property of the United States Forest Service, still stands.

During the long winter evenings Heideman was wont to hitch his little radio set to the portable phonograph for use as a loud speaker. The radio programs brought him the best in music and two years ago, he began to buy all sorts of musical instruments and books of instruction.

Now he can give a good imitation of

a one man band for he plays the banjo, guitar, French harp, Spanish mandolin, wind whistle, ocarina, mandolin, and Jews harp—not all of them at once, of course. The photo doesn't show all of his musical accoutrements but he's playing the mandolin and the French harp. He learned to play the various instruments by studying the instruction papers and then he tuned in on stations and accompanied the various orchestras that he heard every night—playing up in the stillness of the night in the great out-of-doors.

The last seen of Heideman he was on his way to civilization to entertain his mountaineer friends and others with a varied musical program from Los Angeles radio stations.

TWO radio favorites of the West have gone to the Great Beyond and will be heard no more from KHJ, KFI and KNX. Harry Hahn, baritone, who appeared in many prologues

and who has been a radio favorite for more than two years, recently died as the result of a leaky gas jet.

Marguerite de Forest Anderson, flutist, who appeared with Nordica, Melba and others will play no more via radio. Miss Anderson played in New York, Boston, Paris and London a few years ago. In the English City she played many times at Covent Garden and Queen's Hall and was a member of the royal family's private orchestra.

Once a member of world famous musical groups she earned a small stipend the past year playing via radio and leading cafe and cafeteria orchestras. Death came as the result

man Symphony Orchestra for three seasons, and for two years concert master of the Chicago Symphony Orchestra.

Mr. Lipschultz has often been called the American Kreisler because he

played every week either from KNX, KHJ or KFI. At this writing he is on the way to the San Francisco Bay District where he will be located for a year and will there be heard from KGO and KPO.

KJR, in Seattle, is the Pacific Northwest's newest station operating on 1,000-watt power at 405 meters wavelength. Most of the programs are sponsored by the Seattle Post-Intelligencer, they being on the air afternoons from 4:30 to 6 and Monday, Wednesday and Friday evenings from 8:30 to 10, Pacific time. The 10 to 11-hour evenings brings music from Ray Robinson's Orchestra via remote con-



Jack Bain, soloist at the Butler Hotel

Prof. George Lipschultz, famous violin virtuoso

of much brooding over circumstances and inadequate funds for living.

LIPSCHULTZ, violin virtuoso, has been billed everywhere as such, but his first name is George. The son of a well known Chicago musician, young Lipschultz won a music scholarship when fourteen years old that gave him his start towards a career.

He was soloist and orchestra leader for four years in various Milwaukee theatres and later, for two seasons, concert master of Victor Herbert's orchestra. He has played as many as a hundred and twenty-five concerts a year when with the Ball-

(Top and bottom) Miss Norma Gregg of KHJ and KFI who has adopted the latest style in noses

toured with Kreisler for twenty-six weeks and received daily instruction from him. For nearly a year this violinist has been leader of Loew's Music Masters in Los Angeles and has

trol from the Willard Cafe. Aunt Bunny has a story for the youngsters afternoons at five o'clock and the Blind Boys Orchestra plays an hour program daily at 12:30. KJR has become very popular in the brief time it has been on the air and its programs are worthy of this popularity.

KFQG, Los Angeles, the new station of the Southern California Radio Association, was constructed entirely by its members. They operate a 100-watt station on 226 meters from the Exposition Park Armory Buildings, Monday, Thursday and Saturday nights from 7 to 8 only.

WGR Ensemble

A stringed quartet that has become very popular on the air

By Lloyd S. Graham

ANY student of feminine psychology knows that it is rare indeed for three or four women to work together amiably on any sort of a proposition unless they happen to be under the guiding influence of mere man.

As the first notes floated out over the dining room of the Statler, fourteen men entered by the main entrance and solemnly marched in single file. The coincidence was too much for the group and it must be admitted that during the mirth that followed there was a little

that is almost white in pleasing contrast to her hair. Altogether there is something about her which reminds one of Raphael's Sistine Madonna.

Musically, Martha Gomph is "there." All of the group are, but she is especially favored in coming from a highly



(Left to right) Martha Gomph, Mary Reynolds, Agnes Millhouse and Katherine Stang

In contradiction of that theory—perhaps an exception which proves the rule—we present the Hotel Statler Concert Ensemble which broadcasts with the regularity of the clock from WGR and is one of the station's most popular regular features. Moreover, none of the four have bobbed hair.

Here are four decidedly feminine musicians who have worked together day in and day out for months without the slightest show of friction and with great satisfaction to the radio audience.

There is only one time on record in which the musical zeal of the four was upset even for a moment and then the cause was from without the group rather than within.

It happened this way. They had been broadcasting a radio program when Kenneth Fickett, then announcing for WGR, noted that there would still be some air time to go. He asked them what they wanted to play as an added number. None of them had any suggestion to offer so he asked for "The Parade of the Wooden Soldiers" having received a request for the number in the morning's mail.

That was agreeable so they struck up—if a stringed quartette can be said to strike up—the well known selection.

hitch in the rendition of the selection. Several of the diners thought it was a good joke also. The group of fourteen men who appeared so unexpectedly on the first beat of "The Parade of the Wooden Soldiers" were members of the federal grand jury then in session, accompanied by two court officers in uniform. The uniforms improved the joke.

This ensemble has been on the air daily except Sunday for more than three months. It goes on the air from the main dining room of the Statler, promptly at 12:45 and continues until 1:15. Its fan mail is constantly growing and the number of requests which come in is increasing constantly. What better proof of popularity could there be? In this connection it may be interesting to note that the group is especially popular with the Canadian audience.

We introduce them. There is Martha Gomph, harpist. She has been on the Statler musical staff ever since the hotel was opened. Clever little lady with hair black as the blackest night and a countenance marked by a calmness and serenity rare in this day and age, particularly in such a sophisticated place as a modern hotel. A fine skin

musical family. Carlos Salzedo of New York was her teacher of the harp.

Katherine Stang is the violinist of the group. Everyone around the Statler consider Martha Gomph and Katherine Stang as the inseparables. See one and you are bound to see the other not far away. Miss Stang, too, has been a part of the musical organization of the hotel since it opened. The Gomph-Stang combination is an old one. As children they were playmates together. They studied together, did concert and movie work together, although it would be difficult to find two persons more nearly opposites in temperament and appearance than these two young ladies. While Martha Gomph is calm and serene in the face of the most disturbing events, Miss Stang gives one a suggestion of dash and fire, a highly-strung mental organization. For instance, Miss Stang lost her purse one day and soon had the whole hotel looking for it. She got action with the utmost swiftness. Like the well known old lady with the lost spectacles resting upon her forehead, the purse was found in plain sight on her dressing room floor.

(Turn to page 74)

TELEVISION *a Reality*

Electrical transmission of colored and moving pictures

By Theo. M. Swards

THE problem of television has occupied the minds of scientists of every country for many years, but so far, it has not been possible to transmit moving pictures in the same simple manner as sounds and speech.

A German engineer, Alfred Heinze, who has been experimenting in the field for over sixteen years, has just perfected apparatus which was recently tested with very satisfactory results.

In most methods of long distance transmission the picture to be sent is transmitted and received line by line. In Heinze's system, the picture appears as a whole in the receiver, the instant it acts on the transmitter. The most important part of Heinze's invention

with the addition of an agent to slightly retard the reaction. Wonderfully steady and clear pictures are obtained. One of the cells is shown in figure 1A which represents the picture breaker. The cell C consists of a mantle which acts as one electrode, a second electrode E and the photoelectric substance D, which is struck by the light rays travelling in the direction of the arrow. The second organ of the transmitter is the "picture breaker," an apparatus actuated by a small electric motor, and possessing 40,000 contacts, all of which can be closed and opened again *one after the other* in one-fifteenth of a second. Each cell of the camera background is connected to

pulses received. The screen can be made in various sizes, according to the size of the picture desired, the individual cells and bulbs being smaller or larger as the case may be. The sketch shows the picture builder A, the cell H with lamps I. The light rays pass through the screen in the direction of the arrow. Either D.C. or A.C. can be used to furnish the current required for transmission.

In a general way, the principle of the instrument, as outlined, was already known, but various difficulties had so far proven insurmountable in practice. It was impossible, for instance, to build a contact apparatus which could open and close 600,000 in-

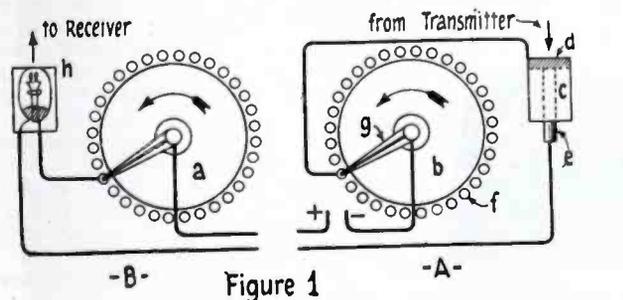
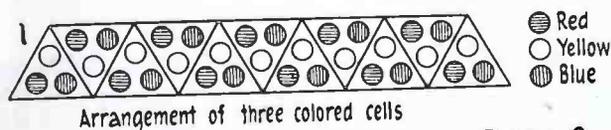


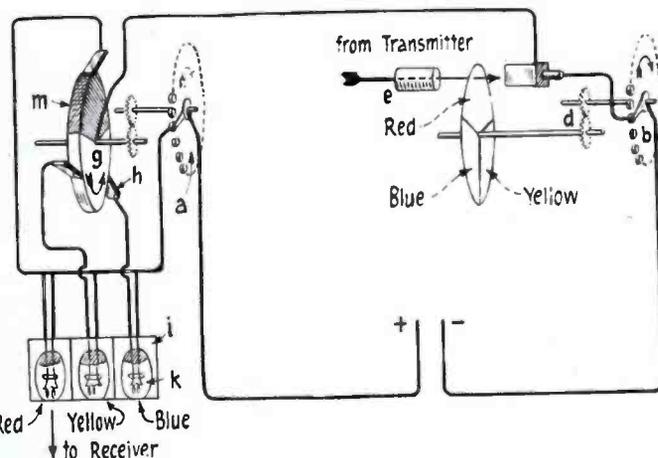
Figure 1



Arrangement of three colored cells

Figure 2

The various parts entering into the radio television system



is the creation of a synchronism between transmitter and receiver and a contact apparatus, which closes and opens 40,000 circuits in the fifteenth part of a second.

The process of transmission is as follows: The transmitter is equipped with a photographic camera on the background of which the object to be sent is thrown by a strong lens. This background is divided into tiny unit cells (40,000 to a square meter), which break up the picture into minute sections. The cells are so constructed that any variation in the light thrown on them, changes their conductivity, and thus produces current fluctuations in the circuit to which they are attached.

To produce this effect Heinze uses a substance of his own manufacture, composed of various alkali metals,

such a contact point.

Figure 1A shows the schematic arrangements of the breaker B the contact points F and the rotating contact tongue G which opens and closes the 40,000 circuits.

From this sender the picture, which has been broken up into minute sections separated by an interval of time, is transmitted to the receiving apparatus figure 1B, which is absolutely identical to the sender, but is now called the "picture builder." This receives the picture sections which arrive as electric impulses of varying current intensity, each of which corresponds to one of the photoelectric cells. The same contact apparatus groups these picture parts on a screen made up of the corresponding photoelectric cells, each of which is connected to a bulb of low voltage, lit by the current im-

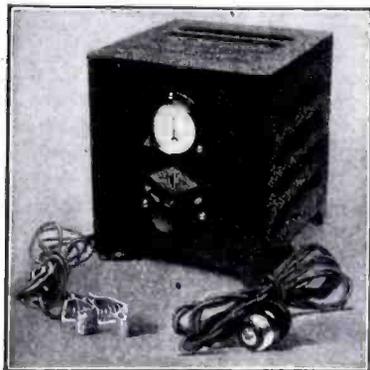
dividual circuits in one second. That is where Heinze's work fits in. This contact system works satisfactorily, without moving large masses and without an excessively high rate of revolution.

The inventor has further endeavored to transmit colored pictures. His method is illustrated in figure 2. The light rays passing through the sending lens E, strike the sensitive photoelectric cell C. A revolving color filter which consists of three segments of the basic colors—red, yellow and blue—is interposed between lens and cell. This disc is geared to the contact apparatus C in such a way that the disc revolves once, to every three contact series of the apparatus. Thus the cells can receive only the rays of one color at a time, as the others are held back by the color filters.

Appliances and Devices

The Acme Battery Charger

THE battery charger which performs its duty in excellent style and which is thoroughly reliable and a finished looking instrument is the new Acme 1925 model. Some models of this line are inclosed in a case which is made of sheet metal with the sides and top pierced for ventilation purposes. The charger is mounted on rubber feet and noise



and vibration generally attending such a device is considerably lessened. There is a switch so connected as to easily change from A to B battery and the owner of this battery charger may charge his storage B battery by merely throwing a switch. The Acme Chargers are equipped complete with a plug, cord, and battery clips.

Rigid Battery Connectors

THE Sherman Battery Connectors fill a long felt need for a suitable means of connecting up dry cells. They provide a strong, neat, simple mechanical means of securing perfect contact with each cell and



eliminate the danger and nuisance of a confused tangle of wires. They are made in two styles, a short clip for series connections and also parallel types suitable for connecting two or more dry cells in parallel. The slotted openings have spring contacts



similar to a lock nut so that the battery nut cannot loosen. The slots are so spaced that the individual cells are prevented from touching and a bridge formation prevents connectors from touching the metal battery casing.

A Portable Summer Set

A RECEIVER that is particularly light and compact and easily convertible into an ideal portable set for summer use, is the Marwol Baby Grand. This efficiently designed, well-built set comes equipped for storage battery use, but may easily be made to operate on dry cell tubes. While the Marwol Baby Grand is much smaller than the Marwol Model A-1, it contains—only

more compactly—identically the same 5-tube tuned radio-frequency circuit that is well

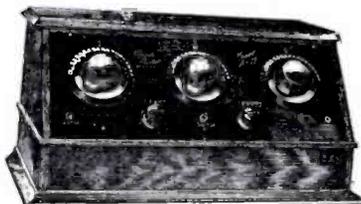


known for its extraordinary selectivity and range with ease of operation and which is manufactured by the Marwol Radio Corporation.

The Blair Receiver

THE Blair Six-Tube Receiver employing two stages of tuned radio frequency, a detector and three stages of resistance audio amplification is now available to the American market.

The Blair Receiver is the result of years of experimentation in both British and American Laboratories and represents the perfected combination of two highly efficient methods of amplification, namely, tuned radio frequency for distance and selectivity,



and resistance—coupled audio for tone quality. The result is the exceptional clarity of delivery for which resistance-coupled amplification is noted, together with distance and volume in any quantity desired.

Heretofore, the manufacturers of the Blair Receiver have confined their sales efforts to the British market, and they are now one of the largest exporters of radio receiving sets in this country. In choosing a receiving set for His Majesty King George V, the British engineers chose resistance-coupled amplification.

This set is being manufactured by the Blair Radio Laboratories.

A Stewart-Warner Receiver

THE Stewart-Warner Speedometer Corporation, recently placed on the market, the Stewart-Warner, Aeromaster, Type TRF-5, radio receiver. The set consists of

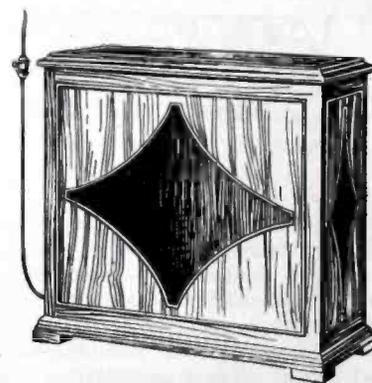


two stages of tuned radio-frequency amplification, detector and two stages of audio amplification.

This circuit, while neither new nor radical in principle, has been developed to the highest state of perfection by the use of air core radio-frequency transformers, in which the usual losses due to the use of cardboard, fibre or bakelite tube forms have been eliminated. These transformers are tuned by three highly efficient condensers with plates rigidly connected together to further decrease electrical losses, which accounts for the purity of tone and the extreme amplification produced by the Stewart receiver. The cabinet is finished in dark walnut, and its sloping panel permits easy manipulation of the dials.

The Kellogg Trans-B-Former

THE Kellogg Trans-B-former is the result of considerable scientific experimentation conducted in the laboratories of the Kellogg Switchboard & Supply Co. With the Trans-B-former the problem was to manufacture an instrument that would effectively take the place of B batteries and by means of which 60-cycle 110-volt house current could be smoothed out and all noises removed so that the current would be adaptable to radio. This B battery eliminator employs two UV-201A's as rectifier tubes. Tests on this Trans-B-former, a model of which was sent to our office, indicated that Kellogg has completely eliminated the line hum. It costs approximately one-fifth of a cent per hour to run and can be used wherever the house lighting supply is 110-volt 50 to 60 cycle. The advantage of a constant supply of B battery voltage such as this delivers, is that the receiving set operates at maximum efficiency all of the time. The Trans-B-former may be used



with all types of sets. It is provided with four taps including a common negative and a variable detector tap ranging in voltage from 5 to 35 volts with the variable detector feature of the Trans-B-former the exact voltage necessary to properly balance and stabilize the detector tube. This is of particular advantage when a soft critical tube is used as a detector. For the amplifier tube two taps are provided one for 45 volts and one for 100 volts. The instrument is inclosed in a walnut cabinet of very attractive design. It is small enough to stand behind the receiving set or rest inconspicuously on the floor near the storage battery.

The GREENLAND radio stations

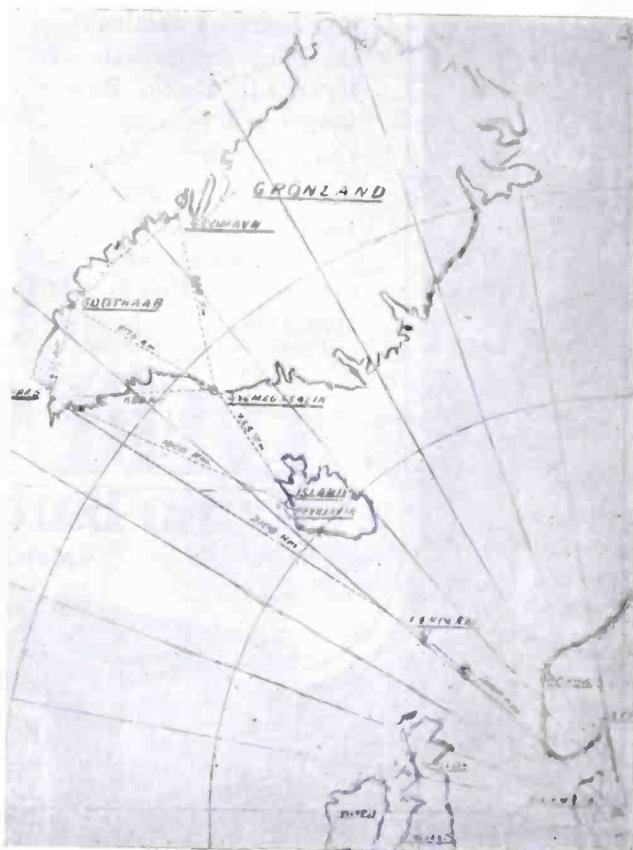
Four Danish stations being constructed to advance communication in the North Atlantic

By O. Lund-Johansen

THE erection of wireless stations in Greenland is the fulfillment of plans dating from before the war and designed to bring Greenland into more direct connection with the rest of the world. The circumstances of war caused the Greenland authorities to put their plans aside temporarily, but as soon as possible after the war was over the preparatory work and necessary investigations were taken in hand, and it is interesting to observe that it was during the Danish Royal visit to Greenland in 1921 that connection was for the first time established between the west coast of Greenland and the international telegraph services, connection being made by means of the wireless aboard the King's ship.

The stations are to be erected at Julianehaab, (60° latitude) Godthaab (65°) and Godhavn (70°) on the west coast and at Angmagssalik (65°) on the east coast of Greenland. The contract for the erection of the stations has been placed in the hands of the Danish Radio Company, Ltd. (Dansk Radio A/S), who have already commenced to despatch the necessary materials, equipment and workers. It is anticipated that all four stations will be in operation before the end of the year.

The station at Julianehaab is being built according to the Polusen-arc-system, with an energy of 5 kilowatts in the aerial. This is in the form of an umbrella frame suspended from a mast 82 meters high to 6 smaller masts surrounding it in a circle with a radius of about 175 meters. The stations are designed with a view to communicate with the Faroe Islands, a distance of about 2100 km., and under normal atmospheric conditions it will probably be able to reach Copen-



Map showing the location of the four Danish wireless stations about to be erected in Greenland at Julianehaab, Godthaab and Godhavn on the west coast and also indicating the distances between these various points as well as the distance from Copenhagen to Greenland via the Faroe Islands and Iceland

hagen, distant about 1500 km.

The stations at Godthaab and Godhavn will be of a smaller size, as they have to cater only to local traffic. They are being built as tube-stations, with an energy of ½ kilowatt in the aerial, which latter are similar in form to the aerial at Julianehaab, but are suspended from a main mast of only 52m. in height.

The stations at Angmagssalik on the east coast is being erected at the special request of the Danish-Icelandic Committee, the intention being first and foremost that this station should send meteorological reports to Reykjavik, Iceland, distant about 750 km., and so afford the utmost possible pro-

tection to fishers in the Icelandic waters by giving them advance information of coming storms and hard weather originating to the west of Iceland. The stations are being built according to the quenched spark system, with an energy of 1½ kilowatt in the aerial, which latter is constructed in the shape of an inverted L suspended between two wooden masts each 42 meters high.

Almost exclusively Danish materials are being used throughout and the erection is being done by Danish workers under the guidance of Danish technicians.

Owing to the great distances and isolated location of the stations, the lack of available materials and skilled workers on the several sites, the task in hand is quite a difficult one. The poor transport facilities in Greenland and the short season available in which to work—being quite impossible in the winter—increases the difficulties, but in spite of everything there is no question that the scheme will be carried out according to plan and that the stations will soon be in operation and sending out communications,

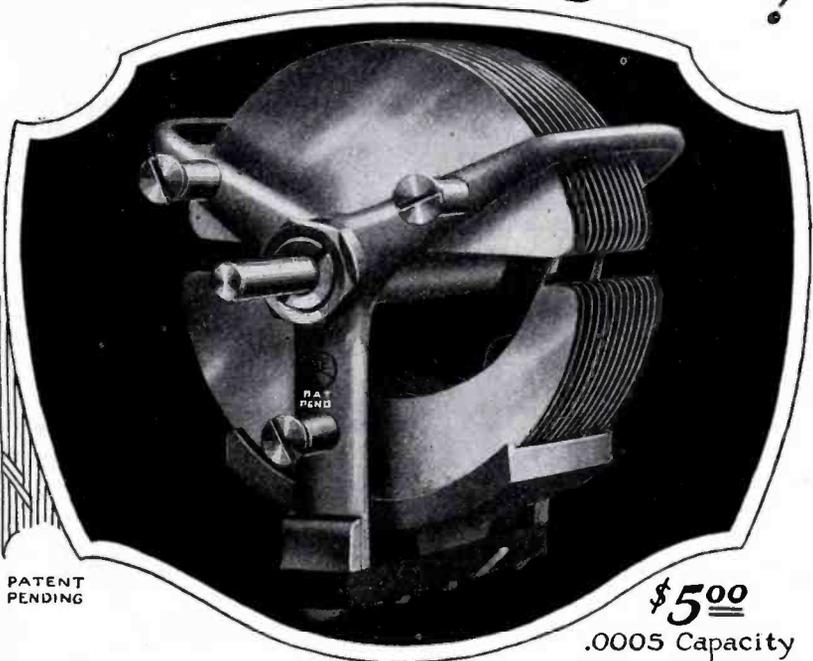
especially of a meteorological nature. This service will be of the greatest significance in compiling weather forecast for the eastern part of Europe, and will add to the security and safety of shipping traffic fisheries, etc. The new stations will also form an additional connecting link between the mother country of Denmark and her far distant Greenland colonies.

Work is proceeding rapidly at this time and there is very little reason to believe that the end of the year will not see the stations completed and in operation. When that happens a new era will undoubtedly dawn for Greenland in commerce and economic development.

Lacault Scores Again!



The new Ultra-Lowloss condenser is the latest improved radio device designed by R. E. Lacault, formerly Associate Editor of Radio News, the originator of Ultradyne Receivers and now Chief Engineer of Phenix Radio Corporation.



PATENT PENDING

\$5⁰⁰
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ULTRA-LOWLOSS CONDENSER

LIKE every Lacault development, this new Ultra-Lowloss Condenser represents the pinnacle of ultra efficiency—overcomes losses usually experienced in other condensers.

Special design and cut of stator plates produces a straight line frequency curve, separates the stations of various wave lengths evenly over the dial range, making close tuning positive and easy.

With one station of known frequency located on the dial, other stations separated by the same number of kilocycles are the same number of degrees apart on the dial.

In the Lacault Ultra-Lowloss Condenser losses are reduced to a minimum by use of only one small strip of insulation, by the small amount of high resistance metal in the field and frame, and by a special monoblock mounting of fixed and movable plates.



ULTRA-VERDIER TUNING CONTROL

Simplifies radio tuning. Pencil-record a station on the dial—thereafter, simply turn the finder to your pencil mark to get that station instantly. Easy—quick to mount. Eliminates fumbling, guessing. Furnished clockwise or anti-clockwise in gold or silver finish. Gear ratio 20 to 1.

Silver \$2.50 Gold \$3.50



This seal on a radio product is your assurance of satisfaction and guarantee of Lacault design.

At your dealer's, otherwise send purchase price and you will be supplied postpaid.

Design of low loss coils furnished free with each condenser for amateur and broadcast frequencies showing which will function most efficiently with the condenser.

To Manufacturers Who Wish to Improve Their Sets

The Ultra-Lowloss Condenser offers manufacturers the opportunity to greatly improve the present operation of their receiving sets.

Mr. Lacault will gladly consult with any manufacturer regarding the application of this condenser to any circuit for obtaining maximum efficiency.

PHENIX RADIO CORPORATION, 116-A EAST 25th ST., NEW YORK

"Quality Goods for Quality Readers"

Education Via Radio

(Continued from page 43)

the King of Italy to an assemblage gathered by royal invitation to celebrate the entrance of Italy into the World War. For this occasion Senor Marconi had prepared a special receiving set for the king.

Mr. Koretsky is a charming, reticent type of man and one would hardly suspect that so voluminous and powerful a voice were lodged within him. He has the kind of manners that sometimes put us brusque Americans to shame.

IF YOU want another musical treat, tune in on Godfrey Ludlow, famous concert violinist, recently added to the

staff of WJZ and WJY, New York. He gives recitals accompanied by Keith McLeod, at least once a week. Mr. Ludlow is an Australian, who, at the age of ten was awarded the Gold Medal for New South Wales. At fourteen he left Australia, to spend three years in Prague and two years in Vienna studying under the great master Sevcik. When he was seventeen he entered the Maester-Schule (Master School) of the Imperial and Royal Academy of Music at Vienna. During a two-year tour of Europe, he played before many crowned heads of Europe, making his debut appearance in London at Queen's Hall, and creating such a furore in musical circles that shortly

thereafter, by special command, he gave a concert at Buckingham Palace. Later he went to Russia and studied with Leopold Auer. Mr. Ludlow came to New York in 1924, making his debut at Aeolian Hall, after which he gave many concerts, the last two of which have been broadcast by WJZ. His violin is one of the six finest in the world. It is the priceless De Rougemont Stradivarius, dated 1703, and valued at \$50,000 by those who know such values. Mr. Ludlow not only plays entrancingly, but the feminine contingent of radio listeners would, if they saw him, be quite susceptible to the wonderful permanent wave he wears! Real!

Silver-Marshall

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Low Loss Parts That ARE Low Loss

Silver parts are not just "low loss" in name only, for they have been designed by McMurdo Silver, Assoc. I. R. E., to meet the most exacting requirements—to be absolutely right. Each piece of apparatus embodies the soundest of design principles—the accuracy of each detail has been verified time and again in research laboratories throughout the country.

R. A. Bradley, Technical Editor of the "Wireless Age," selected S-M low-loss coils and condensers for his five tube receiver. Just as they are the heart of Mr. Bradley's design, so are they the prime factors in the success of the Four-Tube Knockout described in the March "Radio Broadcast."



No. 105 Low Loss R. F. Coupler, provided with fixed primary; secondary with neutralizing tap and adjustable rotor. Range with No. 301-A condenser 200 to 500 meters.
Price \$5.00



No. 301-A Low-Loss Condenser. Grounded rotor type with straight line curve. Capacity range .00009 to .0005. Ideal for use in conjunction with No. 105 and No. 205 coils.
Price \$4.50



No. 205 Low Loss R. F. Antenna Coil. A single coil self supporting, (as in No. 105) with antenna tap. Range 200 to 550 meters with No. 301-A condenser.
Price \$2.50

"THE FOUR TUBE KNOCKOUT"

This booklet is a complete description of the Four Tube Receiver described by Mr. Silver in "Radio Broadcast." It contains valuable data on low-loss receiver and coil design in addition to detailed building instructions. It is invaluable to any one interested in low-loss receivers.

Price 25c.

DEALERS: Write for the name of your nearest jobber.

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THERE is no greater educational force in the world than music and literature. In considering this, then, we have available, for the listening, talks by Dr. Clifford Smyth, editor of the Literary Digest International Book Review, one of the foremost literary journals of America and recognized as an authority in its field in Europe. Before Dr. Smyth settled into journalism, he did a great deal of traveling. One of the most interesting trips was, with a knapsack on his back, hiking through England, with Shakespeare's grave as his goal. Serving as newspaper reporter and editor, he was later appointed U. S. Consul at Cartagena, Colombia, where he became an interested student in Spanish literature. After serving his term as Consul, he returned to Colombia on various newspaper and political missions. A remarkable background, and a wealth of valuable material, which later evidenced itself in Dr. Smyth's novel: "The Gilded Man." Since then, Dr. Smyth has been a newspaper man, special writer for Sunday editions of the New York Times, and served as Assistant Sunday Editor. He later became editor of the New York Times Book Review, completely and radically changing its policy and making it a live, strong influence in literary life. There is no doubt of the personality of Dr. Smyth, which reaches out to an understanding of people; whether through books or through the radio.

ANOTHER gentleman who has done delightful things for us over the air is Dr. Sigel Roush, whom it is one of the keenest pleasures to hear from WGY, for you get a sense of travel to foreign places almost real. Dr. Roush may easily be ranked among the leading radio broadcasters of the East. It is well known that the air is filled with talk these days—much without appeal—but that is the joy of radio—if you don't like it, you just tune out. But to listen to Dr. Roush is to have a real treat, his radio travelogues are indeed important to our "air" education.

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When

Turn the inner knob of your Jewett Micro-Dial a full half-circle. The main dial—and the instrument within the set—would move only two degrees of calibration.

Move the inner knob but slightly and you cannot even see the movement of the main dial.

But what a difference in reception!

Stations you would otherwise pass over, without hearing at all, come in clearly and with surprising strength.

“Fuzzy” reception ceases to be a problem.

On high powered, selective sets, marvels of tuning can be accomplished with Micro-Dials. Less modern sets prove selective ability their owners never suspected.

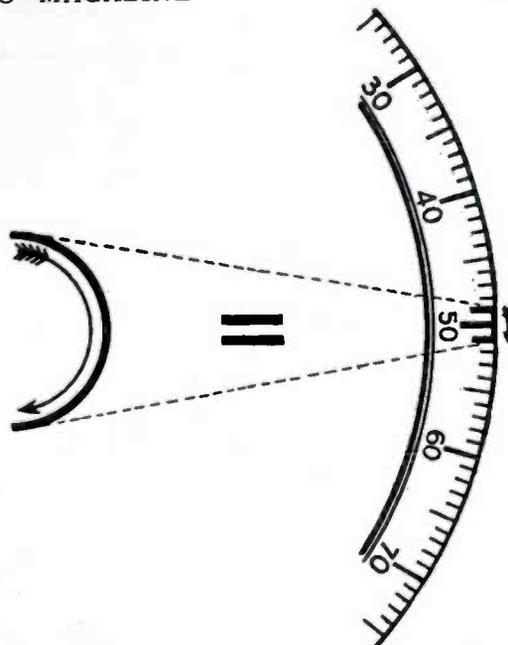
Make these benefits yours! You simply can't afford to be without them.

Needs only a screw-driver to install—no butchering of shaft or instrument. At your dealer's or, if he is not supplied, send to us direct, enclosing list price, \$3.50 each. We will prepay carrying charges.

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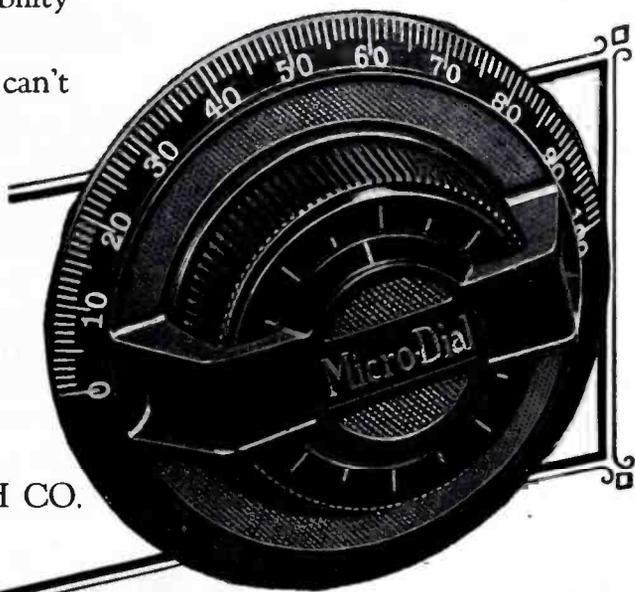
5678 Telegraph Road, Pontiac, Mich.

“THERE IS NO SUBSTITUTE FOR THE BEST”



EXCLUSIVE!

Mounts where any four-inch dial will mount—Absolutely self-contained—Nothing to be attached to panel—Slight eccentricity or angularity of instrument shaft of no consequence; Micro-Dial will not bind—Absolutely noiseless—Knob mounted on substantial bearing, which prevents wobble—No metal to tarnish or cause body effects; no rubber to deteriorate—Micrometer and coarse adjustments turn complete circle—Calibration zero right or zero left as desired—Mechanism lubricated for life—Lasts forever—Improves with use.



Micro-Dial

Trademark Registered

“Quality Goods for Quality Readers”

From the time he was a youngster, almost, Dr. Roush has been a traveler and his travels have taken him into innumerable out-of-the-way nooks and corners of the earth, places seldom seen by the average traveler. Besides being a member of a polar expedition a few years ago, Dr. Roush has drifted on many an isolated isle in his goings and comings and criss-crossings of the seven seas. At first it was difficult to meet the necessary expense for these travels, but at length the ingenious Dr. Roush hit on a scheme of commercializing his "wanderlust" and making it self-supporting. So he organized a newspaper syndicate and succeeded in

obtaining numerous subscribers. Some in Europe and a few in Australasia. His letters soon began to attract attention and his next effort resulted in doubling his papers.

If you want to take a trip to Tahiti or some unknown part of the world without leaving your job—or your comfy couch some evening—tune in on Dr. Roush—spending hours in foreign parts of the world—and getting back, mind you, in time to put what Mother Stoner calls the "kiddies" to bed!

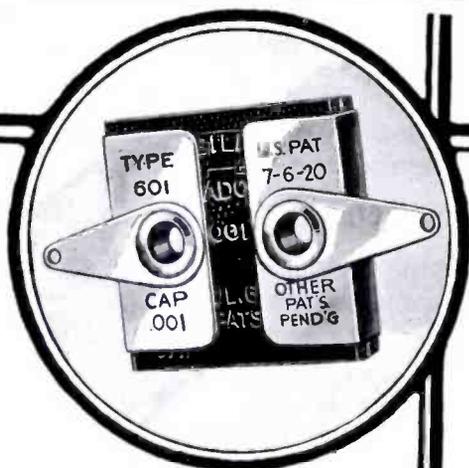
True, most of us want our travels, our lectures and our music first-hand. But how many hundreds of thousands of people cannot travel. What a marvelous thing radio is for these.

N. T. G. Speaking

(Continued from page 41)

went on my last voyage. We sailed south over Nova Scotia on a little, smelly, dirty fishing vessel out of New Bedford. I went up to Boston to ship as a sailor for my vacation, but nothing was moving at the time as there was a fishermen's strike on, but I found the *Natalie* ready to start on a sword-fish hunt. Three days later we were one hundred and eighty miles away, up near the Georges Bank. There were six of us in this forty-seven foot boat, two Frenchmen, two Yanks, a Portuguese and myself. The captain was an ex-whaler, and he could stand more than any man I have ever seen. Before we struck the sword-fish, we struck a gale that blew us south so that we were lost a week. We were nine days out before we saw a fish and then we got seventeen of them. If you know anything about sword-fishing you know it is done just like whaling. One of those I landed weighed four hundred and eighty pounds. I caught him at eight-thirty in the morning and it took a two and one half hours struggle to finish him. I drove an eight-foot lance through his eye. The sword-fish fight furiously. And three times in one voyage they ran their swords through the bottom of our boats. When you go into the Hotel Waldorf and order sword-fish you get the finest eating in the world. It is too rare and expensive for most of us. In the two weeks and a half that we were out I didn't have my clothes off and I came home with two broken ribs and had run a grapnel hook through my foot. One night after we had been butchering, a gale blew up. When you butcher sword-fish you cut off the head and the tail and throw them over to the sharks which are following your boat. The decks were slippery and bloody and we were in a state of exhaustion. Through the night a great ship bore down toward us; it was the *Aquitinia* coming home. She was alight from stem to stern and standing almost on end as she took the huge seas. The men and women inside who were dancing and dining, had they looked over the railing and seen us floundering around in our tiny boat would have said, 'What can possibly drive men to go out like that when they might be stewards or a porter on something much nicer and safer.' And as we crouched there in danger of our lives, the lines formed themselves in my mind of the poem that was later called "The Liner Speaks to the Fisherman! Men who do work like sword-fishing, do it because of the love of independence, the desire to protect their families and all the other elemental passions that can influence men. Most people have no conception of the

Only specialists can make good fixed condensers



THE small fixed condensers in your radio set are there to help you get clear reception. If these little condensers are not made *most accurately* the quality of reception you get—even though your set may be excellent in all other respects—will be greatly impaired.

You will find that nearly all sets made—in fact over 90% of them—are equipped with Dubilier Micadons. This is the name by which all Dubilier fixed condensers are known.

Be sure your set—whether you buy it or build it—is equipped with Micadons. They are made by specialists.

Dubilier

CONDENSER AND RADIO CORPORATION

Judging from the inquiries we have been receiving from our readers we are sure you will say
“JUST WHAT I WANTED!”

Log Your Stations—Get Your Distances By Call Signals, By Cities, By States,
 By Countries, For the United States, Canada, Cuba, Mexico, The World

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Each map is best and largest that can be shown in convenient form. Red dots show Radio Centers.

LISTS All Radio Stations for

The U.S. Canada World

Alphabetical by

Signals, by States, by Cities

Latest Wave Lengths

Kilocycles Locations

Names of Operators

Liberal space for your private log and new stations.

CONTENTS

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City

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“I selected it for its high insulating qualities

It cuts down the losses in the circuit”

THOSE were the exact words of a prize-winner in a radio set-building prize contest, when asked why he used a Radion Panel. Like thousands of others, he had found by experience that there is nothing quite like Radion for real results.

Our engineers developed Radion Panels especially to order for radio. Losses from surface leakage and dielectric absorption are exceptionally low. And low losses mean clearer reception, more volume and more distance.

Easy to work—moisture proof—resists warping

Radion is easy to cut, drill and saw. You need not have the slight-

est fear of chipping. Radion resists warping. It's strong. It's moisture proof. It comes in eighteen stock sizes and two kinds, black and mahoganite.

Radio dealers have the exact size you want. The use of Radion by the manufacturers of ready-built sets is almost invariably a sign of general good quality in that set.

Send for booklet “Building Your Own Set”

Our new booklet, “Building Your Own Set,” giving wiring diagrams, front and rear views, showing new set with slanting panel, sets with the new Radion built-in horn, lists of parts and directions for building the most popular circuits—mailed for ten cents.

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Dials, Sockets, Binding Post Panels, etc.

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NO LOOP

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IMPROVE RECEPTION
Easy to install. Not attached to, but merely placed under the telephone.
Sold with a money-back guarantee.
AT YOUR DEALER or sent by mail complete with insulated wire upon receipt of One Dollar.
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PERFECT REPRODUCER
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Spaulding
-BAKELITE
RADIO PANELS
SPAULDING FIBRE COMPANY INC.
TONAWANDA, N.Y.

bravery of men who go down to the sea in ships.”

When I first entered the studio at WHN, N. T. G. was reciting “The Rhyme of the Rescued Ones,” by Robert W. Service. I took it for granted that he had been an actor in his day, but this is not true. Quite by accident he says, he found that he could recite.

“One night I had to fill-in so I picked up a book and read. They liked it. It became one of the most popular features, so we have become very much interested down here in the popularization of poetry over the radio.”

Those of us who remember Clifton Crawford with affection are glad to welcome to Broadway a successor who can handle “Gunga Din” and “Boots” with ability and sincerity. You have undoubtedly heard Mr. Granlund recite some of these. Do not be surprised to know that he is going to make Okeh records of them, something which has never been done as a series.

Perhaps the success of WHN is directly attributable to the fact that N. T. G. has worked always on a definite policy. He says,

“The policy of the station is not to educate the masses. People like lyrics that they can understand and music that is really tuneful. Let somebody else elevate them. What I want to do is to entertain the people and to bring some frivolity into their homes.”

I once read an article about N. T. G. in which the author stated that one of the remarkable things about him is that he so rarely smiles himself. All I can say is that N. T. G. must have had a severe attack of indigestion that night for if anyone has a good time over his own humor as well as that of other people, this is the man.

We are rather used to thinking of fat men being funny with round, jolly, ruddy faces, but the mirthful N. T. G. is long and lean and lithe, quite jaunty and a bit debonair. His fund of humor is apparently inexhaustible. He can see a joke in everything and his jests spring so irresistibly to his lips that the contagion of his humor is quite irresistible. Imagine my amazement in discovering his Lapland origin. I said, remembering the usual reserve that is the inheritance of cold mother countries, “Is it typical of Laplanders to have such a fund of humor?” And he answered, “I don't know, I never met any of them socially.”

Those of you who have known N. T. G. only through the microphone do not know just what it is that has endeared him to the hearts of the workers of Broadway. It is his constant desire to protect the reputation of the chorus girl, and to reveal her to the people as she really is. From Station WHN he says,

“As the friends of the ‘Great White

“Quality Goods for Quality Readers”

Way' down here, we broadcast Broadway and we respect and protect Broadway girls. There are thirty-six girls in various cafe shows which I have used in my appearances on the stage, and none of them smoke or drink, and most of them support their mothers. The Broadway girls are fine girls; I have them at my home, and at my parties. Especially fine are the Ziegfeld girls. Mr. Ziegfeld is really wonderful in his choice of girls for character as well as looks. I like to show these people as they really are. I take my microphone back into the dressing rooms of some of the cafes and put on special programs and get them to talk about themselves, their lives and their experiences so that this impression that they are wild and dissolute shall be destroyed and they shall be seen in their true colors as girls who make their living by jazz, but whose morals are above reproach."

WHN has many titles. Among others it has been called the "Birthplace of Song Hits." In the one evening that I spent in the studio I met Lew Brown, who wrote "Last Night on the Back Porch," and "Georgette," Lou Davis who wrote "Will You Remember Me," and "I'm Sittin' Pretty in a Pretty Little City," Abel Baer, author of "Mamma Loves Papa," and "The Wabash Blues," Ira Schuster, and Johnny White, who collaborated on "Mr. Radio Man," "Ten Little Fingers," Ray Henderson, of "Follow the Swallow," Henry Santley, Al Wohlman, and a half dozen others. WHN has direct wires in over thirty Broadway restaurants, cafes and ball-rooms. N. T. G. is in and out of them all the time and their leading spirits come and go at WHN and among them you will find many of his discoveries. It was he who brought to light Harry Richman, of the Club Richman, and Al Wohlman, of the Wigwam.

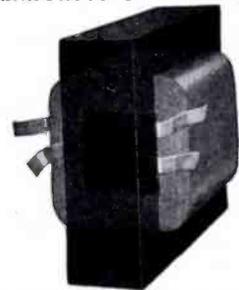
Don't think that N. T. G. does without any home life. To be sure Mrs. Granlund in her home in Narragansett Bay is a "radio widow" but "Granny" as he is so affectionately called, runs home to see her and his ten-year-old daughter as often as possible, sometimes dropping down on them in airplanes. There he has his boats. He has owned *Ingomar*, one of the most famous cat boats, and on the occasion of his visits home he and his daughter have great times. She is a clip of the old block, driving a canoe over miles of the ocean fishing, canoeing and climbing just like her father does. Next summer will see him sword-fishing again. What is there more I can say about him? He has known life in more phases than practically any one on Broadway. He knows its rough places and he knows its smooth places. Perhaps that is why we love him.

Leading set makers use *more* Thordarsons than all competitive transformers combined. What better evidence is there that Thordarsons are best?

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THORDARSON SQUARE COIL
LEAK-PROOF CONSTRUCTION



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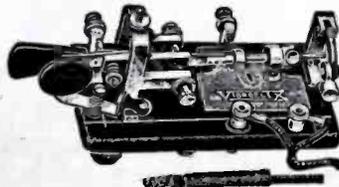
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Transmits perfect signals at any desired speed and with the least effort. Easy to learn. Makes every operator a good sender. Used by over 85,000 operators.

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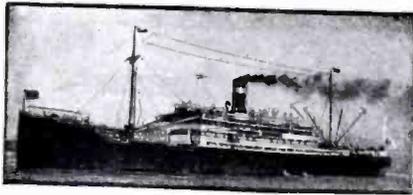
Has 3/16 inch contact points to break high current without use of relay. *Special model..* **\$25**

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Name

Address

Aerials

(Continued from page 23)

near the center, is generally considered far less efficient.

Every connection in both aerial and lead-in should be carefully soldered. Do not overlook this point, or you may find yourself using only the lead-in as the aerial after the wire has been out in the weather for a few months. A connection which is not soldered may become corroded and set up such a high resistance that incoming signals will not get past it at all. Make sure, also, that the aerial is insulated carefully. The side of the house or branches of trees will not help any if they are touching the wire.

Particular care should be taken where the lead-in comes into the house. The wire should not only be insulated, but should also be run through an insulator of some kind. If the building has steel frames around the windows or metal frame screens, this metal will have a decided effect on the uninsulated wire and also on the radio set.

The connection between the lightning arrester and the lead-in should be taken care of by soldering, in fact the Board of Fire Underwriters state that all connections in the aerial, lead-in and ground shall be soldered. Thus it will be seen that you have a double barreled affair. You should do it to get the best results and you should do it anyway to protect your own insurance.

So much for the outside aerial. We next come to the inside aerial. This is not a loop aerial despite the fact that a loop also works inside of the house. An inside aerial is exactly the same thing as an outside aerial only it is put up inside of the house instead of outside.

Of course the straight span of wire cannot be secured and for this reason the inside aerial is usually slightly inferior, but with a powerful receiving set the difference in results will be so small as to be hardly noticeable to the average listener.

As for the aerial itself it may take on many different forms. The favorite seems to be a wire fastened to the picture frame moulding in such a way that it runs around the room and down the hall or around several rooms. Only one end of this wire is fastened to the aerial binding post on the set and the ground connection is made in the usual way. The wire may be either insulated or bare or for that matter a metallic tape, one will work just as well as the other and the fact that the wire is insulated will make not the slightest difference to the incoming waves.

Some very particular fans use small insulators to hold the inside aerial from the wall while others simply

"By merit raised to an eminence"—Milton

NATIONAL Velvet Vernier CONDENSERS and DIALS

are used by
LIEUTENANT FREDERICK H. SCHNELL
(Traffic Manager, American Radio Relay League)
for communication with amateurs on wave lengths from 20 to 125 meters from the Pacific Fleet during the cruise to Australia and return.

In recognition of his splendid achievements in short-wave experiments, Mr. Schnell was invited to join the Pacific Fleet and was commissioned a lieutenant. For his short-wave transmitter he has chosen NATIONAL Condensers with NATIONAL Velvet Vernier Dials.

NATIONALS won this high honor only after the severest tests, one of which was the application of 6,000 volts A. C. at 40 meters without a breakdown. That tells the triumphant truth of the merit of NATIONAL Condensers. What further proof of their efficiency and dependability could you ask?

If your dealer is not yet stocked with NATIONALS send us his name. We will see that you are supplied. Here are the prices:

TRANSMITTING CONDENSERS:	
.00025 (23 plates) \$11.	.00046 (43 plates) \$16.
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Capacity, maximum, M.F.001 .0005 .00035 .00025	
3 1/2 in. Bakelite Dial	\$7.25 \$6.25 \$6.00 \$5.75
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ANTENELLA
is not only a real distance getter, but also overcomes troublesome static.

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Chas. Freshman Co. Inc.
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FRESHMAN BUILDING
240-248 WEST 40TH ST.—NEW YORK, N.Y.

tack the wire to the moulding where it will not show. Glass pins of the kind used for hanging pictures are particularly effective for this work, and will present a neat appearance. If these are used with a fine cotton covered wire the aerial will be practically invisible, especially if the walls are finished in a light color.

Of course, if the building in which such an aerial is used, happens to be all steel construction with metal lath under the plaster, the aerial may be completely ineffective. In one or two cases where this has been tried, the radio set has been so completely shielded that not a single thing penetrated, not even static.

For the usual non-fireproof apartment house or the home in the suburbs, such an aerial is excellent provided an outside antenna cannot be erected. The latter will, however, always give superior results and is to be recommended wherever possible. Of course any type of receiving set which will work on an outside aerial will also work on the inside kind, but the distance will be somewhat cut down. If you get good results with an inside aerial, rest assured that you will get better results on the outdoor kind.

The loop aerial is in another class as it works on a somewhat different principle. It can only be used with sets which are designed to operate with such aerials. Usually it takes a set of five or six tubes using either the reflex or the super-heterodyne principle. Sets such as the neutrodyne or other tuned radio frequency circuits will not work successfully unless the first inductance is entirely cut out of the circuit and even then the results are generally far from satisfactory. The outside aerial is best for such sets.

The loop, like the other aerials, may assume many different forms, but there are only one or two really efficient arrangements. One of these is known as the spiral wound and the other the box loop. The latter is generally considered slightly better. The spiral wound loop is exactly what its name signifies. A wooden frame in the shape of an X is made up usually about thirty inches across. The wire is started on the end of one of these crosspieces and wound around in such a way that it is secured to each of the legs. This continues in a spirally diminishing square. The wire may be held in place on the wooden frame by either small brass screws or better yet threaded through holes in a piece of rubber or bakelite which has been fastened to the woodwork. Almost any kind of wire may be used successfully with a loop aerial, but stranded green silk covered wire is good as it is more easily handled. The

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The astounding growth of Radio has created thousands of big money opportunities. Millions of dollars were spent during the past year on Radio, and thousands of young men are needed right now to meet the ever-increasing demand of work.

Men are needed to build, sell and install Radio sets—design, test, repair—as Radio engineers and executives—as operators at land stations and on ships traveling the world over—as operators at the hundreds of broadcasting stations. And these are just a few of the wonderful opportunities.

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No matter if you know nothing about Radio now, you can quickly become a Radio Expert by our marvelous new method of practical instruction—instruction which includes all the material for building the latest up-to-date Radio apparatus.

Scores of young men who have taken our course are already earning from \$75 to \$200 a week. Merle Wetzel of Chicago Heights, Ill., advanced from lineman to Radio Engineer, increasing his salary 100% even while taking our course! Emmett Welch, right after finishing his training, started earning \$300 a month and expenses. Another graduate is now an operator of a broadcasting station—PWX of Havana, Cuba, and earns \$250 a month. Still another graduate, only 16 years old, is averaging \$70 a week in a Radio store.

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Hardly a week goes by without our receiving urgent calls for our graduates. "We need the services of a competent Radio Engineer." "We want men with executive ability in addition to Radio knowledge to become our local managers." "We require the services of several resident demonstrators"—these are just a few small indications of the great variety of opportunities open to our graduates.

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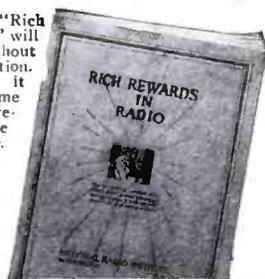
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size need never exceed sixteen and in many cases smaller wire will work just as well and will put up a neat appearance.

In the box type of loop, the bakelite or rubber strips are laid crossways to the spokes of the loop frame in such a way that the end of each one forms a T. Slots may be cut in these pieces of insulating material and the wire laid through these. The ends, in both types of aerials should be brought to binding posts somewhere on the frame-work of the loop.

The amount of wire in an aerial of this kind is most important. With the usual .0005 mfd., variable condenser to tune with it is usually necessary to use about ninety feet of wire. A few turns one way or the other may make a big difference in the wavelength range. Too much wire will cut out

the low wave stations and if you do not have enough wire, you will not hear the higher wave broadcasters. Provision should also be made for turning the loop aerial so that it may be pointed in any direction. Loops are directional in their effects and unless this is taken care of you may completely miss some of the distant stations.

In order to turn the instrument it may be either suspended from the ceiling near the set or mounted on a pedestal with a three or four-inch length of brass rod running up into one of the legs acting as a pivot.

From the foregoing it will be seen that there are three general types of receiving antennae, the outdoor, indoor and loop. The two first named are the most commonly used while the latter is primarily for the larger sets. The loop is extremely directional, ex-

cept in cases where it is close to a regulation aerial or a large mass of metal. The others are decidedly non-directional unless the amount of wire is most extreme. In actual experiments the writer has found that a one-hundred-foot aerial running east and west is just as effective as one running north and south. If a difference exists, it is so small that it cannot be detected. Therefore why worry over the direction in which your aerial points? If it is 300 or more feet in length, it is a different story, but such an aerial as this is worthless in the crowded air these days. The longer the aerial the more interference it will pick up and the harder the set will be to tune. Fifty feet should be the lower limit and 150 feet the upper. Use the proper aerial with your receiving set and half of your troubles will be ended.

Radio Cabinets

(Continued from page 26)

all around. If you possess a small lathe you will be all "set" for the next job, that of turning the feet. If not you can get them turned at a small cost, according to the general dimensions on figure 3.

These are drilled with a $\frac{1}{2}$ " auger and with the aid of glue and $\frac{1}{2}$ " doweling are made a part of the corner posts. Let me warn you here to use nothing but hot boiled glue of the best grade or some day your cabinet may take a notion to fall apart.

I am presuming that you are carefully smoothing all parts by scraper and sandpaper before assembling.

The doors can now be made and fitted. These are cut and fitted for opening, very carefully, leaving about $\frac{1}{32}$ " for clearance and varnish. Next drill two holes with a $\frac{3}{8}$ " bit into edge of door (hinge edge), almost through to other side. This will be found a job that must be done very carefully or you will break through the side. However, with a little care it can be done O. K. Cut some pieces of $\frac{3}{8}$ " dowel and coating same with hot glue drive into hole, cutting off flush with edge. Two of these in the small doors and three in the larger ones will prevent them from warping, if your stock was kiln dried in the first place, and will not be seen.

The doors can be hinged to the corner posts now, cutting all of thickness of hinge out of door and none out of post. Use loose pin hinges with fancy ball ends for this, $1\frac{1}{2}$ " for small doors and 2" for the large ones. The cover is made by aid of the mitre box. Procure some gumwood moulding from a mill making builders finish, of a design suitable for the cover, and mitre the corners carefully. There will be a hard job to secure the pieces together

firmly, but glue, long brads, and some small brass angles on the inside will do the job. The top of cover is $\frac{3}{16}$ " mahogany glued and bradded down, and then all sanded nicely. The cover is secured to the cabinet by two 2" brass butt hinges at the back.

It should project out over the top rail $\frac{3}{16}$ " all around.

The doors are held fast closed by snap fasteners recessed in bottom corner of each door and cross rail. Brass knobs are placed on each door to open them.

The radio panel is placed in upper compartment back of small doors. A ledge should be made about 2" back, to allow for dials and knobs, for panel to screw to. Do not make panel full size of opening or it cannot be got in place. Fill in space between panel and front of cabinet with some pieces of stock 2" wide. The panel is $\frac{3}{16}$ " Bakelite.

The under compartment is used for the horn and below that the closet for the batteries. The horn is made of stock from egg boxes, clear sides being selected. This wood is used because it is thin and bends easily, and that characteristic being necessary on the elbow of the horn.

The sides are cut to the shape as shown in figure 4, the grain of the stock being as the arrow shows up and down. The dimensions can best be obtained by measuring the opening. The other sides are placed on the first sides and secured by brads and glue. If the grain of these pieces are cut according to the other arrow, figure 4, it will bend around elbow; slightly wetting it at this point will help. Glue a block on the end with a $\frac{3}{4}$ " hole and piece of $\frac{3}{4}$ " brass tubing about 2" long will complete the horn.

This now is secured in the cabinet by blocking and brads. Make a strip around the front of same about $\frac{1}{2}$ " wide after it is in cabinet. Before putting these in, make diagonal saw cuts on side strips as in figure 5 to take four slats.

This whole assembly should be a little over $\frac{5}{8}$ " from front edge to allow for doors to close. The battery compartment is covered by two more doors, likewise set $\frac{5}{8}$ " from front surface, and fastened shut by snap fasteners. These should not be hinged directly to sides or they will not open very wide. Rather screw pieces $\frac{3}{4}$ " wide to sides and hinges will work nicely from this.

On finishing the cabinet make sure that the surface everywhere is perfect and free from dents and imperfections, as every one will show up later. You cannot spend too much time on this item with scraper and different grades of sand paper, and filler.

When you are sure the surface is O.K., apply a mahogany stain of the penetrating type to the color and shade desired. Next apply a good paste filler, leaving it on for about 10 minutes and then remove with a rag.

Apply four coats of clear varnish, rubbing each coat with pumice and water, and when you are done, if you have been careful of every detail, you have a radio cabinet, unconventional in regard to the usual design, and one that will make a good-looking piece of furniture for any room.

The circuit used can be any 3-tube or more, variety. I would recommend one of the latest 3-circuit type, using a two rotor tuning coil, as the controls are few, and can be used with the comparatively short panel necessary, and the efficiency of this type is high.

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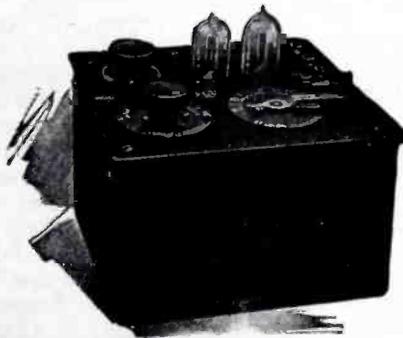
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"Quality Goods for Quality Readers"

How-do-you-do?

By ANN LORD

(Continued from page 35)

song about her. But his lines were not very refined, and so they were recast by Lady John Scott. She had no idea that her version of the old song would be the one known through the ages instead of the original.

And out of Jack Lowell's desire to find his father and mother, the present "How Do You Do" song was born. Letters and telegrams began to pour into the station. They came from every corner of the globe. This necessitated the installation of a permanent "How-Do-You-Do" man at WQJ and Jerry Sullivan satisfied himself that Harry Geise was the original and employed him.

At the very beginning, a brother and sister separated when mere babies through misfortune were happily reunited through radio after fifteen years. The other day I was inquiring about this and other cases and I met two cousins, the only living relatives of their respective family tree, who had been introduced by radio. Fathers, mothers, brothers, sisters, sweethearts, friends began to make use of the radio as the best means of finding their lost one. Many of the facts surrounding these queries are confidential—so much so that even the "How-Do-You-Do" man will only give you the desired information if you satisfy him with proof that you are either sought or are seeking some lost one.

Mrs. Ora Hughes, 229 North Collett St., Lima, Ohio, wrote in last week that she would like to find her father and mother, neither of whom she can remember.

"My own mother," she writes, "was born Jeanette Davis, in 1873 at Piqua, Ohio. My father's name is William Schweck. He was born in Columbus, Ohio. Shortly after I was born my mother divorced him and remarried a Mr. Spriggs, who has since been reported dead. This left mother and myself with step-Grandmother Spriggs. Mother qualified for the stage and her work took her abroad, but I was left behind with Grandmother Spriggs who placed me in the Franklin County Home, at Columbus. From there I was adopted by a family by the name of Ross who took me to Toledo, Ohio to live.

"Through this brief history of myself, I am trying to locate my father, William Schweck, or my mother Jeanette Spriggs."

WQJ is still radioing the request on the air along with many others adding a verse for Jeanette Spriggs and William Schweck, so that the song

which started modestly with six verses, now totals more than six thousand.

Recently Fred Gartung, a mine operator out in Montana asked a station here to locate his wife, Florence, whom he alleges he "still loves and wants back." An SOS was sent to Lew Cody, then appearing at a local playhouse. As you know he is an artist at the art of influencing errant wives to return to forgiving husbands. Mr. Cody prepared the following for the air, and he asks to be pardoned if he leans over backwards in doing his duty in the matter.

"For years," said Mr. Cody, "I have been playing bachelor types on the screen and stage—I'm the gay dog whose life work is to 'understand' the 'misunderstood' woman. Somehow, directors have come to depend upon me for ideas as to how a bachelor gets into a flirtation, usually with a married woman whose home life is dull and stupid, but more particularly he is interested in how to get out of such affairs. The outcome is that the wife goes back to the husband; it's a subtle 'How Do You Do' song of which I shall tell you. I use the following alibis, ruses, dodges, subterfuges, evasions, and 'get-a-ways' from matrimony and it does a lot of good in reuniting husbands and wives—so try it on the air:

"No. 1—Tell her that she should not give up such a fine man as her husband for a mere idler like yourself. Tell her she is too good for you, and that the memory of her dear, kind husband sitting at home alone hurts you and would keep coming between you.

"No. 2—Read her a stern moral lesson out of the Bible. That love story of King David and Beth-sheba is very attractive and effective. Show her how you are like King David, intensely in love with another man's wife, but that death and disaster would follow her divorce and remarriage to you. I make good use of this in 'So This Is Marriage.'

"No. 3—Tell her your doctor has just told you that you haven't long to live, that your heart is weakening under the strain of gayety and though you love her dearly, you can't think of tying her for life to your cadaver. This puts a damper on her romanticism.

"No. 4—Pretend you can't quit drinking, even for love of her, confess your dipsomaniac tendencies and ask her to help you overcome them. This will frighten her back to any kind of husband.

"No. 5—Have a sudden bankruptcy. Go broke and tell her that you have been neglecting business, thinking of her, dreaming of her, and that the crash has come. You will have to live in a kitchenette apartment if she marries you. This I find is an excellent

cure for misplaced affections and it still leaves her pride untouched.

"I manage to keep a step ahead of the radio man, and my plays have the tendency to make husbands and wives more contented with each other when they see what could happen. The King David story is the most plausible. I am prouder of it than of any of the others, but if any of you listening in on this program know of any better alibis for a bachelor, please send them in to station WQJ, Chicago."

Immediately the armchair bachelors took possession of the air—that is, they began to telegraph in and make demands of the "How Do You Do" man. Among the first messages was one from Dowagiac, Michigan. A bachelor admitted the girls liked him, and would the "How Do You Do" man tell him why. So WQJ broke in on the air at midnight with:

"Hello, A. R. Greer, how do you do? Hello, Allie Greer, how are you?"

You're a rich old bach so they say That's why Dowagiac girls flock your way,

How do you do Allie Greer, how do you do!"

The latest report from Mr. Greer is to the effect that he is learning all of Lew Cody's alibis by heart, in the event of needing them.

The letter which follows was not given any attention. I culled it from a host of others, because it will prove with what courage a farmer faces a loss. The writer of this letter lives near Dry Glaze, Mo., and reads:

"Dear W. Q. J.:—Will you please help me find my Bessie? She is seventeen years old, large for her age and never gave mother and me any trouble from the day she was born, until the day she disappeared. She seemed to be contented on the farm, and neither of us suspected that it was different with her until she was gone and we couldn't find any trace of her.

"I've advertised in the country papers and put up hand bills at the grocery store, but nothing has come of it. It is now going on two months since she left home. She used to run with Hiram Benton's Gertie, but Gertie doesn't act as if she knew anything of Bessie's whereabouts, and I don't believe she does.

"Please help me find her if you can. Mother says I'd better add that Bessie is our old cow."

Respectfully,

(Signed) F. F. CARREY.

Many children write, wire and telephone about lost cats, dogs, birds and pets of various kinds, but these, too, are ignored by the busy broadcasting stations, while the much more important task of reuniting families and friends go on nightly from various stations.

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A 3-stage RESISTANCE COUPLED UNIT which gives you that perfect tone-quality you are seeking. It is already wired and may be made a part of your set with a minimum of assembly labor. The merits of this modern form of amplification is so appreciated that progressive set builders are adopting the SUPER AMPLIFIER for perfect results. It costs less to install and adds greatly to the life of your "B" Batteries.

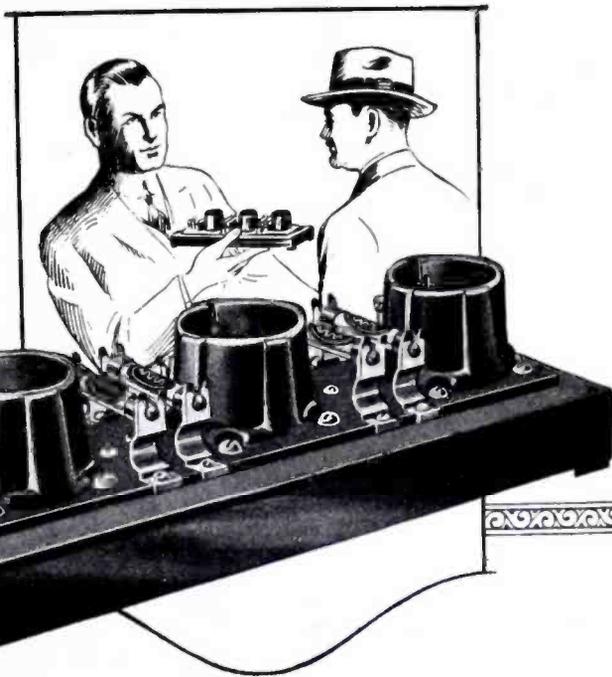
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Loud Speaker Horns

(Continued from page 16)

tones from the latter horn will exceed considerably that from the former one.

As the frequency is increased above the cut-off frequency of an exponential horn, the sound output increases quite rapidly for a while, after which it increases but slowly, gradually approaching a straight horizontal line. This is a very desirable characteristic for it helps to give the flat, ideal loud speaker curve. This is the second distinguishing characteristic of the exponential horn—the first being the low frequency cut-off point.

The third distinguishing character-

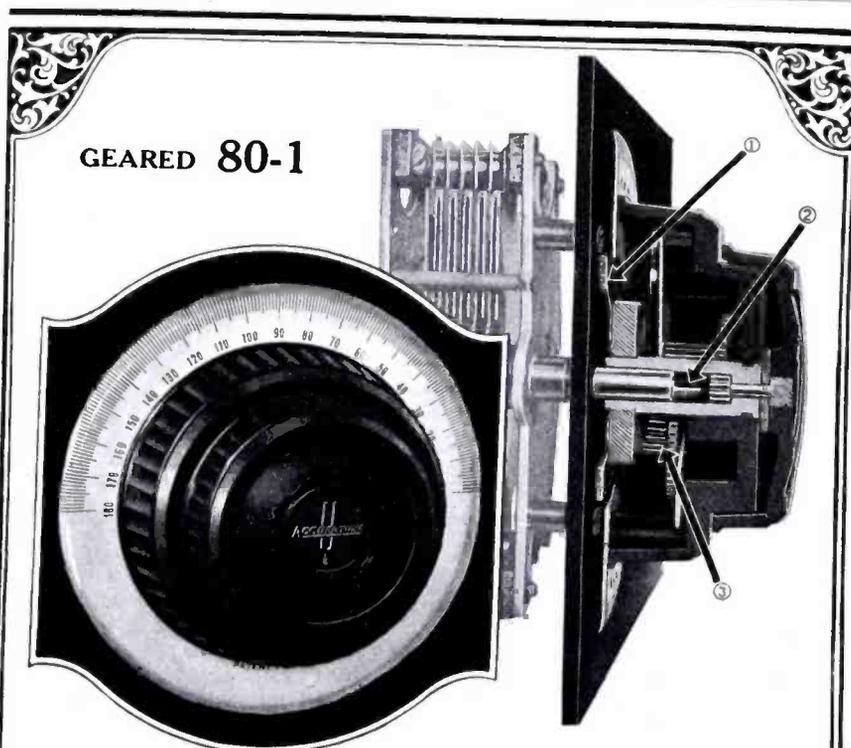
istic of an exponential horn is that the sound radiation can be increased over the low frequency region by proper design. The controlling factor is the rate at which the area (size of the horn) increases as we go from the small to the large end. This rate of area-increase can be made smaller simply by making the ratio of the small end to the large one larger. That is, if one horn starts with an initial area $\frac{1}{2}$ sq. in. and a second one starts with an initial area of $\frac{1}{4}$ sq. in. and both have the same final area, then the former horn will have a lower cut-off frequency than the latter. This is very desirable, of course; and we make

use of this law continually in exponential horn-design. This also has another desirable effect, because the slower the horn opens up the more nearly the pressure and air velocity are in phase, as we call it. This further augments the energy radiation from an exponential horn.

Of course, we must not make the small end too large for several reasons. One of these give us the fourth distinguishing characteristics of exponential horns. This is, that the sound radiation from this type of horn becomes larger the smaller we make the initial opening. This argues for a small initial opening, but the third characteristic mentioned above argues for a large initial opening in order to reduce the cut-off frequency to a lower value. There must, therefore, be a mutual adjustment to obtain the best results.

Another reason why the opening cannot be too small is that the flow of air out through a small orifice is too much retarded by the smallness of such an opening. Everyone is familiar with the difficulty of attempting to make a liquid flow through small necks, orifices, etc., and we need not illustrate our idea further.

While on the subject of the initial opening, let us indicate in another manner why a horn has to be small at the end attached to the unit. The reason why the large end needs to be large is to prevent too sharp resonance and permit more radiation, as has been explained above. There must be large pressure changes and high air velocities at the small end of the horn in order to have a sufficient amount of sound energy enter the horn. The pressure is made large (that is, the sound pressure), by having the unit diaphragm vibrate in a small cavity with a small exit into the horn. The horn opening must be made small to match the opening to the unit chamber in which the pressure variations corresponding to sound are generated. It is exactly analogous to the electrical case of matching impedances for maximum transfer of electrical energy. Then, the horn must open up gradually—that is, abrupt changes in the area must be carefully avoided to prevent the sound being reflected back instead of transmitted out. Then, too, the horn must be carried to a fairly large opening to reduce the pressure gradually and thus avoid an abrupt change to the surrounding air outside the horn. All this amounts to, is to adjust the acoustic impedance, as we call it, of the horn to fit the loud speaker unit at one end and the open air at the other end. That is, we match the impedances in acoustics for maximum sound energy-transfer just as we do in electricity for maximum



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energy-transfer. The principle is the same in both cases, but the mathematical theory has been only partially worked out in the acoustical case since it is much more difficult to handle, both theoretically and experimentally, than the electrical case.

Now, it is impossible to have very large loud speakers in the home, so that the size of the horn is limited by home conditions, consequently, the final opening will not be large enough to avoid end reflection.

Resonance will, therefore, enter and more or less sharp peaks will show up. So the solid curve shown in figure 8 is never obtained in practice. On the contrary, the dotted curve in the figure is typical of what is obtained. This curve is further modified, of course, by the loud speaker unit characteristics, and the result is a curve much like those obtained for a conical horn and no space need be given in this place for a loud speaker with this type of a horn.

The discussion for horns of other shapes will be carried on in our next installment and we shall be able to introduce other phases of our subject, which is, I believe, one which well deserves a rather complete treatment.

Trans-Atlantic Reception

EDITOR, WIRELESS AGE:

Am writing to submit a suggestion for your approval.

I believe that the international test week of some time ago created a great deal of interest in DX reception; and I believe that there are many fans like myself who would like further and regular opportunities to get a try for Europe.

Why couldn't it be arranged to have a silent night each night of the week or at least four or five nights each week by meters. For instance, let Monday eve be a silent night for all stations broadcasting between 200 and 275 meters. Let Tuesday night be silent for stations operating on 275 to 350 meters, and let Wednesday night be silent for those stations from 350 meters to 425. Thursday would cover the balance up to 600 and still have Friday, Saturday and Sunday open to all broadcasting stations.

By that plan we would open the channel to England's 2LO every Tuesday and would be able to tune for some other European station on each silent night.

Radio has developed now to the point where we should be able to get European reception with reasonable consistency if it were not for domestic interference. Personally, I would get more kick out of one-half hour's reception of Europe than an hour of the finest local music in the world, and I believe there are many more like me.

I feel that if some big magazine like WIRELESS AGE were to propose some such plan it could be brought about.

Hoping that you will be able to start something that will give us a chance at foreign reception and thanking you in advance, I remain,

Sincerely,

EARL DELOSO HAMER.
Genoa City, Wis.

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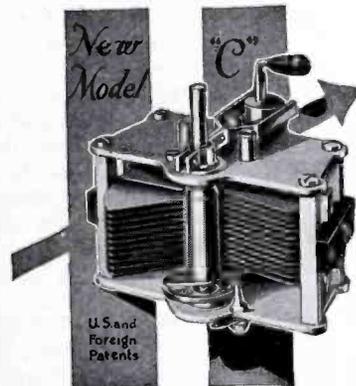
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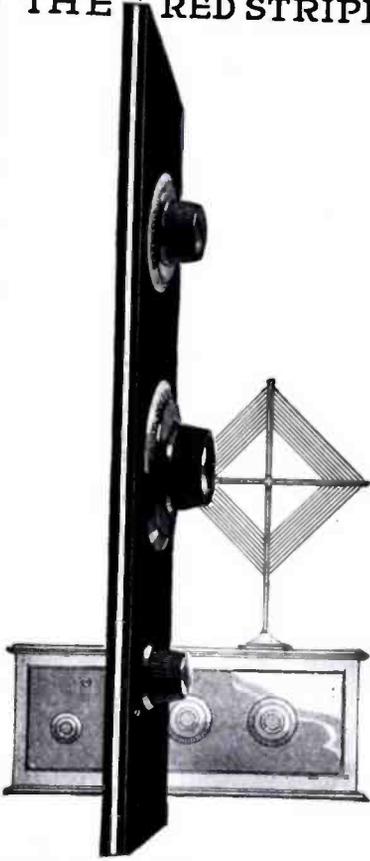
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Low Loss Coils

(Continued from page 24)

wound with wire having zero resistance, the coil being isolated in free space without any material support.

We can wind such a coil, with a few modifications.

1. We can wind the coil on an air core and make the supports as small as mechanically possible.

2. We can keep all imperfect dielectrics as far from the strongest part of the field of the coil as feasible.

3. We can minimize the ohmic resistance of the winding by avoiding the use of too small wire for the winding.

Before going ahead with the construction of the radio-frequency transformers there are a few more pertinent points that we should bear in mind.

1. Dead end turns in a coil will increase its radio-frequency resistance.

2. Terminals of radio-frequency coils which are embedded in insulating material introduce resistance due to our old friend "dielectric absorption."

3. Insulating material between the turns of a coil increase the radio-frequency resistance, again due to "dielectric absorption."

4. Actual leakage of radio-frequency currents between successive turns in the winding of the coil will also increase the radio-frequency resistance.

Now, considering the last four facts mentioned, let us see what we can do toward eliminating the causes for radio-frequency resistance as put forth in those four paragraphs.

As far as No. 1 is concerned, we can eliminate that entirely by not having any useless turns in our coils.

We can take care of No. 2 very nicely. Instead of bringing the ends of the primary and secondary windings of our radio-frequency transformers to terminals which are embedded in the bakelite form on which the coils are wound, we will, in the first place, bring the ends of the windings directly out to the bus-bars to which they are to be connected and in the second place, we won't have any bakelite form.

No. 3 brings up the point that we must exercise our better judgment in the choice of the insulation we have on the wire we use in winding the coils. It is just as essential that we check the quality of the dielectric introduced in the field of the coil by the insulation on the winding as it is that we be careful of the dielectric we would put in the field of a condenser if we were constructing one.

In the latter case, if we wanted the best results, we would use air for a dielectric, but in the case of the dielectric between the turns of wire on

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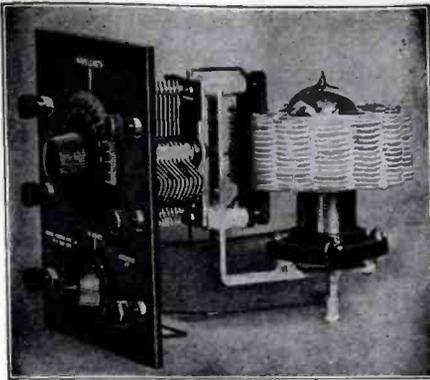
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our coils it is not feasible to have air as we want the wire to be covered with some material substance. It is not advisable to use enameled wire as enamel is a poor dielectric and another thing, too, owing to the thinness of the enamel, a coil wound of this kind of wire would have a high distributed capacity.

Cotton insulation is good because it is a good dielectric (as long as it is kept dry). Single cotton covered wire is not feasible due to the lack of insulation. Double cotton covered wire is good insulation and also provides plenty of spacing between turns. Double silk covered wire is good, also, because it offers good insulation, plenty of spacing between turns and is a good dielectric.

From No. 4 we see that it is advantageous to always keep our coils dry because leakage between the turns of the coil occurs when the insulation becomes moist. One way to overcome this last effect is to use enameled wire, but we have just said that enamel is undesirable because it is a poor dielectric and hence increases the resistance of the coil due to dielectric absorption. The way to get around this is to use double cotton covered enameled copper wire. The enamel will prevent the moisture from making contact with the copper conductor and the double cotton covering will provide sufficient spacing between turns so the dielectric effect of the enamel will not be bothersome.

For the three coils which we are to wind for the "Direct coupled regenerative radio-frequency receiver" we will need 1/2 lb. of No. 24 double cotton covered enameled copper wire. If this seems a little difficult to procure, buy 1/2 lb. of No. 24 double cotton covered copper wire. The first thing that we must do now is to make a winding form. The diagram in figure 1 gives you a good idea of how the winding form is constructed.

First, procure a wooden disc 3 inches in diameter and 3/4 of an inch thick. Divide the rim of this disc into 15 equal parts and you will have located 15 equidistant points around the circumference. Insert a 1/4-inch dowel into the rim at each one of these points, just the same as spokes in a wheel, so that each dowel protrudes 1 inch out from the rim. Don't make this a driving fit because it will be necessary to remove the dowels, after the winding is completed, before you will be able to remove the completed winding from the form.

After the winding form is completed, you can start winding the first coil. This coil is the one in the input circuit to the first radio-frequency amplifier tube and is a single 40-turn coil.

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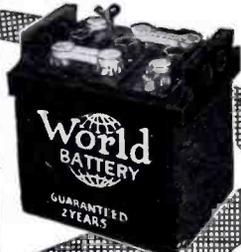
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To facilitate the description of the method of winding these coils, a view is shown of the rim of the winding form, with dowels inserted, rolled out into one plane as shown in figure 2. In this view, the entire rim of the winding form is shown as it would look if it could be unrolled and laid out in one plane. The 15 dowels are numbered from 1 to 15.

Starting the winding at dowel No. 1, pass the wire to the left of No. 1 and No. 2, then cross over and pass No. 3 and No. 4 on the right, now cross back again and pass No. 5 and No. 6 on the left, etc., always passing the wire around the left hand side of two successive dowels and then around the right hand side of the two succeeding ones, criss-crossing back and forth in this manner until you have completed 40 turns. When the coil is completed, take out the dowels, carefully, and then tie the winding securely at strategic points to keep it from unravelling.

The next coil is wound in a similar manner. The only difference between this coil and the first is that this second one is tapped at the fifth turn.

The last transformer is different from the first two in that it is composed of two windings. Proceed the same as you did in the case of the first coil and when you have completed 40 turns you will have completed the first winding. Start the second winding right where you end the first and proceed until you have wound on 5 turns. Then end this winding. Thus you have completed a transformer composed of a 40-turn secondary winding and a 5-turn primary winding, the two windings being separate.

This completes the story on the winding of the coils for the "Direct coupled regenerative radio-frequency receiver" and the story of the receiver was in last month's issue of this magazine.

I will be glad to hear from all you fellows regarding your success with this circuit, also, any suggestions for improvement which you care to submit will be most graciously accepted.

The Voice from the Cabinet

(Continued from page 39)

you hear him? He's speaking to us now! Go to the telephone! Quickly! Call them up now, before he leaves! Oh, you'll be too late!"

He did not notice that her mother and her father were in the room; had come at the girl's first cry; he noticed nothing, knew nothing except that this girl whom he loved was trying to invoke a rival who would slay the little happiness he had for so short a time enjoyed.

"You just imagine it, dear!" he cried, and without thought he gathered her into his arms. She tore herself away from him.

"You don't want to help me!" she cried accusingly. "You want me to lose him forever!"

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Before the fire of her accusing eyes, he stood for a moment speechless, then, without a word he turned on his heel and plunged blindly out to the hall where he clutched the telephone as though he would have strangled it and grimly demanded a wire to Detroit. At his departure she turned with wide, harried eyes to her mother and flung herself into her arms.

"Rodney! He's there! He's talking to us! On the radio!" she cried; and she buried her face in her mother's breast, weeping.

Her father turned to the wooden cabinet in perplexity and deep concern. Only a slight, almost imperceptible grating noise issued from it.

With the same grim determination with which he had called Detroit that night and conveyed to a gratified official of the Michigan State Bulletin (which housed station WHKY) his suspicion that the lost man was Rodney Trimble of Sarnac, Early saw the matter to its conclusion. He could not forget the passionate accusation which had flamed in the eyes of Kate Meredith as she had sent him to the telephone, and the memory aroused in him a spirit which had not before existed in his relation to the girl. Hitherto devotion had been the keynote of his wooing; now it was as though he fought in active combat with an unscrupulous, merciless foe. That foe was the intangible substance of a romantic infatuation which existed in the heart and mind of a girl, and Early found himself battling against it grimly, desperately.

He obtained from the distant sponsors of the unknown man's destiny a detailed description of the lost one. He also derived a complete summary of the man's habits, mannerisms, peculiarities and traits. All these he found were satisfactory, but he did not give the results of his inquiries to Kate Meredith or her parents.

He devoted the entire morning to this untiring quest for information and at luncheon with the Merediths he told them only that they could expect the man who had lost his memory to appear at their house that evening. Kate, who tensely endeavored to appear no more than quietly interested in the development of these strange circumstances, exerted all her self control to question him.

"Did you get his description?" she asked in a tense staccato.

He gazed very straightforwardly into her eyes.

"As far as I could," he said. "I think he is the man." And she dropped her knife and fork with a little clatter on her plate, turning deathly pale.

He persuaded them to await the hostage of fortune in their home. He argued that they must at all cost avoid a scene at the station, and it was not convenient that all Sarnac should know of Trimble's return. Mrs. Meredith assured him that she would manage that, which left nothing more to do than for four people to contain their various emotions until they were put to the ultimate test by the singular denouement of the strange adventure which had enmeshed them.

It was dark evening when Early brought his two guests to the Meredith home from the station, and the door being opened as usual by the capable Mrs. Meredith, the three of them strode forward immediately to the living room. There, in the light,

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Kate Meredith stared at them with her brown eyes sparkling amazingly in her tense, white face.

"Where is he?" she cried. And Early very deliberately placed his hand upon the shoulder of the frail young man at his side.

"This is the man," he said steadily.

She drew back as though he had indicated a wild beast.

"No!" she faltered. "Oh, no!" For whereas Trimble had been tall and peculiarly graceful, this man was small and thin and stooped. Whereas Trimble had been graced with a profusion of curling black hair, this man was sparsely crowned with iron grey. And the tired face of this stranger was drawn and wrinkled. He stood there and blinked at them.

"I can't remember," he said weakly. And his eyes wandered about the room.

"Jack Early," the voice of Mrs. Meredith boomed ominously. "Who is this man?"

"I don't know," admitted Early.

"But you had his description?" snapped Meredith.

"Yes."

With a swift movement the girl confronted him.

"You knew all the time that he wasn't Rodney Trimble?" she demanded; and her voice quivered with the intensity of her emotion.

"Yes, I knew. I knew." He frowned in the depths of his despair. "Oh, don't you see, Kate?" he cried. "It was the only way! The only way to convince you!"

But she stood there with a peculiar glitter in her eyes.

"But you knew it! You knew it all the time!" she said.

What Early would have done in that

moment he never knew for in that moment the stranger had leapt across the room and pounced like a bird of prey upon the picture of Rodney Trimble which smirked at them from the table.

"It's him! It's him!" cried the stranger with a peculiar ferocity in his voice; and seizing the picture frame in his hands as though he would have torn the smirking face it framed asunder, he sank into a chair at the table side. "My God!" he murmured. "My God!"

They crowded about him, plying him with questions, while he stared at them as though in a trance.

"Who are you all?" he cried. "What am I doing here?"

Then suddenly he arose, the picture in one hand.

"WHERE CAN I FIND THIS MAN?" he shrieked. "Where is he?"

And they knew that he had remembered.

The story he had to tell them was not precisely a new one; and his emotions at regaining his memory of the past were not completely happy. It seemed that Trimble had met the unfortunate fellow for no other purpose than to swindle him, and that having become intimate with him, he had departed not merely with his money but with his wife as well. The unhappy victim had devoted many months to pursuing Trimble and brooding over his troubles until he suffered the inevitable effects of such an enterprise in complete collapse. When he departed from Sarnac the following morning he had procured not merely his identity, but he had procured the friendship and financial backing of LeRoy Meredith; but those things are hardly of interest to us inasmuch as the story ended for Jack Early this very night.

After their strange guest had departed with her parents for the library, Kate Meredith found herself alone once more with Early beside the cabinet which contained the radio.

"I suppose that before I go tonight, I must ask you to forgive me," he said. He spoke without penitence however, and there was in his voice the essence of resignation and regret. He recalled the tone with which she had voiced her discovery of the deception he had wrought.

"Forgive you for what?" she asked.

He glanced at her swiftly. There was in her voice the incredible sound of a playfulness, an assured coquetry, which he had not heard since the day when Trimble disappeared.

"Don't look so astonished," she laughed; and instantly became deeply serious. "What is it that I have to forgive you, Jack?" she asked.

"Surely you haven't forgotten!" he cried. "Oh, Kate, I— It was the only way— You forced me to do it, Kate!"

He was standing over her now; standing close to her chair. And she arose.

"Yes," she said. "I know. I forced you to do it. And there is only one thing I should never have forgiven you."

"What's that?"

"Oh, Jack, I was afraid! I was terribly afraid that it was really him! I should never have forgiven you if you had brought him back again!"

He held her in his arms and wondered what it was he ought to say.

"Let's . . . Let's try Chicago," he ventured.

So they tried Chicago, and heard a suite of dulcet love songs while they learned the true usefulness of the vast davenport which epitomized LeRoy Merediths in furniture.

The H. I. in Broadcasting

(Continued from page 44)

radio programs; and when it is first-class entertainment, as a great deal of it is, the listener doesn't care a tuppenny-bit if they do tell us who is paying for it.

We never bought a Silvertown Cord, but we like to dance to their orchestra; nor have we ever seen a box of Gold Dust, but that doesn't keep us from tuning in on Goldy and Dusty occasionally, and while we enjoy the Book-Cadillac orchestra, when we go to Detroit, we stay at the Statler. It is just as easy to turn a dial as a page in a magazine, and the American public at this date is surely too immured to advertising to lose much sleep over it.

COMES a wail from Father in the middle west;

"Why in Sam Hill don't some of these stations that are forever quarreling about their time, get busy and broadcast a few chirps on Sunday, when I, and a few thousand and beasts of burden like me, have time to listen to them? I've got some three hundred dollars invested in that outfit and all I ever hear are dinner concerts and bedtime stories, because I am so tired every night I can't sit up. I go to my own church Sunday morning, and I am not terribly excited over listening to forty-seven brands of religion at night. Sunday afternoon I am in a mood to listen to anything, but aside from one dinky little concert, there is not a vibration on the air.

"Quality Goods for Quality Readers"

I wonder that all these people with something to sell have overlooked the possibilities of Sunday. Roxy is the only oasis in the Sabbath desert, and furnishes about the only program I hear all week."

Father has an idea at any rate.

HOW can we gauge the educational value of radio? It is almost infinite. One perturbed father, who had viewed, somewhat with dismay, the avidity with which his small son was lapping up all that came out of the air—good, bad and commonplace—was agreeably surprised when the young hopeful piped,

"That was the aria from Samson and Delilah," with faultless pronunciation and accent. He had apparently been listening in on the right man.

It is to be regretted that some of the announcers of the hinterland have not the time for similar enlightenment. One was sorely puzzled to hear a broadcaster, who shall be nameless, intone,

"You just heard Lay Ape Rus My-Dy," until he added, in a most apologetic tone,

"That's French for 'afternoon.'"

The Man Who Buys the Batteries writhed with glee on the Davenport, and vowed he had spent his last penny for tickets to a vaudeville show. We might add that this station is a continuous joy; for the unbelievably funny things that it tells the world night after night have no parallel in our recollection. We cannot, however, recommend it for its educational value.

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City.....

State.....

New Subscriber I am now an AGE subscriber

A-5-25

Giant Radio Lab.

(Continued from page 32)

ting plant is beyond the hope of any except a large company.

In the receiving laboratory the engineers are interested in developing the various unit parts which comprise radio receivers. They study the characteristics of the tubes for each piece of apparatus making up the receiving set to make sure that each part is capable of functioning properly. Ordinarily, an experimental receiver laboratory might take up a space equivalent to an ordinary house.

In a transmitter laboratory the engineers are interested in such features as the conversion of the ordinary 110-volt lighting current to 15,000 or 20,000 volts direct current. They must study means of converting this direct current into radio frequency currents. In so doing the efficiency of each part is of vital importance. This is especially true if the transmitter is to have an output above 10 kilowatts. New means must be discovered for holding the radio frequency supply constant. Again, the engineers must study continuously the problem of modulation whereby the audio frequency energy may be accurately and efficiently superimposed upon the radio frequency energy. These are but a few of the problems the transmitter engineer must study and when it is appreciated that he may be dealing with transmitters up to 100 kilowatts in power some idea is gained of the size of the plant that must be placed at his disposal.

Besides transmitter circuits and their associated equipment the transmitter engineer must also make a study of the propagation of electro-magnetic waves, that is he must determine theoretically, if possible, and then check these results by experimental tests, the wavelengths that are most desirable for any given type of service. He must determine the power required to cover any given distance under any specified condition.

It is for the purpose of carrying on this intensive work in transmission development that the General Electric Company is erecting its great laboratory near Schenectady.

Mr. T. P. Alley

(Continued from page 45)

Gone is the Mammy-lad who was several times a Secretary of State—financially. The trend of T. P. A.'s thought is:

If there is a handy word lower in the scale than moron, what is it? The only single thing the public has noticed in months is an obscure western weather forecaster who bellows promises of drought. "Drought" is a mild word for what's happening. Sure fire song hits meet the scorching blasts of popular disfavor and their shriveled bodies

Physicist Tests B-T Condensers

G. M. Wilcox, Professor of Physics at Armour Institute of Technology, recently conducted tests on B-T Condensers taken from stock. The test included a comparison of readings obtained by interchanging a B-T Condenser with their "laboratory standard" in a circuit through which a current was passed at radio frequency.

The results show that B-T Condensers have *less* resistance than the *laboratory standard*. Part of Professor Wilcox's letter is reproduced below:



B-T Type L Condenser
Clockwise Reading

Chicago, Illinois,
February 27, 1925.

"When Bremer-Tully Condensers were in the circuit, the current was from 1 to 2% greater than that obtained with the Laboratory Standard. It was necessary to introduce about 0.1 ohm in the circuit to bring the current down to the same value as that obtained with the "Standard." The *equivalent resistance* of B-T Condensers is therefore less than that of the standard by approximately 0.1 ohm.

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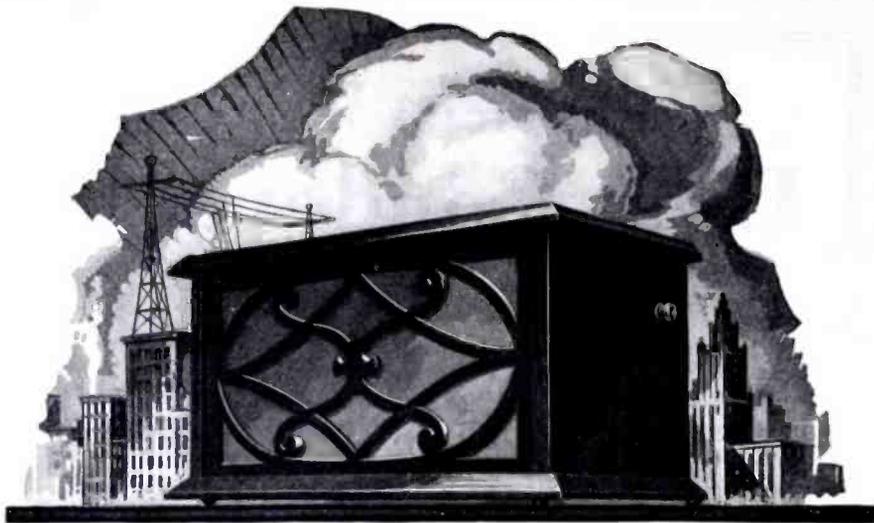
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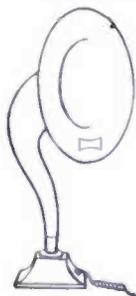


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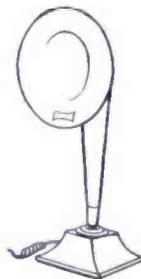
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872 Broadway, New York City

fairly clutter the pavements of the one-time Tilting Forties.

"Saylissen." The brainworker of the firm makes the password snappy. He is having to work faster every day.

"Lissen, we been awful dumb. Pullin' this moron stuff an' thinkin' the public's so nix-witted. Give us 'nawful black eye. Even Varieties comes out an' prints a list of snappy song writers who've hadda go back to sellin' neckties, jerkin' soda 'n' clerkin' in cigar stores."

"They's twenty million in the radio audience now, and they can't stand so much sugar, that's what. Sticky songs won't sell any more. I got the low-down today. Good old-timers and high-brow stuff is sellin' faster and faster. We was the morons. I'm learnin'. The public was buyin' what it knew about, and now it's hearin' the hash we give 'em so often it sickens 'em. But the public's findin' out they is some pieces you can't ever get too much of."

"An' say, did you know that John McCormack was makin' twice as much as many of the jazz kings, all the time? That oughta told us something about what the public'll pay for—"

"Say, Lissen." T. P. A. himself entered the conversation with his hireling's counter-sign. "What's the matter with you anyway? Have you got bit by Culture, or something?"

"Me?" said the fast worker. "No, I finally woke up and got me a radio set. An' I been hearin' our stuff too often. But Lissen, tomorrow night they's to be a symphony orchestra concert. Y'oughta hear it. I donno what it's all about; but say, it's hot stuff."

There was only one thing he could do. Although but thirty-five years old, Mr. Tin Pan Alley retired the next day. He said he had been a king on Broadway for more than five years; that made him an old man, and an old dog can't be taught new tricks—and so on.

But everybody was engrossed with cross-word puzzles so nobody listened to what he had to say.

WGR Ensemble

(Continued from page 48)

Perhaps it takes this sort of a person to get the most out of a violin. the instrument with such an infinite capacity for the portrayal of emotions. Noah Webster is credited with saying that the violin is "distinguished for the brilliancy and gayety, as well as the power and variety of its tones, and in the orchestra," he further says, "it is the leading and most important instrument."

Then, there is Agnes Millhouse. This lady may be termed the comedienne of the group. Probably there are few people in the world who get as much real fun out of the joys and

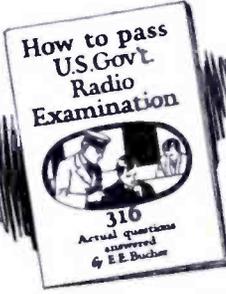
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Advertisers' Index

Adams-Morgan Co., Inc.	73
All-American Radio Corp.	3
Allen-Bradley Co.	4
American Electric Co.	58
American Hard Rubber Co.	58
Antennaphone Co., The	58
Apex Electric Mfg. Co.	71
Bakelite Corporation	69
Bel-Canto Mfg. Co.	74
Brandes, C., Inc.	5
Branston, Inc., Chas. A.	69
Bremer-Tully Mfg. Co.	73
BurBess Battery Company	71
Continental Fibre Co., The	68
Continental Radio & Elec. Corp.	63
Crecent Radio Supply Co.	61
Crosley Radio Corp., The	Third Cover
Cunningham, E. T.	Second Cover
Daven Radio Co.	65
Dubilier Condenser and Radio Corp.	56
Durham & Co.	73
Eastern Coil Corp.	68
Federal Tel. Mfg. Corp.	63
Freshman Co., Inc., Chas.	60
Frost, Herbert H.	68
General Electric Co.	76
General Instrument Co.	75
General Radio Co.	8
Hammariund Mfg. Co.	67
Hull & Co., S. W.	71
International Correspondence Schools	69
Jewell Elec. Instrument Co.	61
Jewett Radio & Phonograph Co.	7, 55
Kellogg Switchboard & Supply Co.	75
Lopez, A. C., & Co.	74
Marshall Electric Co.	67
Mica Insulator Co.	70
Mozart Grand Co.	58
Music Master Corp.	67
Mydar Radio Co.	66
National Carbon Co.	51
National Company, Inc.	60
National Radio Institute	61
Newman-Stern Co., The	70
New York Coll Co., The	68
Omnigraph Mfg. Co., The	76
Ozarka, Inc.	75
Phenix Radio Corp.	53
Premier Electric Co.	75
Radiall Co.	68
Radio Assoc. of America	75
Radio Corporation of America	Fourth Cover
Radio Corporation of America Distributors	70
Radio Engineering Laboratories	69
Radio Institute of America	60, 74
Rhamstine, Thos. J.	67
Silver-Marshall	54
Small Ads of Big Interest	69
Spaulding Fibre Co.	58
Thordarson Electric Mfg. Co.	59
Tower Mfg. Co., The	1
Valley Elec. Co.	71
Vibroplex Co., Inc., The	59
Wireless Age	57, 65
World Battery Company	69, 75

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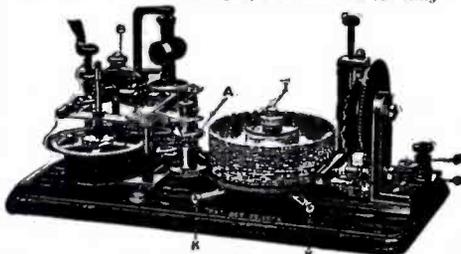
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If you own a Radio Phone set and don't know the code—you are missing most of the fun

"Quality Goods for Quality Readers"

sorrows of this old world as Agnes Millhouse. If you happen to be low in your mind Agnes Millhouse could cheer you up. Give her five minutes and she would have you in a spasm of laughter over some happy yarn of her concoction. Naturally, the incident of the "Parade of the Wooden Soldiers" was a great mirth-provoking event to her and she made the most of it.

The group is complete with Mary Reynolds, who manipulates the pipe organ. What? We hear someone ask. A pipe organ? You must mean piano. That is the instrument to complete such a group. But, no. Here's some inside stuff. It is no secret but E. M. Statler has a very warm place in his heart for the pipe organ. He thinks that it is true of most of the public. Perhaps he is right. He ought to be, having spent a life-time finding out what the public wants. And if there is any doubt about the four instruments blending splendidly—harp, violin, cello and organ—you should tune in on WGR and hear for yourself. So Mary Reynolds plays the pipe organ. She is a quiet sort of person, interested in everything that happens, but perfectly willing to let Agnes Millhouse add the jazz to the group and take her fun out in observatory laughs.

That's the Hotel Statler Concert Ensemble. Is it any wonder that M. A. Rigg, Jr., general manager of WGR, Announcer Becker and Fickett, watch its work with great pride and care? Aside from this pride in good music, there's the fan mail, always the fan mail which proves beyond anything else what a good feature it is for the noon-time audience.

A Radio Star

(Continued from page 29)

to me themselves, or else they simply do not understand. I do make my personality felt! It is the personality in my music that makes it art—and that brings people to write these enthusiastic letters. You can't arouse enthusiasm with machine-like, personality less playing, can you? No. Others use the voice to tell you of themselves, while I can say all kinds of thoughts with my little old fiddle."

And, speaking of personality, glance back at that string of photos. Is it not a fact that if under each of the six of them were a different name, you would never think to question, but what they were so many different individuals! Half a dozen vivid personalities wrapped up in one personable girl, that is Madeleine MacGuigan, violin virtuoso of the air. What wonder that we radio fans find her music fascinating, even though it comes over a hundred or a thousand miles of space?

Amateur Stations of the United States

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- 8 ASI Bennett Kendig, 39 1/2 Lowell St., Rochester, N. Y.
- 8 BEW Edward Klinko, W. 610 St. Cockhart, Sayre, Pa.
- 8 BFU Frederick R. Thomas, Jr., Hotel Danford, Woodfield, Ohio
- 8 BMV William B. Hanlon, 511 North Ave., Wilkensburg, Pa.
- 8 BOW Henry L. Carter, 580 N. Goodman St., Rochester, N. Y.
- 8 BPH John B. McClure, Stop 139, Shore Line, Euclid, Ohio
- 8 BX Donald Steward, 1043 W. Main St., VanWert, Ohio
- 8 HZK Paul Roth, 13610 Larchmere Blvd., Shaker Heights, Ohio
- 8 CHY Max H. Edwards, Leipsic, Ohio
- 8 CTF Clarence Young, 33 1/2 Cedar St., Binghamton, N. Y.
- 8 DHI John C. P. Lewis, 1471 Michigan Ave., Buffalo, N. Y.
- 8 DIL Henry Gilmore, 705 W. Cross St., Ypsilanti, Mich.
- 8 DRV R. C. Wendler, 5736 Field Ave., Detroit, Mich.
- 8 EN Clyde Hillman, 630 N. Negley Ave., Pittsburgh, Pa.
- 8 ILL Elwyn S. Marvin, 102 Willys St., Elmira, N. Y.
- 8 ZAD Allen E. Apple, 115 So. Euclid St., Dayton, Ohio
- 8 ZIF Robert C. Bohannon, Columbus, Ohio
- 8 XAV University of Cincinnati, Elec. Engr. Dept., Cincinnati, Ohio
- 8 XBB Reo Motor Car Co., Lansing, Mich.
- 8 KO Harold W. Elliott, 7622 14th Ave., Detroit, Mich.
- 8 SD 106th Cavalry Headquarters, Det. U. S. Mch. Nat'l Guard, 1144 Collingwood St., Detroit, Mich.
- 8 WP Frank J. Mack, 67 Randolph St., Rochester, N. Y.
- 8 AAE Abraham A. Wilder, 1535 Sixth St., Detroit, Mich.
- 8 AEX Orville F. Smith, R. D. 1, Bellefontaine, Ohio
- 8 AKH Willard F. Penn, 2423 Catalpa Dr., Dayton, Ohio
- 8 ALJ Carl Luhn, 4900 Arnold St., Cincinnati, Ohio
- 8 BBL Coleman Murphy, Jr., 55 Dinsmore Ave., Crafton, Pa.
- 8 BER Richard E. Palmer, 207 John St., Owosso, Mich.
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- 8 BSG Wilbur Mack, 116 Prospect St., Newark, N. Y.
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- 9 LK S. Ellison Sayers, 208 E. Monroe St., Mexico, Mo.
- 9 MQ Walter J. Muir, 2857 Fulton St., Chicago, Ill.
- 9 AAH Roy Beck, 827 N. Dodgean St., Independence, Mo.
- 9 AAX Richard J. Fencl, 2804 W. Mich. St., Duluth, Minn.
- 9 AEA Carroll Mason, Burke, S. Dak.
- 9 AFO Ralph Billings, 2115 W. 107th Pl., Chicago, Ill.
- 9 BCG George K. Shirling, 1338 Ohio St., Lawrence, Kans.
- 9 BCX Victor T. Wedel, 1220 High St., Keokuk, Iowa
- 9 BCY Edward Goodberlet, 6604 Flyer Ave., St. Louis, Mo.
- 9 BEK Albert V. Chase, Jr., 412 Menlo Blvd., Milwaukee, Wis.
- 9 BEV Falls Cities Radio Assn., 220 S. Fourth St., Louisville, Ky.
- 9 BGL Edward B. Stern, Peninsula Hotel, Lindstrom, Minn.
- 9 BHM Walter B. Roe, 5311 Lakeside Ave., Chicago, Ill.
- 9 BRB Theodore Mundens, P. O. Box 919, Winnetka, S. Dak.
- 9 BKW Alfred Beech, Springfield, Minn.
- 9 BKY Edward E. Brautisam, 1507 Selby Ave., St. Paul, Minn.
- 9 BLY Paul B. Nelson, 622 Main St., Anoka, Minn.
- 9 BMB Norman L. Conrad, 527 N. 54th Ave., Duluth, Minn.
- 9 BMH John D. Breeding, 508 Capital Ave., Frankfort, Ky.
- 9 BNY Fabian R. Fletcher, Brookfield, Mo.
- 9 BOW Hubert M. Scholes, P. O. Box 235, Burke, S. Dak.
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- 9 BQQ Charles W. Scott, 6026A Washington Ave., St. Louis, Mo.
- 9 BRF Erwin W. Martens, R. F. D. 2, Gresham, Nebr.
- 9 BSN George A. Riddell, Jr., 2206 N. 6th St., Sheboygan, Wis.

- 9 BTG Malcolm H. Gibson, 2120 N. 8th St., Sheboygan, Wis.
- 9 BVQ Godfrey Wondrasek, 3232 Nagle Ave., Chicago, Ill.
- 9 BVT Raymond O. Rapp, 3711 Greenwood Ave., Chicago, Ill.
- 9 BXS Emmet L. Anderson, 201 Bay Shore St., Marinette, Wis.
- 9 BZX William Dittenhofer, 827 Summit Ave., St. Paul, Minn.
- 9 CAI Clayton Wanek, 920 16th St., Aurora, Nebr.
- 9 CHD James J. Griffin, 101 W. South St., Nokomis, Ill.
- 9 CBQ Arthur W. B. Phillips, Robinson Creek, Box 364, Pikeville, Ky.
- 9 CBS L. B. Tuckerman, 447 Edgewater Drive, Milshawaka, Ind.
- 9 CHU Western Illinois State Teachers' College, W. Adams St., Macomb, Ill.
- 9 CBX Maurice A. Davis, 1617 Grand Ave., Parsons, Kans.
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- 9 CCU Fred J. Gelsch, Box 611, Washington, Ill.
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- 9 CCZ A. Verne Roberts, 1241 Perry Ave., Wichita, Kans.
- 9 CDB William W. Bradley, P. O. Box 76, Lewellen, Nebr.
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- 9 CDH Arthur Shaw, 7736 East End Ave., Chicago, Ill.
- 9 CDR Dale D. Jenkins, 903 Eighth St., Corvallis, Iowa
- 9 CDZ Mark R. Williams, Skidmore, Mo.
- 9 CEO Permen H. Karr, 524 Biust St., Beloit, Wis.
- 9 CFT Glen F. Franz, 524 Biust St., Beloit, Wis.
- 9 EV Ralph W. Ballard, 404 E. 9th St., Chicago, Ill.
- 9 EX Harry B. Clark, 4130 Ashland Ave., St. Louis, Mo.
- 9 FA Good's Radio Shop, 1954 W. Madison St., Chicago, Ill.
- 9 FG Irving Hecht, 2206 North Kedzie Ave., Chicago, Ill.
- 9 FO Herbert O. Erickson, 653 Bittersweet Pl., Chicago, Ill.
- 9 FC Clarke & Wahlstrom, 1711 Estes Ave., Chicago, Ill.
- 9 SW Thomas E. Davis, Racine, Wis.
- 9 UP Adolph J. Zeitlhamer, 2503 S. 61st Ave., Cicero, Ill.
- 9 ACN Clark W. A. Barnard, Seneca, Mo.
- 9 AEH Otto H. Steelsmith, R. F. D. No. 2, Ripley, Iowa
- 9 AEQ John Herzog, Jr., R. F. D. No. 1, Box 202, Grudnia, Nebr.
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- 9 AGJ William W. Heiberling, 712 LaFayette Ave., Racine, Wis.
- 9 AHB Theodore Johnson, R. F. D. No. 5, Sheridan, Ind.
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- 9 CFE George W. Glasser, 229 Fremont Ave., Elmurst, Ill.
- 9 CFW George C. Hume, Jr., 151 School St., Chilton, Wis.
- 9 CGF Leonard R. Strader, 657 Gulney Court, Altam, Ill.
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- 9 CGX Edward L. Masterton, 1816 E. 79th St., Chicago, Ill.
- 9 CJO Ben J. Chromy, 235 Mason St., Milwaukee, Wis.
- 9 CPF W. Harry Jennings, 527 E. 1st Ave., Cedar Rapids, Iowa
- 9 CTD Harold E. and Archie M. Pohl, 310 Linn St., Boone, Iowa
- 9 CUQ James B. Pollard, 951 E. 11th Ave., Denver, Colo.
- 9 CWI Everett Stone, 200 Pewable St., Houghton, Mich.
- 9 DJM Sherman A. Brose, 100 E. Benton St., Clair Lake, Iowa
- 9 DKF William E. Spartogrove, 4003 Third St., Des Moines, Iowa
- 9 DLF John A. Garrgrave, 412 Wabash Ave., Carthage, Ill.
- 9 DLE Alva A. Smith, E. Main St., Caledonia, Minn.
- 9 DWK Alvin R. Uetke, 301 S. High St., Jackson, Mo.
- 9 EHT Norrel Douglas, 1622 New Hampshire St., Lawrence, Kans.
- 9 EJ Robt. E. Compton & Oliver Kretzner, 412 Wabash Ave., Carthage, Ill.
- 9 JD GEH Meredith, 860 Fifth St., N. W., Luton, Ind.
- 9 AIZ Wallace R. Smith, 2311 W. Third St., Duluth, Minn.
- 9 AJB Ora A. Koch, Hampshire, Ill.
- 9 CHB Harold M. Hassman, 5 Sherman Pl., Appleton, Wis.
- 9 CHD Horace W. Gohbert, Franklin St., Edinburg, Iowa
- 9 CHH Ralph C. Speltz, Gregory, South Dak.
- 9 CHM Henry Bosch, 4827 Ellis Ave., Chicago, Ill.
- 9 CHQ Charles F. Craig, Aton, Iowa
- 9 CHY Otis L. Carpenter, 1916 Clinton St., Lincoln, Ill.
- 9 CIA Raymond O. Vias, 2602 Lincoln Way, Ames, Iowa
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- 9 CIY Theodore P. Kinn, 1224 California St., Denver, Colo.
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- 9 CLU Lee R. Watts, Cornick, Iowa
- 9 CSN Edward J. Bromley, Jr., Whitewater, Wis.
- 9 CUE John E. Gohbert, Franklin St., Edinburg, Iowa
- 9 CUP Wallace T. Hensen, Bancroft, Nebr.
- 9 DOV Ralph E. Goodwin, Wenona, Ill.
- 9 AOK Ivan D. Horton, 11 Felton Ave., Gregory, S. Dak.
- 9 AQC David H. Lentz, Jr., 301 Whitley Ave., Joliet, Ill.
- 9 CID Chester W. Fendricks, 202 Arkansas City, Kans.
- 9 CJK William Harnishfeger, 1701 Lanternier St., Ft. Wayne, Ind.
- 9 CJP Arthur W. Swerline, 412 Wabash Ave., Almor, Minn.
- 9 CON William W. Roper, 410 E. Bryan St., Hopkinsville, Ky.
- 9 CTF Robert F. Allen, Jr., 809 Indiana Ave., Mendota, Ill.
- 9 DBD Franklin H. Avers, 730 Prospect Ave., Portage, Wis.
- 9 DQZ Arthur G. Hebb, Jr., 927 Pepper Ave., Lincoln, Neb.
- 9 DRG Elmer R. McMullen, 222 Superior Ave., Tomah, Wis.
- 9 DRK Edwin C. Shaw, 400 N. Third St., DeSoto, Mo.
- 9 EAH Richard C. Wells, (Chanced), 905 25th St., Moline, Ill.
- 9 JO George Damman, 725 Oakton St., Evanston, Ill.
- 9 RX Gerald D. Barton, 1201 Blument Ave., Manhattan, Kans.
- 9 YM Albert Millington, 100 E. Elm St., Canton, Ill.
- 9 WI Lewis C. Meek, 521 S. Downing St., Denver, Colo.

- 9 AFN Donald H. Storer, 725 W. Avon St., Freeport, Ill.
- 9 AIIH Joe E. Smy, 2942 Orchard St., Lincoln, Nebr.
- 9 AIIH Hoopston Radio Shop, 513 E. Seminary St., Hoopston, Ill.
- 9 ALX Stanley Tollman, 3927 Beachwood Ave., Pine Lawn, Mo.
- 9 AOG Clifford E. Hilmoe, 1631 Corning St., Park, Kans.
- 9 AOP Leslie Anderson, 1452 Balmorel Ave., Chicago, Ill.
- 9 AQM Wilford G. Cooley, 1831a State St., Granite City, Ill.
- 9 BBO Fred M. McCarthy, 8739 S. Bishop St., Chicago, Ill.
- 9 BBR Joseph A. Brene, 920 Adams St., Waukegan, Ill.
- 9 BET Roy C. Pasly, 818 Humboldt St., Manhattan, Kans.
- 9 CBF Alf M. Myhre, care of Holt Motor Co., Milbank, S. Dak.
- 9 CFB Maynard R. Briggs, 51 S. Albert St., Paul, Minn.
- 9 CIZ Kenneth A. Smith, 934 William St., Chester, Ill.
- 9 CKZ Wallace Howard, 2333 13th St., Boulder, Colo.
- 9 CVR Albert B. Marshall, 414 Caldwell St., Louisville, Ky.
- 9 CWX Jesse H. Lofton, 316 E. Liberty St., Mexico, Mo.
- 9 CYK Russel A. Cline, 521 S. Main St., Maryville, Mo.
- 9 DDP Carl A. Jacobsen, Main St., Kenneth, Minn.
- 9 DFV Warren D. Birkhead, 1842 Warland Ave., Chicago, Ill.
- 9 DHK William E. Voltz, 219 E. 10th St., Michigan City, Ind.
- 9 DIU Ralph R. Miner, 113 E. Reese St., Fond du Lac, Wis.
- 9 DKG Jack R. Adams, 1602 Canthorn Ave., Columbia, Mo.
- 9 DKH Virgil Swearingen, 501 N. Willis Ave., Champaign, Ill.
- 9 DKQ Harry B. Manning, 114 S. Euclid St., No. 117, Stouff Falls, S. Dak.
- 9 DLQ Noble C. Lippincott, 325 Cook St., Lake Geneva, Wis.
- 9 DNC Paul Palmer, 3145 "S" St., Lincoln, Nebr.
- 9 DOE Alfred Bergtold, 5023 St. Louis Ave., St. Louis, Mo.
- 9 DYY John F. Melody, 208 Broadway, Peoria, Ill.
- 9 ACF Paul Garotto, 2115 Pratt St., Omaha, Nebr.
- 9 AFR George G. Glade, 1820 "G" St., Lincoln, Nebr.
- 9 AFT Eugene W. Applebaum, 1111 Alniese Ave., Chicago, Ill.
- 9 GW James E. S. Hayes, 1014 E. 11th Ave., Duluth, Minn.
- 9 KCB Philo H. Tucker, 722 Randolph St., Lyons, Iowa
- 9 AFF William W. Bingham, 3101 N. Kezizo Ave., Chicago, Ill.
- 9 CVA David C. Maloney, 1913 Division St., Murphysboro, Ill.
- 9 CWQ Royd L. Thorp, 2118 Dewey St., Murphysboro, Ill.
- 9 CYB Raymond L. Herchert, 4728a Delmar Ave., St. Louis, Mo.
- 9 DVV Marvin Elehorst, 858 N. 15th St., Manitowish, Wis.
- 9 ELC Harold E. Stopp, 501 North Greely St., Stillwater, Minn.
- 9 FQ Charles Jun, 6148 S. Albany Ave., Chicago, Ill.
- 9 FU William K. Ingle, 804 Woodbine Ave., Oak Park, Ill.
- 9 DSC Harold O. Schabel, 940 Washington Ave., Duwaka, Ind.
- 9 EKA Fred'k G. Salm, 189 Herteau Ave., Elmhurst, Ill.
- 9 JVK Elden E. Dulfand, Jr., 1336 Castlewood Ave., Louisville, Ky.
- 9 ELS Colorado Springs High School, 11th School Bldg., Colorado Springs, Colo.
- 9 BA Elden F. Horn, 2017 Hudson St., Denver, Colo.
- 9 EU Earl R. Thornburg, 503 First St., Coon Rapids, Iowa
- 9 GI Everett C. Smith, 3611 Elmwood Ave., Berwyn, Ill.
- 9 HQ John N. Becker, 736 N. Raymond St., Brookfield, Ill.
- 9 IY Jesse Huber Jay, 1341 Wisconsin St., Racine, Wis.
- 9 IO The Radio Club, Inc., 1132 Indiana Ave., LaPorte Ind.
- 9 JE Philip S. Westcott, 928 N. Grove Ave., Oak Park, Ill.
- 9 WZ Ralph Helberg, 1700 N. Third Ave., Minneapolis, Minn.
- 9 ACH Ralph Leach, 3912 13th St., Des Moines, Iowa
- 9 ATO Edwin A. Cary, 594 1/2 Delaware St., Milwaukee, Wis.
- 9 AYZ Merlon C. Harris, Box 381, Villisca, Iowa
- 9 BBE Jacob G. Hadden, N. West St., Greenwood, Ind.
- 9 BKS George J. Chesky, 2426 Trumbull Ave., Chicago, Ill.
- 9 BKV Alfred W. Kruse, R. F. D. No. 6, Akron, Ohio
- 9 BIL Paul W. Andrew, 1431 East 24 Ave., Coburn, Iowa
- 9 BWC Francis E. Nelson, 1431 East 24 Ave., Cedar Rapids, Iowa
- 9 CHO John A. Davies, 517 Ottumwa St., Ottumwa, Iowa
- 9 CFC Clifton M. Fischbach, 222 Poplar St., Seymour, Ind.
- 9 CMX Robert N. Parsons, R. F. D. No. 5, Aneta, N. Dak.
- 9 DIB Ernest J. Stringos, 631 E. 63d St., Chicago, Ill.
- 9 DIT Malcolm B. Magers, 1331 S. 22d St., St. Joseph, Mo.
- 9 DLV Henry Konwinski, 407 Seventh Ave., Milwaukee, Wis.
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- 9 EMB Joseph Harnel, 2238 Alberta St., St. Louis, Mo.
- 9 SS Earl B. MacDowell, 3145 Karnes Blvd., Kansas City, Mo.
- 9 TB Ludwig D. Dinndorf, 712 Metzroth Place, St. Cloud, Minn.
- 9 BDR Harold M. Pirie, 1124 S. 21st St., Des Moines, Iowa
- 9 BRF Henry D. Tysson, 443 W. 103rd St., Chicago, Ill.
- 9 BNA Harvey H. Dozols 1017 Pleasant Pl., Oak Park, Ill.
- 9 BZB Mervil W. Price, Route H, Box 364-H, Indianapolis, Ind.
- 9 CFY Clarence O. Ford, 609 S. Hancock St., Colorado Springs, Colo.
- 9 CJZ Wilfred M. Pearson, 327-329 Main St., Mt. Vernon, Ind.
- 9 COA Fred C. Booty, 4727 W. Adams St., Chicago, Ill.
- 9 CWV Verner Hicks, 631 E. 63d St., Spring Valley, Ill.
- 9 DB James T. Gregerson, Jr., 360 50th Ave., Ft. Allen, Wis.
- 9 DFC H. Leslie Atlas, 7421 Sheridan Rd., Chicago, Ill.
- 9 DMT Marzo A. Kennedy, State Highway 8, Macon, Mo.
- 9 DNZ Eugene Fritschel, 145 Highland Ave., Ames, Iowa
- 9 DOE Alfred Bergtold, 2107 E. Fourth St., Duluth, Minn.
- 9 DPM Chas. S. Hotchkiss, Stratford Ave., Elmhurst, Ill.
- 9 DRH Frank R. Brown, 132 N. State St., Wausau, Wis.
- 9 DZR Albert L. Strickel, 314 Jessie St., Joliet, Ill.
- 9 FG Lawrence D. Dillard, 4167 McPherson Ave., St. Louis, Mo.
- 9 ABQ James C. Fear, 229 Niagara St., Eau Claire, Wis.
- 9 ADA Lester Marholz, 3051 19th Ave., Chicago, Ill.
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- 9 BIA Clarence R. Armour, 401 S. Lowman St., Ft. Scott, Kans.
- 9 AFM Gordon L. Davy, 12 Tenth St., Minot, N. Dak.
- 9 PQ Lanford T. Bourland, 308 W. Grove St., Fontaine, Ill.
- 9 TD Lynn H. Mathias, 717 Seventh Ave., Des Moines, Iowa
- 9 RT James G. Smith, 305 S. Garth Ave., Columbia, Mo.
- 9 VD Clarence N. Crapo, 443 Newton Ave., Shorewood, Wis.
- 9 CJG Franklin M. Henry, 501 N. Cedar St., Colorado Spring, Colo.
- 9 DAS Laurence C. Turner, 1014 State St., Osage, Iowa
- 9 DMX Clark Spisburg, 721 Miss. St., Lawrence, Kans.
- 9 DNG Ferus McKeever, University Heights, Lawrence, Kans.
- 9 DOF Harold E. Rittenhouse, 631 W. Grove St., Pontiac, Ill.
- 9 DOI William H. Morrison, 517 Greenup St., Bradshaw, Nebr.
- 9 DSN Luther J. Jensen, 517 Greenup St., Covington, Ky.
- 9 DVA Osborn A. Fischbach, 223 S. Poplar St., Seymour, Ind.
- 9 DVII Woosley Radio Co., 7248 Candler St., Chicago, Ill.
- 9 DVI Clifford Hamill, 726 Illinois St., Lawrence, Kans.
- 9 DVO Lush S. McCartney, 516 S. Pacific St., Cape Girardeau, Mo.
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- 9 IV Carl W. Liden, 1726 Grand Ave., Ft. Chicago, Ill.
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- 9 UF David Levy, 856 N. Haynes St., Chicago, Ill.
- 9 AOK Arthur V. Grave, 5055 Spaulding Ave., St. Louis, Mo.
- 9 CBF Al. M. Myhre, c/o Holt Motor Co., Milbank, S. Dak.
- 9 COM Edwin W. Landgraf, 516 S. Pacific St., Cape Girardeau, Mo.
- 9 DBM Stanley D. Fisher, 2030 Kinzlo Ave., Racine, Wis.
- 9 DLJ Fred and Harry Seltzer, 3307 Douglas Blvd., Chicago, Ill.
- 9 DLQ Noble C. Lippincott, 325 Cook St., Lake Geneva, Wis.
- 9 DRW Frank J. Whalen, 17th and Duncan Sts., St. Joseph, Mo.
- 9 AUA Winfred C. Hagedick, 117 W. Forest St., Marengo, Ill.
- 9 BQO Clarence R. Shenberger, 117 W. Forest St., Marengo, Ill.
- 9 BSL Stanley H. Burks, 5727 S. Sawyer Ave., Chicago, Ill.
- 9 EII George W. Plikram, 1805 Edmond St., St. Joseph, Mo.
- 9 DE William H. Hobbs, 2001 Edgeland St., Louisville, Ky.
- 9 QK Ivan J. Bulock, 17 E. Second St., Fairmont, Minn.
- 9 ANZ Louis F. Leuck, 1718 S. 14th St., Lincoln, Nebr.
- 9 ATR Jial P. Rea, 718 Locust St., Chillicothe, Mo.
- 9 BEA Robert D. Wahlstrom, 105 S. Babcock St., Urbana, Ill.
- 9 RIZ Howard Powers, 309 S. Pleasant St., Princeton, Ill.
- 9 BPY Edward M. Van Duzee, 1726 Grand Ave., St. Paul, Minn.
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- 9 DDV Charles E. Ashabraner, 1014 Clark St., New Albany, Ind.
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- 9 AB Carl M. Leidmold, Jr., 20 Jefferson Ave., Chicago, Ill.
- 9 AK Charles M. Orcutt, 2702 Cottage Grove Ave., Des Moines, Iowa
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- 9 CO Jerome T. Shannon, 914 E. 13th Ave., Duluth, Minn.
- 9 CV Joseph E. Deines, 409 E. Ninth St., Topeka, Kans.
- 9 DI William J. Baner, 2001 Edgeland St., Louisville, Ky.
- 9 EH Carl W. Clement, Main St., Java, S. Dak.
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- 9 GQ Frank Opdyke, Jr., 211 N. Jackson St., Frankfort, Ill.
- 9 HH Clarence F. Lippert, 117 W. Forest St., Marengo, Ill.
- 9 HW Bates Radio Co., 485 Wahl Ave., Milwaukee, Wis.
- 9 HZ Lester Borchardt, 2111 Grand St., N. E., Minneapolis, Minn.
- 9 IK Charles J. Webster, 2111 Grand St., N. E., Minneapolis, Minn.
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- 9 KY Frank L. Murphy, 4575 Gibson Ave., St. Louis, Mo.
- 9 LD Oscar A. Pash, Jr., 821 N. 13th St., St. Joseph, Mo.
- 9 LP Irvin R. Linnard, 219 E. Wilson St., Peotone, Ill.
- 9 MP Julian Boehmle, 5905 Kimbark Ave., Chicago, Ill.
- 9 MS LeRoy J. Morrice, 1100 W. Wallingford, Iowa
- 9 MY James C. Scott, 527 N. Superior St., De Pere, Wis.
- 9 ND Arthur T. Doyle, 3432 Abner Pl., St. Louis, Mo.
- 9 OV Damon N. Voght, 1504 Freedom St., Huntington, Ind.
- 9 PG Frank M. Kratochvil, 1147 S. Grove Oak Park, Ill.
- 9 PH Glenn D. Johnson, Pleasantville, Iowa
- 9 PN Alvin Leeman, Unadilla, Iowa
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- 9 BTX Herman A. Moench, 43 S. 15th St., Terre Haute, Ind.
- 9 BVH Leo J. Arthurs, 121 W. 24th St., Kearney, Nebr.
- 9 BXC Archie P. Fenner, 1329 "N" St., Lincoln, Nebr.
- 9 BXH Neil D. Cole, Hastings College, Hastings, Nebr.
- 9 BYM Phi Pi Phi Fraternity, 2122 Sherman Ave., Evanston, Ill.
- 9 RYN Clifford Van Houten, 1904 S. 24th St., St. Joseph, Mo.
- 9 BYV Murrell B. Moore, R. F. D. Belleville, Ill., Scott Field, Ill.
- 9 BVZ Dunham J. Gilbert, Pittsburg Academy, Owatonna, Minn.
- 9 BWV Walter J. C. Kirkpatrick, 1723 Estes Ave., Chicago, Ill.
- 9 BZX William Dittenhofer, 807 Summit Ave., St. Paul, Minn.
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- 9 DYS Harlan J. Dewitz, R. F. D. No. 2, Wisner, Nebr.
- 9 DZY Heno C. Hillabidel, 10 E. Lewis St., Vermillion, S. Dak.
- 9 DIH Richard T. Brackett, 10 E. Lewis St., Vermillion, S. Dak.
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- 9 API Kenneth Oliver, R. F. D. No. 3, Emerson, Iowa
- 9 AUJ C. Clinton Hawkins, Main St., Alden, Minn.
- 9 AVH John C. Bayles, 236 S. Second St., Chillicothe, Mo.
- 9 BGQ Erwin G. Schroeder, 61 W. 112th St., Chicago, Ill.
- 9 BNX University of Missouri, 604 S. Ninth St., Columbia, Mo.
- 9 BBV Alva R. Crosby, Appleton, Minn.
- 9 CDT Robert L. Worrell, Walkerton, Ind.
- 9 CMR Harry R. Likens, 1420 E. Winchester Ave., Ashland, Ky.
- 9 DAB Howard Wolcott, Wakefield, Nebr.
- 9 DAC Addison T. Miller, 1610 "A" St., Lincoln, Nebr.
- 9 DAR William J. Mesmer, 544 W. Fourth St., Ottumwa, Iowa
- 9 DBG Arthur C. Lewis, 901 E. 11th St., Bloomington, Ind.
- 9 DCL Cecil E. Barrette, 310 Second Ave., Watertown, S. Dak.
- 9 DDK Russell Sindt, 1509 Washington St., Cedar Falls, Iowa
- 9 DEK Robertson B. Johnson, 1814 Carroll Ave., St. Paul, Minn.
- 9 DFP Charles A. Rohner, 209 S. Albany Ave., Chicago, Ill.
- 9 DFS Charles J. Webster, Cogswell, N. Dak.
- 9 DFY Lester W. Beery, R. F. D. No. 2, Rockwell, Iowa
- 9 DGB William J. Beacham, Fenimore, Wis.
- 9 DGJ Walter W. Rickman, Keswick, Iowa
- 9 DGG Benhart O. Tweet, Radcliffe, Iowa
- 9 DHC Martin L. Blumstein, Brighton, Ill.
- 9 DHD Robert H. Martin, 815 Cassopolis St., Elkhart, Ind.
- 9 DJJ John F. Rogers, 714 Laurel St., Des Moines, Iowa
- 9 DJD Andrew G. Woolfries, 304 Welch Ave., Ames, Iowa
- 9 DKJ Ellis W. D'Arcy, 1330 Central Ave., Wilmette, Ill.
- 9 DKV Theodore C. Goodner, 409 S. Third St., Hockley, Ford, Colo.
- 9 DOW Mahlon W. Garrison, 302 Fifth St., Minot, N. Dak.
- 9 DPS Raymond D. Chamberlain, 1118 W. Seventh St., Grand Island, Nebr.
- 9 DRP Elbert R. Tilden, Mt. Morris, Ill.
- 9 DRT John R. Martin, 204 N. First St., Rockwell City, Iowa
- 9 DSB Carl R. Raymond, R. F. D. No. 18, Box 28, Bunker Hill, Ill.
- 9 DVN Clarence W. Thyberg, 1907 S. 13th Ave., Minneapolis, Minn.
- 9 DVP E. C. Kessler, 522 W. Third St., Maryville, Mo.
- 9 DVV Earl S. Johnson, 3516 Jackson Ave., Kansas City, Mo.
- 9 DWI Frederick Gronvold, Jr., 910 N. Broadway, Fargo, N. Dak.
- 9 DXG Fred A. Smith, 7646 East End Ave., Chicago, Ill.
- 9 DXO Robert W. Burns, 304 Masterson Ave., Ft. Wayne, Ind.
- 9 DXR James M. Milne, 417 Fifth Ave., Brookings, S. Dak.
- 9 DYA Paul B. Ward, 710 W. Prospect St., Kewanee, Ill.
- 9 DYB Ross T. Hatton, 4926 Military Ave., Omaha, Nebr.
- 9 DYQ Galladay La Motte, 318 E. Seventh St., Hopkinsville, Ky.
- 9 DZF Robert F. Blaine, 415 N. Oak Park Ave., Oak Park, Ill.
- 9 DZL Donald C. Leary, Ravenswood, Mo.
- 9 DZW John P. Matthews, 620 E. Fifth St., Newton, Iowa
- 9 DZZ Thomas A. Burns, 5343 Winthrop Ave., Chicago, Ill.
- 9 EFY Cialborne C. Van Zandt, 2021 Albion St., Denver, Colo.
- 9 EJC T. Luther Morris, 217 W. Eighth St., Mankato, Minn.
- 9 XBI University of South Dakota, Vermillion, S. Dak.
- 9 XBQ University of Missouri, 604 S. Ninth St., Columbia, Mo.
- 9 GG Charles K. Davis, 615 Oblon St., Hickman, Ky.
- 9 HAI Robert J. Tyrrell, 1867 Selby Ave., St. Paul, Minn.
- 9 HIO Loy S. Hillegas-Baird, 712 Prairie Ave., Kenosha, Wis.
- 9 OH Lee Mesicke, 2124 S. Third Ave., Maywood, Ill.
- 9 IIR Lawellin R. Lalzure, 8020 Mercer St., Kansas City, Mo.
- 9 SI Layton Siebothem, 4284 Farlin Ave., St. Louis, Mo.
- 9 AUX Herman F. Hedlger, Route No. 3, County Rd., White Bear, Minn.
- 9 CHW Everett M. Strout, 257 Crosat St., La Salle, Ill.
- 9 CTT Willard A. Hayward, 6704 S. Union Ave., Chicago, Ill.
- 9 DHS Marvin E. Haseltine, 1078 2nd Ave., S. E., Minneapolis, Minn.
- 9 DIO Oliver C. Kuehnel, 2810 North Ave., Milwaukee, Wis.
- 9 DJE Charles A. Soderger, 6134 S. Halsted St., Chicago, Ill.
- 9 AS Fred L. Damsirn, S. Summit Ave., Villa Park, Ill.
- 9 EF Minnesota Wireless Assn. (not Minneapolis Wireless), 402 Court House, Minneapolis, Minn.
- 9 HW Clarence F. Bates, 1019 Bartlett Ave., Milwaukee, Wis.
- 9 JX Harry E. Adams, Avilla, Ind.
- 9 WZ Ralph Helberg, 1700 Third Ave., N., Minneapolis, Minn.
- 9 APK Harry B. Smith, 2304 Park Place, Evanston, Ill.
- 9 AXJ David H. Freeman, 2719 Sheffield Ave., Chicago, Ill.
- 9 BAY Roy N. McCord, 1249 Roland St., St. Paul, Minn.
- 9 BCT Clifford J. Kriel, 285 N. Tremont St., Indianapolis, Ind.
- 9 BJB Donald H. Cameron, 1311 Georgia Ave., Kansas City, Kans.
- 9 BYI Oriand B. Banning, 213 Water St., Elkhart, Ind.
- 9 DAL Stewart Lyon, R. F. D. No. 6, Arkansas City, Kans.
- 9 DFP Charles A. Rohner, 209 S. Albany Ave., Chicago, Ill.
- 9 EFY Cialborne C. Van Zandt, 2021 Albion St., Denver, Colo.
- 9 ELU Allen Woodriddle, Oak St., Osage, Iowa

BROADCASTING STATION DIRECTORY

KDKA	Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.	309	KFOO	Latter Day Saints University, Salt Lake City, Utah	242	WAAC	Tulane University, New Orleans, La.	360
KDLR	Radio Elec. Co., Devils Lake, N. Dak.	231	KFOR	David City Tire & Electric Co., David City, Neb.	242	WAAD	Ohio Mechanics Institute, Cincinnati, Ohio	258
KDPM	Westinghouse Electric & Mfg. Co., Cleveland, O.	250	KFOT	College Hill Radio Club, Wichita, Kan.	231	WAAB	Chicago Daily Drovers' Journal, Chicago, Ill.	286
KDPT	Southern Electrical Co., San Diego, Cal.	245	KFOU	Hommel Manufacturing Co., Richmond, Cal.	254	WAAM	I. R. Nelson Co., Newark, N. J.	263
KDYL	Newhouse Hotel, Salt Lake City, Utah	250	KFOX	Technical High School, Omaha, Neb.	248	WAAN	University of Missouri, Columbia, Mo.	254
KDYM	Savoy Theatre, San Diego, Cal.	280	KFOY	Garrett Radio Service, St. Paul, Minn.	238	WAAP	Lake Forest University, Lake Forest, Ill.	227
KDZB	Frank E. Siefert, Bakersfield, Cal.	209	KFPB	C. C. Baxter, 205 Grafton St., Salt Lake City, Utah	242	WABB	Harrisburg Sporting Goods Co., Harrisburg, Pa.	266
KDZE	Rhodes Department Store, Seattle, Wash.	270	KFPN	New Futurer, 205 Grafton St., Dubuq, Iowa	242	WABB	Lake Shore Tire Co., Sandusky, Ohio	244
KEPT	Cope & Johnson, Salt Lake City, Utah	268	KFPP	Missouri National Guard, 70th Infantry Brigade, Jefferson City, Mo.	242	WABI	Bangor Railway & Electric Co., Bangor, Me.	240
KFAB	Nebraska Bulck Auto Co., Lincoln, Neb.	248	KFPR	Los Angeles County Forestry Department, Los Angeles, Cal.	236	WABL	Connecticut Agricultural College, Storrs, Conn.	283
KFAD	McArthur Bros. Mercantile Co., Phoenix, Ariz.	272	KFPV	Meintz & Kohlnoos, San Francisco, Cal.	236	WABM	F. E. Doherty Automotive & Radio Equipment Co., Saginaw, Mich.	206
KFAE	State College of Washington, Pullman, Wash.	330	KFPW	St. John's Church, Sparteville, Mo.	268	WABN	Ott Radio, Inc., 1627 State St., La Crosse, Wis.	244
KFAJ	Western Radio Corporation, Denver, Colo.	278	KFPX	First Presbyterian Church, Hot Springs, Ark.	242	WABO	Hickson Electric Co., Rochester, N. Y.	277
KFAI	University of Colorado, Boulder, Colo.	360	KFPY	Synons Investment Co., Spokane, Wash.	283	WABQ	Haverford College Radio Club, Haverford, Pa.	261
KFAN	The Electric Shop, Moscow, Idaho	360	KFQA	The Principia, 5539 Page Ave., St. Louis, Mo.	261	WABR	Scott High School, Toledo, Ohio	263
KFAU	Independent School District of Boise City, Boise High School, Boise, Idaho	500	KFQB	Searchlight Publishing Co., Fort Worth, Texas	252	WABU	Victor Talking Machine Co., Camden, N. J.	226
KFAW	The Radio Den, Santa Ana, Cal.	280	KFQC	Kidd Brothers Radio Shop, Taft, Cal.	232	WABW	College of Wooster, Wooster, Ohio	207
KFCG	First Congregational Church, Helena, Mont.	248	KFQD	Southern California Radio Association, Exposition Park, Los Angeles, Cal.	228	WABX	Henry B. Joy, Mount Clemens, Mich.	245
KFCB	F. A. Buttrey & Co., Havre, Mont.	360	KFQH	Albert Sherman, Hillsborough Box 51, Burlingame, Cal.	220	WABY	John Magaldi, Jr., 815 Kimball St., Phila., Pa.	242
KFCB	W. K. Azbill, San Diego, Cal.	223	KFQI	Thomas H. Ince Corp., Culver City, Cal.	234	WABZ	Coliseum Place Baptist Church, New Orleans, La.	263
KFCB	Horn & Wilson's, San Luis Obispo, Cal.	215	KFQJ	Harbour-Longmire Co., Oklahoma City, Okla.	236	WADC	Allen T. Simmons, Akron, Ohio	258
KFCB	First Presbyterian Church, Tacoma, Wash.	360	KFQK	Democratic Leader, Fayette, Mo.	266	WAHE	A. H. Grebe Co., Brooklyn, N. Y.	229
KFCB	Kimball-Upson Co., Sacramento, Cal.	283	KFQL	Texas Highway Bulletin, Austin, Texas	252	WAGB	Purdue University, West Lafayette, Ind.	283
KFBK	Leese Bros., Everett, Wash.	224	KFQM	C. F. Kriehlm Photo, Radio & Electric Shop, North Bend, Wash.	248	WAGC	James Millikin Publishing Co., Decatur, Ill.	275
KFBK	The Cathedral, Laramie, Wyo.	270	KFQO	W. Ilker, Helena, Mont.	252	WAGD	Wortham-Carter Publishing Co. (Star-Telegram), Fort Worth, Texas	476
KFCB	Nielsen Radio Supply Co., Phoenix, Ariz.	238	KFQP	P. F. Kriehlm Photo, Radio & Electric Shop, North Bend, Wash.	248	WAGF	Erner & Hopkins, St. Louis, Mo.	294
KFCF	Frank A. Moore, Walla Walla, Wash.	256	KFQQ	Alfred M. Hubbard, 310 Green Blk., Seattle, Wash.	233	WAGH	John H. Steiner, Jr., 66 Gliderlevy St., Wilkesbarre, Pa.	256
KFCF	Leslie E. Rice, Los Angeles Union Stock Yards, Los Angeles, Cal.	236	KFQR	Farmers State Bank, Healden, Neb.	273	WAGI	Irving Verilyna, Maitland, Miss.	248
KFCF	Ralph W. Flygare, Ogden, Utah	208	KFQS	Taft Radio Co., 5553 De Longtree Ave., Hollywood, Cal.	239	WAGJ	J. Irving Bell, 1511 Gordon St., Port Huron, Mich.	205
KFCG	Omaha Central High School, Omaha, Neb.	258	KFRB	Hall Brothers, Beville, Texas	248	WAGK	Grace Covenant Church, Richmond, Va.	283
KFCG	St. Michael's Cathedral, Boise, Idaho	252	KFRB	Hall Brothers, Beville, Texas	248	WAGL	Potosky High School, Potosky, Mich.	214
KFCG	University of Arizona, Tucson, Ariz.	258	KFRB	Hall Brothers, Beville, Texas	248	WAGM	Peoples Pulpit Association, Russellville, Mo.	273
KFCG	Oregon Agricultural College, Corvallis, Ore.	360	KFRB	Hall Brothers, Beville, Texas	248	WAGN	Jenks Motor Sales Co., Monmouth, Ill.	224
KFCG	Magnolia Petroleum Co., Beaumont, Texas	360	KFRB	Hall Brothers, Beville, Texas	248	WAGO	Johnstown Radio Co., Johnstown, Pa.	248
KFCG	First Baptist Church, Le Mars, Neb.	258	KFRB	Hall Brothers, Beville, Texas	248	WAGP	Ruffner Junior High School, Norfolk, Va.	222
KFCG	South Dakota State College, Brookings, S. D.	360	KFRB	Hall Brothers, Beville, Texas	248	WAGQ	Washington Light Industry, Charleston, S. C.	268
KFCG	Harry O. Iverson, Minneapolis, Minn.	231	KFRB	Hall Brothers, Beville, Texas	248	WAGR	Noble H. Watson, 233 Iowa St., Indianapolis, Ind.	227
KFCG	Meler & Frank Co., Portland, Ore.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGS	Southwest Economist Station, Chicago, Ill.	266
KFCG	Winnier Radio Corp., Denver, Colo.	254	KFRB	Hall Brothers, Beville, Texas	248	WAGT	The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich.	256
KFCG	Seroging & Co., Hank, Dak. Neb.	268	KFRB	Hall Brothers, Beville, Texas	248	WAGU	Illas Elec. Co., Takoma Park, Md.	222
KFCG	Auto Electric Service Co., Fort Dodge, Iowa	231	KFRB	Hall Brothers, Beville, Texas	248	WAGV	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFCG	Augsburg Seminary, Minneapolis, Minn.	261	KFRB	Hall Brothers, Beville, Texas	248	WAGW	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFCG	Hunter Hill & Sullivan Mining and Concentrating Co., Kellogg, Idaho	360	KFRB	Hall Brothers, Beville, Texas	248	WAGX	Entresh Electric Co., Columbus, Ohio	265
KFCG	Jenkins Furniture Co., Boise, Idaho	240	KFRB	Hall Brothers, Beville, Texas	248	WAGY	Nebraska Wesleyan University, University Place, Neb.	280
KFCG	Eastern Oregon Radio Co., Pendleton, Ore.	360	KFRB	Hall Brothers, Beville, Texas	248	WAGA	St. Olaf College, Northfield, Minn.	360
KFCG	First Baptist Church, Moberly, Mo.	226	KFRB	Hall Brothers, Beville, Texas	248	WAGB	St. Andrews and Stayton Co., Baltimore, Md.	275
KFCG	Newada State Journal, Sparks, Nev.	226	KFRB	Hall Brothers, Beville, Texas	248	WAGC	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFCG	Graceland College, Lamoni, Iowa	250	KFRB	Hall Brothers, Beville, Texas	248	WAGD	Southern Radio Corp., Charlotte, N. C.	360
KFCG	Louisiana College for Women, Baton Rouge, La.	275	KFRB	Hall Brothers, Beville, Texas	248	WAGE	Westinghouse Elec. & Mfg. Co., Springfield, Mass.	337
KFCG	Louisiana State University, Baton Rouge, La.	268	KFRB	Hall Brothers, Beville, Texas	248	WAGF	St. Lawrence University, Canton, N. Y.	263
KFCG	Oklahoma College for Women, Chickasha, Okla.	252	KFRB	Hall Brothers, Beville, Texas	248	WAGG	Kaufman & Haer Co., Pittsburgh, Pa.	462
KFCG	Leland Stanford University, Stanford, Cal.	226	KFRB	Hall Brothers, Beville, Texas	248	WAGH	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFCG	Crav Hardware Co., Boone, Iowa	226	KFRB	Hall Brothers, Beville, Texas	248	WAGI	Entresh Electric Co., Columbus, Ohio	265
KFCG	First Presbyterian Church, Orange, Texas	250	KFRB	Hall Brothers, Beville, Texas	248	WAGJ	St. Olaf College, Northfield, Minn.	360
KFCG	Western State College of Colorado, Gunnison, Colo.	252	KFRB	Hall Brothers, Beville, Texas	248	WAGK	St. Andrews and Stayton Co., Baltimore, Md.	275
KFHH	State Teachers College, Warrensburg, Mo.	234	KFRB	Hall Brothers, Beville, Texas	248	WAGL	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFHL	Penn College, Oxford, Ohio	234	KFRB	Hall Brothers, Beville, Texas	248	WAGM	Southern Radio Corp., Charlotte, N. C.	360
KFHR	Star Electric & Radio Co., Seattle, Wash.	283	KFRB	Hall Brothers, Beville, Texas	248	WAGN	Illas Elec. Co., Takoma Park, Md.	222
KFI	Earle C. Anthony, Inc., Los Angeles, Cal.	469	KFRB	Hall Brothers, Beville, Texas	248	WAGO	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFIF	Benson Polytechnic Institute, Portland, Ore.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGP	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFIO	North Central High School, Spokane, Wash.	252	KFRB	Hall Brothers, Beville, Texas	248	WAGQ	Entresh Electric Co., Columbus, Ohio	265
KFIO	First Methodist Church, Yakima, Wash.	242	KFRB	Hall Brothers, Beville, Texas	248	WAGR	St. Olaf College, Northfield, Minn.	360
KFIU	Alaska Elec. Light & Power Co., Juneau, Alaska	226	KFRB	Hall Brothers, Beville, Texas	248	WAGS	Southwest Economist Station, Chicago, Ill.	266
KFIZ	Daily Commonwealth and Ocean A. Luelsmann, Fond du Lac, Wis.	273	KFRB	Hall Brothers, Beville, Texas	248	WAGT	The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich.	256
KFJB	Marshall Electric Co., Marshalltown, Iowa	248	KFRB	Hall Brothers, Beville, Texas	248	WAGU	Illas Elec. Co., Takoma Park, Md.	222
KFJF	National Radio Mfg. Co., Oklahoma City, Okla.	261	KFRB	Hall Brothers, Beville, Texas	248	WAGV	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFJI	Liberty Theatre, Astoria, Ore.	252	KFRB	Hall Brothers, Beville, Texas	248	WAGW	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFJM	University of North Dakota, Grand Forks, N. D.	280	KFRB	Hall Brothers, Beville, Texas	248	WAGX	Westinghouse Elec. & Mfg. Co., Springfield, Mass.	337
KFJR	Ashley C. Dixon & Son, Stevensville, Mont.	258	KFRB	Hall Brothers, Beville, Texas	248	WAGY	St. Lawrence University, Canton, N. Y.	263
KFKJ	Iowa State Teachers College, Cedar Falls, Cal.	246	KFRB	Hall Brothers, Beville, Texas	248	WAGA	Kaufman & Haer Co., Pittsburgh, Pa.	462
KFKL	Tunwall Radio Co., Fort Dodge, Iowa	246	KFRB	Hall Brothers, Beville, Texas	248	WAGB	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFKJ	Texas National Guard, 112th Cavalry, Fort Worth, Texas	254	KFRB	Hall Brothers, Beville, Texas	248	WAGC	Entresh Electric Co., Columbus, Ohio	265
KFKA	Colorado State Teachers College, Greeley, Colo.	273	KFRB	Hall Brothers, Beville, Texas	248	WAGD	St. Olaf College, Northfield, Minn.	360
KFKB	Brinkley-Jones Hospital Association, Winifred, Kan.	286	KFRB	Hall Brothers, Beville, Texas	248	WAGE	St. Andrews and Stayton Co., Baltimore, Md.	275
KFKC	Conway Radio Laboratories, Conway, Ark.	250	KFRB	Hall Brothers, Beville, Texas	248	WAGF	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFKU	University of Kansas, Lawrence, Kan.	250	KFRB	Hall Brothers, Beville, Texas	248	WAGG	Southern Radio Corp., Charlotte, N. C.	360
KFKV	F. E. Gray, 3200 Richardson St., Butte, Mont.	283	KFRB	Hall Brothers, Beville, Texas	248	WAGH	Illas Elec. Co., Takoma Park, Md.	222
KFKX	Westinghouse Electric & Mfg. Co., Hastings, Neb.	341	KFRB	Hall Brothers, Beville, Texas	248	WAGI	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFKZ	Nassau Bros. Radio Co., Colorado Springs, Colo.	234	KFRB	Hall Brothers, Beville, Texas	248	WAGJ	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFLA	Abner R. Wilson, 1321 W. Blithum St., Butte, Mont.	283	KFRB	Hall Brothers, Beville, Texas	248	WAGK	Entresh Electric Co., Columbus, Ohio	265
KFLB	Signal Electric Mfg. Co., Menominee, Mich.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGL	St. Olaf College, Northfield, Minn.	360
KFLC	National Educational Service, Denver, Colo.	268	KFRB	Hall Brothers, Beville, Texas	248	WAGM	St. Andrews and Stayton Co., Baltimore, Md.	275
KFLD	Everette M. Foster, 1242 South Sixth St., Cedar Rapids, Iowa	256	KFRB	Hall Brothers, Beville, Texas	248	WAGN	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFLR	University of New Mexico, Albuquerque, N. M.	254	KFRB	Hall Brothers, Beville, Texas	248	WAGO	Southern Radio Corp., Charlotte, N. C.	360
KFLU	Illo Grande Radio Supply House, San Benito, Texas	236	KFRB	Hall Brothers, Beville, Texas	248	WAGP	Illas Elec. Co., Takoma Park, Md.	222
KFLV	Swedish Evangelical Mission Church, Rockford, Ill.	229	KFRB	Hall Brothers, Beville, Texas	248	WAGQ	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFLX	George R. Clough, 1214 40th St., Rockford, Ill.	229	KFRB	Hall Brothers, Beville, Texas	248	WAGR	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFLZ	Atlantic Automobile Co., Atlantic, Iowa	271	KFRB	Hall Brothers, Beville, Texas	248	WAGS	Southwest Economist Station, Chicago, Ill.	266
KFMB	Christian Churches of Little Rock, Little Rock, Ark.	254	KFRB	Hall Brothers, Beville, Texas	248	WAGT	The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich.	256
KFMC	University of Arkansas, Fayetteville, Ark.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGU	Illas Elec. Co., Takoma Park, Md.	222
KFMR	Morningside College, Sioux City, Iowa	261	KFRB	Hall Brothers, Beville, Texas	248	WAGV	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFMT	George W. Young, 2219 W. Bryant Ave., Minneapolis, Minn.	231	KFRB	Hall Brothers, Beville, Texas	248	WAGW	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFMW	M. G. Sateren, 127 Blanche St., Houghton, Mich.	266	KFRB	Hall Brothers, Beville, Texas	248	WAGX	Westinghouse Elec. & Mfg. Co., Springfield, Mass.	337
KFMX	Carleton College, Northfield, Minn.	283	KFRB	Hall Brothers, Beville, Texas	248	WAGY	St. Lawrence University, Canton, N. Y.	263
KFNF	Henry Field Seed Co., Shenandoah, Iowa	266	KFRB	Hall Brothers, Beville, Texas	248	WAGA	Kaufman & Haer Co., Pittsburgh, Pa.	462
KFNG	Wooten's Radio Shop, Coldwater, Miss.	254	KFRB	Hall Brothers, Beville, Texas	248	WAGB	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFNI	Central Mo. State Teachers College, Warrensburg, Mo.	234	KFRB	Hall Brothers, Beville, Texas	248	WAGC	Entresh Electric Co., Columbus, Ohio	265
KFNL	Radio Broadcast Association, Paso Robles, Cal.	212	KFRB	Hall Brothers, Beville, Texas	248	WAGD	St. Olaf College, Northfield, Minn.	360
KFNV	L. A. Drake, 505 Third St., Santa Rosa, Cal.	228	KFRB	Hall Brothers, Beville, Texas	248	WAGE	St. Andrews and Stayton Co., Baltimore, Md.	275
KFNY	Montana Phonograph Co., Helena, Mont.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGF	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFND	Royal Radio Co., Burlingame, Cal.	227	KFRB	Hall Brothers, Beville, Texas	248	WAGG	Southern Radio Corp., Charlotte, N. C.	360
KFNE	Rhodes Dept. Store, Seattle, Wash.	455	KFRB	Hall Brothers, Beville, Texas	248	WAGH	Illas Elec. Co., Takoma Park, Md.	222
KFNF	First Christian Church, Whittier, Cal.	230	KFRB	Hall Brothers, Beville, Texas	248	WAGI	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFNG	The Radio Shop, Wallace, Idaho	224	KFRB	Hall Brothers, Beville, Texas	248	WAGJ	Clyde R. Randall, 2813 Calhoun St., New Orleans, La.	268
KFNI	Moberly High School Radio Club, Moberly, Mo.	240	KFRB	Hall Brothers, Beville, Texas	248	WAGK	Entresh Electric Co., Columbus, Ohio	265
KFNL	Leslie M. Schafbuch, 502 W. Marion St., Marengo, Iowa	234	KFRB	Hall Brothers, Beville, Texas	248	WAGL	St. Olaf College, Northfield, Minn.	360
KFNO	Echophone Radio Shop, Long Beach, Cal.	230	KFRB	Hall Brothers, Beville, Texas	248	WAGM	St. Andrews and Stayton Co., Baltimore, Md.	275
KFOO	Latter Day Saints University, Salt Lake City, Utah	242	KFRB	Hall Brothers, Beville, Texas	248	WAGN	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFOR	David City Tire & Electric Co., David City, Neb.	242	KFRB	Hall Brothers, Beville, Texas	248	WAGO	Southern Radio Corp., Charlotte, N. C.	360
KFOT	College Hill Radio Club, Wichita, Kan.	231	KFRB	Hall Brothers, Beville, Texas	248	WAGP	Illas Elec. Co., Takoma Park, Md.	222
KFOU	Hommel Manufacturing Co., Richmond, Cal.	254	KFRB	Hall Brothers, Beville, Texas	248	WAGQ	Baltimore Radio Exchange, Wilkesbarre, Pa.	231
KFOX	Technical High School, Omaha, Neb.	248	KFRB	Hall Brothers, Beville, Texas	248	WAGR	Chesapeake & Potomac Telephone Co., Washington, D. C.	469
KFOY	Garrett Radio Service, St. Paul, Minn.	238	KFRB	Hall Brothers, Beville, Texas	248	WAGS	Southwest Economist Station, Chicago, Ill.	266
KFPB	C. C. Baxter, 205 Grafton St., Salt Lake City, Utah	242	KFRB	Hall Brothers, Beville, Texas	248	WAGT	The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich.	25

WDBX	Otto Baur, 138 Dyckman St., New York, N. Y.	233	WIL	Benson Radio Co., St. Louis, Mo.	273	WSY	Alabama Power Co., Birmingham, Ala.	350
WDBY	North Shore Congregational Church, Chicago, Ill.	258	WIP	Gimbel Brothers, Philadelphia, Pa.	509	WTAB	Fall River Daily Herald Pub. Co., Fall River, Mass.	266
WDBZ	Boy Scouts of America, Ulster County Council, Kingston, N. Y.	233	WIAG	The Norfolk Daily News, Norfolk, Neb.	270	WTAF	Penn. Traffic Co., Johnstown, Pa.	269
WDM	The Church of the Covenant, Washington, D. C.	234	WIAM	Clifford L. White, Greentown, Ind.	254	WTAL	Louis J. Gallo, 2222 Lap-yrouse St., New Orleans, La.	268
WDF	Frank Wilcox, Flint Cranston, Ill.	500	WIAP	D. M. Periam, 522 Third Ave., New York, N. Y.	492	WTAM	Toledo Radio & Elec. Co., Toledo, Ohio	252
WDZ	J. E. Hubb, Police Building, Tuscola, Ill.	275	WIAR	Peoria Star, Cedar Rapids, Iowa	268	WTAN	Willard Storage Battery Co., Cleveland, Ohio	389
WEAA	Duke D. Fahlsh, Police Building, East, Mich.	234	WIAS	The Outlet Co., Providence, R. I.	260	WTAP	Cambridge Radio & Elec. Co., Cambridge, Ill.	242
WEAF	American Telephone & Telegraph Co., New York, N. Y.	492	WIAT	Pittsburgh Radio Supply Co., Pittsburgh, Pa.	275	WTAQ	S. H. Van Gordon & Son, Osasco, Wis.	254
WEAH	Wichita Board of Trade, Wichita, Kan.	268	WIAX	Zenith Radio Corporation, 332 So. Michigan Ave., Chicago, Ill.	268	WTAS	Charles E. Erbe, R. F. D. 6, Box 15, Elgin, Ill.	286
WEAI	Cornell University, Ithaca, N. Y.	254	WIJD	Richard Howe, Grandville, Ohio	217	WTAT	Edison Electric Illuminating Co., Boston, Mass.	244
WEAJ	University of South Dakota, Vermillion, S. D.	278	WIJJ	Mooseheart, New York City	405	WTAW	Ingeg Battery and Electric Co., Tecumseh, Neb.	242
WEAM	Borough of North Plainfield, North Plainfield, N. J.	261	WIJY	R. C. A., New York City	455	WTAX	Agricultural & Mechanical College, College Station, Texas	280
WEAN	Shepard Co., Providence, R. I.	273	WIJZ	H. F. Paar, 1444 Second Ave. E., Cedar Rapids, Iowa	278	WTAY	Williams Hardware Co., Streator, Ill.	231
WEAO	The Ohio State University, Columbus, Ohio	360	WKAA	Charles Looff (Crescent Park), East Providence, R. I.	240	WTAZ	Oak Leaves Broadcasting Station, Park, Ill.	250
WEAP	Mobile Radio Co., Mobile, Ala.	360	WKAB	Dutee W. Flint, Cranston, R. I.	360	WTB	Thomas J. McGuire, Lumberville, N. J.	261
WEAR	Goodyear Tire & Rubber Co., Cleveland, Ohio	384	WKAC	Radio Corp. of Porto Rico, San Juan, P. R.	340	WTBS	Flint Senior High School, Manhattan, Kan.	278
WEAU	Davidson Bros. Company, Sioux City, Iowa	273	WKAD	Michigan Agriculture College, East Lansing, Mich.	280	WTIC	The Travelers Insurance Co., Hartford, Conn.	348
WEAY	Iris Theatre, Houston, Texas	360	WKAE	Laconia Radio Club, Laconia, N. H.	254	WWAD	Wright & Wright, Inc., Philadelphia, Pa.	360
WEBA	The Electric Shop, Highland Park, N. J.	233	WKAF	K. & B. Electric Co., Oklahoma City, Okla.	360	WWAE	Lawrence J. Crowley (Alamo Ball Room), Joliet, Ill.	242
WEBC	Walter C. Bridges, Superior, Wis.	242	WKAG	W. K. Y. Radio Shop, Breckenridge St., Louisville, Ky.	286	WWAO	Michigan College of Mines, Houghton, Mich.	244
WEBD	Electrical Equipment Service Co., Anderson, Ind.	246	WKAK	Greencastle Community Broadcasting Station, Greencastle, Ind.	231	WWJ	Ford Motor Co., Dearborn, Mich.	265
WEBE	Roy W. Miller, Cambridge, Ohio	273	WLAX	University of Minnesota at Minneapolis, Minn.	283	WWL	DeWitt Detroit Co., Detroit, Mich.	517
WEBH	Edgewater Beach Hotel Co., Chicago, Ill.	270	WLBL	Wisconsin Department of Markets, Stephens Point, Wis.	278			
WEBJ	Third Ave. Ry. Co., New York City	273	WLIT	Lit Brothers, Philadelphia, Pa.	394			
WEBK	Grand Rapids Radio Co., Grand Rapids, Mich.	242	WLS	Scars, Rockock & Co., Chicago, Ill.	343			
WEBL	R. C. A. United States (portable)	226	WLC	Crosley Radio Corp., Cincinnati, Ohio	423			
WEBU	Tate Radio Co., Harborsburg, Ill.	224	WLD	Clive H. Meredith, Cazenovia, N. Y.	265			
WEBS	H. H. Howell, Springfield, N. Y.	245	WLE	Round Hills Radio Corp., Dartmouth, Mass.	360			
WEBT	Dayton Cooperative Industrial High School, Dayton, Ohio	270	WLF	General Supply Co., Lincoln, Neb.	254			
WEBW	Beloit College, Beloit, Wis.	270	WLG	Northern Laboratories, Lockport, N. Y.	265			
WEBX	Nashville, Tenn. R. R. No. 9, Franklin Pike, John E. Cain, Jr.	263	WMA	Hoekst, Rockock & Co., Columbus, Ohio	277			
WEBY	Hubert Radio Co., Rutland, Mass.	226	WMAH	QAQ Chicago Daily News, Chicago, Ill.	448			
WEBZ	Savannah Radio Corp., Savannah, Ga.	234	WMAJ	Kingshighway Presbyterian Church, St. Louis, Mo.	280			
WEEL	Edison Co., Boston, Mass.	303	WMAK	Mercer University, Macon, Ga.	261			
WEMC	Emmanuel Missionary College, Berrien Springs, St. Louis, Mo.	286	WMB	Commercial Appeal, Miami Beach, Fla.	394			
WFAM	The Dallas News, The Dallas Journal, Dallas, Texas	476	WMC	Hotel St. Albin, Broadway & 34th Street, N. Y.	241			
WFAN	Times Publishing Co., St. Cloud, Minn.	273	WMD	Alvinsworth-Gates Radio Co., Cincinnati, Ohio	309			
WFAY	University of Nebraska, Lincoln, Neb.	273	WME	Douglas-Hill Electric Co., Washington, D. C.	261			
WFBB	Eureka College, Eureka, Ill.	240	WMAF	Shepard Stores, Boston, Mass.	278			
WFBC	First Baptist Church, Knoxville, Tenn.	250	WMAH	University of Oklahoma, Norman, Okla.	254			
WFBD	Getthensano Baptist Church, Philadelphia, Pa.	234	WMAI	Wittenberg College, Springfield, Ohio	248			
WFBE	John Van der Walle, P. O. Box 41, Sayre, Ind.	277	WMAJ	First Christian Church, Butler, Mo.	231			
WFBF	William F. Gable, Co., Alcorn, Miss.	273	WMAK	Leann Bros. Co., Philadelphia, Pa.	250			
WFBG	Concourse Radio Corp., N. Y. C.	236	WMAJ	Dakota Radio Apparatus Co., Yankton, S. D.	244			
WFBI	Galvin Radio Supply Co., Camden, N. J.	236	WMAK	Radio Shop of Newark, Newark, N. J.	233			
WFBJ	St. John's University, Collegeville, Minn.	236	WMAK	City of New York, New York, N. Y.	526			
WFBL	Dartmouth College, Hanover, N. H.	256	WMAK	Pager Grant Co., New York, N. Y.	261			
WFBL	Onondaga Hotel, Syracuse, N. Y.	252	WMAK	Tyler Commercial College, Tyler, Texas	360			
WFBM	Merchants Heat & Light Co., St. Guaranty Building, Indianapolis, Ind.	268	WMAK	Southern Equipment Co., San Antonio, Texas	394			
WFBN	Radio Sales & Service Co., 1 Broad St., Bridgewater, Mass.	226	WMAK	Vaughn Conservatory of Music, Lawrenceburg, Tenn.	360			
WFBQ	Wynne Radio Co., 226 Fayetteville St., Raleigh, N. C.	252	WMAK	Woodmen of the World, Omaha, Neb.	526			
WFBR	Fifth Infantry, Maryland N. G.	254	WMAK	Franklin J. Wolff, 600 Ingham Ave., Trenton, N. J.	240			
WFBT	Fifth Regiment Army, Baltimore, Md.	252	WMAK	The Palmer School of Chiropractic, Davenport, Iowa	498			
WFBT	Gloucester County Civic League, Pittman, N. J.	231	WMAK	Hotel Jamestown, Jamestown, N. Y.	275			
WFBY	Signal Officer, Fifth Corp Area, Baltimore, Md.	252	WMAK	Iowa State College, Ames, Iowa	360			
WFBZ	Knox College, Ft. Hayes, Columbus, Ohio	248	WMAK	John W. Maramba, Philadelphia, Pa.	509			
WFBZ	Strawbridge & Clothier, Philadelphia, Pa.	395	WMAK	Western Radio Co., Kansas City, Mo.	360			
WFC	What Radio Shop, Manhattan, Kansas	218	WMAK	L. Bamberger & Co., Newark, N. J.	405			
WFCV	Lancaster Elec. Supply & Const. Co., Lancaster, Pa.	248	WMAK	Peoples Pulpit Association, Batavia, Ill.	278			
WFCV	Young Hotel, Shreveport, La.	252	WMAK	Missouri State Marketing Bureau, Jefferson City, Mo.	441			
WFCV	The South Bend Tribune, South Bend, Ind.	274	WMAK	Doolittle Radio Corp., New Haven, Conn.	268			
WFCV	James E. & Radio Mfg. Co., Baltimore, Md.	275	WMAK	North Dakota Agricultural College, N. D.	275			
WFCV	Harry H. Carmon, Freeport, N. Y.	244	WMAK	Concordia College, Moorhead, Minn.	286			
WFCV	First Baptist Church, Memphis, Tenn.	266	WMAK	Dr. John R. Koch, Charleston, W. Va.	267			
WFCV	Flisk Furniture Co., 307 Upper 7th St., Evansville, Ind.	216	WMAK	Municipal Radio Station, Atlantic City, N. J.	296			
WFCV	Breitenbach's Radio Shop, 216 Thirton, Va.	226	WMAK	Penna State College, State College, Pa.	251			
WFCV	Frank S. Megargee, Scranton, Pa.	209	WMAK	Fronts A. Heals, Jr., Parkersburg, Va.	360			
WFCV	Theodore Campbell, Johnstown, Pa.	248	WMAK	Clash Radio Service, Amarillo, Texas	234			
WFCV	Lawrence S. Saaty, Providence, R. I.	234	WMAK	Moore Radio News Station, Springfield, Vt.	275			
WFCV	Hub Radio Shop, 128 First St., La Salle, Ill.	256	WMAK	Electrical Equipment Co., Miami, Fla.	283			
WFCV	Dr. Rosses Arnan, 197 Ponce de Leon Ave., San Juan, P. R.	275	WMAK	Scranton Times, Scranton, Pa.	250			
WFCV	Stout Institute, Menomonee, Wis.	234	WMAK	Calvary Baptist Church, New York, N. Y.	360			
WFCV	Gimbel Brothers, New York City	316	WMAK	Primer Water Co., Lowell, Mass.	448			
WFCV	Furman University, Greenville, S. C.	236	WMAK	Clemson Agricultural College, Clemson, S. C.	360			
WFCV	University of Maine, Orono, Maine	252	WMAK	J. A. Foster Co., St. Petersburg, Fla.	266			
WFCV	American Radio & Research Corp., Medford Hills, Mass.	360	WMAK	United Playing Card Co., Cincinnati, Ohio	326			
WFCV	Drake Hotel, Chicago, Ill.	370	WMAK	Grove City College, Grove City, Pa.	229			
WFCV	Federal Telephone Mfg. Co., Buffalo, N. Y.	319	WMAK	Allentown Call Publishing Co., Allentown, Pa.	229			
WFCV	Georgia School of Technology, Atlanta, Ga.	274	WMAK	Seventh Day Adventist Church, N. Y. C., N. Y.	263			
WFCV	General Electric Co., Schenectady, N. Y.	380	WMAK	Doughty & Welch Elec. Co., New York, N. Y.	254			
WFCV	University of Wisconsin, Madison, Wis.	283	WMAK	Camp Martindell, Chesapeake, N. H.	229			
WFCV	University of Illinois, Urbana, Ill.	273	WMAK	Clifford W. Viek Radio Construction Co., Houston, Texas	360			
WFCV	University of Cincinnati, Cincinnati, Ohio	232	WMAK	Chicago Radio Laboratory, Chicago, Ill.	268			
WFCV	Eastman School of Music, Rochester, N. Y.	277	WMAK	Chase Electric Shop, Pomeroy, Ohio	244			
WFCV	Seaside Hotel, Atlantic City, N. J.	275	WMAK	Atlanta Journal, Atlanta, Ga.	429			
WFCV	Courier Journal and Louisville Times, Louisville, Ky.	400	WMAK	Hatfield Elec. Co., Ufa, N. Y.	242			
WFCV	Wilmington Electrical Specialty Co., Inc., Wilmington, Del.	360	WMAK	School of Engineering of Milwaukee, Milwaukee, Wis.	246			
WFCV	Rensselaer Polytechnic Institute, Troy, N. Y.	480	WMAK	Harden Sales and Service, Broadland, Ill.	233			
WFCV	Sweeney School Co., Kansas City, Mo.	311	WMAK	Radio Co. (Harry W. Fahrlander), Hamilton, Ohio	252			
WFCV	Shaffer Music House, Oil City, Pa.	250	WMAK	State University of Iowa, Capitol and Washington Sts., Iowa City, Ia.	...			
WFCV	Heal's Store, Stevens Point, Wis.	240	WMAK					
WFCV	Henry E. Loy, Canton, Ohio	254	WMAK					
WFCV	Charles E. & Radio Mfg. Co., Baltimore, Md.	275	WMAK					
WFCV	Beadsley Specialty Co., Rock Island, Ill.	222	WMAK					
WFCV	John S. Skane, Harrisburg, Pa.	231	WMAK					
WFCV	Culver Military Academy, Culver, Indiana	222	WMAK					
WFCV	Chesaning Elec. Co., Chesaning, Mich.	227	WMAK					
WFCV	Laver, Ill.	234	WMAK					
WFCV	Franklin St. Garage, Inc., Ellsworth, Maine	231	WMAK					
WFCV	James H. Slusser, Logansport, Ind.	220	WMAK					
WFCV	C. L. Carroll, Chicago, Ill.	233	WMAK					
WFCV	First Ave. Methodist Church, St. Petersburg, Fla.	258	WMAK					
WFCV	Y. M. C. A., Sumner St., Patsyuckett, R. I.	231	WMAK					
WFCV	Johnston Automobile Co., Johnston, Pa.	256	WMAK					
WFCV	Thomas W. Tizzard, Jr., Downers Grove, Ill.	206	WMAK					
WFCV	H. B. Linc's Sons, Anderson, Ind.	218	WMAK					
WFCV	D. H. Koenig, Philadelphia, Pa.	215	WMAK					
WFCV	William Hood Dunwoody Ind. Inc., Minneapolis, Minn.	278	WMAK					
WFCV	Hickson Electric Co., Rochester, N. Y.	258	WMAK					
WFCV	Radlow Co., Cleveland, Ohio	283	WMAK					
WFCV	George Schobel, Loew's State Theatre Bldg., New York City	360	WMAK					
WFCV	Bankers Life Co., Des Moines, Iowa	526	WMAK					
WFCV	Howard R. Miller, 6318 N. Park Ave., Philadelphia, Pa.	254	WMAK					
WFCV	Journal-Stockman Co., Omaha, Neb.	278	WMAK					
WFCV	Home Electric Co., Burlington, Iowa	283	WMAK					
WFCV	The Capital Times, Madison, Wis.	236	WMAK					
WFCV	K. & L. Electric Co., McKeesport, Pa.	238	WMAK					

What the Trirdyn gets where it's hotter than Summer!



Crosley Trirdyn—on the Sahara Desert at mid-day—brings in Radio-Paris on the loud-speaker!

Not only at mid-day, but in February—in Northern Africa and far hotter than any American summer. The picture above, a post card snapshot sent from Tunis to Mr. Crosley, by D. F. Keith of Toronto, Ont., tells this story on the other side:—

Tunis, North Africa, March 3, 1925

Dear Mr. Crosley:

Fishing here is rotten but radio is fine. On the Sahara, using three tubes on the Trirdyn circuit, reception from Paris came through on the loud speaker. Along the south coast of the Mediterranean, using this set, six or eight high power European stations came in with good volume by day-light and all of them after dark. Can usually get a few American after 1 a. m. Can you fish with us this year?

Cordially,
(Signed) D. F. Keith

Further details on the margins of the picture:—

Sahara Desert, 250 miles south of Algiers, February, 1925. Receiving noon-day concert from "Radio-Paris", Paris, using aerial and counterpoise.

Who said summer in America is a poor time for radio—if the receiver is a Crosley Trirdyn?

Every radio fan—actual and aspiring—is invited to think this over and then act.

On the Trirdyn is the beautiful new Crosley Musicone, radio's most startling development. The Musicone's ability and its beauty are so superior that we expect it to replace a half million loud-speakers this year. \$17.50.

The Crosley Radio Corporation, 528 Sassafras St., Cincinnati
Powel Crosley, Jr., President

CROSLEY
RADIO
Better—Costs Less

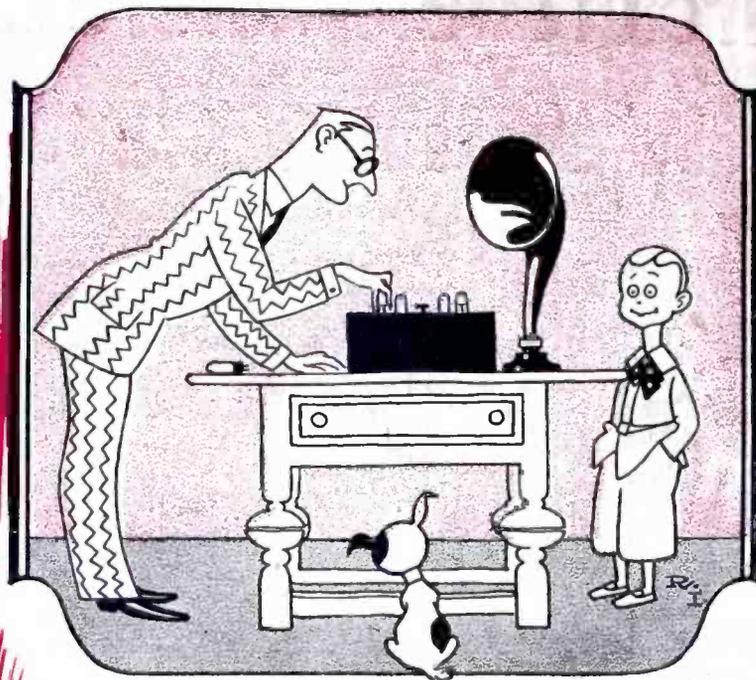
\$65⁰⁰
Accessories Extra

Crosley Trirdyn Special

Three tubes better the results of five or six
A highly efficient, non-radiating combination of tuned radio frequency, Armstrong regeneration and reflex amplification.

New cabinet, sloping panel
Battery self contained
Exclusive Crosley 3-tube circuit





Put in the best!

To get the best out of a set—put the best into it. In some parts of the circuit, quality is more important than in others. It is most important in the tubes. They should be genuine RADIOTRONS.

The volume—the clearness—the quietness and the economy of operation—these depend on many things—but first of all upon the Radiotrons.

No matter what the job of the tube in the set, there's a Radiotron to fit it. You will always find it makes a difference if you demand a Radiotron—ask for it by name—and look on the tube for the word Radiotron and the RCA mark.

\$3

WD-11
WD-12
UV-199
UV-200
UV-201-a

Radiotrons with these model numbers are only genuine when they bear the name Radiotron and the RCA mark.

Radio Corporation of America

Sales Offices: Suite No. 15

233 Broadway, New York

10 So. La Salle St., Chicago, Ill.

28 Geary St., San Francisco, Cal.

Radiotron

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