

Radio Lessons; New Sets; Advance Programs

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

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TALK ACROSS ATLANTIC

SANTA'S WORKSHOP NEWS FOR KIDDIES

HAS DIRECT WIRE SERVICE FROM "ICICLE"

Tells Daily Doings in St. Nick's Land; Also Plans for "Night Before"

NEWARK, N. J.—"Icicle," the loving Ambassador of Childhood at the Court of Santa Claus, is now addressing his youthful friends from WOR every Monday evening at 6:15 (E. S. T.), until Christmas. He is delighting the youngsters with the very latest news from Toyland. Since grown-ups have their stock market and sport reports by Radio, what is more appropriate for the little folks than a direct wire service from Santa Claus' workshop?

Each evening "Icicle" describes a particular toy he has been working on during the day in Santa Claus' shop, and delights the youngsters with intimate stories of Santa's plans for Christmas Eve.

"Icicle" is first assistant to the children's genial old friend, and at the evening hour will report from WOR how work is progressing in Toyland, describing each evening a particular toy that is being prepared for good little girls and boys. All the youngsters are invited to write "Icicle," in care of Station WOR, telling him just what would please them most to receive at Christmas.



TRANS-OCEAN CONVERSATION GIVEN PUBLIC

Ten American and Five British Plants Make History During Week of Tests

KDKA Speaks to 2LO

NEW YORK.—America has talked to England on the wings of ether! The final triumph of the recent trans-Atlantic broadcasting tests has joined the two greatest powers in the world in a closer bond of sympathy. The story of the achievement is as thrilling as its importance.

How a band of newspaper men and Radio engineers waited, how a second seemed like hours, how the voice of Cardiff, Wales, broke the awful suspense, all reads like fiction but is in faith much stranger.

Little Receiving Shack All Silence!
To anyone peering in through the windows of a little shack at Garden City. (Continued on page 5)



To the left is presented Genevieve Gilbert, dramatic soprano, who often delights listeners in to KGW, the Morning Oregonian's station at Portland

Among the many European celebrities of the concert stage who are touring the States this season, Lilly von Kovics, the Hungarian pianist, takes no mean place. She has the skill and temperament required to execute the fiery music with which one usually associates her native country

Florence Macbeth, of the Chicago Civic Opera, and "Princess Endossia" in the "Jewess." She took the part of "Lucia" in the recent broadcast of "Lucia di Lammermoor" by Station KYW



Simple Method to Aid in Overcoming Interference from Local Broadcasters

Chief for Westinghouse Company Gives Radiophans Tip—Get 25 to 30-Turn Coil of Wire and Good Variable Condenser—
How to Make Wave Trap

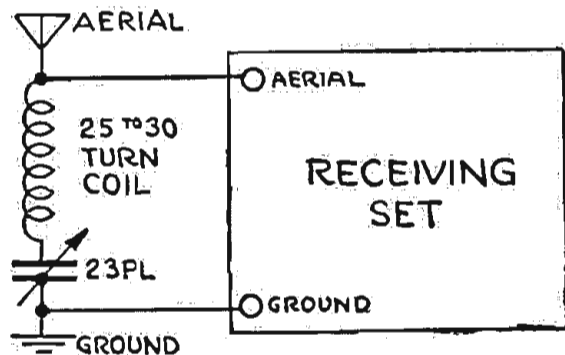
By C. W. Horn, Superintendent of Radio Operations, Westinghouse Elec. & Mfg. Co.
THOSE of us who have sensitive Radio receiving sets know how sharply a distant broadcasting station tunes in—we know from experience how carefully we must adjust our dials to get any particular station. A few divisions off on the scale and we are lost.

Now, I have been asked a great number of times "Why cannot the local stations be tuned just as sharply?" I will attempt to explain the reason and also give detailed information, which I trust will assist the great army of listeners in overcoming a factor considered by many to be a very important one now.

"Forced Oscillations" Root of Evil
When a receiving set is located near a powerful broadcasting station, you are able to hear that nearby station over a considerable range of the dial because of what is known as "forced oscillations." This can best be described by referring to that analogy so often used of a pond of water after a pebble has been thrown into it.

Waves radiate from the center of disturbance. At some little distance from this center the waves are regular and travel smoothly but right near where the stone struck the water, and particularly if it was a large one, you will notice a large number of irregular splashes. Any device designed to be affected by the regular waves would also be troubled by these irregular splashes or waves as you may call them. It is the same thing in Radio and the problem is to so arrange matters that these irregular splashes can be deflected or so handled as not to interfere.

Wave Trap Will Turn the Trick
In your Radio set you desire to pick up the tune or, as before named, the regular wave and weed out the irregular or forced oscillations. This may be done in several ways by devices called traps or filters. I will describe here a very simple one—something you can easily construct for yourself in a few minutes with simple apparatus usually used in Radio.



Wave Trap Connections

This filter that I am about to describe is so arranged and connected that it tends to offer a very low resistance path to the wave that is not wanted, while the tuner dial is set to offer an easy path for the desired wave which, therefore, passes through your receiver and is registered. Therefore, this circuit must be connected in such a manner that it can be tuned to the undesired wave and also so that the energy so picked up by-passes the receiving apparatus.

Need Coil and Variable Condenser
The circuit consists of an inductance (coil of wire) and capacity (condenser) either of which may be variable. It is probably simpler to use a variable capacity, or condenser as it is more usually called. This variable condenser may be of the 23-plate type and can be purchased for a few cents in any store handling Radio equipment if you should not happen to have one.

Next obtain a small inductance of about 25 or 30 turns of small wire, any size in the neighborhood of 24 or 26 B. and S. gauge, or if you have a so-called honeycomb or spider web coil, so much the better. This inductance can, however, easily be made by winding about 25 or 30 turns of wire on a cardboard tube 2 or 3 inches in diameter. CAUTION—do not wind on a metal tube! Now connect this inductance in series with the variable condenser and connect this combination across your receiving set between the antenna binding post and the ground binding post.

This is so that energy from the antenna can also flow through our filter circuit (or as we have described, "inductance and capacity in series") to the ground, as well as enter the receiving set. Make sure that there is no coupling between the set and the filter circuits. To prevent this keep the filter circuit several feet away from the receiving apparatus.

How to Try Out Wave Trap
After having done all this, we are now ready to try it out. Wait until a local station begins operating and then try to tune in another station. That means you have set your dial at the point where the desired station can be heard, but it is being interfered with by the local station. Now adjust the variable condenser of the

filter circuit until the interference has been reduced to a minimum, at the same time readjusting your receiving set so that the desired station comes in as strong as it is possible to make it. A little practice will soon enable you to obtain sharp tuning.

Low Losses Aid Trap
Now this filter circuit is not one hundred percent perfect but it is believed that for the amount of money invested and the simplicity of this arrangement, the results are worthwhile. This device depends upon low losses in the filter, particularly in the condenser. Great care should be taken to make sure the variable condenser used is a "low loss" condenser. There are several good types on the market.

This device will drain unwanted frequencies off the antenna, but it will not weed out unwanted frequencies from the receiving circuit itself. The receiver should be well shielded in order to prevent it from picking up any considerable amount of energy without antenna connection.

I will be glad to hear as to what success' readers of Radio Digest have with this method, as we all are anxious to improve Radio conditions and I feel this can best be done by furnishing information to Radio listeners whenever possible.

ARCTIC RADIO HAILS CHICAGOYACHTSMEN

Station WNP near North Pole Sends Air Message Dedicating Floating Club

CHICAGO.—Ceremonies for the rechristening or dedication of aquatic craft were marked in the past by the well-known beribboned bottle of "something good," but it remained for Radio recently to establish a precedent in the manner of speeding ships on their ways.

When the program for the dedication of the floating house of the Chicago Yacht club, Belmont harbor, Lincoln park, was in the making, a novel feature was included—a dedicatory message from Captain Donald B. MacMillan, commander of the Arctic exploring expedition on the schooner Bowdoin.

Radio contact with the Bowdoin was established by means of a message relayed from Station 9BP, Prince Rupert, B. C., the only plant which had been able to communicate regularly with WNP, the Bowdoin. When the yacht club's intent was first made known to WNP, it placed on the air Captain MacMillan's acceptance but regretted that he then was hunting walrus for food many miles away. Soon MacMillan himself sent a message of acceptance.

His words of dedication were heard plainly a few nights later during the festivities in the clubhouse. MacMillan also reported that WNP had heard 486 American and fourteen Canadian stations, one in Mexico and one in Hawaii. The Bowdoin, at the time of the dedication here, was frozen in the ice, 760 miles from the North Pole.

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Looking Ahead

How's Your Super-Triplex Progressing? Next week, H. J. Marx will give you three illustrations of the assembled set, together with full instructions for its operation. Learn how this remarkable set shuts out the nearby stations that ordinarily shut out long distance work. Mr. Marx also promises some Hazetone Neutrodyne tips next week.

King Miloplex, the Mystery Man, Has a Christmas Surprise for You—He will give it to you next week, a few days in advance of Santa's visit, but he's generous that way. He whispered to us that it was so simple that any one could make it with a toothpick and a couple of double-humped hairpins. Name? King's ex or King X, we're not quite sure. It will be in Simplex Diagram form, too.

David Grimes Has Been Holding Out on You—He has an article coming in an early issue that reveals one of the most important parts of all his research work on the Grimes Inverse Duplex. What is it? Nothing less than tuned Radio frequency will be his subject. Don't miss this!

Flewelling Is Preparing an Article You'll Like—It won't be ready for you next week, but will soon, and, best of all, it describes the latest idea of the noted inventor. What is it? Wait till he applies for a patent. We will give a hint. Ever hear of regeneration—and Radio frequency amplification?

Honeycomb Coils Are Still Popular and Convenient to Use—Next week we'll tell you inside dope on mounting them inside the set with dials outside the panel. By the way, H. J. Marx is collecting lots of data on honeycomb coils, and promises an interesting article soon.

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Radio Digest

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My! how they stand the racket! That's because they are housed in strongly molded brown Bakelite. Then there is just the right gauge of wire and number of turns to get the stuff hot and sassy right out of the "blue." No sliding contacts; nothing to wear or short. Rotor ball turns accurately on big husky bearings. A spring takes up the play—no back lash.

Built for heavy work, Brother Bug. The standard price is \$8.00—but you never think of that when you put this baby to work.

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Give a Morrison Loud Speaker and Be Sure

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Loud Speaker

EXPOSE OF MUSIC TRUST PRINCIPLES

BROADCASTERS REFUSE TO BE "BLACK-JACKED"

Tell Whole Truth about WEAF—Cabarets, Theaters Ask for Tax Free Music

(The following article is one of a series which is being published with the express purpose of explaining to the Radio public the situation existing between the broadcasting stations and the American Society of Composers, Authors and Publishers. The series tells in detail the reasons why the National Association of Broadcasters was organized, and why certain popular songs, the copyrights for which are controlled by the "music trust," are not being broadcast.—The Editor.)

PART V

IF the American Society had wanted to tell the whole truth about Station WEAF, the American Telephone & Telegraph Company, they would have told the following: "Station WEAF is a commercial station patterned on the well-known policy of the American Telephone and Telegraph Company to serve the public. It is the only station in the United States said to be authorized by the government to make a direct charge for its service. Anyone who wants to make proper use of the station may buy 'time on the air' from WEAF. Gimbel Brothers and Browning, King & Co., both of New York, buy time from WEAF. Obviously when WEAF offers its services it cannot say to those who are its customers, 'You cannot play the music of so and so.'"

Broadcasting stations generally are keenly aware of these facts. They know the commercial aspects of WEAF. But they also know that none of these arguments apply to them and they refuse to be black-jacked into any agreement with the mere handful of publishers belonging to the American Society.

Society Annoys Broadcasters

But this was not all. Broadcasters began receiving legal notices and other warnings from various associations, heretofore unheard of, all claiming to be owners of musical copyrights. Investigations, however, showed clearly that these other associations had no intention of making any demands similar to those made by the avaricious American Society, but, quite on the contrary, were desirous of co-operating with broadcasters. Arrangements have now been made between two of these associations and the National Association of Broadcasters.

(Continued on page 3)

Hold Up His Wedding to Get Radio "March"

And Two Anniversary Parties Also Send Thanks

NEW YORK.—An excited voice is reported to have called up Station WEAF here a few days ago with the news: "My wedding is going to be tomorrow night, and I thought I'd tell you about it."

"Glad to hear it; many happy returns and many more of them," said Announcer Randall.

"Thanks. Do me a favor. I'm going to have a little Radio-party at my wedding and I'd like to have an orchestra play the wedding march."

"Sorry, but we haven't any orchestra on Tuesday. Why don't you postpone the wedding a day so we can do it for you?" suggested the announcer.

"Just a minute, please." After a brief conversation with the better seven-eighths of the house-to-be the voice came back, "Yes, I've decided to postpone the wedding a day."

This accounts for the wedding march played one recent night. Strangely, three telephone calls were received thanking WEAF for the music, one from the man who postponed his wedding and from two holding wedding anniversary parties.

LAW BLOCKS WLAG IN ROLE OF CUPID

MINNEAPOLIS, MINN.—WLAG was forced to disappoint two loving hearts several days ago. A telegram was received reading: "Dear Eva, all O K feeling fine hope to be home soon good night sweetheart." It was signed "John" and is believed to have been sent from Rochester, Minn., by a patient at one of the hospitals there. Government rules forbade broadcasting the message.

CHURCH BURNS; WGI USED AS SUBSTITUTE

MEDFORD HILLSIDE, MASS.—Station WGI, American Radio and Research Corporation here, became a substitute church a few Sabbaths ago for Rev. A. A. Pitman and the members of his large Glendale Methodist Church congregation of Everett, Mass. Their church totally destroyed by fire recently, they now sit quietly in their own homes and listen to the services broadcast from WGI.

RELAY PITTSBURG TO WESTERN COAST

INTERCEPTING STATION IN HASTINGS, NEB.

Programs Now Will Be as Distinct in Rocky Mountains as in Alleghenies

HASTINGS, NEB.—KFKX here has been equipped as a Radio relay station to intercept concerts broadcast on 94 meters from Station KDKA, Pittsburgh, Pa., and then rebroadcast them on 286 meters. This will enable listeners in the West to hear the Pittsburgh programs as distinctly as Radiophans in Pennsylvania. No longer are sensitive sets required to pick up KDKA in the Western states; for listeners can tune in KFKX and enjoy the same concerts as radiated on KDKA's assigned wave of 326 meters.

KFKX to Relay to Pacific Coast

The next step in the Westinghouse plan is to have a station on the Pacific coast intercept programs from KFKX on another low wave of 107 meters.

The system will then operate as follows: KDKA, Pittsburgh, will broadcast on 326 meters and also on 94 meters; KFKX will pick up the 94-meter wave, amplify them, and rebroadcast on 286 and 107 meters; the Pacific Coast station will receive the 107-meter signals and rebroadcast on 400 meters.

Short waves are employed for relay broadcasting so they will not be interfered with by regular broadcasting stations operating on wave lengths ranging from 222 to 545 meters, and amateur traffic. The average receiving set will not be able to tune in the low wave lengths.

Short Wave Work Gives Problems

High frequency or low wave length broadcasting requires a short aerial. The aerials here at Hastings and Pittsburgh are thirty-five feet long. There is only thirty-five feet between the aerial proper and the counterpoise ground. One of the difficulties encountered in high frequency broadcasting is that every precaution must be taken to prevent outside influences, such as vibration, that would change the frequency.

To prevent this the aerials are rigidly attached to the masts instead of to swinging spreaders. The lead-in wire consists of copper tubing mounted on high voltage porcelain insulators. Copper tubing is used to make all connections and the various coils are wound on rigid forms. The high frequency transmitter at Pittsburgh is mounted on springs to prevent vibration of the building from affecting the frequency.

Scenes from WLAG Are Reproduced on Stage

Three Announcers and Staff of Entertainers Appear

MINNEAPOLIS, MINN.—The appearance of WLAG on the stage recently at the Hennepin Orpheum theater here marked the Twin City Radio Central's observation of National Radio Week.

The performance at the downtown theater showed an actual scene from the broadcasting studio of WLAG. Paul Johnson and Eleanor Poehler, famous all over the United States as the Minneapolis and St. Paul announcers, handled the microphone. Ed Squires, Jr., visiting announcer from WDAP, Chicago, also appeared, and a great many of the WLAG favorites were on the programs. Among these were Edith McDonald Carpenter, Elsie Yoerg, Donald Harris, Dody Reimer and Charlie Cordray.

British Columbia Hears WRW

TARRYTOWN, N. Y.—Station WRW has recently received letters from two listeners in Portland, Oregon, in British Columbia, and another in Boulder, Colo.

HOW FAR FROM YOU TO ME?



This pretty fan—Irene Purcell of the "Rainy Day" company—knows, for the top of the set consists of a Radio map of the United States, executed in silver. The solid silver encased receiver, a well-known make exhibited at a recent Radio Show, cost \$2,000. Int. Photo

AUSTRALIA GETS FIRST HIGH POWER STATION

News and Drama to Be Features from Sydney

SYDNEY, AUSTRALIA.—The first high power Radiophone broadcasting station in Australia was completed here recently. The Australian broadcasting scheme permits competitive services. It is planned to broadcast programs from newspapers and theaters. Similar stations are being

constructed in other cities, with special facilities for reaching inland and isolated centers.

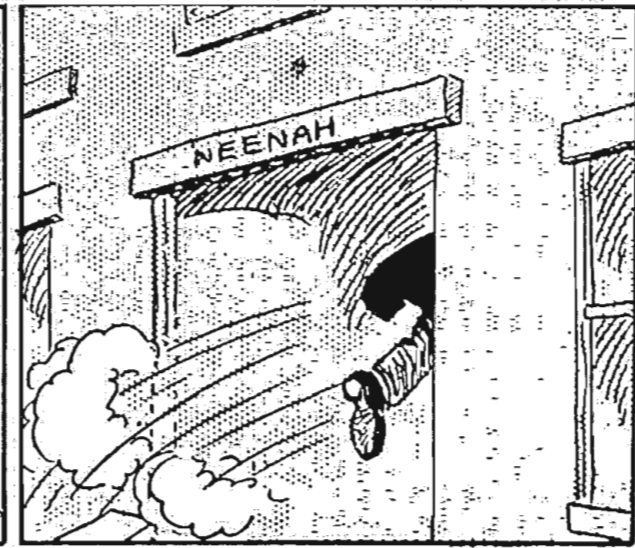
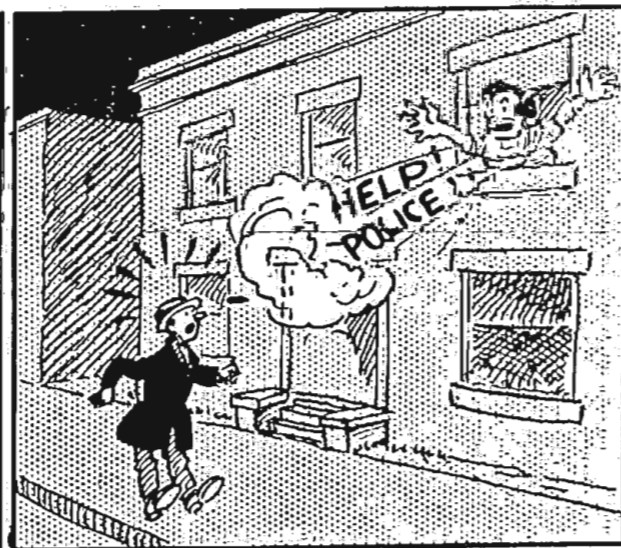
Columbus Plant, Silent Since August, Takes Air

COLUMBUS, O.—After being quiet since August 8, Station WCAH, of the Entekin Electric Co. has taken the air again. The Columbus Philharmonic Orchestra is one of the added attractions this winter. Station WCAH is the oldest in point of consistent service in Columbus.

THE ANTENNA BROTHERS

Spir L. and Lew P.

May Be 'Twas a Pig



THIS LETTER EXPLAINS ITSELF

Mr. John Daggett,
Manager, Times Radio,
Los Angeles.

Dear Mr. Daggett:--

I was amazed today to learn that some of my numbers, such as Marcheta, and Just An Old Love Song, were among those which you are not able to use over your radio, according to the ruling of the Society of Authors, Composers and Publishers.

This is news to me, as I am certainly not in sympathy with any move that would stand in the way of radio as I spend most of my evenings listening to the other fellow's efforts broadcasted by radio.

You have my full permission to use any of my writings at any time over your radio.

Yours sincerely,

Victor L. Schutinger

EXPOSE MUSIC TRUST

(Continued from page 3)

al Association of Broadcasters, whereby their music is being used by members.

The Bureau of Music Releases of the National Association of Broadcasters is in charge of Mr. Raymond Walker, an experienced song writer and ex-publisher, having to his credit several song hits which were sung universally.

Bureau Gains Ground

The bureau goes steadily along, releasing weekly to members good, late, copyright music of superior quality and freeing members completely from demands

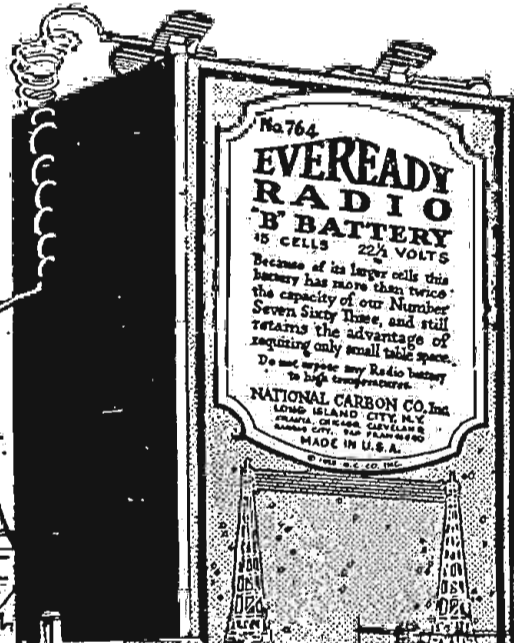
made by anyone on account of musical copyrights.

Some of the best known orchestra leaders in the country are playing National Association of Broadcasters' music. Dancing patrons in fashionable hotels are dancing to this tax-free music. Dancing academies, cabarets, moving picture houses and hotels apply for and are given this tax-free music.

Now let us see what is the fundamental reason for all of this opposition to the American Society. Let us go back a number of years and come down to the present.

(TO BE CONTINUED.)

Eveready No. 764 "B" Battery, 22½ volts, 3¼ inches long, 2¾ inches wide, 5½ inches high, weight 2½ lbs. Price \$2.25 everywhere



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Fifteen vigorous cells give 22½ volts. Two Fahnestock Spring Clip terminals.

For compact capacity, buy the new Eveready No. 764.

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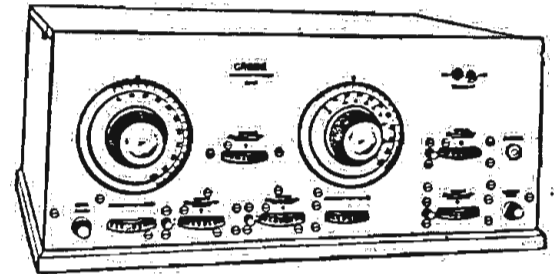
You require no cumbersome storage battery with

The New GREBE Broadcast Receiver



Compartment are provided in the attractively finished walnut cabinet for dry cell A and B batteries.

Ask your dealer or write for "Grebe Radio in the Well-Appointed Home."

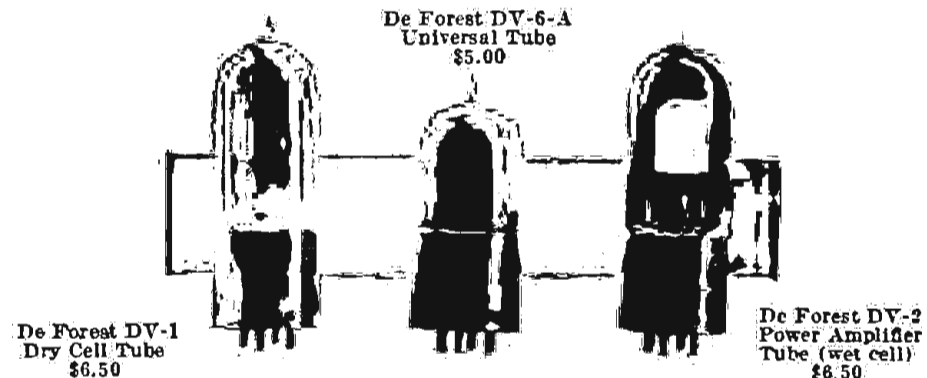


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De Forest DV-1 Dry Cell Tube \$6.50

De Forest DV-6-A Universal Tube \$5.00

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The More You Know About Radio The More You Rely on De Forest

Without Lee De Forest's discovery of the vacuum tube there would be no radio today. All radio broadcasting, all radio receiving by means of tube sets, rests on De Forest patents.

De Forest has been a pioneer in radio since 1900 and De Forest is a pioneer today. That is the reason for the great success of the De Forest Reflex Radiophone. That is the reason for the success of the new De Forest tubes—DV-1 Dry Cell Tube, DV-6-A Universal Tube, DV-2 Wet Cell Power Amplifier Tube.

If you want a radio receiving set with a range on indoor loop of from 1,500 to 3,000 miles, depending on atmospheric conditions; if you want simplicity of control, clear reception without distortion and without extraneous noise; if you want operation on either wet or dry cells—see the De Forest Reflex Radiophones at the De Forest agent's today.

The D-7A Reflex Radiophone is a three-tube set at \$125.00; the D-10 Reflex Radiophone has a drawer in its cabinet for dry batteries and is a four-tube set at \$150.00. No matter what you pay, you can't get greater radio satisfaction.

Whether you buy your set complete, or build your own from the laboratory tested De Forest parts, you can rely on De Forest, the greatest name in Radio.

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If located west of Pennsylvania address De Forest Radio Tel. & Tel. Co. WESTERN SALES DIVISION

Dept. RD. 3, 5680 12th St., Detroit, Mich.

De Forest Portable Reflex Radiophone type D-10 which operates on wet or dry cells, has a reception range of from 1,500 to 3,000 miles on indoor loop; has drawer for all necessary A and B dry cells. Price \$150.00, plus approximately 6% for transportation in territories west of Rocky Mountains.

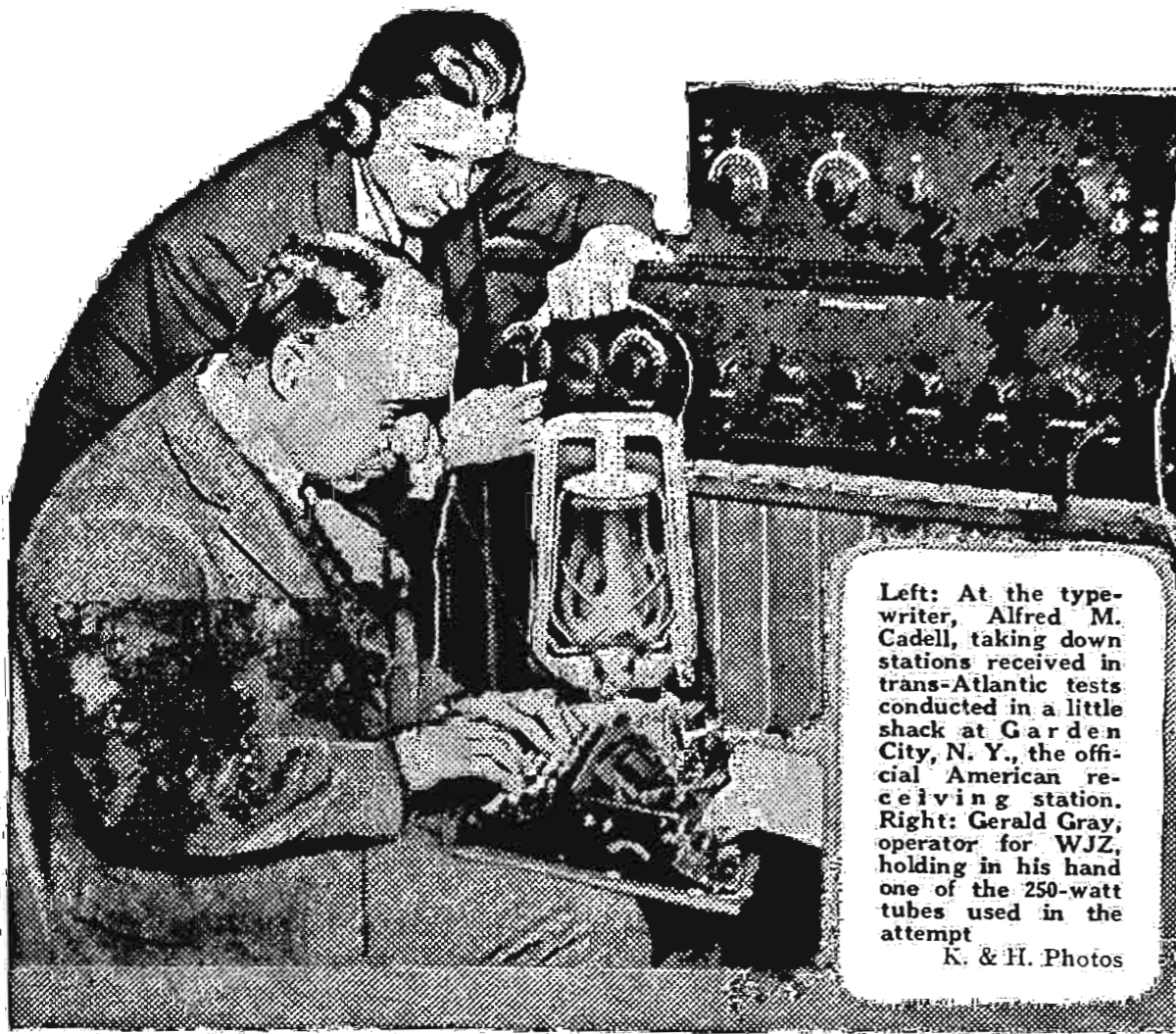


Radio Catalogs Free Send a postcard for De Forest's Free Radio Catalog with full details and prices on sets, tubes, and parts.

De Forest products are sold only through exclusive agents, direct to the public for your protection. The De Forest Company will be glad to hear from representative dealers in various communities who wish to become exclusive De Forest agents.



JOHN BULL SHOUTED "HELLO" HERE



Left: At the typewriter, Alfred M. Cadell, taking down stations received in trans-Atlantic tests conducted in a little shack at Garden City, N. Y., the official American receiving station. Right: Gerald Gray, operator for WJZ, holding in his hand one of the 250-watt tubes used in the attempt
K. & H. Photos



Thousands of American Listeners In Hear English Plants Talk to States

(Continued from page 1)

L. I., it would have appeared ludicrous—or possibly a case of group suspended animation. Silence, absolute silence, with the tenseness of the moment reflected in the faces of the group of men who stood or sat without the slightest movement of hand or foot in the dim light of the little lamp-lighted shack. Seemingly they had all ceased to breathe, as indeed they momentarily had.

The object of the concentrated gaze of the little group was a long black-paneled box, its smooth surface irregularly broken by dials and knobs, two of which were constantly being turned slowly back and forth by an intent operator. Beside the operator a large reel-like affair of wood and wire and on the table, near the box that was the center of interest, a large horn.

Voice of Cardiff, Wales, Breaks Through

Suddenly the operator paused in his manipulation of the dials and slowly raised his hand for more silence—if that were possible—and not a breath was drawn for a time that, while actually measured in seconds, seemed like hours to the group anxiously assembled.

Then the operator came to life like a flash and, snatching a plug from a hole in the box before him, quickly inserted another. From the mouth of the great horn came a soft, sibilant hissing and then a voice, "This is Cardiff, Station 5WA. This is Cardiff, Station 5WA. Hello America. Senatore Marconi will now speak in the hope that his words are being heard by listeners in the United States. This is Cardiff, Station 5WA."

Momentary Joy Short Lived

The little group that but a moment be-

fore had been so quiet was now all life and action. A cheer from one or two, excited whispering here and there, and the rapid scribbling of pencils as representatives of the press tried to copy the voice from the horn and to describe what took place, all at once.

The smooth rolling voice was suddenly broken by another and frowns instantly displaced the smiles of triumph on all faces. "The next number by the Dancing Fools Orchestra will be—" said the new voice. It was interference from an American station not courteous enough to accede to the request of those interested in Radio's progress that a half hour of silence be maintained during an important test.

2LO at London Brings Cheers

"We'll see if we can pick up another of their stations," said the operator. "They're all hooked onto the same microphone over there," and again he slowly revolved the large dials on the set before him, while the group gathered about him.

resumed positions of rigid attention. Again the hand was raised for complete silence—again the horn sent forth a single booming voice. "Hello America, this is 2LO London, 2LO London. We have another well-known guest with us this evening who will speak for his American hearers, Monsieur Carpentier."

This time the dozen or more newspaper and magazine men broke into open cheers of congratulation. Voice communication between two great countries, separated by thousands of miles of rolling water seemed achieved. The entertainment enjoyed by one could be heard and enjoyed by the other; closer relations would be established and better understanding between the two would result.

Reports from Fans Pour In

Then they gathered around the long black cabinet with the request that its contents and operation be explained. The operator threw back the lid of the cabinet revealing what the experienced eye

(Continued on page 6)

Thrills from Radio

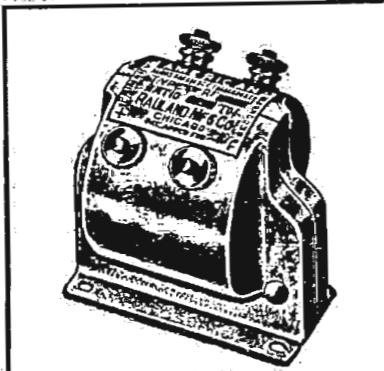
No. 7 of a Series Featuring Experiences of "ALL-AMERICAN" Users

Thrill Your Best Friend at Xmas!

By E. N. Rauland

"How about that good friend of yours who is not getting the amplification he wants—the sharp, clear amplification without annoying tube noises, that makes radio a real joy to everyone?"

"No matter what circuit he is using, there is just one transformer that will best bring in the far-off stations, as well as the nearby ones—that will faithfully reproduce music and speech with volume



All-American Audio Frequency Transformers made in three ratios: 3:1, 5:1, 10:1, \$4.50 to \$4.75.

and tone exactly as it is broadcasted. "It is the 'All-American'—as over 300,000 fans will back me up in saying. So here's the gift question solved for your friend—give him an 'All-American' Transformer this Christmas. He'll be more than thrilled!"

"All-Americans are the best known, most widely used transformers in the world—in fact, they are so popular we can hardly supply the demand, and, as you know, they also are standard on the better sets."

Special Offer!

All-American diagram and circular describing Power Amplification; also Book of Hook-ups containing 22 tested circuits. Send 4c in stamps.

All the better dealers sell "ALL-AMERICAN"

RAULAND MFG. CO., 200 N. Jefferson St., CHICAGO
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AUDIO AND RADIO
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POWER AMPLIFYING
INPUT AND OUTPUT

ALL-AMERICAN

AMPLIFYING TRANSFORMERS

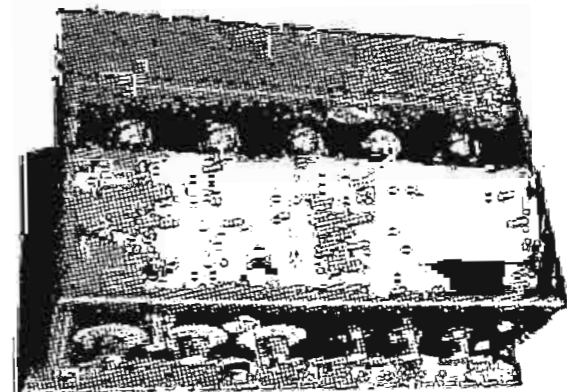
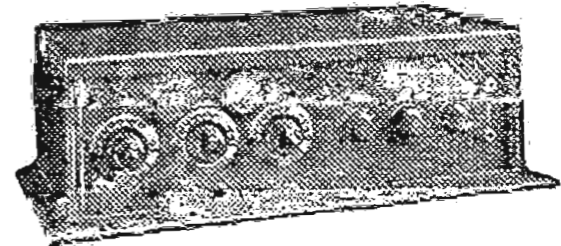
Largest Selling Transformers in the World



The "Radio Magnet"

which will attract desired programmes and eliminate undesired signals, etc., is known as Service Type 212 Receiver. Greatest distance, clarity and freedom from unwanted "noises." "Hearing" is believing. Ask your dealer for a demonstration.

Price
\$150.00
with loop
antenna



This is a TELEFORCE Product

Service Radio Co.

4747 Montgomery Ave. NORWOOD, O.

TALKS ACROSS ATLANTIC

(Continued from page 5)

recognized as a super-heterodyne receiving set.

While the explanation was in gross, the phone began to ring. Others had heard British stations—some of those who called up had heard but one, others reported hearing as many as four or five. Manchester, with its call of 2ZY, had actuated American receivers; Newcastle 5NO, Glasgow 5SC and Bournemouth 6BM, also carried British voices across the ocean. Then came telegrams from New England, from southern states, from the West, all reporting the reception of stations in the British Isles. A very few had heard the entire program, several had enjoyed hearing more than one station, many had encountered serious interference from American stations.

Ten American Plants Succeed First Night

The attempt by British and American Radio enthusiasts to hear each others stations at prearranged times began on the evening of November 25. On that night, the eight English plants, all operated from a single microphone in London, put on all the power available and American listeners strained their ears between 10 and 10:30 Eastern time, 9 and 9:30 Central time, 8 and 8:30 Western time, and 7 and 7:30 along the Pacific coast.

The following evening, American stations crowded on power in an attempt to send their waves across the dark heaving ocean to far-away sets in the hands of English enthusiasts. Ten succeeded—WGY at Schenectady, WHAZ at Troy, WMAF at Dartmouth, KDKA at Pittsburgh, KSD at St. Louis, WOR at Newark, WDAP at Chicago, WGR at Buffalo, WBAH at Minneapolis and WDAR at Philadelphia. The report from England advised that all were heard very well.

Later Tests Confirm Results

The third evening, British stations again attempted to reach us with the results described above, and of them all, the London station, 2LO, seemed to come through with the most consistent strength

and clearness. The fourth evening, Wednesday, the same American stations were heard in England, and on Thursday night the American reception of English stations was not up to par on account of the Aurora Borealis and storm conditions over this country.

Friday night WGI, Medford Hillside, while not according to the prearranged schedule, succeeded in establishing two-way communication with 2LO, London. At 10:45 p. m., Eastern time, WGI said, "Hello England, Amrad WGI, Medford Hillside calling. Hello England." Then London 2LO replied, saying, "Hello America, Amrad WGI, Medford Hillside, Massachusetts. Do you hear us?" The London station was heard distinctly by many Radiophans in Boston.

KDKA Holds Conversation with 2LO

On Saturday night the two-way conversation test was very successful. KDKA, Pittsburgh, however, was the only American station obtaining a complete report on the English transmission sufficiently well to carry on a conversation. KDKA talked with 2LO, London.

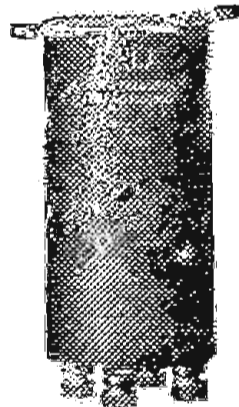
WGY at Schenectady, WOR at Newark and KSD at St. Louis were also reported by English stations as heard, but these American plants could not follow the English stations' transmissions sufficiently well to carry on conversation. American fans reported hearing 2LO at London, 5SC at Glasgow and 5NO at Newcastle with fair consistency.

A Compliment and Criticism

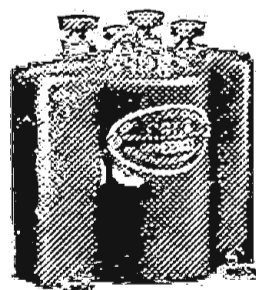
And now, receiving the great achievement of trans-Atlantic Radiophony, comes a compliment—and a criticism. The American broadcasters who were not in the tests are to be highly complimented for their generous co-operation in remaining silent during the "zero" hours. Especially is this compliment deserved for all concerned on Saturday night, the time of the two-way test.

But the kick! Too many Radiophans interfered by improperly using their regenerative receivers. The oscillations from the inefficiently operated regenerative sets were bad enough to almost stop the tests at times.

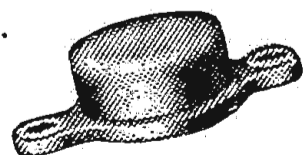
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Unduplicated amplification without distortion enables Erla audio transformers to improve any receiving unit. Ratios: 3 1/2 and 6 to 1. \$5



Solve crystal troubles by installing an Erla fixed crystal rectifier. Once installed, no attention is required. Jolt and jar proof. List price, \$1

"All U.S. Stations on Loud Speaker, Using Only Three Tubes"

Typical of the thousands who have discarded complicated multi-stage receiving units in favor of simple, efficient Erla reflex design, is the experience of J. G. Hamock, 1917 So. Western Avenue, Chicago, who writes:

"During my first week with your three-tube hook-up, tuning through high power Chicago stations, I got Jefferson City, Dallas, Memphis, Atlanta, Omaha, Kansas City, St. Louis, New York, Springfield, Pittsburgh, Harrisburg, Louisville, Cincinnati, Fort Worth and Tampa.

"The Sunday following I added Fresno, Denver, Astoria, Ore., Los Angeles; Honolulu, Hawaii Naval Maneuvers; and Juneau, Alaska, the Alaska Electric Light and Power Company.

"The United States Stations all were clear on the loud speaker. Also I re-tuned every station by checking them with my twelve-year old son, who would get them on the re-tune, whereupon I would, when required, sharpen the re-tune myself."

Such power, selectivity and ease of control, with three tubes, are attainable only through Erla reflex design, incorporating Erla synchronizing radio and audio frequency transformers.

Guaranteeing the perfect synchronization of received and reflexed currents having the same phase characteristics, Erla transformers enable vacuum tubes to do triple duty, as simultaneous amplifiers of received radio frequency, reflexed radio frequency and reflexed audio frequency currents. For complete details, ask your dealer for Erla Bulletin No. 14, giving Erla one, two and three-tube reflex hookups. Or write direct, giving your dealer's name.

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Federal head sets are but one of the more than 130 radio products which experts endorse because of their sturdy, dependable efficiency.

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1 Vernier.....	1 Potentiometer, 1850 ohm.....	2.20	3 Dry Cells.....	1.35
1 Estru Variometer.....	1 Rheostat.....	1.00	12 ft. sq. brass bus wire.....	.30
1 .00025 Variable Condenser.....	1 Socket Bakelite Base.....	.90	1 Set Readem Bind. Posts.....	.75
1 Variable Grid Leak.....	1 Bakelite Panel 9x14x 1/2.....	2.50		
1 .00025 Mica Fixed Condenser.....	1 DeForest D.V. 6 Tube.....	6.50		
2 .002 Phone Condensers.....				
				TOTAL.....\$35.70

Blue print FREE only with order for complete parts

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1 Tricolor Transformer.....	2.00
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1 199 Socket.....	.90
1 199 Tube.....	6.50
1 Baseboard, 7x9.....	.25
1 7x9x 1/2 Bakelite Panel.....	1.25
1 Set Readem Binding Post.....	.75
2 .002 Micon Fixed Condensers.....	.80
1 Type B. B. Metal Detector.....	1.50
1 Cabinet, 7x9x8.....	2.50
Complete	
OUR PRICE ONLY.....	\$22.45
TOTAL.....	\$26.45

Complete Parts RD 99 Long Distance Receiving Set
(See Radio Digest, September 29th issue)

3 Bakelite Base Sockets.....	\$ 2.25
3 Rheostats.....	3.00
2 A. F. Transformers.....	8.60
2 Double Circuit Jacks.....	1.50
1 Open Circuit Jack.....	.75
1 Estru Variometer.....	5.00
1 Variable Grid Leak and Condenser.....	1.00
1 .0005 Variable Condenser with Vernier.....	6.00
1 .005 Fixed Condenser.....	.75
1 75-turn Yokecomb Coil, mounted.....	1.20
1 Singla Coil Mounting.....	.50
1 Set Readem Binding Post.....	.75
1 Panel Bakelite, 7x16x 1/2.....	2.25
1 Cabinet, 7x16x8, fine mahogany finish.....	6.00
Our price complete with panel drawing	\$30.25
and blue print. ONLY.....	TOTAL \$39.25

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NEUTRODYNE

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Same parts complete with 1 UV-200 and 3 UV-201A Tubes; 3 2 1/2-volt large size B Batteries; 1 Storage A Battery, 110-ampere; Baldwin Head Phones and Aerial Equipment. **\$92.15**

This set would cost you \$181.65 if it was bought ready made.

Crystal Set Complete

With Phones, Aerial, Lead-in Wire, Insulators. An attractive Christmas Gift. **\$8.50**

Price, complete.....

Above Set alone, without Phones or Aerial Equipment..... **\$2.50**

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9x14x8, mahogany finish.....	\$3.25
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MURRAY GIVES TIPS ON LATEST DANCES

FAMOUS COURSE IS BROADCAST FOR RADIOPHANS

Fifth Lesson Is Tango Fox Trot—Repeat First Lesson for Late Dance Listeners

Learn to dance by listening in! Radio Digest has perfected an arrangement with Arthur Murray, nationally known teacher of ballroom dancing, whereby Mr. Murray is broadcasting dancing lessons from WOR, L. Baumberger and Company, Newark, N. J., and a score of other prominent stations. Radio Digest exclusively will give the charts and instructions which apply to the lessons broadcast by Mr. Murray personally at WOR and by the other stations. WOC, WBAP, WNAC, WLW, WLAG, WRW, WHAS, WFL, KPO, CFCF, WSAD, WTAS, WGY, WMC, KDKA, WRC, WGI, WCAE, WHAM, WBZ, WGR, and KYW are broadcasting the series of lessons. The series below may be used in conjunction with the broadcast lessons. The complete course will occupy six lessons, one of which will be given each week. Save the lessons to use with the broadcasts.—The Editor.

LESSON V—THE TANGO FOX TROT

By Arthur Murray

THE new Tango is often referred to as the "Waltz Tango" because of the predominance of old-fashioned waltz steps. It is most important that one should know the real Waltz—not the Two-Step Waltz—before learning the Tango. Everyone who wants to become a really good dancer should know the actual steps in the old-fashioned "round waltz." There is no more important dance today than the real Waltz. It is used very extensively in the Fox Trot and is evident in almost every new variation which makes its appearance.

As stated before, the Tango tempo is the same as the Fox Trot. It is danced to "four-four" time. However, we will not be concerned with technical terms. We will use the simplest method of counting; that of counting the actual steps taken.

Learn Slow and Fast Step Time

In the Tango and Fox Trot, the steps are divided into slow and quick movements. The slow step takes about a second and gets two beats of music. The quick step is twice as fast as a slow step and is given only a half second.

To be sure that you know just how fast to walk, take out your watch and hold it in your hand while walking. Give one second to each slow walking step. Walk around the room for about ten minutes doing the slow steps.

After that, walk around the room, with watch in hand, and do the quick steps, giving a half a second to each step.

Be sure and learn to walk correctly to Tango or slow Fox Trot Music before going further. Go back to the beginning now and review every lesson carefully. The promenade or Corté in the Tango Fox Trot was explained last week in Lesson IV.

(TO BE CONTINUED.)

For the benefit of newcomers and listeners whose stations have just begun the Murray series of broadcast dance lessons, Lesson I—The Cut Step or Chassé, is repeated below.—The Editor.

Cut Step or the Chassé—Man's Part

This step is one of the standard and most popular steps of the Fox Trot and One Step. It is sometimes referred to as the "Cut Step" because on the fourth step

FOLLOW CHARTS FOR BROADCAST LESSONS

Man's Part

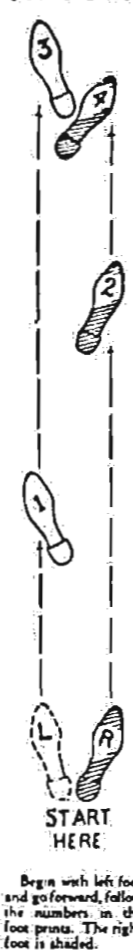


Figure 1

Lady's Part



Figure 2

the man draws his right foot up to the left.

Here is how the step is done: At the "start" stand erect with your heels together. Then—1. Begin with the left foot and step directly forward, taking an ordinary walking step; 2. Walk forward on right foot; 3. Walk forward on left foot; 4. Draw the right foot up to the left, placing weight on right foot. That's all.

Follow the numbers in the foot-steps shown in Figure 1.

If you want to repeat the step, begin with the left foot.

DON'TS FOR DANCERS

By Arthur Murray

Don't advertise the extent of your education by counting aloud.

To find fault with your partner's dancing is the best way of advertising the fact that you are just learning to dance.

Don't clutch your partner's hand as though it belonged to a long lost friend. It really isn't necessary to get a death grip.

The Chassé may also be used in the One Step and the Waltz Canter. At first it is advisable to learn to dance the Chassé to Fox Trot music. After you learn it in the Fox Trot, you will have no difficulty in dancing it to One-Step or Waltz music.

The walking steps in the Fox Trot are long and slow. Each walking step takes a full second. The man generally walks forward so that he can see where to go. If the man dances backward he may collide with other couples.

The Chassé—Lady's Part

The lady's part in the Chassé is just the opposite of the man's part. Start anywhere. Stand erect, with your heels together. Remember that the lady goes backward when the man goes forward.

1. Begin with right foot and step directly backward; 2. Walk backward on left foot; 3. Walk backward (long step) on right foot; 4. Draw the left foot up to the right, placing weight on left foot. That's all.



Arthur Murray and Ann Forrest illustrate first step in Tango Fox Trot

Follow the numbers in the foot-steps shown in Figure 2.

In the Chassé, as in other steps of the One Step and Fox Trot, the lady walks backward. To dance backwards may seem difficult at first, but with a little practice you will find it even easier than going forward.

Although the Chassé may also be used in the One Step and the Waltz Canter, it is most popular in the Fox Trot. Practice it going backward around the room, remembering to take long, slow steps. Each step is given a full second.

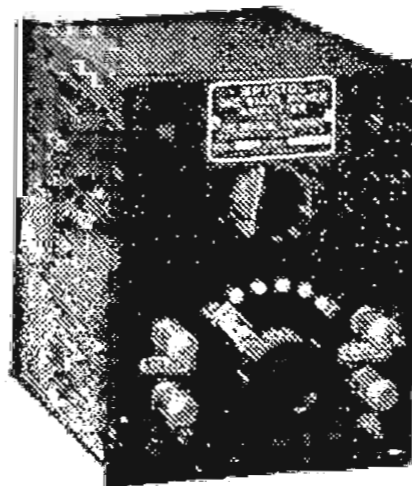
Remember to dance on the toes. Do not let your heels touch the floor.

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Table with columns for Station and City, M-t, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Lists various radio stations and their broadcast times.

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours.

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ACCESSORIES NECESSARY TO COMPLETE SET FOR OPERATION \$49.65 221 A. 5 Bonded tubes \$22.00 222 A. 1 Seaman loud speaker, genuine Baldwin type C unit 12.75 223 A. 4 Columbia or Red Seal A battery 1.60 224 A. 2 45 volt B batteries 9.06 225 A. 1 Set complete aerial equipment 2.00

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To each purchaser of the parts and accessories for the HAZELTINE NEUTRODYNE RECEIVER at the low price of \$97.00 we will, without cost to you, ship a Genuine HANES-ZENER special hand rubbed solid mahogany cabinet. Value \$10.00. Each of the above parts are of the highest standard grade, and carry the HANES-ZENER guarantee and can be purchased separately at our special prices.

Flewelling Circuit Complete List Price Our Price 7x9 Radlon Panel \$ 1.15 .90 23 Plate Var. Condensers 3.00 1.50 3 .006 Mica Condensers 3.00 2.00 C. R. L. Var. Grid Leak 1.85 1.30 Two Coil Honeycomb mount adjustable with knobs 4.00 2.55 50 Turn Honeycomb Coil 1.54 1.00 75 Turn Honeycomb Coil (Mounted) 1.54 1.00 One tube socket 1.00 .40 Klosner vernier rheostat with dial 1.50 1.00 One three-inch Dial (Taper Knob) 1.00 .25 B Binding Posts .80 .40 Baseboard for Mounting .75 .40 Complete Instructions for Assembly and Wiring .50 .50 Regular Price \$21.63 OUR PRICE \$13.20

Reinartz Circuit Complete List Price Our Price Genuine Reinartz Coil endorsed by John L. Reinartz and bearing his signature. The only genuine coil for this circuit on the market. All others are imitations. \$ 2.50 \$2.00 One 7x10x2 Radion Panel 1.25 1.00 National Bakelite Socket 1.00 .40 Klosner Vernier Rheostat with dial 1.50 1.00 Two 23 plate variable condensers at \$3.00 each 6.00 3.00 Switch Points and Nuts .80 .40 Six Switch Stop Points and Nuts .40 .20 Freshman Grid Leak and Condenser 1.00 .65 Seven Binding Posts .70 .35 25 ft. Tinned Bus Bar .50 .30 3 Switch Levers with knobs .75 .35 One Baseboard for mounting .75 .40 One Fixed Phone Condenser .40 .25 One Single Jack 1.00 .25 Blue Prints with complete instructions for assembly and mounting .50 .50 Regular Price \$19.05 OUR PRICE \$11.05

All the necessary screws, nuts and miscellaneous small parts which are necessary to complete the set are included in the above prices. Any part in either of these circuits may be purchased independently at the advertised cut prices.

LOUD SPEAKERS List Price Our Price \$30.00 Music Master \$24.50 \$161.00 Western Electric 10-A \$125.75 55.00 Western Electric 10-D 44.00 60.00 Magnavox Type R-3 51.00 35.00 Magnavox Type R-2 29.50

PHONES List Price Our Price \$6.00 Brandes \$5.25 8.00 N. & K. German 6.50 7.00 Federal 5.50

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CONDENSERS List Price Our Price \$1.80 3 Plate Vernier \$.90 5.00 23 Plate Vernier 2.50 5.50 43 Plate Vernier 2.75 3.00 23 Plate Plain 1.50 2.80 43 Plate Plain 1.90

AUDIO TRANSFORMERS List Price Our Price \$4.50 All American, 3 to 1 Ratio \$3.95 4.75 All American, 5 to 1 Ratio 4.10 4.75 All American, 10 to 1 Ratio 4.10 7.00 Amertran 5.55 7.00 Federal No. 65 5.55

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FOURTH ANNUAL CONTEST
DEC. 22 TO JAN. 10

Valuable Prizes Listed for Best Long
Distance Reception from
European Stations

HARTFORD, CONN.—Amateur transmitting stations in the United States will be enabled to compete from December 22, 1923, to January 10, 1924, in the reception of Radio messages from various stations in Europe, thus effecting the fourth international exchange of holiday greetings.

Under the auspices of the American Radio Relay League, whose headquarters are in this city, stations in France will begin the contest on the night of December 22. British amateurs will transmit on alternate nights. So that the competition may proceed without interference, American amateurs will refrain from transmitting during the twenty-day period named, from 8 o'clock in the evening until 1 o'clock in the morning, Eastern time. Only those amateur receivers tuned most selectively will be able to hear the more powerful foreign amateurs.

American Radio manufacturers will award prizes worth several thousands of dollars to those amateurs whose logs, on examination, will show the best records as to distance. One of the prizes will be a complete four 50-watt tube transmitter, valued at \$1,100, for the highest total mileage reception (without duplication) in a single night.

Control of WSY Shifted to Birmingham Merchants

BIRMINGHAM, ALA.—Station WSY, for some time under the control of the Alabama Power Company, is now being operated by Loveman, Joseph & Loeb, whose department store has been the home of the station since its construction in April, 1922.

The Alabama Power Company designed and built this station and operated it until the present time. The Alabama Power Company's personnel will continue to operate this station until others can be trained. WSY is one of the oldest and most noted broadcasting stations in the South.

CERBERUS OF THEATER IS A FAN



The stage door keeper of the Globe Theater, New York, finds himself lonely at times and beguiles the tedium by listening in to Radio programs he fancies. He looks quite mild and if we call him "Cerberus" it implies neither that as a watchdog he is fierce nor that the door he keeps leads to the infernal regions (though some may think so) © Keystone Views

LISTENING IN FROM WAY UP NORTH

By Vera Brady Shipman

I TUNE in on WSB, Atlanta. The voice of the South says: "Marcelle Stanton Megahee, singing the songs of her father, Frank L. Stanton, Georgia's own poet."

I can see the old man sitting deep in his chair, listening to the plaintive "Just a-Wearyin' for You" and dainty "Sweet Miss Mary." Marcelle's voice witches away the years. Stanton of yesterday lives again.

Plays are the thing now. WOC gave "Little Old New York" in three divisions at 11:30 Monday, Wednesday and Friday

nights, and KYW gave Shaw's "How He Lied to His Wife" the other Friday evening, but the mystery remained unsolved, for while I was trying to find out how he DID get away with the lying, a deafening "bla-a-a" completely annihilated the big moment.

And now here we are on Monday—Chicago's silent night. Let's see what we can get. The November wind is whistling outside. I lift the shade and the moon gleams on the lake before me in chilly beauty. The agile moon fairies dancing on the beams are telling us it is November. Let's tune in on the Radio now. WMC, Memphis, "Down in Dixie," broadcasting the Gayoso Hotel dance orchestra. They are playing "Dreamy Melody"—quite appropriate as I watch the moon through the window!

NEW MICROPHONE, REVUE, MARK KYW

Chicago Station's Glow Device and
Midnight Program Feature
Anniversary

CHICAGO.—The second anniversary of Station KYW, Westinghouse company, of this city was recently marked by the operation of a glow discharge microphone and the establishment of a second weekly midnight revue.

According to its inventor, Dr. Philip Thomas, research engineer for the Westinghouse company, E. H. Moore, electrical engineer for the Chicago Civic Opera company, and Walter Evans, chief engineer, Station KYW, the glow discharge microphone enables broadcasting without distortion. The microphone discharge is in effect a high voltage low current discharge between two electrodes. It is similar to an arc. The new "mik" is being used to pick up the opera at the Auditorium Theater.

The Friday midnight revue of musical comedies has drawn thousands of listeners according to complimentary letters to the station. So popular are the revues that they will be sent on the air not only Friday but also on Tuesday night.

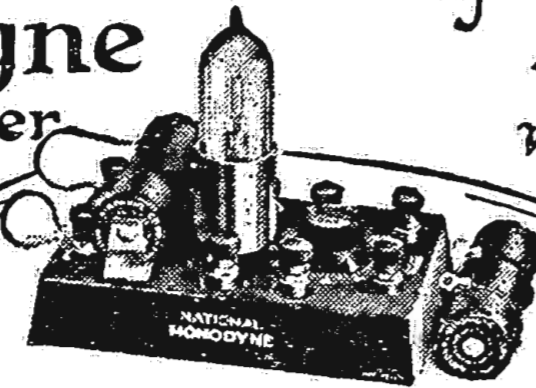
But Monday night I traveled my red-letter distance by Radioplane. A Radio fan is always a wanderer, but seldom goes in all directions at once. But this time I went from Calgary, Can., where Knox College choir requested those listening in who were interested enough to donate to the college fund; then to Fort Worth, where the Agricultural College Glee Club from Stephenville, Tex., was singing "Home, Sweet Home."

And then I tuned in on WHN, New York City, jazzing away at Broadway and Forty-fifth street, and within five minutes I heard KFI, Los Angeles, with a dance orchestral swing. My Radioplane had carried me to the four corners of Radioland, into Canada on the north, and the farthestmost points of Radio broadcasting in United States. I was too excited to realize the hour until I heard Zion City, with its white-robed choir singing "Taps."

I looked out on the lake. The moon was a bit farther on and the trees shaded my beam of light. Midnight was the Time; the north woods the Place, and I was the Girl—listening in.

Say Merry Xmas with a
Monodyne Radio Receiver \$10

Without Tube



NATIONAL
MONODYNE
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MODEL GT-1

An appreciated gift is both useful and enjoyable. When you select a MONODYNE as the gift for your family or friends you make sure of the recipient's gratitude, for its simplicity and perfection.

No technical knowledge is required to operate it.

Distance comes in clear and loud without distortion.

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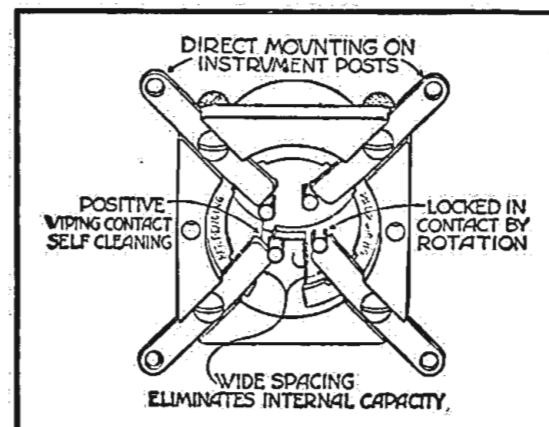
RADIO TALKS

Perhaps the most important thing to remember particularly in the case of those who make their own Radio sets is that they must use high grade apparatus if they are to secure high grade reception. It seems almost an impossibility to overemphasize this particular point. E. J. Flewelling

E. J. Flewelling Sockets

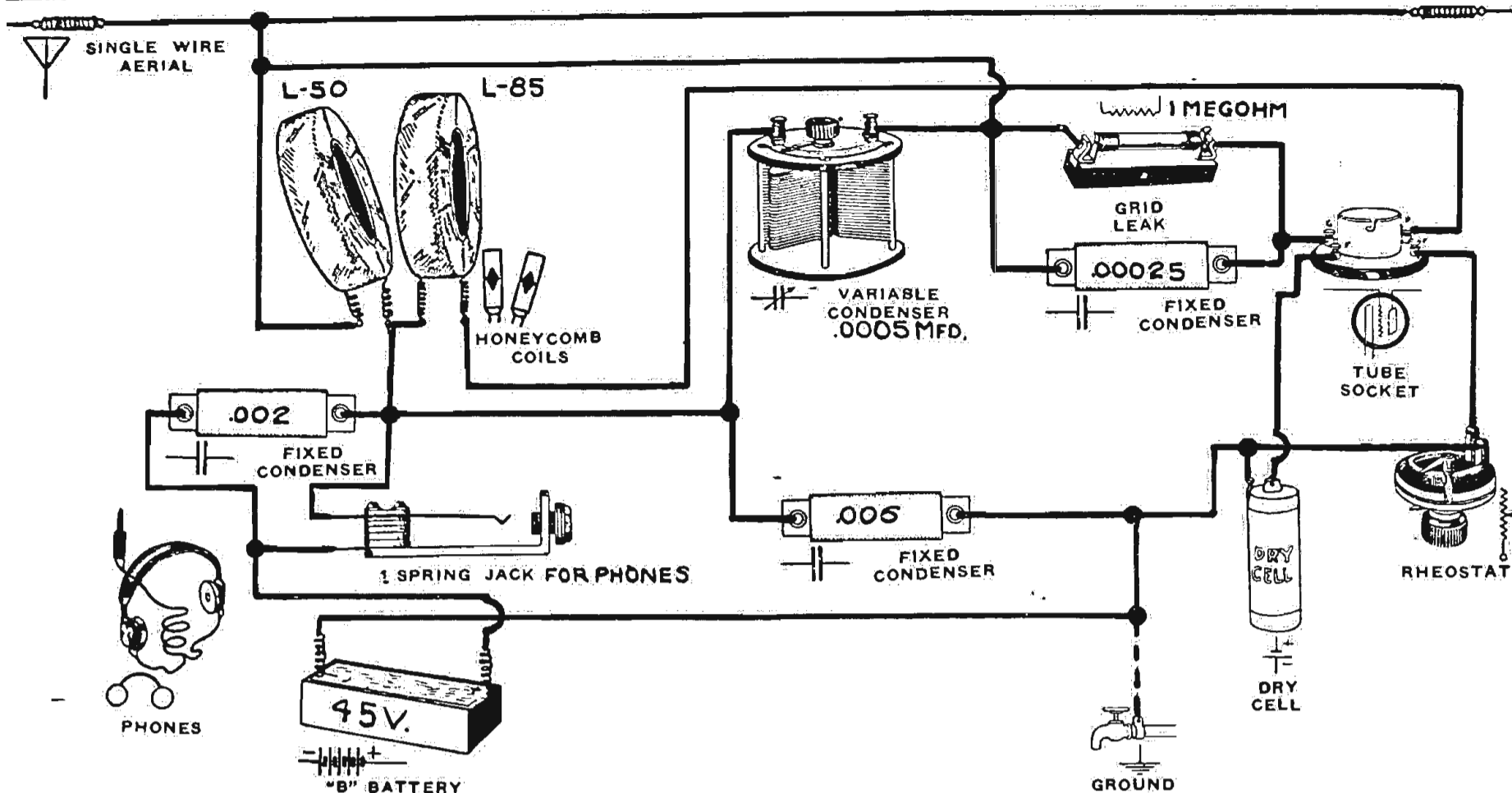
Flewelling Sockets make all sets better and better sets the best. This most efficient socket is designed to give truer tone values, purer volume and eliminate socket noises. [These are frequently mistaken for tube noises where imperfect sockets are used]. It is ideal for the Hetrodyne, Neutrodyne and Radio Frequency circuits. Its efficiency lies in the simplicity of the design—short, direct terminals and positive side contacts on the tube terminals. It is sold at the nominal price of one dollar.

BUELL MANUFACTURING COMPANY
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\$1.00
At your
dealers
or post
paid.

HOOK-UP THAT TAKES HOWL OUT OF FLEWELLING



READ what one Canadian fan has to say about his Flewelling: "This set, which I have constructed, gives me real satisfaction; when properly handled in tuning it does not whistle, squeal or howl, and has practically no body capacity. Its receiving range is from 800 to 1,000 miles. I can listen to programs broadcast from Dallas, Texas, quite nicely, which is about 1,250 miles from Toronto. With two honeycomb coils of 50 and 85 turns its range in meters is wide enough to cover all broadcasting stations up to 600 meters. Without filament ground it will reach up to 500 meters, but when I ground the filament circuit, the range is from 360 to 600 or more meters. Only those two coils are necessary.

"The tube I use is the smallest of our Canadian peanut tubes. As a dry cell tube I think it is equal to any other on the market. From 22 to 40 volts on the plate is sufficient. The set is wired with No. 12 bus wire, except the filament circuit, which has No. 14 round. No insulation is used. The panel is lined with copper foil and grounded. As a result there is practically no body capacity.

"Outside of static, the set operates without a whimper. My idea is that if a set whistles, it wants something it hasn't got, and if it howls it has too much of something else. The tuning is done with the vernier condenser and all vernier rheostat. Distant stations come in with good

volume, loud enough for phones. The antenna is 90 feet long, including lead in; single wire and 30 feet high. The binding posts for the batteries are at the back. Only three posts are on the front, two for the phones and one for the antenna.

"It is probable that with a 'hard' tube and high plate voltage greater volume would result, but I doubt whether it would reach any farther. The diagram shows the layout of my set as seen from the back. The only new thing about it is the filament ground. When the ground wire is clipped on the filament post the tube will stand more current without 'spilling' and so get better volume."—Hector McDonald, 84 Greenlaw Ave., Toronto, Can.

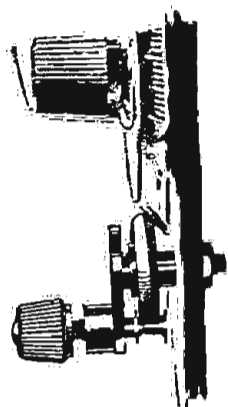
Testing Receiving Set for Right Connections

To make sure that the B battery current has not been routed through the filament in any way, connect your A battery to the binding posts intended for the B battery and turn on the current. To make the test complete, short the regular A battery binding posts with a small piece of wire and then turn the rheostat to the full "on" position. If the filament does not light up, the wiring is correct and you are ready to hook up the B battery with safety. If any signs of life are seen in the filament you had better track your hook-up. In using this method you are only putting the normal voltage through the filament and no harm will result.—Laurence Hercher, Dillard, Ore.

TINY-TURN

A New and Superior Vernier Control

TINY TURN makes possible an exactness in tuning never before attained. It has a 30 to 1 gear ratio instead of only 4 or 5 to 1 as in the ordinary vernier. No lost motion! The vernier turns in the same direction as dial. It can be instantly disengaged, leaving dial free. TINY TURN provides a continuous vernier adjustment over the entire range of the dial. When you desire, you can pass from one station to another by a continuous rotation of the vernier knob, without touching the dial at all. TINY TURN can be INSTALLED ON ANY SET IN 3 MINUTES. Handsome nickel and black finish. Packed in individual containers. We furnish counter display demonstrating boards.

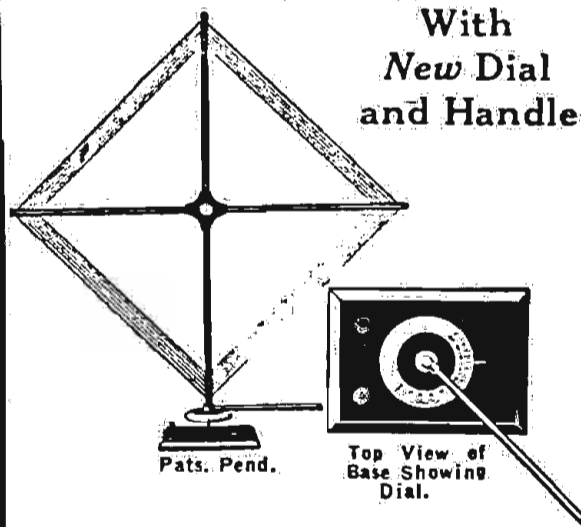


Pats. Pend. Side View showing friction drive against dial.

PRICE 75 Cents

DUO-SPIRAL

The Leading Loop Aerial With New Dial and Handle



Pats. Pend. Top View of Base Showing Dial.

Careful tests of all available loop aerials by leading manufacturers and radio engineers has proved the superiority of the DUO-SPIRAL Loop. It is used exclusively by the largest manufacturers of radio frequency sets. It has many advantages over other forms of antenna for all radio frequency circuits, such as the Neutrodyne, the Reflex, the Super-Heterodyne, the transformer coupled circuits, etc. It is trim and neat in appearance and handsomely finished. It rotates freely on its base. Adjustment is made easy by handsome dial and a long handle which eliminates body capacity effects. The green double silk covered wire is kept always taut by hidden springs. The DUO-SPIRAL loop completely replaces roof antenna and ground and practically eliminates static.

24" Size \$8.50 - 12" Size \$7.50 (These prices include NEW Dial and Handle.) The above products (folders on request) are sold through dealers and jobbers. If your dealer cannot supply you, write us direct.

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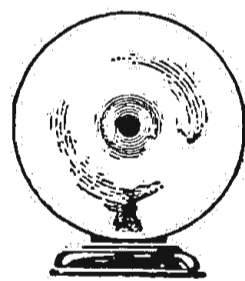
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Guaranteed Goods at "Lower-Than-New York" Prices!



VICTOGRAND

A loud speaker as faithful in its reproduction as it is beautiful in appearance. Black and gold. No extra parts or batteries needed. **\$9.95**

DIALS

De Forest type with brass bushing and clear, readable numbers.
4-inch45c
3-inch23c
2½-inch18c
2-inch (rheostat)16c



MARKED POSTS

Binding posts with engraved heads make connecting easy and prevent mistakes. These posts are clearly marked. Set of eight... **40c**

JACKS

Single and double circuit with a special insulator strip that makes short circuits impossible. Highly nicked and packed with two washers... **34c**

PLUGS

Either the round or the flat type. Well made, sturdy brass parts that insure good contact... **42c**



SAVE ON TUBES

These genuine Supertrons are exceptionally sensitive and will oscillate in all circuits.

SUPERTRON
Type WD 12 (silvered).....**\$2.98**
SUPERTRON
¼ ampere type.....**\$3.98**

NEUTRODYNE

The Neutrodyne is the circuit of today. It is supreme when it comes to distance.

We are featuring a set of complete Neutrodyne parts, all genuine and licensed under the Hazeltine patents, complete with Neutrodyne transformers, condensers and all: All the parts for the five tube set, complete with panel.....**\$25.97**

BRUNSWICK SPECIAL

6½ to 1 Audio
This transformer has a specially impregnated coil. The special construction makes distortion almost zero.....**\$3.49**

KRONEFONES

A very sensitive well made headset. These phones are easily worth more than the special price of.....**\$2.95**

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The catwhisker eliminated. This is a highly sensitive detector in which crystal touches crystal. Glass enclosed.....**\$1.00**

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22½ VARIABLE
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ALL FRESH AND TESTED

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Moulded endplates and a unique tension holding adjustment which keeps the plates in line.
43 Plate\$1.45
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VERNIER CONTROLS

You can make any dial a vernier with one of these controls. Attached to any panel in a minute. Great for DX work..... **29c**

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A little device that will protect your tube against being blown out by accident or careless usage. State type of tube when ordering... **25c**

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Mounted on pure Bakelite De Forest type plugs. Correctly wound.
No. 35\$.85
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Further Details of the Famous Miloplex Hook-Up

Part XI—King X or the Christmas Circuit

By the Mystery Man

WERE you looking for me at the Chicago Radio Show? Yes, but did you find me, that's the big question? Certainly I was there from high noon until the last dog was hung, and Maggie tagged me most everywhere—hain't she the jealous cat—suppose she was scared that maybe I'd be discovered and she wouldn't know who did it.

Anyway, many times I stood right next to your left ear carefully listening to you cuss and discuss the King, and from the general remarks, you many, who are making the King do some transcontinental stuff, were certainly tickled enough to see that I kept on eating, while you who cussed, saw the set at the Digest's booth and possibly now know where you slipped. Atta boy! Now go home and revamp it and have it saying "Hello" to you.

The Christmas Circuit Ready

The Christmas circuit is now ready, but I want to try it out on the dog first; then will spring it—anyway it will be in your hands for Christmas. So beware!

Whadaya mean, I haven't got a dog? Quite so, quite so; I didn't have one for the very personal reason that I couldn't ask a dog to enter flat A and take a chance on starving, when I was ever on the ragged edge. But three times regular at the feed bag is my daily schedule now, and something left in the "Kitty." Therefore I bought a dog—one of those of the "hot dog" type with an aperiodic antenna tail. The first night from 6 to 8 he

broadcast on a very low wave, but from midnight on, the poor cuss didn't seem able to control his regeneration and howled the long night through. Next morning I decided to give him a real dog name like "Shep" or "Fido," but Maggie hogged in, and as a result if he wants to eat, it's his job to say "present" when Maggie hollers "Howler." But watch this baby, because I'm going to train him to retrieve circuits, and methinks he will bring in a few good ones that will please you.

You know, this finding a name for a new circuit is just as easy as finding last week's newspaper, and as certain of being the correct name as calling Bay View 005J, asking for Mabel and wondering who'll answer.

Seeing as how everyone now seems to be spelling Christmas with an "X," methinks I will call the Christmas circuit King X, so there you are; and I suppose while Maggie is crowning me for the selection, "Howler" will also take out his pound of flesh.

Other Circuits to Come

It is my intention to keep all of you busy on a few circuits which I will release from time to time, and while the King no doubt will still remain the true

King of all, yet each of them will or should allow you to get a real kick out of them.

Supposin', for instance, modifications or improvements on some of the A B C types of circuits you all know, but which you wish you could do more and better stunts with . . . Oh, yes! I have it! When Ma and Pa get peeved just because they only have one pair of phones and both want to listen—each, by hek, at one and the same time—why not give them a single tube hand talker that will keep them both smiling and bring in the "old

songs" on a small loop. Very well, let's do anything to keep peace in the family! Therefore this is a timely notice that the Ma-Pa circuit will follow the King X; of course just because it may DX a mile or two you fan—will try to keep Ma and Pa from listenin' in. Sat yo' self, at any rate supposin' we do thl.

Make it a Merry Xmas; build a single tube, you fellows who can afford it and give it to a "shut-in"; then you'll both have a Merry Xmas and the shut-in will thank you a thou' and time.

(TO BE CONTINUED.)

SPECIAL OFFERS

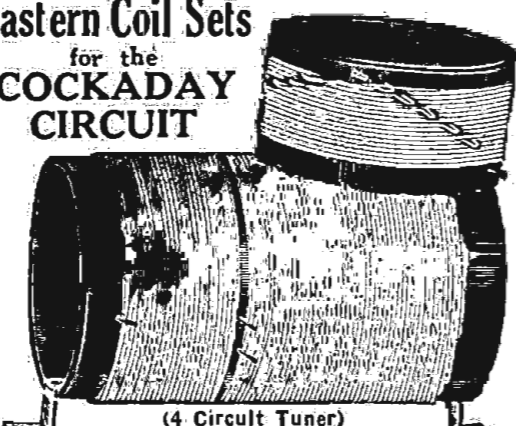
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4 Tube Set \$41.79
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- \$ 1.75 22½ V., small \$.70
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 - 13 plate Vernier Condensers, AMSCO 2.65
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 - 1.75 Potentiometer, 400 ohms, AMSCO90
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Complete Assembled Set of B, C and D Coils \$2.75

Hook-up directions and material list furnished free with each set of coils.

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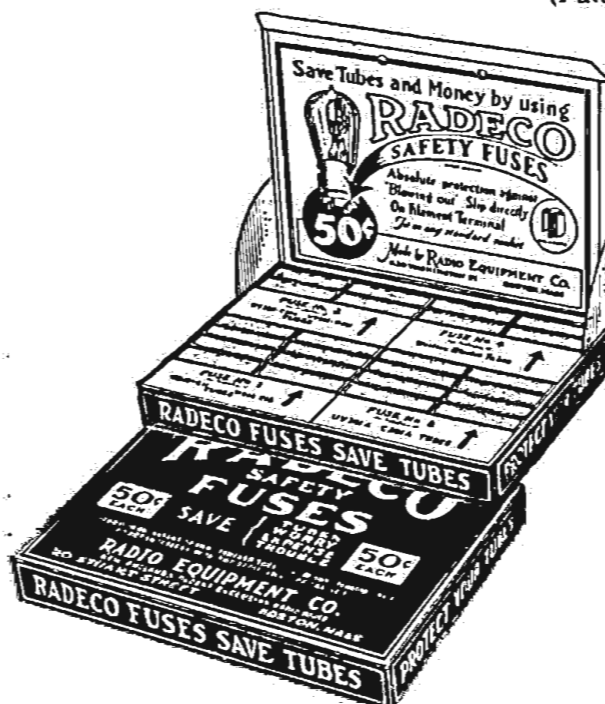
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The merit of the fuses, their low price and our extensive advertising have created a ready sale.

Up to now these fuses have been sold direct by mail, but the demand is so great that we want to distribute them in larger units through the trade channels. You will find Radeco Fuses a profitable item to add to your stock.

To assist you in handling them, we have made up attractive display boxes in colors containing an assortment of two dozen fuses.

Price per box (2 dozen fuses)
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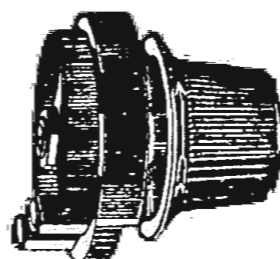
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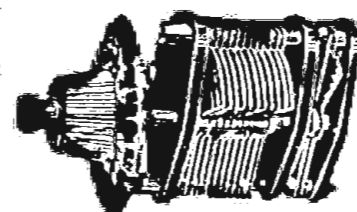


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"THE BEST FOR LESS"



FLEWELLING CIRCUIT

EVERY PART COMPLETE

2 honeycomb coils, 1 2-coil mounting, 2 coil plugs, 3 .006 condensers, 1 variable grid leak, 1 grid leak, 1 23-plate .0005 MFD. variable condenser, 1 Vernier rheostat, 1 tube socket, 8 binding posts, 20 feet bus bar wire, 1 3" dial and 1 high grade panel ALREADY DRILLED as per Diagram in Booklet of instruction sent free. **\$11.95**

Two-Stage Audio Frequency Amplifier—Parts complete in every detail for this Circuit—\$11.00 Specify type of tubes you intend using

CONDENSERS

- 3 Plate Variable; value, \$1.75 \$1.05
- 11 Plate Variable; value, \$2.50 1.20
- 13 Plate Variable; value, \$2.50 1.20
- 17 Plate Variable; value, \$3.50 1.95
- 23 Plate Variable; value, \$3.50 1.35
- 43 Plate Variable; value, \$4.50 1.95
- 13 Plate VERNIER; value, \$5.50 \$3.75
- 23 Plate VERNIER; value, \$6.00 4.00
- 43 Plate VERNIER; value, \$6.50 4.25

- Honeycomb Coils, 50 turns mounted \$.95
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- Filament Rheostat, 6 ohm65
- Filament Rheostat, 20 ohm80
- Filament Rheostat, 50 ohm90
- With 2" Dial, 15c extra.

AUDIO FREQUENCY TRANSFORMER—
Designed for use with W. D. 11
Tubes, list, \$4.50; price **\$2.75**

BALL BEARING INDUCTANCE SWITCH—
value, 75c; special \$.25

V. T. SOCKETS—Nickel, brass sleeve, composition base; value, \$1.00; special at40

EXTRA SPECIAL—Telephone 3000 Ohms Headsets; \$9.00 value; reduced to 3.50

Vernier Dial Adjuster, List, 35c; special25

REINARTZ CIRCUIT

EVERY PART COMPLETE

1 Reinartz wound coil, 1 tube socket, 1 rheostat, 1 23-plate .0005 MFD. variable condenser, 1 13-plate .00025 MFD. variable condenser, 3 inductance switches, 23 switch points and nuts, 6 switch stops and nuts, 8 binding posts, 2 3" dials, 1 variable grid leak, 1 .002 MFD. phone condenser, 23 feet bus bar wire, 1 high-grade panel ALREADY DRILLED AS PER DIAGRAM and complete instructions **\$10.95**

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BEST QUALITY JACKS, Single Circuit;
value, 65c; special at \$.30
Double Circuit; value, 90c; special at45

MULTIPLE POINT INDUCTANCE SWITCH
with Knob and Dial (15 Switch Points) \$1.25

LIGHTNING ARRESTERS approved by underwriters90

THREE-INCH DIALS—Unbreakable—heat resisting composition—high finish; special30

TWO-INCH DIALS—Same design—for rheostats and potentiometer; special at \$.25

TELEPHONE PLUGS60

FRESHMAN VARIABLE RESISTANCE LEAK and MICA CONDENSER Combined.75



A Radio Set for Christmas—what other gift can offer even half the enjoyment and lasting pleasure? By building a set yourself you save considerable money. And besides, it's lots of fun and not a bit hard. Our service department will be glad to give you any information you need. Just drop us a line.



Every article advertised above is guaranteed by the manufacturer and by us—Mail orders filled immediately—transportation PREPAID on all orders of \$5.00 or over east of the Mississippi River. Send cash, check or money order—absolutely no goods sent C. O. D.

MANY BRILLIANT FEATURES MARK

These Stories Will Aid Opera Listeners

STORY OF MONNA VANNA, WMAQ, DECEMBER 11

NO DOUBT you are familiar with Maeterlinck's play *Monna Vanna*, and so know the story of this opera. The drama takes place in Italy during the middle Ages. A powerful town is being besieged. Prinzivalle, the captain of the foreign troops, demands that *Monna Vanna*, the wife of Guido, the leading prince, be brought to his tent clothed in nothing but her cloak. For this personal sacrifice the townspeople will be saved. Guido is enraged because she goes and will not believe that she is innocent when she returns. Discouraged by his jealousy and disbelief in her, *Monna Vanna* runs away with Prinzivalle.

STORY OF OTHELLO, KYW, DECEMBER 13

OTHELLO is also the story of a jealous husband. The ruin that overtakes Othello, the Moor, a general in the Venetian army, is brought about by the cunning suggestions of Iago, an ensign. He begins his scheming by getting Cassio, a trusted lieutenant drunk and brings about a brawl which makes it necessary for Othello to deprive Cassio of his command. Iago gradually works upon Othello until the Moor believes that Desdemona his wife is untrue to him, and that Cassio is the guilty man. At last in a jealous rage Othello strangles his wife. Too late he learns that Iago has woven a web of lies to deceive him. Although at the height of his political power, Othello stabs himself.

—THE PROGRAM LADY.

Tuesday, December 11

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Dinner concert, Geaf's Orchestra of N. Y.; 7:30, "The Key to the Gift Puzzle—Books that Will Please Children," Herbert Askowith, former instructor in English in Eng. Lit. at Harvard; 7:45, "A Reception Babouska," children's party; 8:15, "A Reception by the Archbishop of Canterbury at Lambeth Place, Dr. John Jay Ewers; 8:30, Amanda Vierheller presents students; Corinne Gerstner, Jean Woodford, Wilhe, Bertha Gundelfinger, Hetty Bell, Carl Ruhe, Blanchard Wiester, Robertson Tiltout, William Hasselman, Olive Nevin, Chaucey Parsou, Gladys Ramanoff, Ruth Scanlon, Thelma D. Barbin; 11:30, Special concert, Queen City Serenader. 4:59; 6:45-7:30 p. m., KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Musical program, Emma M. Bartlett, chairman public school music; State Federation of Clubs; 10:00-11:00, Vocal and instrumental concert by Neany and Nels.

KGW, Portland, Oregon (Pacific, 492), 3:30 p. m., Jeannette F. Carmer, home economics editor; 8:00, Talk for farmers, Paul V. Maris; 10:00, Dance music, George Olsen's Metropolitan Orchestra. 12:30-1:15 p. m., KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Margaret F. Melrose, soprano; Alce Lee Wiley, pianist; 2:30-3:30, Weekly visit of the "Sandman"; 6:45-7:30, Program, arranged by Whittier Chamber of Commerce, "The Fundamental Concepts of Science," John C. Shedd; 10:00-12:00, Art Hickman's Orchestra.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Harry Gray, baritone; Virginia Williams, pianist; B. M. Goodsell, violinist; Address, L. M. Watt; 11:00, Dance music, Silverman's Orchestra.

KYW, Chicago, Ill. (Central, 539), 11:35 a. m., Children's bedtime story; 6:30, Herbie Mintz, pianist; "Sen Kaney," specialty act; Chicago Musical College; 10:00-12:30 a. m., Late show.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Farmers' period—Talk by a member of the Mass. Agri. College; 7:30, Twilight tales for the kiddies; "Social Values in the Home," Agnes H. Craig; 8:00, Hayden Male Quartet; 9:00, Bedtime story for grown-ups, Orison S. Marden; 11:00-12:00, WJAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Edna Finestone, pianist; 7:30, Bedtime stories, Dream Daddy; 7:45, Dramatic review, Walter Greenough.

WEAF, New York, N. Y. (Eastern, 492), 11:00-11:20 a. m., Program by Y. M. C. A.; 11:20-11:50, Board of Education; 4:00-4:30 p. m., Mildred Langworthy, lyric soprano; 4:30-5:00, George Blundon, baritone; 5:00-5:30, Christmas program for children; 7:30-7:40, Thornton Fisher's Sport Talk; 7:40-8:00, Gertrude Peterson, contralto; 8:30-8:45, American Museum of Natural History; 8:45-9:00, John A. Spooner, tenor; 9:00-9:15, American Surety Co.; 9:15-9:30, California Rambler Orchestra; 9:30-10:30, Eveready Minstrels.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., DeWitt McMurray; 8:30-9:30, Musicians and specialty performers at the Jefferson Theater; 11:00-12:00, Mrs. Albert L. Seales with assisting musicians.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer-Davis Bellevue Stratford Orchestra; 3:00, Loreta Kerk, pianist; 5:30, Meyer-Davis Bellevue Stratford Orchestra; 7:00, Message from "Snowball"; 8:00, Strawbridge and Clothier radio players in one-act playlet.

WGI, Medford Hillside, Mass. (Eastern, 360), 12:00 m., Edison Laboratory Phonograph, and Ampico in the Chickering; 3:00 p. m., Amrad Women's Club Program "Talk," Ida Bailey Allen; Descriptive music, Chickering & Sons; "Books as Gifts," Herbert Askowith; 7:00, Concert, Winchester, Laundries' Orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Elise de Grood, violinist; 6:30-7:30, Vincent Lopez Dance Orchestra; 7:30, Digest of day's news; Topics of scientific interest.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "Christmas Ribbon Notes," Modern Friscilla; 7:45, A talk on outdoor life, Jud Landon; 8:00, Program, Albany Community Chorus, Frederick J. Clinnick, cornetist; John Dick, baritone; Margaret DeGraft, harpist; Ruth G. Woodin, violinist; Louise B. Haefner, contralto.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; Four-minute talk on Household Economics; 7:30-9:00, Al Gorman's Novelty Orchestra, Al Gorman, pianist; Henry Miller, saxophonist; Cliff Gorman, banjoist; Homer Muth, trombonist; Hubert Elkins, drummer.

WNN, New York, N. Y. (Eastern, 380), 3:45-4:15 p. m., William A. Tyler's Orchestra; 4:45-5:30, Tangoland Serenaders; 9:30-10:00, Charles Hathaway's Orchestra; 10:15-10:30, Bob Molinari's Orchestra; 10:45, "What Shall We Do With America," Hon. Milton W. Satorn; 11:00, Shapiro Bernstein; 11:30, Billy Berkes, baritone; 11:45, Ernest Graepel and His Castles House Orchestra.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Organ recital, Karl Bonawitz, Germantown Theater; 3:00, George Kelly and his record-recording orchestra; 6:05, Dick Regan and His WIP Little Symphony Orchestra; 7:00, Bedtime stories, Uncle Wip; 8:00, Dramatic review, Elliott Lester, Charlie Kerr and his orchestra from St. James Hotel.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Program arranged by the Cleveland News-Leader; Bedtime story and Santa Claus in Toyland, E. G. Johnson.



On Monday, December 17, Elmina White, the lady at the extreme left above is going to broadcast a talk on the "National Boys' and Girls' Club Congress," from Station KFAE, Pullman, Washington. Other educational lectures will feature the same evening



Here we see, at mona" in Verdi's immortal drama; sisters, who enter Chicago, every charming Claudia Vanna," Masterpiece, with music hear the famous on December

son; 7:45, Nell Stannard's Dance Orchestra; 8:00, The Martha Lee Club Players will present a one-act playlet, "Food," Cast: Mercedes Fulton, Patrick Murphy, Frank Dronberger; 8:20, Stannard's Orchestra.

WIAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m., 2 a. m., Dagny Jensen, soprano; Roy Bernhardt, pianist; John Goodney, violinist; James Polteak, pianist; Oriole Orchestra.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Current topics for women; 10:00, Thomas Scalise, violinist; Oliver Plunkett, tenor; Robert Campbell, pianist; May Stober, lecturer Hawaiian music; George Webb and His Hawaiian Entertainers; Native songs, Royden Susumago; Elmer Aichele Novelty Dance Orchestra.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Glenn Dillard Gunn School of Music; "The Value of National Theaters," W. M. Smith; Czechoslovakian program; 7:45, Mrs. Max E. Oberdorfer, announcer; "Monna Vanna" opera at the Auditorium Theater by Chicago Civic Opera Company, opera in French, music by Fevrier, libretto after Maeterlinck's *Monna Vanna*, three acts; Cast: Guidig, George Baklanoff; Monna Vanna, Claudia Muzio; Marco, father of Guido, Edouard Cotreuil; Prinzivalle, Fernando Anseau; Vedio, Jose Mojica; Envoy from Florence, William Beck; Borso, Jean de Keyser; Torello, Ermogildo Morato; Conductor, Eugenio Polacco.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Mazda Grotto Lodge, Honorable G. P. Newbern, announcer; 11:00, Midnight Frolic, A. T. O. Quartette, Gerald Webb, leader.

WOAW, Omaha, Nebraska (Central, 526), 9:00-11:00 p. m., Program, Omaha Business Woman's Club, West Sisters Quartet; Inna Clov, harpist; Mrs. Verne Miller, contralto; Helen Sommers, violinist; Belle Von Mansfield, cellist; Jessie Towne, pianist; "Business Women," Grace Roberts, Gail Hamill, whistler; Leona Tricam, saxophonist; Mrs. Laycock, soprano; Miss Black, alto; Lillian Holloway, saxophonist; Mrs. Tedrow, soprano; Fern McCorey, reader; Club Chorus; Betheme Pcasley, reader.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Influenza," A. G. Hinrichs; 5:45, Chimes.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00-12:55 p. m., Wanamakor Crystal Tea Room Orchestra, Robert E. Golden, director; 5:15, Organ recital, Mary E. Vogt.

WOR, New York, N. Y. (Eastern, 405), 6:15 p. m., Icicle; 6:30-7:30, Man in Moon; Andrew May, baritone.

Wednesday, December 12

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:30 p. m., Pittsburgh Athletic Association Orchestra; 7:30, "The Key to the Gift Puzzle—Books that Will Please Children," Herbert Askowith; 7:45, John Martin's Evening with the Children; 8:15, "The Advantages of Medical Inspection in Public Schools"; 8:30, KDKA Symphony Orchestra; Will A. Rhodes, tenor.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "The Need of Preparation for a Vocation," Dr. Hamilton; "Buy Eggs by Weight and Quality Tests," W. D. Buchanan; "Business Opportunities Through a Knowledge of Spanish," Prof. F. C. Chalfant; "Farm Women in National Affairs," Maud Wilson.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Stories of Detective Life, Detective Nick Harris; 10:00-11:00, Instrumental concert.

KGW, Portland, Oregon (Pacific, 492), 3:30 p. m., Children's program, music by children, story by Aunt Nell; 8:00, Webber's Junior Orchestra; 9:00, Business talk, James Albert; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Music; 2:30-3:30, Matinee musicale; 6:45-7:30, Harmonica contest, auspices of "Uncle Remus"; 8:00-10:00, "A Day On the Old Plantation," presenting Uncle Remus and Company; 10:00-12:00, Art Hickman's Orchestra.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Aberg's Concert Ensemble, Arne Arneson, violinist; 11:00, Hotel Statler Dance Music.

KYW, Chicago, Ill. (Central, 539), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:58, Wendell W. Hall, KYW's music maker; "Sen Kaney," specialty act; Sallie Menkes, pianist; 9:15, Sport talk, Field & Stream; "Clubs, Spades and Wood"; 9:15, Reviews of the latest books, Llewellyn Jones.

PWX, Havana, Cuba (Eastern, 400), 8:30 p. m., General Staff Band of the Cuban Army.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, "Broadcasting," last lecture in the Radio Course, Edward H. Goodrich; 7:30, Twilight tales for the kiddies; "The Farmers' Job Feeding New England—Our Breakfast Eggs," Samuel C. Hood; Story for Grown-ups, Orison S. Marden; 11:00, Program of Chamber of Music, WBZ Quintette, Minnie Bagg, soprano.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 4:30 p. m., Talk, "Care of Children," Mrs. Louis Love; 7:30, Bedtime stories, Dream Daddy; 8:00, Overture, Stanley Theater, Joseph Pasternach, director; 10:10, Howard Lanin's Dance Orchestra from Arcadia Cafe.

WEAF, New York, N. Y. (Eastern, 492), 11:00-11:20 a. m., Columbia University; 11:20-11:50, N. Y. Tuberculosis Assn.; 4:30-5:00 p. m., Helen Felch Gregory, soprano; 5:00-5:30, Christmas Program for Children; 7:00-7:30, United Synagogue of America; 7:30-7:40, Thornton Fisher's Sport Talk; 7:50-8:00, American Agriculturist; 8:00-8:15, Florence Gilmour,

soprano; Bella Gerard, contralto; 8:15-8:30, Tolleson Trio; 8:30-8:45, National Surety Co.; 8:45-9:00, Chof of St. John's Episcopal Church; 9:00-9:10, Board of Education; 9:10-9:20, Florence Gilmour, Bella Gerard; 9:20-9:45, Tolleson Trio; 10:30-10:40, Herbert Askowith's Talk on Books.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Address, Judge Eugene B. Muse.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer-Davis Bellevue Stratford Orchestra; 6:30, Meyer-Davis Bellevue Stratford Orchestra; 7:00, Message from "Snowball".

WGI, Medford Hillside, Mass. (Eastern, 360), 12:00 m., Edison Laboratory Phonograph, Ampico in the Chickering; 6:50 p. m., Message to Camp Fire Girls, Charles W. Casson, "Big Smokem"; 7:15, "This Week's Judge"; 7:20, "Science Up to Date"; 7:30, Essay, David McGregor, Cheney; Evening's Musicale; 8:30, "Books as Gifts," Herbert Askowith.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Elise de Grood, violinist; 6:30-11:30, Vincent Lopez Dance Orchestra; 7:30, Digest of the day's news; 9:00, Concert, direction of J. P. Quinn, featuring the Hawaiian Quartette.

WGY, Schenectady, N. Y. (Eastern, 380), 6:30 p. m., "Adventure Story," Youth's Companion.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; Four-minute talk on Household Economics; 7:30-9:00, Concert, auspices of Mrs. John E. Harmon, Jr.; Reading, An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 380), 4:00-5:00 p. m., "The Washingtonians," from The Hollywood; 7:30-8:00, Clover Gardens Orchestra; 9:15-8:30, Music Students League; 8:45, Ayla Skere, double voiced entertainer; 9:00-9:15, Edward B. Marks Music Co.; 9:30, Ross Fowler & Ethel Bell; 11:30-12:00, S. Jay Kaufman and his celebrities.

WIP, Philadelphia, Pa. (Eastern, 509), 5:05 p. m., Jordan Lewis Dance Orchestra; 7:00, Bedtime stories, Uncle Wip.

WIAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m., 2 a. m., Florence K. White, soprano; Lorrin Pettit, saxophonist; Louise Beatty, violinist; Richard Jones, pianist; Oriole Orchestra.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Vesper program for shut-ins, Wurlitzer Concert Company; William Asprunger, reader; Mrs. William Dunning, pianist; Mrs. O. B. Kaiser, Mrs. C. A. Reburn; 8:00, The 10th Infantry Band, Ernest Fischer, director; "Revolution," an Impressionistic Radario, Crosley Radarians; 8:45, Concert, Walnut Hills Music School; 9:25, 10th Infantry Band.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Cosmopolitan School of Music; 7:00, Georgene Faulkner, the Story Lady; 7:30, Weekly lecture from Northwestern University; Speech, Senator Essington; 8:30, WMAQ Orchestra; 9:00, Hotel LaSalle Trio; 9:15, Program, Thomas N. MacBurney.

WNAE, Boston, Mass. (Eastern, 278), 4:30-5:00 p. m., Ruth H. George, contralto; Grace Brown, accompanist; 6:00, Bed Time Stories; 8:00, Lunel Entertainers; 9:00, Elizabeth Mackay Bishop, soprano; Leroy Goodwin, tenor; Winnifred Douglass, reader; Harold H. Hodges, baritone.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Edema and Its Causes," Clyde G. Kern; 6:30, Sandman's Visit; 8:00, Program by the Spanish-American War Veterans, commemorating 25th Anniversary of peace with Spain, talk, Col. O. C. Smith; 10:00, Nellie E. Robertson, contralto; Ida Apple-Springborn, pianist; Frances Brandt, violinist; Mabel Appel, cellist.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00-11:30 a. m., Organ recital, Mary E. Vogt; 12:00-1:00 p. m., Wanamakor Crystal Tea Room Orchestra; 5:15, Organ recital, Mary E. Vogt; 7:45, Adelphia Hotel Orchestra; 8:30, Monologue, Ralph Braham; 9:30, Organ recital, W. R. New York, N. Y. (Eastern, 405), 3:30 p. m., Murray Wachman and assisting artists, "Bits of Song Hits"; 6:15, Icicle; 6:20, Leonard Curcis, banjoist; Reginald F. Schury, pianist; 8:00-11:30, "Kaznor," (Singing Society), program, Hebrew Folk Song; Arthur Murray Dance Lesson; Pullman Porter Band and Broadway Ltd. Quartet.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Concert program of vocal and instrumental numbers by favorite artists and the WTAM Orchestra.

Thursday, December 13

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Grand Symphony Orchestra; 7:30, Weekly chat with the farmers, Frank E. Mullen; 7:45, Uncle Remus has a story for the children; 8:15, Address for the farmers; 8:30, Mrs. J. E. Martsoff, soprano; Mrs. V. J. Cooper, soprano; Mrs. A. L. Bingham, alto; Mary Geer, alto; Katherine Keach, reader; 11:30, Special late concert.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "The Value of Good Lighting," Dean H. V. Carpenter; "Books for Christmas," A. L. Webb; "Official Testing of Dairy Cattle," E. V. Ellington; "Winter Care of the Dairy Cow," Don G. Magruder.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert thru courtesy of the local Y. M. C. A.; 10:00-11:00, Vocal and instrumental concert.

KGW, Portland, Oregon (Pacific, 492), 8:00 p. m., Dramatic programs, Doris Smith; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Music; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's program, Bedtime story by "Uncle John"; Hattie Mueller, composer-pianist; 10:00-12:00, Art Hickman's Orchestra.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m.,

Odeon concert, St. Louis Symphony Orchestra; Helen Traubel, soprano; Rudolph Ganz, conductor.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna Peterson; 6:50 p. m., Children's bedtime story; 8:00, "Othello," opera at the Auditorium Theater by Chicago Civic Opera Company, opera in Italian, music by Verdi, libretto after Shakespeare's play Othello by Boltz, four acts; Cast: Othello, a Moor, general in the Venetian army, Charles Marshall; Desdemona, wife of Othello, Rosa Ralska; Iago, Othello's ensign, Giacomo Rimini; Emilia, wife of Iago, Maria Claessens; Cassio, his lieutenant, Jose Mojica; Roderigo, a Venetian gentleman, Ludovico Olivero; Lodovico, ambassador of the Venetian Republic, Alexander Kipnis; Montano, predecessor of Othello in the Government of Cyprus, Alfred Gaudoh; Herald, Mito Luka; Conductor, Ettore Panizza.

WBZ, Springfield, Mass. (Eastern, 337), 7:30 p. m., Twilight tales for the kiddies; Letter from the New England Homestead; 8:00, Ruth A. Ray, violinist; Mrs. Elizabeth N. Hooper, pianist; 9:00, Bedtime story for Grown-ups, Orison S. Marden.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Edna Finestone, pianist; "The Market Basket," Mrs. Anna B. Scott; 7:30, Bedtime stories, Dream Daddy.

WEAF, New York, N. Y. (Eastern, 492), 11:00-11:20 a. m., Mrs. Havens Bayles, 11:20-11:50, Miss Mary S. Hayland; 4:20-4:40, Evelyn Platt, recitations; 4:40-5:00, Juan Spota, opera tenor; 5:00-5:30, Christmas Program for Children; 7:00-7:30, N. Y. Federation of Churches; 7:30-7:40, Thornton Fisher Sport Talk; 7:40-8:10, Theresa Wolfe Rashkis, soprano; 8:20-8:50, Sara Alter, pianist; 8:50-9:00, Hearst's International Magazine; 9:00-9:15, Henry W. Taft; 9:15-9:30, Program by Columbia Phonograph Co.; 9:30-9:45, Howard Diggs of N. Y. University; 9:45-10:15, James Alexander, tenor; 10:15-10:30, Robert E. Sherwood; 10:30-11:00, Louis M. Hann, baritone; 11:00-12:00, Vincent Lopez Orchestra.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., McFall's Dance Orchestra; 8:30-9:30, Hauulea School of Hawaiian Music, native Hawaiians.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer-Davis Bellevue Stratford Orchestra; 3:00, Strawbridge and Clothier Male Quartet; Loreta Kerk, pianist; 6:30, Meyer Davis Bellevue Stratford Orchestra; 7:00, Message from "Snowball"; 10:10, Meyer Davis Bellevue Stratford Dance Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360), 12:00 m., Edison Laboratory Phonograph, Ampico in the Chickering; 7:00 p. m., "Bits of Wisdom," George B. Beal; Bedtime Stories for Parents, Alfred F. Whitman; "China," Dr. Telsy Hsieh, China's foremost Statesman; Chinese Orchestra.

WGR, Buffalo, N. Y. (Eastern, Standard, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Elise de Grood, violinist; 6:30-7:30, Vincent Lopez Dance Orchestra; 7:30, Digest of the day's news; Boy Scout Radiogram; Story from "The American Boy" magazine; 9:00, Recital, Miss Bertha Drescher, soprano; Arthur Bolt, tenor; Evelyn Edythe Smith, pianist; and Margaret Blakeslee, violinist.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "What Kind of Literature Do Our Young Folks Read?" Mrs. Hubert Hadlock; 7:45, Program by the Publicity Department, General Electric Co.; Publicity Dept. Orchestra; Ethel Thomas, soprano; H. M. Mott-Smith, cellist; J. F. Quinlan, baritone; "The Press, The Screen and Radio," Martin P. Rice; Publicity Dept. Male Quartet; Edward Rice, violinist; Walter Reagles, tenor; "The G-E Girl," Ellen Neilson.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; Strand Theater Orchestra; Four-minute talk on Household Economics; 7:30-9:00, Ten Best Fester Songs, Courier-Journal Quartette, Fannie Bess Morton, soprano; Mrs. K. W. Surman, contralto; Albion S. Cornwall, baritone; Mrs. Albion S. Cornwall, accompanist; Four-minute Radio Forum talk.

WHN, New York, N. Y. (Eastern, 380), 2:15-3:00 p. m., Shapiro Bernstein Music Co.; 4:00-4:45, Versatile Trio; 9:30, Belle Bart, astrologist; 9:45-10:15, Aron Society Orchestra; 10:30-10:45, Fred Whitehouse Review; 11:00-11:30, Art Quencer's Blue Point Synopsators.

WIP, Philadelphia, Pa. (Eastern, 509), 7:00 p. m., Bedtime stories, Uncle Wip, 8:00, Talk, Eugene Noble, Secretary Automobile Club of Philadelphia; Organ recital, Karl Bonawitz.

WJAX, Cleveland, Ohio (Eastern, 390), 8:00 p. m.,

RENT WEEK'S PROGRAM OFFERINGS

as "Desde Shakespeare's Cambridge station WDAP, to the right of "Monna and master-who wish to be in WMAQ the following



Above is presented P. Arlow Mathews, leader of Wheat's Ice Cream Company's orchestra of Buffalo, New York. He has won renown locally as a first-rate conductor and is also an accomplished performer. Fans who are interested should tune in WGR next Monday

WOR, New York, N. Y. (Eastern, 405), 2:30 p. m., Nathan Cyganero, pianist, 6:15, Icticle; 6:20-7:15, Frank Dalley's Meadowbrook Dance Orchestra; 8:00, Myan Mac Challenger, mezzo-contralto; 9:15-9:45, Icticle; 10:00-11:00, Jimmy Clark's White Way Entertainers.

Sunday, December 16

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., Service by L. A. Church Federation; 4:00-5:00 p. m., Concert by the Federated Church Musicians.
WEAF, New York, N. Y. (Eastern, 492), 2:45-3:45 p. m., N. Y. Federation of Churches Program; 3:45-5:30, Dr. H. Parkes Cadman, Bedford Branch of Brooklyn Y. M. C. A.; 7:20-9:00, Capitol Theatre Symphony Orchestra and "Hoties" Staff of Capitol Theatre Artists; 9:00-10:00, Sklumer Organ Recital.
WFAA, Dallas, Texas (Central, 476), 6:00-7:00 p. m., Radio Bible Class, Dr. William M. Anderson, Jr.; 9:30-10:00, Song recital, Dr. Robert Hunt, Margaret and Miriam Hunt; 10:00-11:00, Jimmy Allen's Southern Serenaders Dance Orchestra.
WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 3:00, Loretta Kerr, pianist; 5:30, Meyer Davis Bellevue Stratford Orchestra; 7:00, Message from "Snowball."
WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m., Vesper services; 4:00-5:00, Robert Munn, organist.
WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., Church services, First English Lutheran Church, Rev. Herbert D. Schuler, pastor; 3:30 p. m., WGY Symphony Orchestra, Mildred Lamb, contralto; 7:30, First English Lutheran Church.
WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Organ music; 10:00, Church service, First Presbyterian Church, Rev. Dr. Richard T. Gillespie, pastor; 4:00-5:00 p. m., Concert, direction of Mrs. Jane Webster Murrell.
WHN, New York, N. Y. (Eastern, 360), 3:00-4:30 p. m., Christian Endeavor Program; 5:00-5:30, Radio Five Orchestra.
WIP, Philadelphia, Pa. (Eastern, 509), 4:30 p. m., Meeting of Germantown Y. M. C. A.
WJAZ, Chicago, Ill. (Central, 447.7), 6:00-8:00 p. m., Mary Wood Chase, pianist and assisting artists.
WLW, Cincinnati, Ohio (Central, 309), 9:30 a. m., Sunday School Services, Editorial Staff of Sunday School Publications, Methodist Book Concern.
WNAC, Boston, Mass. (Eastern, 278), 10:45 a. m., Church service, First Church Christ Scientists; 3:00, Program, Temple Miska-Teffla; 6:45, Church Service, Park St. Cong. Church.

Monday, December 17

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "Mutual Interests of Farmers and Millers," Prof. Hugh Hutton; Chemistry Talk; "Educating the Whole Self," Dr. C. W. Stone; "The National Boys and Girls Club Congress," Emlina White.
WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Edna Finestone, pianist; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Bedtime stories, Dream Daddy; 7:45, Moving picture review; 10:10, Howard Lanin's Arcadia Cafe dance orchestra.
WEAF, New York, N. Y. (Eastern, 492), 4:30-5:00 p. m., Lamee Wragge, lyric soprano; 5:00-5:30, Christmas Program for Children; 7:30-7:40, Thornton Fisher's Sport Talk; 7:40-8:00, Leslie Joy, bass baritone; 8:00-8:20, Hoxie N. Fairchild; 8:20-10:30, Philharmonic Concert from Carnegie Hall.
WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00, George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Elise de Grood, violinist; 6:30, 11:00, Vincent Lopez Dance Orchestra; 7:30, Digest of the day's news; 9:00, Concert, Wheat's Ice Cream Co., direction of P. Arlow Mathews.
WGY, Schenectady, N. Y. (Eastern, 380), 7:45 p. m., WGY Orchestra; Patrick J. Welch, pianist; Edythe Nicoll Sill, soprano; "Joseph Henry and His Contribution to Electrical Science," E. W. Rice.
WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; Four-minute talk on Household Economics; Strand Theater Orchestra.
WHAZ, Troy, N. Y. (Eastern, 380), 9:00 p. m., Anniversary of the invention of the electro-magnetic operation of a bell over a wire with the ringing of the original bell of 1832 brought from the New York State Museum; Addresses by prominent men; Concert, Mrs. Laura Rhoads, soprano; Fritz Beiermeister, baritone; Ruth Hardy, pianist; Miss Vincent, violinist.
WHN, New York, N. Y. (Eastern, 360), 3:45-4:30 p. m., Colonial Inn Orchestra; 4:45-5:15, Edward B. Marks Music Co.; 7:30-8:15, Alfred Dulin, pianist; 10:30-11:00, M. Witmark.
WIP, Philadelphia, Pa. (Eastern, 509), 6:05 p. m., Frank Winegar's Pennsylvanians, orchestra; 7:00, Bedtime stories, Uncle Wip.
WLW, Cincinnati, Ohio (Central, 309), 8:00 p. m., Church School Series, Editorial Staff of the Methodist Book Concern, Cincinnati String Quartet, Ernest Fack, first violinist; Herbert Silbersack, second violinist; Herbert Weiss, cellist; Gordon Kalin, violist; 9:00, Crosley Theatrical Reviews; Dick Mees Dance Orchestra; 9:30, Christmas Carols, Mabley and Carew Male Glee Club, Henry Grad, director; 9:45, Dick Mees Dance Orchestra.
WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Gayoso Hotel Concert Orchestra.
WOO, Philadelphia, Pa. (Eastern, 509), 11:00-11:30 p. m., Organ recital, Mary E. Vogt; 12:00-1:00 p. m., Wanamaker Crystal Tea Room Orchestra; 5:15, Organ recital, Mary E. Vogt; 7:30, Hotel Adelphi Concert Orchestra; 9:30, WOO Orchestra; 10:10, Hotel Adelphi Dance Orchestra.
WOR, New York, N. Y. (Eastern, 405), 6:15-7:30 p. m., Harry Cox Robert Hotel Orchestra; 8:00, "Current Motion Pictures," Alfred J. McCosker; 8:30, Jolly Bill Strecker; 9:00, Cantor Moses Gann and Quartet; 10:00, Frank Reilly Country Club Orchestra.

Saturday, December 15

WTAM, Cleveland, Ohio (Eastern, 390), 9:00 p. m., Regular Saturday Evening Dance Program by the WTAM Orchestra, Jule Sigmund, soprano.

KOKA, E. Pittsburgh, Pa. (Eastern, 326), 1:30 p. m., Dougherty's Orchestra; 6:15, Westinghouse Band; 7:45, "The Little Fir Tree," the Children's Period; 8:30, Westinghouse Band, Margaret R. McCarthy, soprano.
KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Instrumental concert program; 8:00-9:00, Orchestra Numbers; 10:00-11:00, Program of Dance numbers.
KGW, Portland, Oregon (Pacific, 492), 3:30 p. m., Children's program, story by Aunt Nell; 10:00, Dance music, George Oleen's Metropolitan Orchestra.
KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Music; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's program; 8:00-10:00, Band from U. S. S. Flagship Freycyn; 10:00-12:00, Art Hickman's orchestra.
KSD, St. Louis, Mo. (Central, 546), 7:30 p. m., Program, Missouri Theater.
KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 6:50 p. m., Children's bedtime story; 8:00, Esther Coulter, soprano; Sallie Menkes, accompanist; William Peterson, mandolinist; Alfred Tweed, guitarist; 9:05, "Under the Evening Lamp."

Choir: Mrs. Hester Robinson, reader; John D. Thomas, baritone; Richard F. Hise, violinist; L. J. Hise, viola player; Mrs. L. J. Hise, pianist; Cornet Quartet; Dorothy Bull, soprano.
WOAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Edna Finestone, pianist; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Bedtime stories, Dream Daddy; 10:10, Howard Lanin's Arcadia Cafe Dance Orchestra; special Morning Glory Club features.
WEAF, New York, N. Y. (Eastern, 492), 11:35-11:50 a. m., Musical America Magazine; 11:50-12:00, Market reports; 4:00-4:30 p. m., Phil Ohman Trio; 4:30-5:00, Anna Hutler, soprano; 5:00-5:30, Christmas Program for Children; 7:30-7:40, Thornton Fisher's Sport Talk; 7:40-8:10, Ruth Friedman, pianist; 8:10-8:20, John V. L. Hogan, radio poet; 8:20-8:50, Dorothy H. Burke, dramatic soprano; 8:50-9:00, Eveready Instruction talk; 9:00-10:00, Astor Coffee Orchestra.
WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "Worldwide Missions," Dr. Robert Stewart Hyer; 8:30-9:30, Shriners' Dance Orchestra.
WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 3:00, Ednyed Lewis, tenor; 6:30, Meyer Davis Bellevue Stratford Orchestra; 7:00, Message from "Snowball."
WGI, Medford Hillsdale, Mass. (Eastern, 360), 12:00 m., Edison Laboratory Phonograph, Ampico in the Chickering; 3:00 p. m., Amrad Women's Club; Edna, Dorothy H. Goodwin; Edison Program; 7:30, Charles L. H. Wagner, radio poet; Red Cross Health Talk, A. W. Paterson, radio poet; Evening's Musicals.
WGP, Buffalo, N. Y. (Eastern, Standard, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Elise de Grood, violinist; 6:30-11:30, Vincent Lopez Orchestra; 7:30, Digest of the day's news; 8:45, Road reports; 9:00, Concert, The Georgian Orchestra, direction of H. N. Paradis.
WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "Planning the Christmas Dinner," 7:45, Alumnae Association, Troy Conservatory of Music, Lucia T. Walker, Emma Lotz, pianist; Elva Vincent, violinist; Margaret Treanor, pianist; Sarah Conboy, pianist; Mrs. A. W. Paterson, reader; Betty Christiansen, pianist; William Scott, tenor; Mrs. Bertha M. Bowman, pianist; Charlotte H. Homer, pianist; Mrs. Norma V. Catricala, soprano; Eleanor Padley, pianist; 10:30, "Rollo's Wild Oats," WGY Players, Hewston, Rollo's man, John Letturs; Lydia, Rollo's sister, Lola Sommer; Rollo Webster, a youth with aspirations, Edward E. Smith; Mr. Stein, a theatrical manager, Charles S. Baume; Goldie MacDuff, an actress, Rose Cohn; George Lucas, an actor, Edward E. St. Louis; Whortley, Camperdown; Maurice G. Randall; Thomas Skittinger; Jerome Lovenheim; Mrs. Park-Gates; Helen Campbell; Aunt Lane, Rollo's great aunt; Margaret V. Smith; Horatio Webster, Rollo's grandfather, Frank Oliver; Bella, Arline Montgomery; WGY Orchestra.
WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; Four-minute talk on Household Economics; 7:30-9:00, Concert, auspices of Mrs. Harriet Kuersteiner; Reading: An Interesting Historical Episode.
WHK, Cleveland, Ohio (Eastern, 283), 9:00 p. m., Concert program arranged by the Cleveland Radio Dealers' Association.
WHN, New York, N. Y. (Eastern, 360), 2:15-3:15 p. m., Original Indiana Five, 3:45-4:15, Shapiro Bornstein; 4:45-5:30, Commerford's Serenaders; 9:30, Lisa Bickman, soprano; 9:45-10:15, Rex Serenaders; 10:30-10:45, Fred Whitehouse Revue; 11:00-11:30, Jerome Remick Music Co.
WIP, Philadelphia, Pa. (Eastern, 509), 3:00 p. m., Popular program by Remick Studios; 6:05, George Thomas and his Little Club Orchestra; 7:00, Bedtime stories, Uncle Wip.
WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Chicago Musical College, Miss De Marco, director; Oriole Orchestra.
WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Hour-hour lecture recital, Mildred Templeton Williams, "Scenes of Childhood."
WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Bush Conservatory; 7:00, Wide Awake Club, Mrs. Frances Ford, director; Esther Jane Henderson, pianist; 7:30, Weekly musical lecture, Mrs. Marx E. Oberdorfer; 8:30, WMAQ Orchestra; 9:00, Hotel La Salle Trio; 9:15, Bush Conservatory of Music.
WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, "La Hogue's Little Classics," Martha La Hogue, director; 11:00, Frolie.
WNAC, Boston, Mass. (Eastern, 278), 4:30 p. m., Elizabeth Bernard, soprano; Edna Baker, pianist; 6:00, Bedtime stories; 8:00, Harvard Musical Club; 9:30, Modern Theater Organ.
WOAW, Omaha, Nebraska (Central, 526), 6:00-8:00 p. m., Beseda School of Music and Dramatics of St. Mary's Church, Rev. Edw. Chapman, director, Wenceslaus Orchestra, Emil Cermak, Jr., fustist; John Kotera, Louis Foral, saxophonists; Jos. Skola, cornetist; Agnes Foral, pianist; Jos. Herman, violinist; Antonia Filipich, Albert Schenk, violinist; Czecho Jazzers; 9:00-10:00, Program, Old time fiddling, old fashioned singing and dialects, H. G. Kiddoo, director; 10:00-11:00, Dance program, Randall's Royal Orchestra.
WOC, Oavenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Discoveries and Uses of the X-Ray," C. A. Russell; 5:45, Chimes; 6:30, Sandman's Visit; 8:00, Program, artists from DeKalb, Philadelphia, Pa. (Eastern, 509), 11:00-11:30 p. m., Organ recital, Mary E. Vogt; 12:00-1:00 p. m., Wanamaker Crystal Tea Room Orchestra; 5:15, Organ recital, Mary E. Vogt; 9:15, Organ recital, Mary E. Vogt; 10:45, Hotel Adelphi Dance Orchestra.
WOR, New York, N. Y. (Eastern, 405), 3:00 p. m., "Health Hints," De Harriet Van Buren Peckham; 6:15, Icticle; 6:20-7:30, Vernon Orchestra; Man in Moon.

Friday, December 14

KOKA, E. Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Lucile Hale, organist; 7:15, Radio Boy Scout Meeting, Richard Victor, Jr.; 7:45, A Visit by Santa Claus, from the Rosenbaum Company; 8:30, Concert, Lucile Hale, pianist; June Call, Rex Call, William Cook, violinists; Ruth Kealy, reader.
KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert program furnished by the Wa-Wan Juniors; 10:00-11:00, Concert numbers with Madelyn Hardy.
KGW, Portland, Oregon (Pacific, 492), 3:30 p. m., Jessie D. McConh, home economics; 8:15, George Olsen's Metropolitan Orchestra; 9:00, "Oregon Resources," Alfred L. Lomax; 10:30, Hoot Owls with Pantages frolie.
KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Music; 2:30-3:30, Matinee musicale; 6:45-7:00, Children's program, Harry James Beardsley, baritone; 7:00-7:30, Arthur Blakeley, organist; 8:00-10:00, Program, faculty of Wee Tot Villa; 10:00-12:00, Art Hickman's Orchestra.
KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 10:00-12:30 p. m., Late Show; Blanche Beaumont Nelson, soprano; Sallie Menkes, accompanist; Wendell W. Hall, KYW's Music Maker; Herbie Mintz, pianist.
WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, "From the Main Truck," Youth's Companion; 7:30, Twilight tales for the Kiddies; Current Book Review, R. A. MacDonald; Talk by a member of the Eastern States Farmers' Exchange; 11:00, Chamber music, WBZ Quintette, William Titton, baritone; Mrs. Ruby T. Kingsley, pianist.
WCBD, Zion, Ill. (Central, 345), 8:00 p. m., Zion

Varied Tongues Block in Path of Indian Service

500 Word Program, Translated, Would Take 24 Hours

CALCUTTA, INDIA.—Difficulties in popularizing broadcasting in India are many, the greatest arising out of the diversity of languages. A projected super broadcasting station in Delhi was considered impracticable recently when it was found that a news program of 500 words if translated into the many languages of India would take twenty-four hours to transmit. Another difficulty with broadcasting is the enormous distances in the country. The only possibility of establishing broadcasting which appears practicable to the Director of Wireless is the establishment of stations in the large cities such as this city and Bombay. When you hear a good concert write to the station from which it is broadcast, as they appreciate it and many of them will send you a detailed program of their concerts for the next two or three weeks.

RENT WEEK'S PROGRAM OFFERINGS

9:55, 2:30 p. m.,
icicle; 6:20-7:15,
Orchestra; 8:00,
alto; 9:15-9:45,
Jimmy Clark's

r 16

10:00-10:45 a.
ation, 4:00-5:00
ch Musicians
), 2:45-3:45 p.
gram; 3:45-5:30,
ct of Brooklyn
atre Symphony
Capitol Theatre
ctal.
7:00 p. m.,
Anderson, Jr.;
Hunt, Margaret
Allen's South-
1:00 p. m.,
chestra; 3:00,
Davis Bellevue
from "Snow-
00 p. m., Ves-
organist.
10:30 a. m.,
Church, Nev-
WGY Sym-
ntratto; 7:30,
9:57 a. m.,
First Fred's-
blesse, pastor,
of Mrs. Jane
3:00-4:30 p.
50-5:30, Radio
4:30 p. m.,
00-9:00 p. m.,
ne artists.
9:30 a. m.,
ff of Sunday
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10:45 a. m.,
entists; 3:00,
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7:30 p. m.
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Educating the
National Boys
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12:00 m.,
a Finestone.
e Concert Or-
Daddy; 7:45,
Lanin's Ar-
32), 4:30-5:00
o; 5:00-5:30,
1-7:40, Thorn-
sle Joy, bass
d; 8:20-10:30,
all.
12:30-1:00,
00, Tea time
le Grood, vio-
ce Orchestra;
heart, Wheat's
Mathews.
7:45 p. m.,
lanist; Edythe
and His Con-
Rice.
10-5:00 p. m.,
ute talk on
Orchestra.
p. m., Anni-
magnetic op-
ring of the
le New York
it men; Con-
Belermelster,
ent, violinist.
3:45-4:50 p.
Edward B.
lin, pianist;

gram, faculty of Wee Tot Villa; 10:00-12:00, Art
Hickman's Orchestra.
KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table
talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's
bedtime story; 10:00-12:30 a. m., Late Show; Blanche
Beaumont Nelson, soprano; Sallie Menkes, ac-
companist; Wendell W. Hall, KYW's Music Maker;
Herbie Mintz, pianist.
WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m.,
Dinner concert, WBZ Quintette; 7:00, "From the Main
Truck," Youth's Companion; 7:30, Twilight tales for
the Kiddies; Current Book Review, R. A. MacDonald;
Talk by a member of the Eastern States Farmers'
Exchange; 11:00, Chamber music, WBZ Quintette,
William Tilton, baritone; Mrs. Ruby T. Kingsley,
pianist.
WCBD, Zion, Ill. (Central, 345), 8:00 p. m., Zion

Jazzers; 9:00-10:00, Program, Old time fiddling, old
fashioned singing and dialects, H. G. Kiddoo, di-
rector; 10:00-11:00, Dance program, Randall's Royal
Orchestra.
WOC, Davenport, Iowa (Central, 484), 12:00 m.,
Chimes; 3:30 p. m., "Discovery and Uses of the
X-Ray," C. A. Russell; 5:45, Chimes; 6:30, Sand-
man's Visit; 8:00, Program, artists from DeKalb.
WOO, Philadelphia, Pa. (Eastern, 509), 11:00-11:30
a. m., Organ recital, Mary E. Vogt; 12:00-1:00 p. m.,
Wanamaker Crystal Tea Room Orchestra; 7:30, Hotel
Adelphia Concert Orchestra; 9:15, Organ recital, Mary
E. Vogt; 10:45, Hotel Adelphia Dance Orchestra.
WOR, New York, N. Y. (Eastern, 405), 3:00 p. m.,
"Health Hints," De Harriet Van Buren Peckham;
6:15, Icicle; 6:20-7:30, Vernon Orchestra; Man in
Moon.

WMC, Memphis, Tenn. (Central, 500), 8:00 p. m.,
"Macbeth," Frederick Warde, Shakespearean actor
and lecturer.
WNAC, Boston, Mass. (Eastern, 278), 4:00-4:45,
Copley Plaza Orchestra; 8:00-8:45, Colonial Dance Or-
chestra; 9:00-9:30, Copley Plaza Orchestra.
WOAW, Omaha, Nebraska (Central, 526), 6:00-7:30
p. m., Dinner program, Ackerman's Orchestra; 9:00-
11:00, Program, auspices of Omaha Printing Company.
WOC, Davenport, Iowa (Central, 484), 12:00 m.,
Chimes; 3:30 p. m., "Hemorrhoids," C. C. Hall;
5:45, Chimes; 6:30, Sandman's Visit; 9:00, P. S. C.
Orchestra; V. B. Rochte, baritone.
WOO, Philadelphia, Pa. (Eastern, 509), 11:00-11:30
a. m., Organ recital, Mary E. Vogt; 12:00-1:00 p. m.,
Wanamaker Crystal Tea Room Orchestra; 5:15, Band
concert; Organ recital, Mary E. Vogt.

The only possibility of establishing
broadcasting which appears practicable
to the Director of Wireless is the estab-
lishment of stations in the large cities
such as this city and Bombay.

When you hear a good concert write
to the station from which it is broad-
cast, as they appreciate it and many of
them will send you a detailed program
of their concerts for the next two or
three weeks.

WHAT "SALVAGE" REALLY MEANS

Important

Any individual part in any of the four outfits below may be purchased separately at the special reduced prices listed under column headed "Our Price."

All our merchandise is guaranteed by us to be of First Quality.

All Mail Orders, large or small, shipped to you promptly. Address Dept. R-6.

Sometimes a manufacturer overproduces and must sacrifice his surplus stock for cash. Sometimes a dealer misjudges market conditions and must unload—again for cash. Our business is to buy—to "Salvage"—these special offers by paying spot cash for the entire surplus. That's how we bought 40,000 Automatic Electric Headsets—10,000 Western Electric VT-2 Tubes, etc. ¶ But in order to keep on taking advantage of such offers, we must make a quick turnover. That is why we offer you a \$10 Automatic Electric Headset at the unequalled price of \$3.65. That, too, is the main reason why all our offers are priced so attractively. ¶ "Salvage" to us does NOT mean something that has been used. We handle no second-handed merchandise. Every item we sell is guaranteed brand new—in fact 95% of our merchandise is in the manufacturer's own carton and carries his guarantee along with ours. ¶ "Salvage" to YOU means buying quality radio merchandise for less!

Complete Instructions

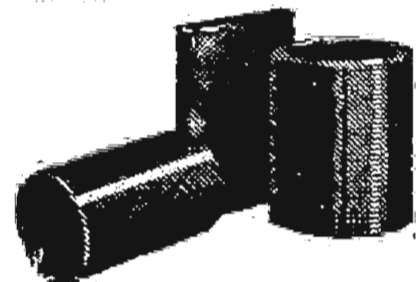
for assembling and blueprints for wiring are included with each outfit. Instructions written so everyone can understand them. No special skill or technical knowledge required—a few hours and you're ready to tune-in New York, Los Angeles—any of 'em!

Panels FREE Drilled

Specially drilled panels are included with each of the sets illustrated and described below. We give this free service only on panels included with complete sets.

FORMICA

Made from Anhydrous Redmanol Resins
SHEETS TUBES RODS



We are prepared to furnish promptly and saw Formica panels of any dimensions. Cutting charge is included in the following prices:

- 3/16-inch Formica, sq. in. 2c
- 1 8-inch Formica, sq. in. 1 1/2c
- Tubing (2 to 4-inch diameter), per running inch 10c

Automatic Electric LONG RANGE Headsets

Formerly sold by the Automatic Electric Co., makers of telephone exchanges, at \$10 each. We bought their entire stock—40,000 phones—paid spot cash and because of this unequalled buying power, we are able to offer you a \$10 headset for \$3.65.

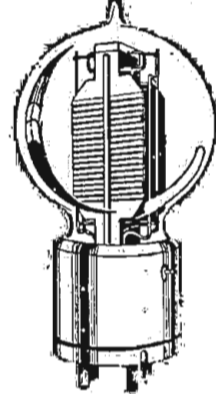
30 years of experience have produced the Automatic headset. Coil is wound with about 6500 turns of No. 40 enamel coated copper wire. DC resistance 1600 ohms. Impedance, at average music and voice frequency (800 cycles) 21,000 ohms. (Effective impedance rather than DC resistance is the big factor in a good headset.)



\$10.00
VALUE
\$3.65

Western Electric VT-2 TUBES

One of the big features of these brand new genuine Western Electric VT-2 Tubes that we bought from the U. S. Signal Corps is that they have a higher amplification factor than any other 5-watt tube made! And almost half of our purchase, consisting of 10,000 tubes have been sold. Radio men know that a genuine VT-2 Tube for \$7.45 is an unusual opportunity—a real "find"! These tubes may be used for both RF and AF amplification and for CW and phone transmitting. These are not Navy defects; they have been sold only as a surplus.



\$7.45

Bradleystat or Bradleyleak UNIVERSAL

New Type **\$1.25** Each



509 South State St.
CHICAGO, ILL.

Moulded Variometers and Variocouplers

\$3.65

HAZELTINE NEUTRODYNE



Regular Price	Consisting of	Our Price
\$3.00	1 Cockaday Coil	\$.95
1.00	2 Bakelite Dials	.25
1.00	1 John Firth Socket	.45
1.00	1 Freshman Grid Leak and Condenser	.65
1.50	1 Howard Vernier Rheostat	1.35
1.00	1 Pacent Double Circuit Jack	.50
.80	8 Binding Posts	.05
.02	7 Switch Points	.01
.50	1 Switch Lever	.25
	1 7x14 1/2 Formica Panel	1.44
	1 Blueprint and Wire	1.00
	1 Baseboard	.25
3.30	2 23 Plate Condensers	1.45

Our Price **\$11.95**

KNOCKED DOWN SHORT WAVE



All Parts Licensed Under Hazeltine Patents

- 1 7x21x3/16 drilled Formica panel
- 1 Howard rheostat
- 3 4-inch Radion dials
- 3 John Firth bakelite sockets
- 8 Binding posts
- 3 23 plate variable condensers
- 1 Wave control neutroformer
- 2 Radio frequency amplifying neutroformers
- 2 Grid neutralizing condensers
- 1 .00025 micron grid condenser
- 1 Marco variable grid leak
- 1 Baseboard for mounting
- 25 feet tinned copper bus bar wire and complete instructions for assembling and wiring.

3 TUBE
OUR PRICE **\$28.60**

4 Tube \$44.65
5 " \$46.25

(Freed-Elseman or Fada Neutroformers)

REINARTZ DETECTOR AND 2-STEP



Reg. Pr. EACH	Our Pr. EACH	Reg. Pr. EACH	Our Pr. EACH
\$6.00	1 Drilled Panel, 7x28x3/16 inches	\$4.40	2 Dozen Switch Points
2.50	1 Spider Web Coil	.02	6 Switch Stops
6.00	1 23 P. Ver. Condenser	.50	3 Switch Levers
5.00	1 11 P. Ver. Condenser	1.00	2 Bakelite Dials
1.50	1 Howard Ver. Rheostat	1.00	2 Jacks, Double Circuit
1.10	2 Howard P. Rheostat	.65	1 Jack, Single Circuit
.75	3 Firth Sockets	1.00	1 Baseboard
2.00	1 Variable Grid Leak and Condenser (cartridge type)	.75	1 Blueprint for assembly
4.75	2 Transformers (All-American 10-1 and 3-1 or new type high and low ratio Thordarson)	.50	25 feet tinned wire
.10	7 Binding Posts		

Reg. Price \$46.97
OUR SPECIAL PRICE **\$29.95**
Detector \$11.45

Reg. Price	Consisting of	Our Price
\$10.00	2 Mahogany Variometers	\$3.90
5.00	1 Mahogany Variocoupler	1.75
3.00	3 Bakelite Dials	.75
1.00	1 John Firth Socket	.45
1.10	1 Howard Rheostat	1.00
4.50	1 Mahogany Cabinet	2.95
2.25	1 Genuine Formica Panel	1.75
.80	8 Binding Posts	.40
.50	1 Switch Lever	.25
.40	12 Switch Points	.20
1.00	1 Freshman Grid Leak and Condenser Combined	.65
1.00	1 Complete Drawing for Assembly and Wiring	.50

\$25.85 Value **\$13.45**
Our Price

let. Spring contacts insure positive connection. Eliminates body capacity. Any standard plugs will fit. Size 3 inches deep, 2 3/4 inches high, 4 inches long.

2 Coil Mtg. \$2.45 3 Coil Mtg. \$3.45

GENUINE Nathaniel Baldwin Loud Speaker



\$25.00

ELECTRIC SOLDERING IRON

Specially adapted to Radio work. Simply attach to your light socket. Complete, with 6-ft. cord and attaching plug. Lasts a lifetime for ordinary home or light shop work.

\$2.45



Simple Explanation of Radio for Everybody

Chapter VII, Part I—Antennas and Grounds

By M. W. Thompson

THE following article is the twelfth of a series for Radio beginners, written by Marvin W. Thompson, well known in air-phone circles for his understandable style of approaching his subject, and his ability as a Radio engineer. Mr. Thompson is now an associate editor on the staff of Radio Digest. A preliminary outline of the chapters to follow is:

- Chapter VII—Antennas and Grounds.
- Chapter VIII—Regeneration.
- Chapter IX—Audio Frequency Amplification.
- Chapter X—Loud Speakers.

THE aerial of a Radio station is, properly speaking, the one or more wires suspended as high as possible between two insulators and from which a lead-in wire goes to the set. Its purpose when used with a transmitter is to

in the air absorbing facts of importance to the moth.

Buildings and trees absorb Radio waves and it is, therefore, of great importance to get one's aerial installed as high and as clear of everything as possible. It is not alone the distance above the earth that counts but the distance from houses and trees—the distance from the nearest objects that will absorb energy from the incoming waves and weaken them.

I stated that an aerial should be as high as possible. That statement is correct only as it applies to those types of aerials which have been in use for many years and are in use now with most of the sets on the market—outside aerials.

There are a few receiving sets available so sensitive that high outside aerials are not necessary. Here, height is not essential, but the insulation of the indoor aerials used is doubly important as less energy reaches them than the outdoor type. In this chapter we will deal chiefly

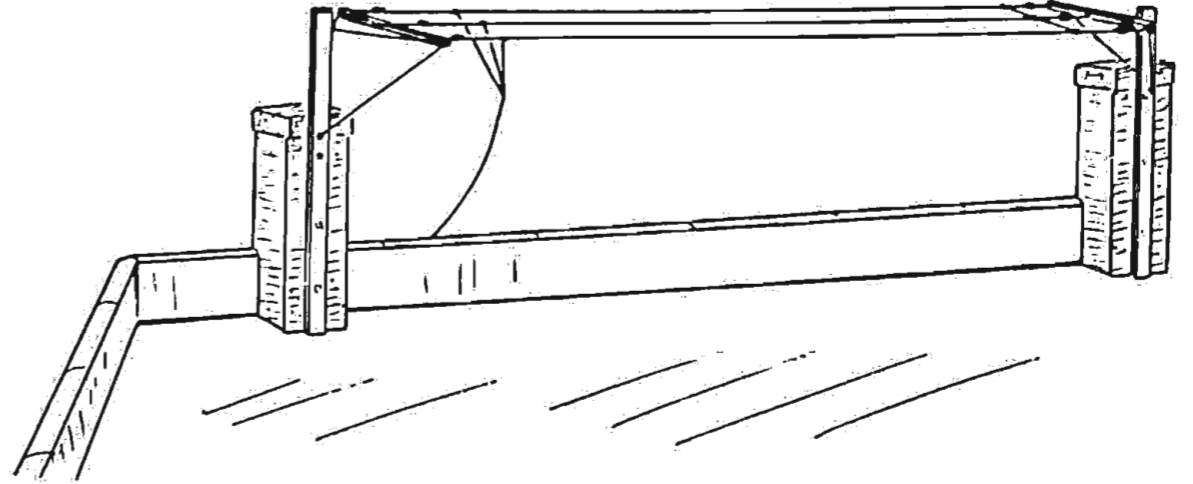


Figure 48—This three-wire inverted L utilizes two chimneys as anchors for short two-by-four

shape these aerials assume. The erection of aerials will be considered more from the viewpoint of the metropolitan amateur than from that of the rural enthusiast, as there are, by great odds, more receiving sets in cities than in the country. The erection of an antenna on a farm is a comparatively easy matter. There are many kinds of wire that may be used in aerials and in the order of their desirability they are: stranded phosphor bronze, stranded copper, solid copper, copperclad bell wire and ordinary cotton-covered.

The Inverted L

One of the many variations of the inverted L aerial is shown in Figure 46. As will be seen, one side of the L is formed by the horizontal wires, the other side by short converging leads and the lead-in wire proper. There are two important points that apply not only to this

aerial but to all other types—insulation and good joints: The insulation cannot be overdone; the joints cannot be too perfect. Only very minute currents traverse the receiving aerial and we cannot afford
(Continued on page 20)

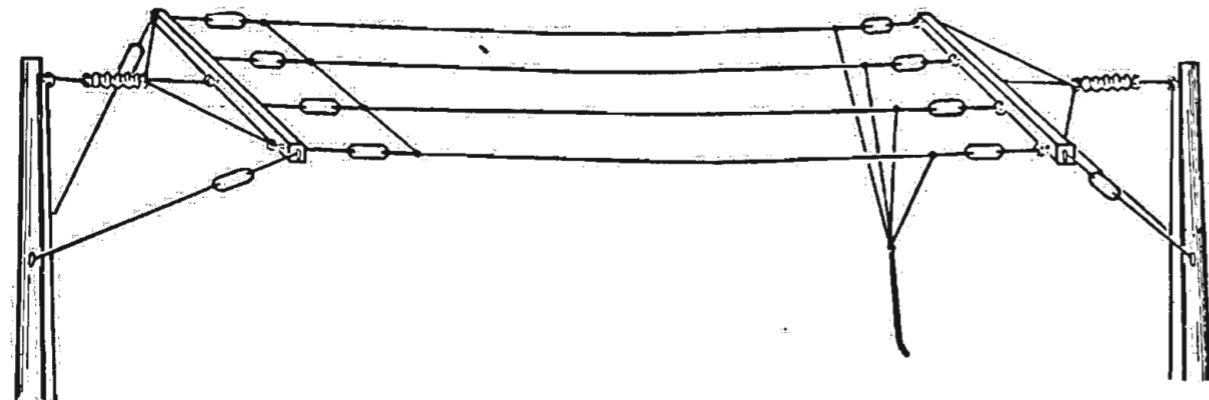


Figure 46—The fanwise inverted L is probably one of the most popular types

act as one side of a huge condenser and also as inductance, in the first case working with the ground to create electrostatic waves, and in the second to create electromagnetic waves, a Radio wave being composed of both kinds. When used with a receiving set, its purpose is to intercept that part of the waves which travels above the ground, while the ground intercepts that part which travels in the

with outdoor aerials, although some space will be given to discussion of the indoor variety.

Types of Antennas

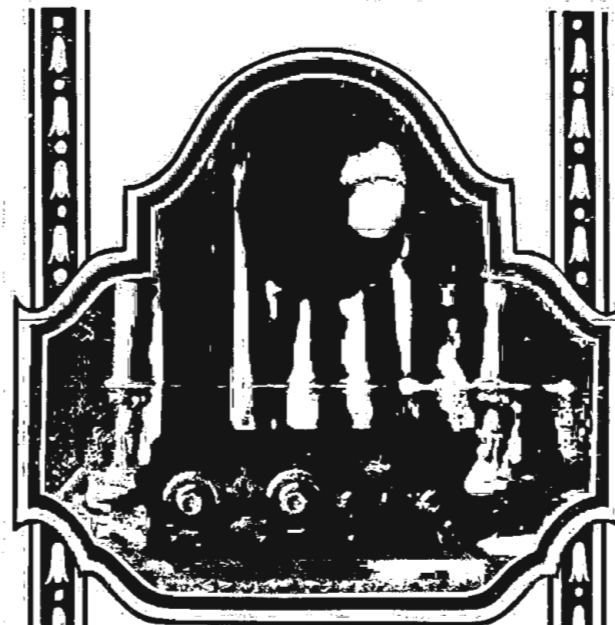
Outdoor aerials, for reception only, have been successfully erected and used in many shapes and sizes, the choice being largely governed by local conditions and the relative positions of high points. We have, in the order of their popularity, the



Figure 47—Buildings several lots apart may provide the ideal points for securing the aerial wire

earth. The antenna system gets its name from its similarity to the two feelers or antennae of a moth which are constantly

inverted L, the T, the V, the umbrella, the cage, the fan and the spiral. The names in each case give an idea of the



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RADIODYNE

"The Voice of the Nation"

YOU don't have to be an expert to install and operate the RADIODYNE effectively. It is operated by simply grounding to a water pipe or radiator and throwing a few feet of wire on the floor.

For use in apartments, boats, automobiles, railroad trains, etc., the RADIODYNE is enjoyable where other types of receiving sets would not be practical.

Stations within a radius of 2000 miles can be picked up on the loud speaker; any wave length from 200 to 700 meters. The RADIODYNE is so sensitive that it picks up Radio telephone speech and music when other receiving equipment fails.

Write for illustrated folder which describes the RADIODYNE in detail. Every radio fan will be interested in this new type (antennaless) receiving set.

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IMPROVED COILS MADE TO COVER NEW WAVE LENGTHS

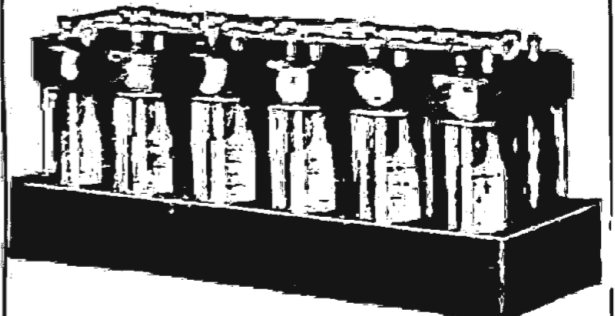
- 21 tap coils \$1.00
- 16 tap coils90

Above prices include coil mounting and also circuit diagram. Sent postpaid upon receipt of money order.

Attractive discounts to dealers.

KINLEY RADIO CO., Box 185, Detroit, Mich.

STORAD "B" BATTERY



24 VOLT UNIT

The Ultimate Battery for "B" Circuit Work
Voltage of the Storad "B" Battery is constant and steady. 3 to 6 months' service on one charge. Recharge cost is very slight. (We can furnish charger at small cost.) A Storad will last for years and pays for itself in less than a year. Capacity 2250 M. A. H.

USE A STORAD STORAGE "B" BATTERY

It has extra heavy 1/4-inch plates and large acid circulation.
It has glass jars, which eliminate cell leakage and allow observation of battery condition.
It will hold its charge for many months at constant voltage.
It prevents many noises in the set ordinarily blamed to static and aids long distance reception.

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\$2.00 **\$2.00**
Should be on every aerial the year 'round. Provides highly efficient lightning and static protection for the home. Fully approved by Fire Underwriters. Can be installed outdoors. Has no vacuum to lose. Install one in your aerial lead now—be safe. This pioneer radio arrester is backed by 31 years' experience in lightning arrester design. For sale by Dealers everywhere, or sent postpaid for \$2.00. Write for circular.

Electric Service Supplies Co.
17 & Cambria Sts. Philadelphia
Monadnock Bldg., Chicago
50 Church St., New York

Natural Re-PRODUCTION

Atlas AMPLITONE

LOUD SPEAKER

The superiority of the Atlas re-PRODUCTION is pronounced. Patented "double diaphragm" renders music in all its original purity. Adjustable to individual receiving conditions. Ask your dealer for a demonstration **TODAY!**

Write for Booklet "R" **\$25**

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Aid to Bed-Ridden Patients

Radio Relieves the Mind of Those Confined

RADIO is assisting in the cure of many unfortunates lying in hospitals or in homes in many parts of this country and Canada. For most of them the Radio broadcast program shatters the deadly monotony which oppresses their days and nights. Radio has taken their minds from their ills and given them something besides pain to look forward to; the voices from distant stations have widened their horizon. News items and educational talks have given them new interests. It is not to be wondered, therefore, that improvement in physical and mental condition has followed in many cases.

Musical programs, drama, travelogues and church services, are a real help in the patient's cure. To most of the bed patients requiring many months of resting, Radio brings a touch of the outside world.

Varied Radio Programs

Demands of a World-Wide Audience Are Many

VARIETY is the spice of life. Too much of one thing is not good for anyone, and this fact is demonstrated most clearly by the audience which listens in nightly to the programs of the Radio broadcasting stations. It is an easy matter to sit at a receiving set and listen to speeches, but he who has the difficult job of arranging this is the studio director.

Station managers must provide original programs that are interesting to its world-wide audience. In a dramatic production the voice takes the place of action, and the listener follows the unfolding of the plot as interpreted by the person at the transmitter. Much of a program must be prepared for broadcasting, just like a movie scene where action only can be recorded. The transmitter does not record action, and hence broadcasting is the reverse of the motion picture.

Boost Radio to Congress

Urge Congressmen to Provide Sufficient Funds

INDICATIONS are that the U. S. Bureau of the Budget will only approve of appropriations amounting to one-sixth of the Department of Commerce's lowest estimate as necessary for the administration of Radio matters during the next fiscal year. With all forms of Radio activity increasing, the scope of the Radio section has been extended until several times the work is being done by the same field force and the same personnel in the Washington office, that existed before broadcasting and extensive amateur activities began. The department needs both more men and money.

What the budget has allotted, in addition to the regular annual appropriations, is not sufficient to secure the services of one additional clerk in each of the nine Radio districts, where several assistant Radio inspectors are needed, besides funds for tests, travel and office work. There are no funds for an increase in the Washington headquarters where thousands of licenses, complaints, and reports of different kinds are handled every week by an inadequate force.

An appropriation of \$215,000 was asked for Radio supervision in the fiscal year ended June, 1923, which was only \$76,000 over the current appropriations. The increase was felt to be absolutely necessary for conducting the work of inspection of ships and shore stations, licensing of amateurs and commercial operators and the administration of Radio in general. Later, officials of the department under budget pressure, cut this figure to an increase of approximately \$60,000 but the budget is understood to insist that about \$149,000 is sufficient for the next year, an increase of only \$10,000.

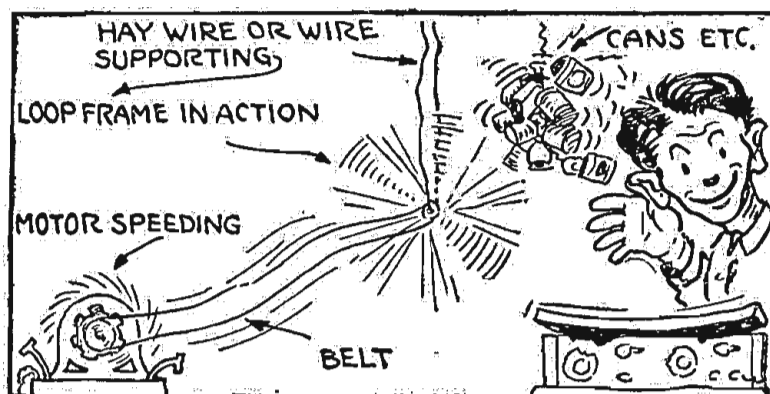
Funds for Radio research, experimentation and tests at the Bureau of Standards are also essential, and should be provided by Congress to insure adequate development in all lines of Radio communication. Manufacturers suggest that all fans urge their senators and congressmen to provide sufficient funds for the proper functioning of Government Radio supervision and development so that America may keep in the fore of Radio communication.

RADIO INDI-GEST

You Contribs Are Always Right, Ellis

Dear Mr. Gest: I sincerely hope you will pardon my long silence, but I have been deeply buried in experiments for the last few months, the result of which I give below: When receiving signals from distant stations, on account of having a pair of phones which do not fit tightly over the ears (ears are too big for that) I have found that any slight noise in the room, such as Tommy pulling the old cat's tail, would render the signal inaudible. Doubtless many other fans have the same difficulty. I have therefore, after long thought and experimentation, devised the following book-up to eliminate this:

Take your young hopeful's Meccano set, and extract therefrom the little electric motor. Take the frame of an old loop aerial, and run an axle through the center, so that it turns freely. Hang it in usual place just above the set. Place the motor on the table beside the set, and run a pulley from the motor to the axle of the old loop. Just above the



loop, and in such a position that it does not quite clear same, hang as large as possible a bunch of old tin cans, diseased cowbells, etc. Turn on the motor, which starts the frame rotating at high speed. Any noise in the room is immediately rendered absolutely inaudible to the operator.

I also might mention that in your recent Walla Walla news bulletin, you state that "the natives have raised a flaming antenna." Of course, everyone understands that this is a mere printer's error, and should read "the natives have raised flaming Gehenna." Am I not right? Disrespectfully,
ELLIS BROOKLEWSE.

(We might mention that Mr. Brookleuse is famed for many inventions, one of which, "we point with pride," is NOT the mothers-in-law wheeze.—Indi.)

WMU Gives "Fun on the Air"

WE ARE modest! We love to admit how modest we are and also, how good we are, in the same breath. Now broadcasting stations (except Station BLAH, on the sunny isle of Walla Walla, Indi-Gest's very own little but mighty squeal of the earth) probably don't know how good our stuff is when "aired." But having been "aired" or "miked" successfully every week by some stations we feel that we must start an honor roll of the wide-awake plants who know a good thing (we said thing! Neuter gender) when they see it. Additions will be made to this list as we are notified. If Indi-Gest goes on the air from your favorite plant—let us know about it. One dollar will be accepted from every Radioknut sending us corrections. We will save the dollars to buy new tubes for Station BLAH. To date frinrance, we have with us:

1. Station WMU, Doubleday-Hill Electric Co., Washington, D. C. Predates WRC and WCAP lots and is a much better outfit, of course. Any plant that puts our stuff on the air is OKEH! Whadya say? Nonayer back talk. We said it.

A-B-C Lessons for Indigest Beginners

Chapter XXVI—The End. Good!

BY GOSH

Z IS for zealot,
A high-sounding nouu,
But it stands for the fan
In most every town.
(THE END.)

Our Own A. & Q. Dept.

EASTERN SCAB TELEGRAM

dere indigestion—wy dos the Anouner at w s b sing the Anounsmints Al to won tun? iz the lon tim between peeces At p w x to Alow the musikins to smok Another sigAret An iz the noiz A stem engin that wins it up plez Anser sun or kwiker. bil sIApout amAKover Ark.

Answer: Lambdin Kay of WSB keeps the Atlanta Journal outfit sharply tuned by the so-called monotone. If that won't do, here's another. Lambdin Kay is trying to find his lost chords. Or how's this. Lambdin Kay doesn't know any other tunes. All right. Now re PWX, all they smoke in Havana is American made Havana cigars, and the noise is the announcer trying to draw through one of 'em.

Sounds Like the Cow's Brother, Mama

Dear Indi: J. A. B. of Lincoln, Nebr., wrote WBAP, Fort Worth Star-Telegram, that its cowbells, used in opening and closing each program, came in so strong a few nights ago that his neighbor got real excited and called out his dogs, thinking his cows were in his garden. Hope you know us too, Indi. MAMA HAYNES.

(Mama put four little crosses on her letter. Seems as though we OUGHT to know her.—Indi.)

Vaughn Will Like This, We Know

Dear Indi: Being an ardent fan of course I admire Vaughn. I wrote the following tribute to her gracious personality. Will you insert it in one of your issues! Thanks.

TO VAUGHN DELEATH

Sweet singer with the happy voice
Do you know, my dear,
How you make our hearts rejoice
With your joy and cheer?
Our gloomy feelings soon take heel,
And run in great despair
When we but hear your merry songs
Coming through the air.
We thank you for the joy you give
The glad warm feeling too.
May you in turn receive much love,
For truly 'tis your due.

MARTHA M. DAHL.

Musta Been a De Forest Fonyfilm

Dear Indi: I was kicked out of the local movie house last night because while looking at the pictures I was trying to put myself in a frame of mind imagining the pictures were coming in by Radio and that, through too high a tube, they were distorted! ART.



Condensed

By DIELECTRIC

Many times the announcements from broadcasting stations carry a feeling of formality, or at any rate they seem impersonal. Should you be tuned to WJAZ, Chicago, Wednesday nights and stay there until midnight, you would have a real thrill in listening to what follows that hour. At that time 9XN (the same station) tells WNP all the news of the day, besides carrying to the MacMillan party a hearty personal greeting from friends in Chicago. WNP cannot talk back except by code, yet for these ice-bound men to hear a familiar voice giving current events and a cheering message is indeed a wonderful thing.

KDKA, the pioneer broadcasting station, informed its listening audience the other night of a new station opened at Hastings, Neb., which is to be a relay station for the Pittsburgh studio. When stations on the Pacific coast desire to get the programs from KDKA, they will secure them by tuning in KFCK. Of course many listeners in the far West are able to get the signals from Pittsburgh direct, but with local stations there sending out music from the "little symphony orchestra," etc., this number will be greatly increased. Relay stations no doubt will come to play a bigger part in broadcasting as time goes on.

Such a ceremony as that performed at the official opening of the trans-Atlantic Radio station in Warsaw, Poland, is not of ordinary occurrence. Considering the important experiments in which this station has played so prominent a part it was fitting to make an imposing affair of the occasion. The president, cabinet, both houses of parliament, diplomatic corps and prominent business men were present; messages of felicitation were exchanged between the heads of the two republics, Poland and the United States. There are a few countries left with no great Radio stations capable of keeping in touch with the rest of civilization; however, it will not be long before all the world will be in direct contact through exchange of Radio messages.

Various estimates of the number of Radio receiving sets in use in the United States have been made from time to time running well up above the million mark. It is the intention at present of officials in the Department of Commerce to take a census of listeners in to find the exact number and percentage of tube to crystal sets. In spite of the improvements in tube sets and their apparent increasing demand, we must not lose sight of the novice who frequently enters the ranks with a crystal outfit—advancing ultimately to the class of tube operators—and whose enthusiasm for the thing would be nil if more expensive sets only were available. A Radio census would be of value in many ways.

Perhaps you don't happen to be living in rather close proximity to commercial code stations along the Atlantic coast, so know nothing of the delights of having a wonderful violin number so covered with dits and dahs as to make an arpeggio sound like a static imitation of a jew's harp. A movement is afoot to have all commercial code-messages sent on other than the 450 meter wave, and such stations refuse to accept traffic from ships using that wave length. The main cry of a buyer near New York is "does the set cut out code?"

You may think you are listening to a certain station direct only to find that KGU, the Honolulu Advertiser, has been spoofing you. That station receives programs from the states and rebroadcasts them for the pleasure of listeners in Hawaii and the perplexity of those a thousand or more miles away. You may have heard the music from the Chicago Civic Opera company through the microphone of station WJAZ, although operatic performances of that company were broadcast by KYW, and wondered at it. Well, the former tuned in the opera on a receiving set and retransmitted it so successfully that many telegraphed their congratulations. "It's a good thing, boost it along," applies here too.

Latest Development in Grimes Inverse Duplex

Part IV—Detector Tubes and Crystals

By David Grimes

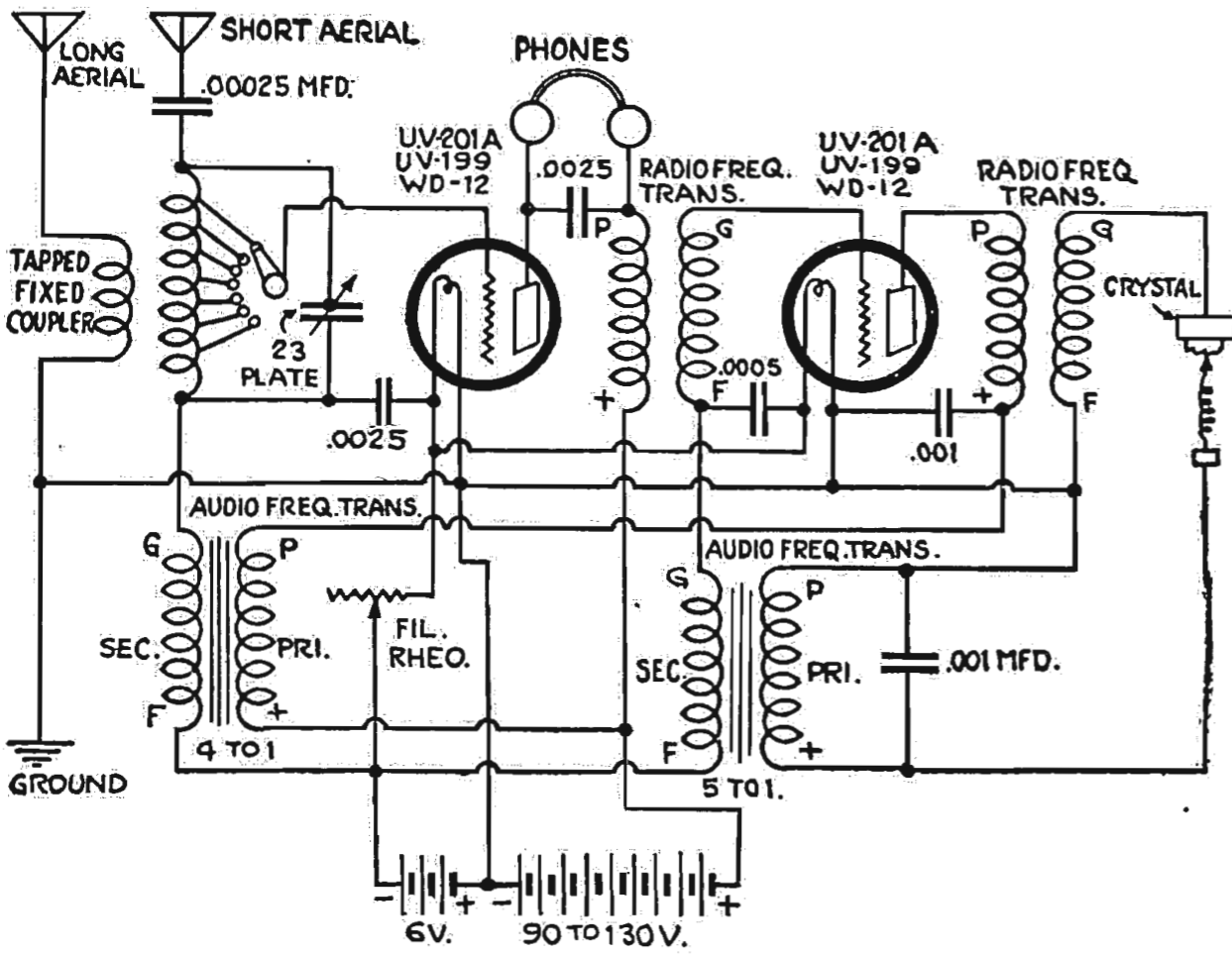


Figure 8—Two-tube Inverse Duplex aerial with crystal detector

IT HAS been assumed in the discussion so far and also in all previous information released, that the UV-200 tube should be employed for detection. Many experimenters have encountered no end of difficulties, not only in the Inverse Duplex system, but in other circuits as well, by attempting the use of "hard" tubes for detection. In many hundreds of tests in every conceivable circuit, the UV-200 "soft" detector tube has been by far the best.

Many amateurs have "kidded" themselves into believing that the UV-201A or C-301A is as good as, if not better than, the UV-200 tube as a detector, although the manufacturers call the UV-201A a "super amplifier tube." For reception of nearby and medium range stations, the UV-200 is overloaded and a 201-A will apparently match the better detector in performance. It is when extremely weak signals are being received that the UV-200 is operating at best efficiency. On all loop reception only the UV-200 tube (or the C-300) is to be recommended.

Now, then, a short paragraph on the best amplifying tubes for the inverse duplex, would not be out of order. Just as many tests were conducted on amplifier tubes in this and other circuits as were run on the detector tubes, and every test showed that the UV-201A was, in reality, the "super amplifier tube." The UV-199 is not to be considered seriously for maximum results in any multitube circuit. I have obtained very satisfactory results with them in single tube sets, but reduced efficiency and poor quality almost inevitably result from their use in circuits employing two or more tubes. The manufacturers have placed on sale the UV-201A as the "super amplifier tube," and the best they can say in their own advertisements for the UV-199 is to describe

it as "the little tube of big performance." It will be found in experimenting with UV-200 detector tubes that considerable variation sometimes occurs between them. Some will require 16 volts on the plate for best results. Others will require as much as 19 volts, while still others will operate most efficiently on 22½ volts. It will thus be necessary to vary the B battery voltage on your detector from 16 to 22½ to determine the correct value for your particular tube. Even with all of these variations, some detectors will be found less effective than others. When you find a particularly good one, I advise you to keep it under lock and key. The detector tube has another inherent peculiarity. When the filament glows at too high a temperature, the tube sizzles or fries. This is sometimes referred to as tube noise. It is just below this

sizzling point that best detection is obtained. Due to the fact that this tube requires 1-ampere filament current and possesses the above-mentioned variations and noises, many experimenters prefer the crystal detector in the inverse duplex circuit. Previous sketches in the other

"soft" tube. A good crystal detector operates as well, and is certainly easier on the battery and much cheaper initially. Recently, some highly satisfactory fixed crystals or rectifiers have been placed on the market, and these, while usually not quite so sensitive as the adjustable type,

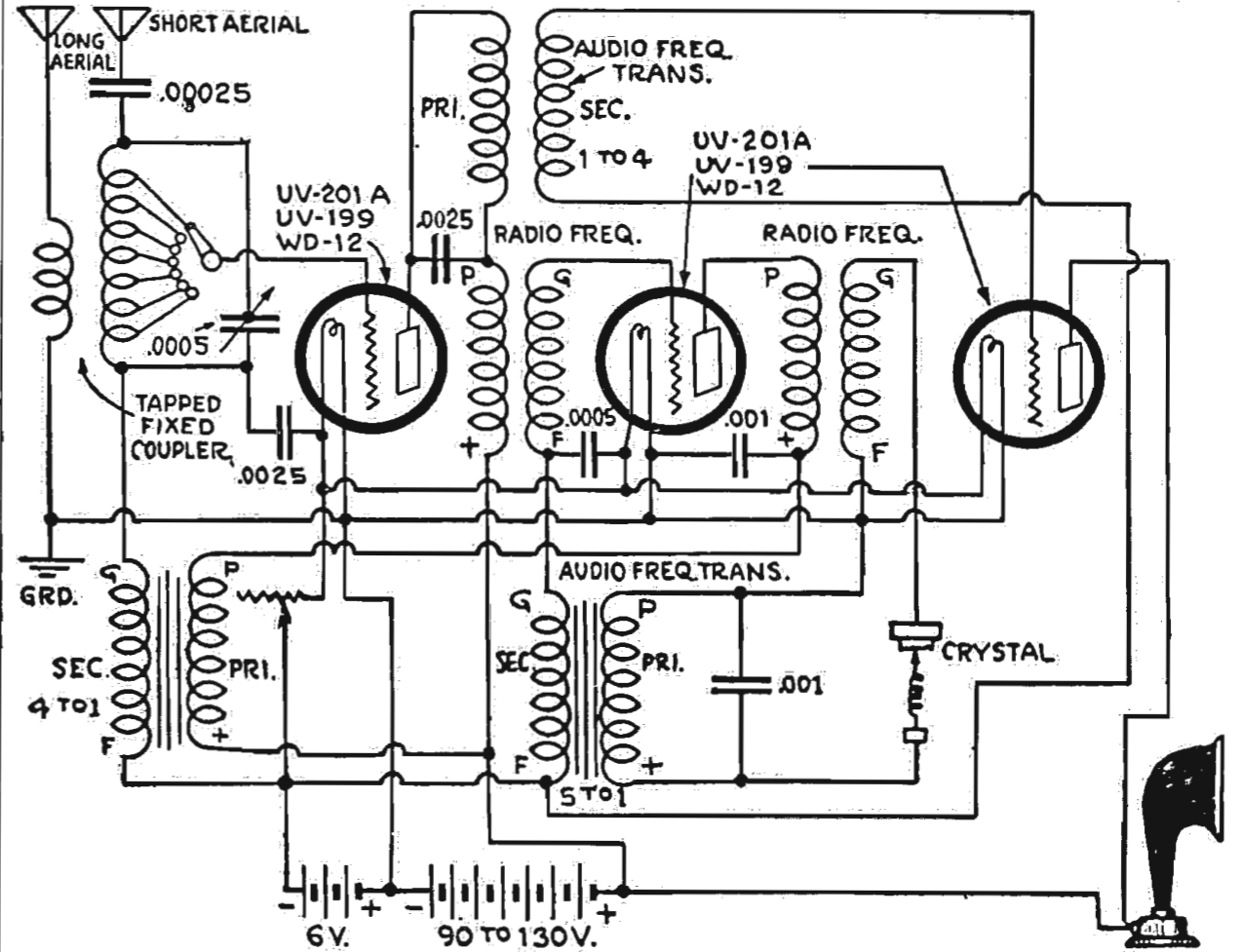


Figure 9—Grimes Inverse Duplex with two Radio, crystal and two audio

articles showed the connections necessary for the use of the detector tube in the Grimes circuit. The remainder of this article will discuss the crystal rectifier.

In the first place, the crystal detector is nowhere near as sensitive as the UV-200, although many crystal rectifiers compare very favorably with the UV-201A, when the latter is used as a detector. Therefore, a "hard" tube is not suggested as the remedy for the objections to the

present certain advantages not to be overlooked by the amateur who does not care to be classed as "the cat's whiskers."

Owing to the decreased sensitivity in both the fixed and adjustable crystals, it will be necessary to add an extra stage of Radio frequency amplification or else

(Continued on page 18)



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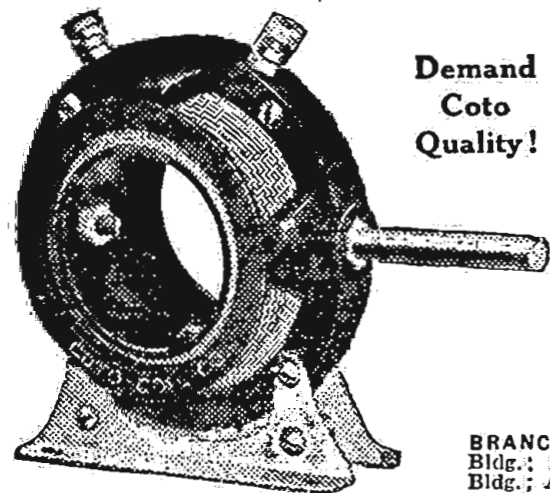
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INVERSE DUPLEX

(Continued from page 17)
operate on an aerial. Many persons do not object to aerial operation, and where one can be erected properly, greater distances

one of the wires leading to the loud speaker or telephones. This is not a normal situation, though, and no difficulty will be experienced unless such actual contact is made.

The tapped aerial coil or tapped fixed

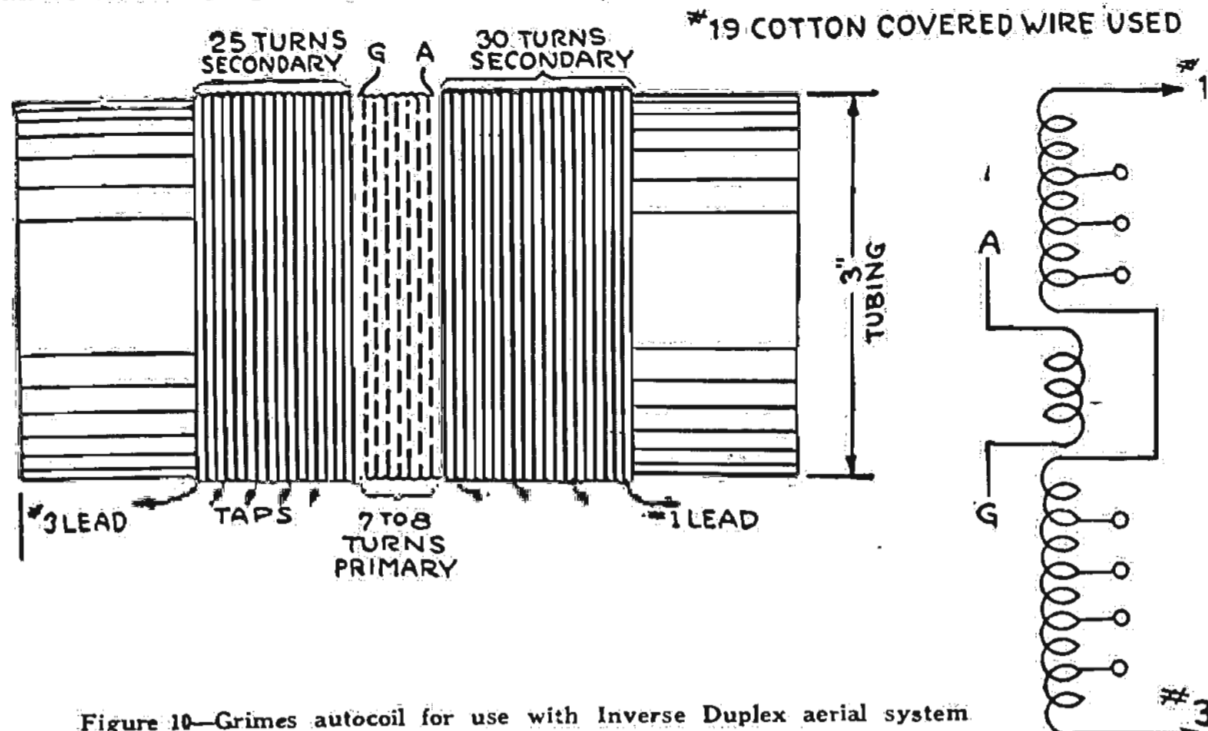


Figure 10—Grimes autocoil for use with Inverse Duplex aerial system

and louder signals can be obtained than with loop reception. The aerial has the objection of being subject to telegraph interference and static disturbances to a much greater degree than a loop. The loop, on the other hand, has the objection of being subject to local conditions to a greater extent than the aerial. Efficient reception on a loop depends primarily on where the loop is located. Nine locations out of ten are satisfactory for excellent loop reception. The tenth one may be in some steel building or some wooded or hilly section of the country where the reception varies all the way from absolute zero to absolute success. Results on loops cannot be predicted in advance, but the inverse duplex which is such a sensitive circuit as to ordinarily cover half the continent on a small loop, is even more remarkable when designed to function on an aerial.

Figure 8 shows a two-tube inverse duplex aerial set using a crystal detector. This circuit still possesses the advantage of one tuning control and the tapped coil method of controlling the Radio frequency energy. Both tubes are UV-201A amplifiers and are controlled by one rheostat. The detector may be fixed or adjustable, but be sure that it is a good one because your results will depend absolutely on its efficient performance. Crystals usually cost very little in comparison with a tube, and it is therefore desirable to purchase several different kinds for trial. A little experience along this line and you will find yourself in possession of a very good crystal. There are both good and bad ones on the market.

It is desirable to operate the set with as low a tap on the fixed coupler or aerial as will give satisfactory signals. Increasing this tap on local stations results in overloading the tubes. This causes poor quality. Partial rectification or detection takes place in the amplifier tubes under these conditions and weak signals may be heard even with the detector disconnected. Don't let this worry you. The remedy lies in dropping the taps on the coil.

Figure 9 shows the above circuit with an extra stage of pure audio amplification added for volume. This has been added merely in place of the phones without any material change being made in the circuit. This additional stage could have been obtained by the choke coil method as discussed in Part III. This is an added expense and is not absolutely necessary. Without the choke coil, however, a slight howl is heard when the operator touches

coupler shown in this circuit may be constructed by those who care to do so. It is called the Grimes autocoil. Wind about 55 turns of Number 19 cotton-covered wire on a spool, 3 inches in diameter. A space should be left at the 25th-turn for eight turns of the primary winding. The general layout is shown in Figure 10. It is possible to use a variocoupler with the tapped stationary primary employed as the tapped secondary. The movable secondary is then used as the primary with a series aerial tuning condenser.

The next article will discuss the use of crystal detectors with an additional stage of Radio frequency amplification for use either on aerial operation or loop. The sixth article will take up in considerable detail the employment of tuned Radio frequency in connection with the Grimes Inverse Duplex System. Wait for it!
(TO BE CONTINUED.)

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FLEWELLING ANSWERS

By E. T. Flewelling

(Editor's Note.—This department is written by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him in care of Radio Digest, he picks the one considered most informative for all and answers it in this column.)

Wave Length in Flewelling Set

(Submitted by J. K., Cicero, Illinois.)
Question. I am using a one-condenser Flewelling circuit with the variocoupler, using a rotor as a tickler described in The Radio Digest and am not able to reach the shorter wave lengths. I cannot get anything under 350 meters. Can you tell me what the trouble is? I am using a 23-plate vernier type condenser.

Answer. I am very glad indeed that you brought this question up, because I have had numerous inquiries along the same line; and because the answer would evidently be of some value to Radiophans in general, I will give it to you in detail.

Wave length range in a Radio set depends not only on the amount of inductance but also upon the variable condenser used. Assuming that the inductance is correct, let us consider the condenser. Many believe that if they use a 43-plate condenser they will get a much greater range than with an 11-plate condenser or a 23-plate. This might be true, but as a rule it cannot be followed because of the great variation in types of condensers on the market. The range that can be covered in the broadcasting field with the condenser does not depend upon its maximum capacity or the number of plates in it, but entirely upon the ratio existing between its minimum capacity and its maximum capacity; in other words, were a 7-plate condenser to have a larger ratio from zero setting to maximum setting than a 43-plate condenser, you would be able to tune over a larger wave length range. One of the things to look for when purchasing a condenser is to see that you are guaranteed a very low capacity at the zero setting of the condenser, and you will then be able to get a very much greater range with your set than if you were to use a condenser without consideration of this point.

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Super-Triplex Selective Receiver Construction

Part II—Panel and Sub-Panel Layout

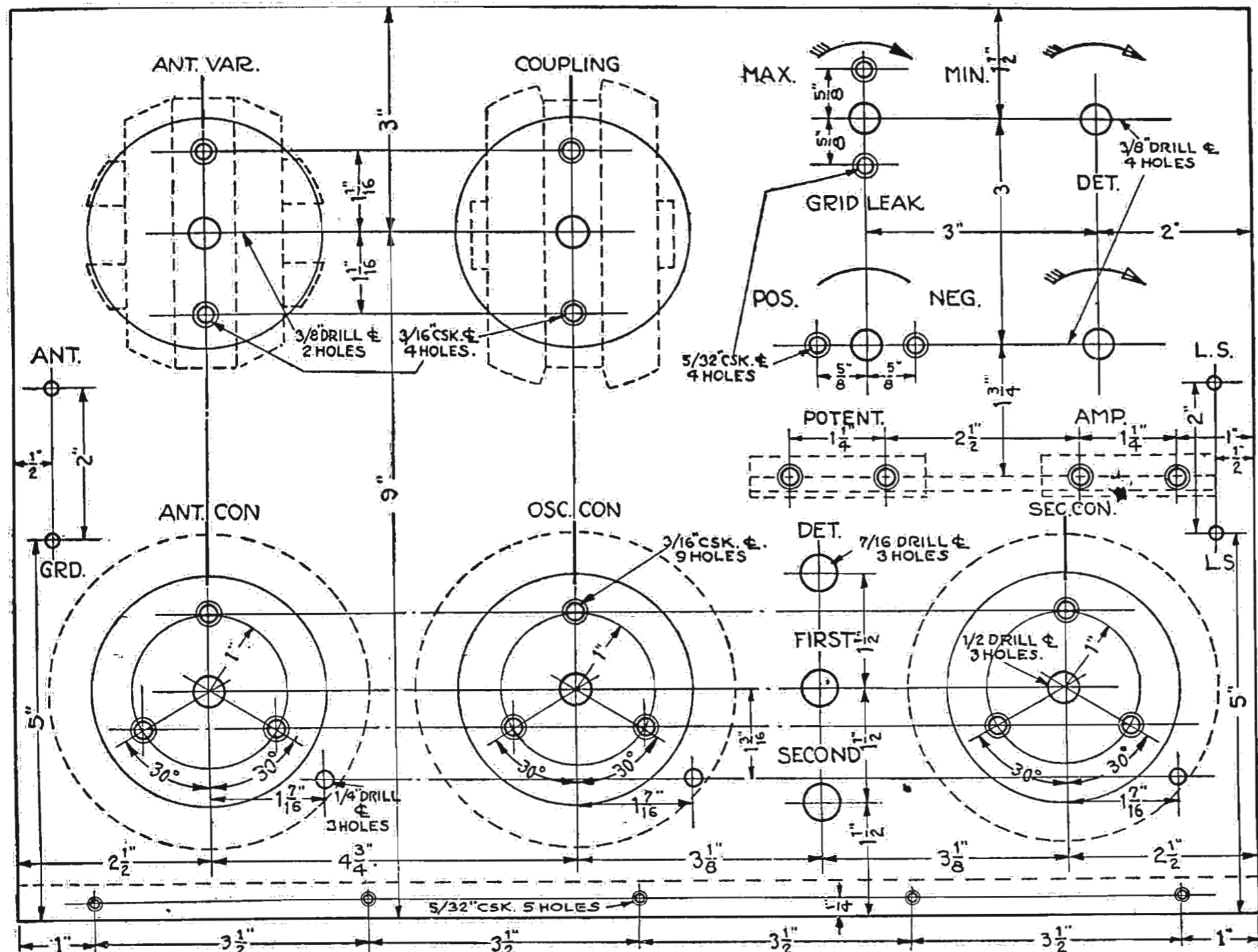
By H. J. Marx

THE problem of proper panel layout is of much more importance than the average fan thinks. There are three facts which must be kept in mind:

Interference
It is quite evident that only two of the controls mentioned have effective fields of force which must be considered.

Advantages
The advantages of this entire arrangement are more or less apparent. The antenna variometer and condenser con-

speaker connections. The jacks then are only used when tuning the set with head phones. When the plug is pulled the loud speaker is automatically connected and all wiring cords are kept clear of the front of the set. All battery connections are made in the rear.



Sub-Panel Mounting
It was originally intended to assemble all remaining apparatus on the baseboard, which is fastened to the main panel by means of five countersunk screws as shown at the bottom of the illustration. This however necessitated unusually long leads from the rheostat to the sockets. These long leads, especially the A battery leads, are easily bent and thus are likely

1. The necessity of compactness;
2. The proper symmetrical arrangement; and
3. Efficient spacing and arrangement of apparatus.

Long narrow panels are by no means handsome in appearance. Besides, they necessitate exceptionally long leads, thus increasing the effects of interference, capacity reactions and the possibility of short circuits or easily broken connections.

Proper Procedure
In the panel layout, naturally the first consideration is what parts having controls are to be assembled on the panel. In the Super-Triplex there are three variable condensers, one variometer, the three-circuit coupler, variable grid leak, potentiometer and rheostats. Naturally it is most convenient to start out without being limited to size of panel, then the design of the layout can be developed around the apparatus, while otherwise the layout must be confined to the panel size.

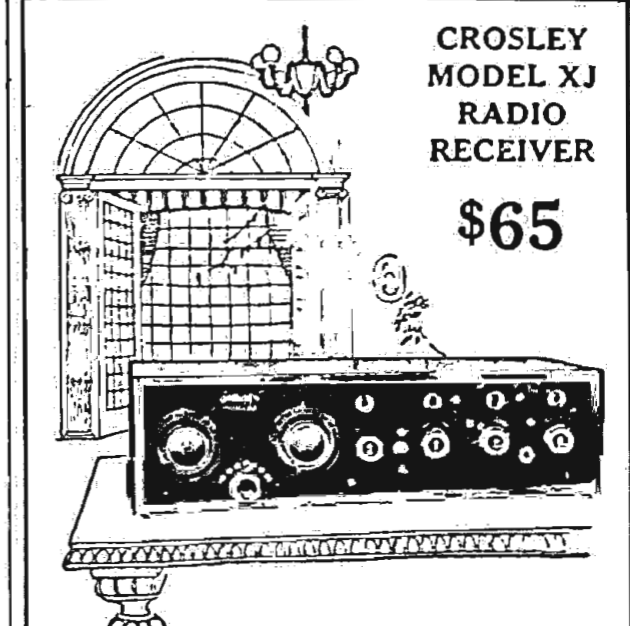
In the panel layout shown in the illustration it happened that a panel 12 inches by 16 inches was available, and as the design readily worked itself to these dimensions no change of size was necessary.

These are the variometer and the variocoupler. They were therefore placed in the upper right-hand corner and spaced 4 1/4 inches apart, which is sufficient to avoid any serious coupling tendency from the one to the other.

The three condensers, as was immediately apparent, were best arranged along the bottom, the only alteration made being the addition of three jacks for controlling the various stages.

An examination of the layout shows clearly why the double rheostat was used for controlling the two audio frequency tubes. This eliminated the space requirement for an extra rheostat and permitted a symmetrical arrangement of the four additional controls in the upper right-hand corner.

controls require the least adjustment of all and also are least critical. They are then farthest out of the way, leaving the more important ones at the right side. The coupling and oscillator condenser are next in this reverse order of importance. The most critical adjustments of all is the secondary condenser, placed in the lower right-hand corner, and requires, therefore, no reaching over other controls for adjustment. In accordance with standard practice the antenna and ground binding posts were added at the left side of the panel. To balance the right side, two posts were added for loud



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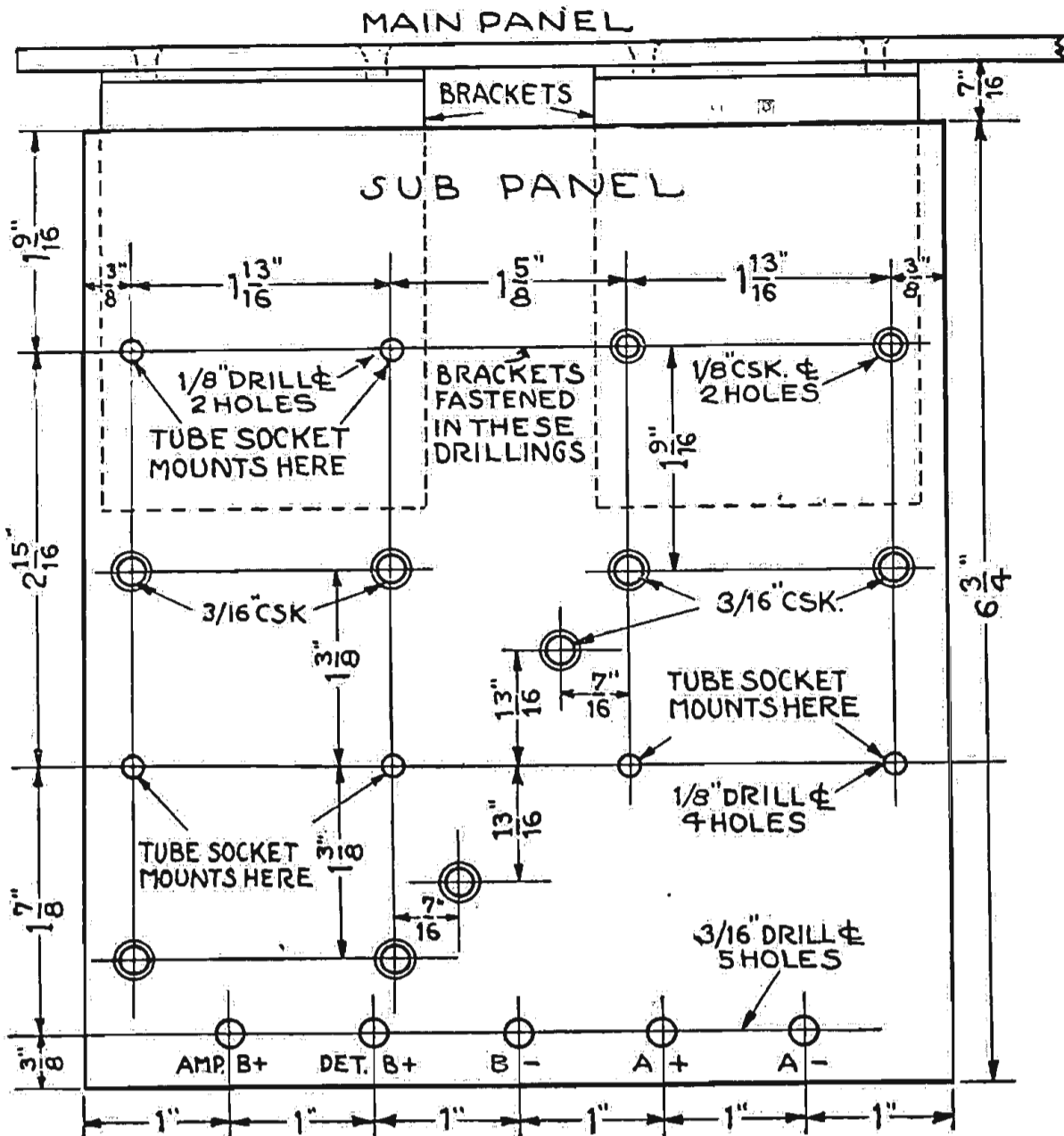
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SUPER-TRIPLEX

Continued from page 19)

to cause short-circuit troubles with disastrous results. Sufficient space for using panel mount sockets was not available.

as shown by the dotted lines indicated at the right side of the panel layout. The sub-panel, measuring 6 by 6 3/4 inches, was then mounted on the plates. Only the three sockets and five binding posts are fastened to this sub-panel, the two audio frequency transformers being mounted on



A little thought revealed the fact that when the socket itself was removed from the panel mounting plate an excellent arrangement for supporting a small sub-panel was available. These two original mounting plates were then accounted for,

the base. A metal brace helps support the rear end of the sub-panel. With the audio transformers just under the sub-panel, all leads are short.

(TO BE CONTINUED.)

RADIO FOR EVERYBODY

(Continued from page 15)

360 meters, one single wire 130 feet long with a lead-in of 40 feet or less is excellent. If you live in an apartment house and

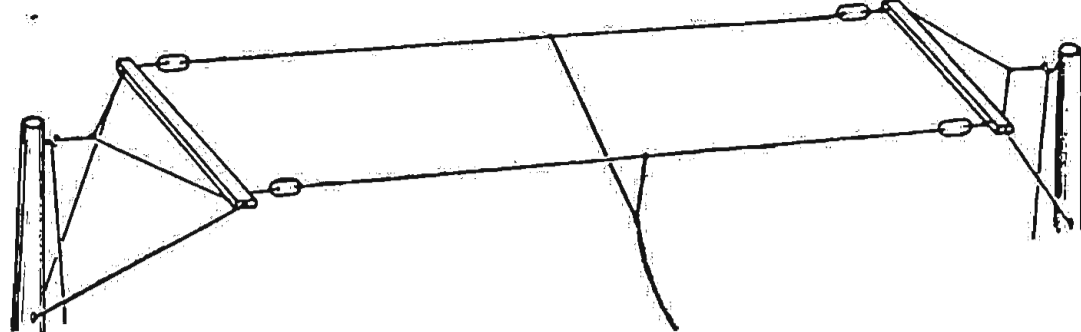


Figure 49—The two-wire T-antenna is often easier to erect than a four-wire inverted L.

to lose any energy. For this reason we have inserted, in the drawing, an insulator at each end of every individual wire, and another large insulator in the supporting ropes where they converge. These ropes, converging from the ends and center of the wooden cross bar, are known collectively as the bridle. The cross bar is termed the spreader—it keeps the wires spread apart. The insulators in the wires may be the white porcelain cleats used in house wiring; they may be made of some composition such as electrose; pieces of scrap bakelite or, when economy is important, strips of wax-impregnated wood. Wood strips boiled in wax will do but are inferior to the others. The insulators used just above the bridle must be larger and possess greater tensile strength as they support the heavy spreaders and wires through wind, sleet, rain and snow. We show the inverted L with four wires, but it may be made with one, two, three, four, five, or six. Where more than one is used, the wires should be kept at least 3 feet apart. Thus two wires, require 3-foot spreaders; three wires 6-foot; four wires 9-foot; five wires 12-foot and six wires 15-foot spreaders.

Antenna Inductance and Capacity

An aerial provides both inductance and capacity to the antenna circuit. The greater these two factors, the longer the natural period or the wave lengths to which the aerial best responds. We increase the inductance rapidly and the capacity a little as we increase the length of the wires. We increase the capacity rapidly and the inductance but little as we add wires. Therefore, one long wire, two medium-length wires, or four short wires can all have approximately the same natural period. For reception, one long wire is best, but that is, more often than not, impossible, especially in cities. For the reception of broadcast signals on

the landlord of a building four or five doors either side will not permit you to attach the wire to his building, try a landlord three doors away and if he agrees, put up two wires 70 to 80 feet long. Should that be impossible, but your own building offers 30 to 45 feet of straightaway, put up four wires as shown in the sketch. But whether you erect one, two, three or four wires put one of those all-important little insulators at the ends of each wire. If one wire is used, the lead-in should, if possible, be soldered to the aerial wire. Even if you must measure out the wire, then roll it up and take it over to a friend who has a soldering iron, do this if you can. If not, scrape a length of 3 inches on the aerial wire, scrape the end of the lead-in to a distance of 1 foot, and wrap the lead-in around the scraped portion of the aerial tightly and closely. Then cover the joint well with black electrician's tape. This is to prevent corrosion as much as possible. Figures 47 shows one variation of the inverted L type as erected in the city. Take advantage of watertanks, chimneys, flagpoles, elevator shaft housings, anything and everything that projects above the roof.

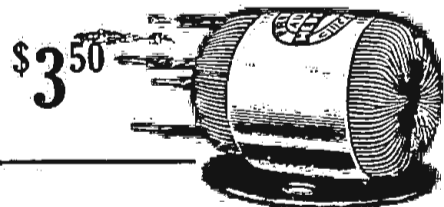
(TO BE CONTINUED.)

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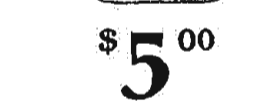
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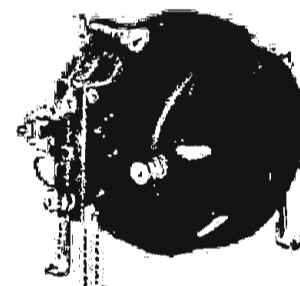
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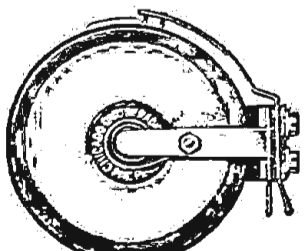
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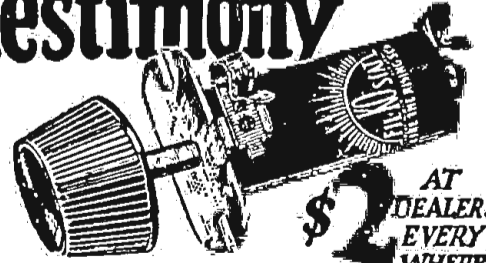


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Ideas for the Amateur's Laboratory

Dollar Savers in the Construction of a Set

There are many amateurs who appreciate the advantages of mica-diaphragm phones, but as in many other instances, the cost is too great and the average amateur is compelled to buy less expen-

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THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.

RADIO KINKS DEPARTMENT,
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123 W. Madison St., Chicago

sive ones. Hence they may find useful the idea shown in Figure 1, which shows an easily made mica diaphragm that can be used on any make of phones. The mica can be trimmed to shape by cutting with a sharp knife around the old diaphragm. The mica should be split as thin as possible. If desired, diaphragm mica may be bought already cut from most Radio specialty houses. A thin piece of core iron or of the old diaphragm is cut circular in form and about 1/4 inch in diameter. This should be shellacked to the mica, and the completed diaphragm placed in the phone with the metal nearest the magnets, but not so close that it touches them. It can be readily seen that the diaphragm will vibrate more freely than the ordinary type.

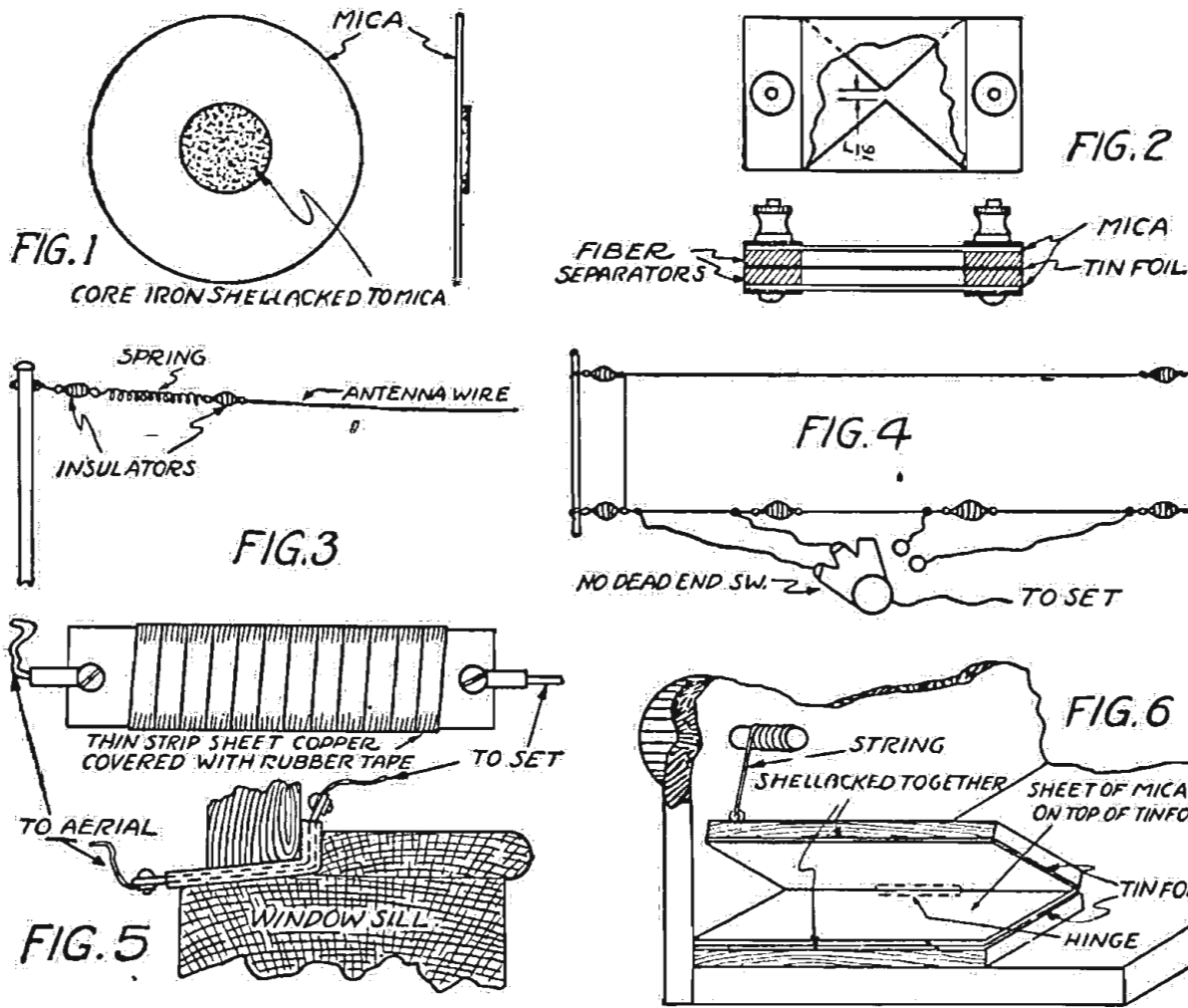
If the reader has ever had a vacuum tube "blow out," I am sure he will agree with me that much "slang" could have been spared if there had been a little fuse in the circuit. If by rare chance you have never had this misfortune, do not wait till the horse runs away before you lock your barn, but insert a little safety fuse in your circuit at once. Figure 2 shows such a device. A piece of tinfoil is cut to a taper of 1/8 inch as shown in the drawing. A binding post is connected at each end of this, and a small strip of mica on each side serves as a protection. One of these fuses connected in the filament circuit is a real dollar saver.

The numerous antennas hanging on the chimney tops about a town, present a dilapidated appearance. Drooping like weeping willows, they seem to be tired of existence. A simple remedy is to attach a spring between two insulators at each end of the antenna as shown in Figure 3. A spring from an old curtain roller serves the purpose quite well. Thus we have a sway-proof and sagless antenna.

The introduction of the vernier to Radio has played quite an important part in its advancement. Figure 4, which is self-explanatory, shows the application of the vernier idea to antennas. By connecting a no-dead-end switch and taking lead-ins between insulators as shown, it is possible to do rough tuning outside of the set itself.

Many landlords object to the drilling of holes in the side of the house for the antenna lead-in. It is quite difficult to make a good lead-in otherwise, but a fairly good one can be made using the

HELPFUL HINTS FOR THE BEGINNER



device shown in Figure 5. A strip of thin sheet copper is covered with rubber tape and a binding post is connected at each end. This can be bent to fit snugly on the window sill. The outside end is connected to the antenna, and the inside binding post is connected to the set.

Remarkable tuning results are being accomplished with two plate condensers. Such a condenser can be easily made at home. Two blocks of wood or hard rubber with a hinge, as shown in Figure 6, are covered with a sheet of tinfoil on one side. This is applied by means of shel-

lac. A piece of mica on the stationary part of the condenser covers the tinfoil and prevents the two plates from touching. Connections to the plates are made by flexible cords. Adjustments of the condenser are made by means of a dial, with the string arrangement shown in the drawing.

The author hopes these kinks will be of aid to the amateur in overcoming some of the obstacles which constantly confront him, and be useful towards improving the Radio set.—Carl Masson, Boston, Mass.

Improve Loud Speaker with Rubber Washer

In loud speaker horns that use a telephone receiver, considerable improvement may be made if a rubber washer the same size as the shell of the receiver can be obtained. The ear cap is removed from the receiver and the shell, with diaphragm clamped securely in place, with the rubber washer between the receiver and the bottom of the horn. By adjusting the pressure on the thumb screws, it is possible to greatly improve the tone. This may not work with all forms of horns, but the most of them can be arranged in this way.

GENUINE EDISON ELEMENTS (new) for making "B" Batteries, obtained from U. S. Government. A positive and negative element—6c; glass tube—3c; all other parts at reasonable prices. Postage, etc., 50c extra per order. Free instructions. TODD ELECTRIC COMPANY, 109 West 23rd Street, New York.

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WD-11-12, UV-199, UV-201-A
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All Work Fully Guaranteed

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NEW TUBES

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A-12 (Type DW-12) **CH**

All the above Tubes guaranteed amplifiers and detectors. Shipped C. O. D., postage prepaid.

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Body capacity has long since ceased to be the bugbear it once was. Shielding has eliminated it, and the disuse of shellac as

an insulator has favored the possibility of sharper tuning.

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The New Freshman CAPACITY FINDER

permits you to actually measure the condenser values necessary in your hook-up.



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capacities
for the
price of
5
FIND OUT

just what value of a condenser will give your hook-up the best results in the grid circuit, across the phones, in the Antenna Circuit, across transformers, battery circuits, etc.

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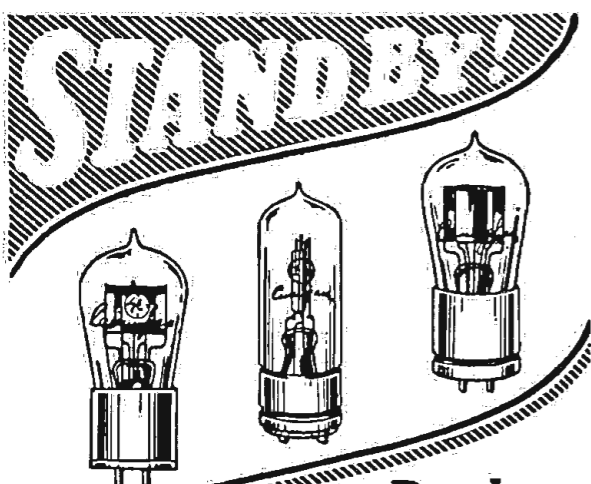
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Have stood the test of time **\$1.50** and are best by every test.

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	12.00 Western Electric.....	8.95	35.00 Magnatone.....	29.00
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	12.00 Baldwin.....	7.95	CONDENSERS	
	7.00 Federal.....	4.95	2.00 R. C. 11 Plate.....	\$0.95
	Ambassador.....	3.75	2.25 R. C. 23 Plate.....	1.05
	BATTERIES		2.75 R. C. 43 Plate.....	1.25
	5.50 45 Large Eveready or Cyclone.....	\$3.25	2.00 Signal 11 Plate.....	1.20
	2.75 45 Small Eveready or Cyclone.....	1.60	2.50 Signal 23 Plate.....	1.35
	2.75 22 1/2 Large Eveready or Cyclone.....	1.60	2.75 Signal 43 Plate.....	1.45
	1.50 22 1/2 Small Eveready or Cyclone.....	1.00	4.50 U. S. Tool Vernier 11 Plate.....	3.25
	TRANSFORMERS		5.00 U. S. Tool Vernier 23 Plate.....	3.50
	7.00 Federal No. 65.....	\$5.25	5.50 U. S. Tool Vernier 43 Plate.....	3.90
	5.00 Acme.....	3.75	6.00 Hammerlund Vernier 11 Plate.....	4.75
	5.00 All-American.....	3.65	6.50 Hammerlund Vernier 23 Plate.....	5.25
	7.00 Amertran.....	4.85	7.00 Hammerlund Vernier 43 Plate.....	6.25
	5.50 Thorlanson.....	4.50	SOCKETS AND RHEOSTATS	
	5.00 Marle.....	4.00	1.00 DeForest Filament Rheostat.....	\$0.80
	5.00 Pearico.....	3.85	1.00 Cutler Hammer 6 Ohm Rheostat.....	.80
	5.00 Erla.....	3.95	1.50 Cutler Hammer 30 Ohm Rheostat.....	1.20
	VARIOCOUPERS		1.00 Federal Socket.....	.85
	3.50 Fisher 180° and Straight.....	\$1.95	1.00 DeForest Socket.....	.65
	3.50 Workrite 180°.....	2.95	1.00 Fada Socket.....	.85
	8.00 Gillfillan 1000 Meter.....	6.00	JACKS AND PLUGS	
	4.00 Simplex Silk Wound 180°.....	2.80	0.80 Federal Double.....	\$0.65
	3.25 Shamrock.....	2.35	.60 Federal Single.....	.50
	6.50 Pearico Moulded.....	5.25	1.00 Carter Plug.....	.85
	7.00 All Wave Coupler.....	5.50	.60 Patent Plug.....	.50
	VARIOMETERS		.60 Cyc 2 way Plug.....	.45
	3.50 Fisher Large 600 Meter.....	\$2.65	1.00 Radio Improvement.....	.85
	3.50 Workrite.....	2.95	1.00 Erla Crystal.....	.90
	7.00 Gillfillan Small.....	4.95	\$65.00 Genuine Fada Parts for 5 Tube Neutrodyne Set	
	3.25 Shamrock.....	2.35	\$49.00	
	6.50 Pearico.....	5.25	A 5 Tube Neutrodyne Set with Genuine Fada Parts wired complete in Mahogany Cabinet without tubes or batteries	
	GENUINE TUBES—RAOITRON		\$85.00	
	5.00 UV-200.....	\$3.95		
	6.50 UV-201A, UV-199, WD-12, WD-11.....	4.95		
	7.00 DeForest.....	5.25		

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Questions and Answers

Neutrodyne and Reinartz

(05486) WSS, Rochester, N. Y.
Being a subscriber to your magazine I have followed very closely the many hook-ups you have so clearly published from time to time. Not having been in a position to build my own set, have purchased several sets, one Armstrong regenerative two step and one peanut tube. Now I feel I would like to build a set with two or more steps.

Kindly advise me on Reinartz as to cost and possibilities, also Hazeltine neutrodyne. Advise which is the most practical for home use. Impossible for me to have outside antenna.

A.—A Reinartz circuit can be constructed for \$10 and upwards in accordance with complete apparatus advertised in Radio Digest and is recommended as an efficient circuit which is simple of construction and operation, and is probably better adapted to the novice both in the matter of construction and operation, than

would be the Neutrodyne circuit, which is also efficient. An efficient antenna system is essential to best results with a Reinartz circuit, however. The Reflex De Luxe is recommended as a superior circuit giving good reception on a loop aerial.

All of the above are featured in Radio Digest, and under favorable conditions of construction and operation are high-class receivers.

Battery Connections

(05836) ECK, Plainview, Tex.

I have a single circuit set with two stages of amplification, using UV-300 and UV-301 tubes. I am using storage A battery with 3 feet of extra-heavy stranded wire for connections to the set and number 14 lamp cord for B battery connections.

Please advise proper size wire and kind to use on B and A battery connections. What size wire shall I use to connect loud speaker to A battery?

A.—Ordinary lamp cord will serve very nicely for making neat-looking connections to batteries in set and for loud speaker number 14 lamp cord is all right.

VT-1 and 2

(05715) JHA, St. Augustine, Fla.
The following information will be appreciated:

Characteristics of VT-1 and VT-2 tubes? Is either more desirable as detector or amplifier—Radio or audio? Plate voltage advisable for best results? A.—VT-1 is an excellent detector and

Radio frequency amplifier, using 6-volt filament supply, 1.2 amperes, 45 to 50-volt plate potential.

VT-2 is an excellent audio frequency amplifier, 6-volt filament, 1.2 amperes, 60 to 120-volt plate potential.

Workman Radio Service

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VARIOCOUPERS

\$3.50 Workrite 180° Silk Wound.....\$2.95
3.00 Mills 180° Silk Wound..... 1.95
3.50 Fisher, Large, 90°..... 2.25
2.75 Fisher, 180°..... 1.75

VARIOMETERS

\$3.50 Workrite.....\$2.95
5.00 Pathé Moulded..... 2.25
3.50 Fisher, Large..... 2.65

CONDENSERS

\$2.00 R. C. 11 plate.....\$1.05
2.35 R. C. 23 plate..... 1.35
2.75 R. C. 43 plate..... 1.65

VERNIER CONDENSERS

\$4.00 R. C. 23 pl.....\$2.25
5.00 R. C. 43 pl..... 2.95

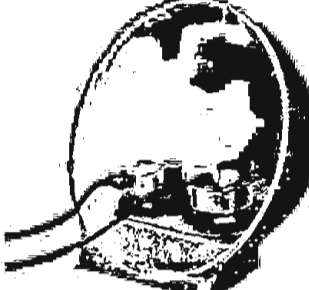
PHONES

\$18.00 DR. SEIBT IMPORTED "SUPER \$5.90 HEADSET"
\$6.00 Brandes Superior.....\$4.90
12.00 N. & K., Imported..... 5.50
5.00 Nerco..... 2.50
6.00 Potter Precision Headset..... 4.25
5.00 Diamond De Luxe Phones..... 3.50

Mail orders promptly attended to. All orders amounting to \$5.00 or more will be shipped prepaid. Will ship C. O. D. unless remittance accompanies order.
The above items are just a few of our numerous attractive priced articles, which are contained in our BULLETIN OF RADIO PARTS. Gladly sent to you upon request.

DUPONT PYRALIN SHELSTONE

Loud Speaker
With
Nath. Baldwin
Head Set
Type C
Perfect Results



Shelstone is made of Dupont's Pyralin, is transparent and one of the most attractive Loud Speakers on the market.

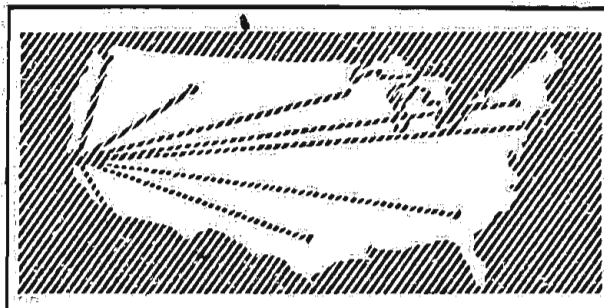
It is built differently to take advantage of the most correct acoustic principles and reproduces music and speech with a clear tone.

Loud Speaker with phones . . \$15.00

Loud Speaker postpaid 3.00

Satisfaction guaranteed. C. O. D. or cash with order. Dealers write for discounts.

THE SHELSTONE COMPANY
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ON ONE TUBE

Broadcasting from Atlantic Coast and Cuba heard in Calif. by users of the CROSS COUNTRY CIRCUIT. This range due to simplicity of set, and operation by one tuning control. Easy and cheap to build by any novice. Dry cell tubes may be used. Complete understandable instructions, full size blue print panel layout, assembly photo, etc., postpaid 25c; stamps accepted.

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What About It?

Isn't it about time to stop experimenting with multiple control circuits and build one that, combining ease of assembly and operation, loudness, clarity and selectivity of signals, as well as beautiful appearance, is excelled by none?

THE ELGIN SUPER-REINARTZ RADIO RECEIVING SET

Embodies all the advantages of the well known Elgin Reinartz (the set which was largely responsible for the popularity of this wonderful circuit) and many others. It is much louder, more selective, requires no storage battery, and can be used with excellent results on a short or loop aerial.

It has brought in California stations two thousand miles from Elgin, clearly and without interference on a loud speaker with only one tube, and that while our powerful local station was broadcasting three miles away.

Could you ask for more?
Write for circular giving one, two and three bulb hook-ups of this remarkable circuit. IT IS FREE.

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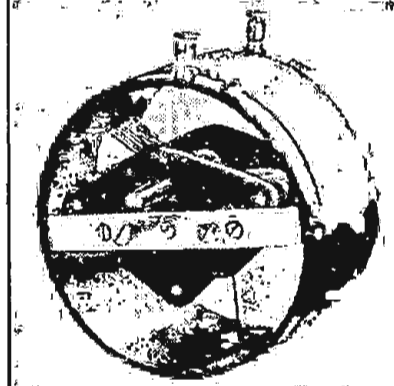
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Combined Fixed Coupler and Variable Condenser



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At your dealer or direct on receipt of purchase price. Booklet of 10 latest radio circuits, 20c.

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Laminated Phenolic Condensation Product
SHEETS TUBES RODS

RADIO PANELS

POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

1/32" THICK	1/2¢	PER SQ. INCH
1/16" THICK	3/4¢	PER SQ. INCH
3/32" THICK	1¢	PER SQ. INCH
1/8" THICK	1 1/2¢	PER SQ. INCH
3/16" THICK	2¢	PER SQ. INCH
1/4" THICK	2 1/2¢	PER SQ. INCH
3/8" THICK	4¢	PER SQ. INCH
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"Red-Heads" are guaranteed radio phones. You run no risk when you buy them. Money back if, after 7 days' trial, you're not satisfied that they're the best receivers on the market at the price. Why not act right now and get a pair? It'll mean getting the maximum from broadcasting from the day you put them into use.

RED-HEAD RADIO RECEIVERS

These remarkable head-sets are made by The Newman-Stern Co., one of the pioneer radio manufacturing houses in America.

JUST OUT

The new 1924 Model F

\$6.50 PER PAIR Complete

The new 1924 "Red-Head" Jr.

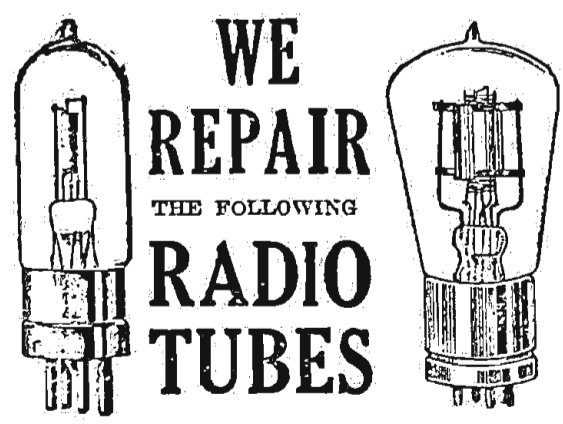
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This is the standard 3,000 ohm "Red-Head." The 1924 Model F has eleven improved features. Sensitive and fine-tuned; aluminum case; famous brown-red ear caps; military headband; high-grade cord.

"Red-Heads" sent prepaid on receipt of price if you are unable to get them at your dealer's.

THE NEWMAN-STERN COMPANY
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WE REPAIR THE FOLLOWING RADIO TUBES



Dealers and Agents write for Special Discount Mail Orders Solicited and Promptly Attended to

WD-11	OUR SPECIALTIES	5 WATT TRANSMITTERS	
UV-199\$3.50	C-299\$3.50
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UV-201 3.00	C-301 3.00
UV-201A 3.50	C-301A 3.50
WD-11 3.50	WD-12 3.50
DV-6 3.00	DV-6A 3.50
UV-202 4.00	DV-6A 3.50
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Clinton Hill Station NEWARK, N. J.

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are making money!

And they don't find it hard to do it either. Why? Because the Mu-Rad Receiver itself does practically all the selling. A careful check on the sales of one Chicago dealer, proved that Mu-Rads are sold in 8 out of 10 competitive demonstrations!

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Choice territory is still open to responsible, rated dealers. Kindly use your business stationery when writing for complete details.

Complete stock of parts
WESTERN ELECTRIC COMPANY
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All Tubes Guaranteed to Work Like New

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RADIOTRONS		CUNNINGHAMS	
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UV-200 2.75	C-300 2.75
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UV-202 3.50	C-302 3.50
UV-201A 3.50	C-301A 3.50
UV-199 3.50	C-299 3.50
DV-1 or 2 3.50	DV-6 or 6A 3.00

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Radiophone Broadcasting Stations

Corrected Every Week—Part II

CHALLENGE SUPPORTS LIST'S CORRECTNESS

ONE DOLLAR will be paid to every Radiophon reader of Radio Digest submitting the most errors in any one station's listing in the Directory of Radiophone Stations, which appears in four parts, serially continuously, on page 23. Letters must reach Radio Digest's office not later than one week from date of issue corrected. Readers are not limited to correcting one station. Turn in corrections for as many stations as you can find—if you can find errors! Use separate sheet of paper for each station submitted and place name and address on each sheet.

(NOTE—The second part of the schedule list appears below. The first appeared last week and the third part will appear next week.)

WAAC, New Orleans, La. 485 meters. 400 watts. Tulane Univ. Fri, 7:15-7:30 pm, reports; 8-9:30, educational and entertainment program. Central.

WAAD, Cincinnati, O. 300 meters. 25 watts. Ohio Mechanics Inst. No regular schedule. Central.

WAAG, Chicago, Ill. 286 meters. 200 watts. Chicago Daily Drovers Journal. Daily ex Sun, 8:40 am, 10:30, 12:45, 12:30 pm. Daily ex Sun, 12:45, 3, 4:30, live stock and weather reports. Central.

WAAL, Milwaukee, Wis. 280 meters. 100 watts. Gimbel Bros. Temporarily discontinued.

WAAM, Newark, N. J. 263 meters. 250 watts. I. R. Nelson Co. Daily ex Sun, 9:15-9:45 am, Daily ex Sat, 11-11:55 am; Mon, Tues, Wed, Thurs, 8-10:30 pm, music. Eastern.

WAAN, Columbia, Mo. 254 meters. 50 watts. Univ. of Mo.

WAAP, Omaha, Neb. 360 meters. 200 watts. Omaha Grain Exchange. Daily ex Sun, 9:45, 10:45, 11:45, 12:45-1:15 pm, 8, market reports; 8:15-9, music. Central.

WABA, Lake Forest, Ill. 266 meters. 100 watts. Lako F. Post University.

WABB, Harrisburg, Pa. 266 meters. 10 watts. Dr. John B. Lawrence.

WABC, Anderson, Ind. 229 meters. 10 watts. Fuller-Widener-Battery Co. Irregular schedule.

WABD, Dayton, O. 283 meters. 100 watts. Parker High School. Fri, 7-8 pm. Central.

WABE, Washington, D. C. 283 meters. 500 watts. Y. M. C. A.

WABF, Mt. Vernon, Ill. 234 meters. 100 watts. Mt. Vernon Register-News Co.

WABG, Jacksonville, Fla. 248 meters. 10 watts. Arnold Edwards Piano Co. Daily ex Sun, 3-4 pm, 5-6, music. Tues, Thurs, Sat, 8-9 pm, music, entertainment. Eastern.

WABH, Sandusky, O. 240 meters. 20 watts. Lake Shore Tire Co.

WABI, Bangor, Me. 240 meters. Bangor Ry. & Elec. Co.

WABJ, South Bend, Ind. 240 meters. 10 watts. The Radio Laboratories. Tues, Thurs, Sat, 6:30-7:30 pm, music, entertainment. Central.

WABK, Worcester, Mass. 252 meters. 10 watts. First Baptist Church. Sun, 10:30 am-12 m. Eastern.

WABL, Storrs, Conn. 283 meters. Connecticut Agri. College.

WABM, Saginaw, Mich. 254 meters. 100 watts. F. E. Doherty & Radio Equip. Co. Daily ex Sun, 10:15 am, news, markets, weather, stocks; 6, news, stocks, sports, music. Thurs, 8:30 pm, Sat, 10 pm, concert. Eastern.

WABN, La Crosse, Wis. 244 meters. 250 watts. Waldo O. Grover.

WABO, Rochester, N. Y. 252 meters. 10 watts. Lake Avenue Baptist Church.

WABP, Dover, Ohio. 266 meters. 100 watts. Robert F. Weinig.

WABQ, Haverford, Pa. 261 meters. 50 watts. Haverford College Radio Club.

WABR, Toledo, Ohio. 270 meters. 50 watts. Scott H. S. & N. W. B. Foley.

WABS, Newark, N. J. 244 meters. 50 watts. Essex Mfg. Co.

WAR, Sisseton, Wis. 406 meters. 500 watts. Kopp Radio Co. Indefinite schedule.

WBA, Lafayette, Ind. 360 meters. 250 watts. Purdue University. Mon, Fri, 7:15 pm. Special programs. Central.

WBAH, Minneapolis, Minn. 417 meters. 500 watts. The Dayton Co. Daily ex Sun, 12:30-1:30 pm, 7-7:30. Mon, Thurs, 9:15-10:45 pm. Central.

WBAK, Harrisburg, Pa. 400 meters. 500 watts. Pennsylvania State Police. Daily ex Sun, 10:30 am, 1:30 pm, 5:45, police reports, fire protection, markets; 12 midnight, police reports. Mon, Tues, Wed, 7:30 pm, special. Eastern.

WBAN, Paterson, N. J. 244 meters. 100 watts. Wireless Phone Corp. Slogan, "The Silk City of America." Daily ex Sun, 9-11:30 am, 12:30-5:30 pm. Sat morn, only. Sun, 10-12 am, 2 pm, 7:30-10:30. Eastern.

WBAO, Decatur, Ill. 360 meters. 50 watts. James Millikin Univ. University activities. No definite schedule. Central.

WBAP, Fort Worth, Tex. 476 meters. 750 watts. Fort Worth Star-Telegram. Club, "Radio Truth League." Daily ex Sun, 10 am, 11, 12 m, 1 pm, 2, 2:20, 3, 4, markets, reports, weather. Mon, Tues, Wed, Thurs, Fri, 7:30-8:30 pm, 9:30-10:45, concert, Sat, 7-7:30 pm, Bible lesson. Sun, 11 am-12:15 pm, church; 5-6 pm, concert. Central.

WBAV, Columbus, O. 390 meters. 500 watts. The Ernor Hopkins Co. Slogan, "We Broadcast a Variety." Daily ex Sun, 12:30-1 pm. Mon, 8-10 pm. Central.

WBAW, Marietta, O. 246 meters. 250 watts. Marietta College. Temporarily discontinued.

WBAX, Wilkes-Barre, Pa. 360 meters. 20 watts. John H. Stenger, Jr. Three nights of week, irregular.

WBAY, New York, N. Y. 492 meters. 500 watts. A. T. & T. Co. Experimental purposes only.

WBBA, Newark, O. 240 meters. 20 watts. Newark Radio Lab. Slogan, "The City in the Valley." Daily ex Sat, Sun, 6:30-7:30 pm, music. Sun, 1:30-4 pm, music. Eastern.

WBBG, Sterling, Ill. 229 meters. 50 watts. Sterling Radio Equipment Co.

WBBD, Reading, Pa. 234 meters. 50 watts. Barbey Battery Service.

WBL, Anthony, Kans. 261 meters. 100 watts. T & H Radio Co. Mon, Wed, Sat, 8-9 pm, concert, lecture. Sun, 10 am, church service. Central.

WBS, Newark, N. J. 360 meters. 20 watts. D. W. May, Inc. Daily ex Sun 11-12 am, music; 1-2:15 pm, reports; 2:15-2:30 pm, music, reports. Tues, Thurs, Sat, 7:30-9:30 pm, program. Sun, 9-10:30 am, sacred music; 1-3 pm, program. Eastern.

WBT, Charlotte, N. C. 360 meters. 500 watts. Southern Radio Corp. Slogan, "Queen City of the South." Daily ex Sun, 11 am, 7:30 pm, weather, markets; 12 m, 5 pm, music. Tues, 8:30 pm, music. Fri, 11 pm, entertainment. Sun, 8 pm, church services. Eastern.

WBZ, Springfield, Mass. 337 meters. 750 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 7 pm, lectures; 7:30, children's hour; 7:45, markets, weather, lecture. Mon, Tues, Thurs, Sat, 8-9 pm, concert. Mon, Wed, Fri, 6-7 pm, concert. Wed, Fri, 11-12 midnight, concert. Sun, 11 am, church service; 6:45, chime vespers; 8:30, church service. Eastern.

WCAC, Fort Smith, Ark. 360 meters. John Fink Jewelry Co. Tests only.

WCAD, Canton, N. Y. 280 meters. 250 watts. St. Lawrence Univ. Daily, 11 am, weather, reports, time. Fri, 8 pm, program. Eastern.

WCAE, Pittsburgh, Pa. 462 meters. 500 watts. Kaufman & Baer Co., Pittsburgh Press. Daily ex Sun, 12:30 pm, news; 3:30, news, music; 4:30, reports, entertainment; 6:30, music; 7:30, news; 8:30, music. Sun, 3 pm, sermon; 6:30, music. Eastern.

WCAG, New Orleans, La. 268 meters. 50 watts. Clyde R. Randall. Mon, Thurs, 8-9 pm, concert. Central.

WCAH, Columbus, O. 286 meters. 100 watts. Entrekind Elec. Co. Slogan, "The Heart of Ohio." Daily ex Sun, 11:30-12:30 am, music, news. Tues, 7:30-9:30 pm, 11:30-1:30 am, concert. Columbus Philharmonic Society. Sun, 1:30 am, concert; 10-12:30, church service. Central.

WCAJ, Univ. Place, Nebr. 360 meters. 500 watts. Nebr. Wesleyan Univ. Daily, 10:30 am, weather. Tues, 7 pm, Children's Hour. Thurs, 8 pm, music, lectures. Central.

WCAK, Houston, Tex. 360 meters. 50 watts. Alfred P. Daniel. Slogan, "Where Eighteen Railroads Meet the Sea." Wed, 8-10 pm, novelty program. Sun, 3-5, feature program. Central.

WCAE, Pittsburgh, Pa. 462 meters. 500 watts. Kaufman & Baer Co., Pittsburgh Press. Daily ex Sun, 12:30 pm, news; 3:30, news, music; 4:30, reports, entertainment; 6:30, music; 7:30, news; 8:30, music. Sun, 3 pm, sermon; 6:30, music. Eastern.

WCAL, Northfield, Minn. 360 meters. 250 watts. Dept. of Physics, St. Olaf College. No definite schedule.

WCAM, Villanova, Pa. 360 meters. 150 watts. Villanova College.

WCAO, Baltimore, Md. 360 meters. 50 watts. Saunders & Stayman Co. Daily ex Sun, 12-1 pm. Mon, Wed, 8-9 pm. Eastern.

WCAP, Washington, D. C. 469 meters. 500 watts. Chesapeake & Potomac Tel. Co. Tues, Sat, 7:30 pm, broadcast jointly with WFAF Thursday, Sat, 10-12 pm, dance music. Sun, 4, 7:20 pm, service.

WCAR, San Antonio, Tex. 360 meters. 150 watts. Alamo Radio Elec. Co. Mon, Thurs, Sat, 8:30-9:30 pm, concert. Central.

WCAS, Minneapolis, Minn. 246 meters. 100 watts. Wm. H. Dunwoody Industrial Inst. Slogan, "From the Flour City of the World." Mon, 7-7:30 pm, technical program. Tues, 8:15-9:30 pm, or 9:30-10:45, on alternate weeks, music, lectures. Wed, 8:30-7 pm, radio problems. Thurs, 7-7:30 pm, code, radio problems. Central.

WCAT, Rapid City, S. D. 240 meters. 50 watts. S. D. State School of Mines. Daily ex Sun, 9:30 am, 12:30 pm, 3 pm, weather, reports. Wed, 7:15 pm, concert. Mountaint.

WCAU, Philadelphia, Pa. 286 meters. 250 watts. Durham & Co. Daily 11:45 am. Thurs, Fri, 7:30-8 pm, concert. Sun, 10:55 am, church services. Eastern.

WCAV, Little Rock, Ark. 300 meters. 20 watts. J. C. Dice Elec. Co. Tues, 8:30 pm.

WCAY, Milwaukee, Wis. 261 meters. 250 watts. Kesselman-O'Driscoll Music House. Daily ex Sun, 11 am, reports. Mon, Tues, Thurs, Fri, 7:30-8:30 pm, music. Tues, 10:30-11:30 pm, dance music. Sun, 7:30-9 pm, church services. Central.

WCAZ, Carthage, Ill. 246 meters. 50 watts. Carthage College. Wed, 9-10 pm, athletics. Central.

WCBA, Allentown, Pa. 280 meters. 5 watts. Chas. W. Heimbach. Wed, 7:30-9:45 pm. Sat, Sun, 2-4 pm, 6-8. Eastern.

WCBB, Greenville, O. 240 meters. 100 watts. K. & K. Radio Supply Co.

WCBD, Zion, Ill. 345 meters. 500 watts. Wilbur Glenn Voliva. Slogan, "Where God Rules. Man Prospers." Mon, Fri, 8-10 pm, concert. Wed, Fri, 2:30-3:45 pm, service. Sun, 9-10 am, Bible School; 2:30-5:30 pm, church services. Central.

WCE, Minneapolis, Minn. 360 meters. 250 watts. Findley Elec. Co.

WCK, St. Louis, Mo. 360 meters. 100 watts. Stix, Baer & Fuller. Daily 12-12:30 pm, 3-4:15, 5-5:30. Mon, Wed, Fri, 6:45-8 pm, concert, lecture. Central.

WCM, Austin, Tex. 360 meters. 500 watts. Univ. of Tex.

WCX, Detroit, Mich. 517 meters. 500 watts. The Detroit Free Press. Slogan, "The Call of the Motor City." Club, "Red Apple Club." Daily ex Sun, 2 pm, news; 2:15, stock reports; 2:50, weather, markets; 4:15, 4:30, 4:50, 6:15, markets, music. Daily ex Sat, Sun, 8:30-10 pm, week starting Dec. 11 and alternate weeks thereafter, concert, Tues, 10-12 pm, Club, Sun, 10:30 am, 7:15 pm, church services. Eastern.

WDA, Lindsay, Kans. 360 meters. 100 watts. Wm. Louis Harrison. Tues, Thurs, Fri, 9:30 pm, entertainment, weather. Sun, 3:30 pm, vesper services. Central.

WDAE, Tampa, Fla. 360 meters. 250 watts. Tampa Daily Times. Wed, Fri, 8-10 pm, music, lecture. Eastern.

WDAF, Kansas City, Mo. 411 meters. 500 watts. Kansas City Star. Club, "Nighthawks." Daily ex Sun, 3:30-4:30 pm, music; 6-7, educational, bedtime story, etc.; 11:45 pm-1 am, Nighthawk Frolic. Mon, Wed, Fri, 8-10 pm, concert. Sun, 4-5 pm, music. Central.

WDAG, Amarillo, Tex. 263 meters. 100 watts. J. Laurence Martin. Tues, Thurs, 8-9:30 pm, music. Central.

WDAN, El Paso, Tex. 268 meters. 100 watts. Trinity Methodist Church South. Wed, Thurs, Sun, 7:30-8:30 pm. Sun, 11 am. Mountain.

WDAL, Syracuse, N. Y. 246 meters. 100 watts. Hughes Radio Corp. Daily ex Sun 12 m, reports. Eastern.

WDAR, Hartford, Conn. 261 meters. 100 watts. The Courant. Sat, 3 pm, concert. Eastern.

WDAL, Jacksonville, Fla. 360 meters. 100 watts. Florida Times Union. Daily, 11 am, weather; 4-5, 6-7 pm, music; 8-9, entertainment; 9:30, reports. Sat, 12-1 am, "The Midnight Aggravators." Eastern.

WDAO, Dallas, Tex. 360 meters. 50 watts. Automotive Elec. Co. Daily, 1-1:45 pm, 7:15-8.

WDAP, Chicago, Ill. 360 meters. 500 watts. Chicago Board of Trade. Drake Hotel. Daily ex Sun, every half hour from 9:30 am to 1:30 pm, quotations, reports; 6 pm, news. Daily ex Sun, Mon, 1:35, 7-8 pm, dance music; 10, concert. Sun, 9:15, concert. Central.

WDAR, Philadelphia, Pa. 395 meters. 500 watts. Lit Bros. Club, "Morning Glory." Daily ex Sun, 12-12:55 pm, music; 2-3 pm, 4:30-6, music, talks; 7:30-8 pm, Dream Daddy. Mon, 7:30-10:55, Wed, 8-11 pm, entertainment. Fri, 8-10:50, entertainment; 1 am, Club. Eastern.

WDAS, Worcester, Mass. 360 meters. 5 watts. Samuel A. Waite.

WDAU, New Bedford, Mass. 360 meters. 100 watts. A. H. Smith. Mon, Wed, Fri, 12:15-12:50 pm, industrial reports; 7:45-10 pm, music. Sun, 11 am, 12:30 pm, 7-8 pm, church services. Eastern.

WDAX, Centerville, Iowa. 268 meters. 100 watts. First Nat'l Bank. Daily ex Sun, 11:30 am, reports, news. Mon, Thurs, 7:30-9 pm, concert. Central.

WDAY, Fargo, N. D. 244 meters. 50 watts. Radio Equip. Corp. Slogan, "The Biggest Little City in the World." Daily ex Sun, 9:30 am, weather. Tues, Thurs, Sat, 8-9 pm, concert. Sun, 10:30 am, church services. Central.

WDBC, Lancaster, Pa. 258 meters. 50 watts. Kirk Johnson & Co., Inc. Mon, Tues, Thurs, 8 pm. Eastern.

WDBF, Youngstown, O. 261 meters. 50 watts. Robert G. Phillips. Tues, Thurs, Sat, 8-9 pm, music, reports. Eastern.

WDM, Washington, D. C. 360 meters. 50 watts. Church of the Covenant. Sun, 11 am, church service; 8 pm, church service. Eastern.

WDT, New York City, N. Y. 405 meters. Ship Owners Radio Service & Premier Grand Piano. Discontinued temporarily.

WDZ, Tupelo, Ill. 278 meters. 10 watts. James L. Bush. Daily ex Sun, 9:30 am, 10, 10:30, 11, 11:30, 12 m, 12:30 pm, 1, 1:15, Chicago Board of Trade quotations. Central.

WEAA, Flint, Mich. 280 meters. 150 watts. Frank D. Fallain. Slogan, "The Vehicle City." No definite schedule. Police broadcasts.

WEAB, Fort Dodge, Ia. 360 meters. 100 watts. Standard Radio Equip. Co. Daily ex Sun, markets every 30 min. from 8:40 am-12:20 pm; 5:15 pm, 10 am, 4 pm, road reports. Central.

WEAE, Blacksburg, Va. 360 meters. Polytechnic Inst. WEAF, New York City, N. Y. 492 meters. 500 watts. A. T. & T. Co. Slogan, "The Voice to the Millions." Mon, 4-5:30 pm, 7:30-10. Tues, Wed, Thurs, Fri, 11-12 am, 4-5:30 pm, 7:30-10. Sat, 4-5:30 pm, 7:30-11. Sun, 2:30-5:30 pm, 7:30-10. Eastern.

WEAG, Edgewood, R. I. 231 meters. 10 watts. Nicholas-Hineline-Bassett Lab.

WEAH, Wichita, Kan. 244 meters. 50 watts. Wichita Board of Trade. Daily ex Sun, 9 am, 10, 11, 12 m, 1 pm, 2, market reports. Mon, Fri, 8-9 pm, music. Wed, 10-11:45, "Winter Garden Frolic." Central.

WEAI, Ithaca, N. Y. 286 meters. 500 watts. Cornell Univ. Discontinued.

WEAJ, Vermillion, S. D. 283 meters. 200 watts. Univ. of S. D.

WEAM, North Plainfield, N. J. 252 meters. Borough of N. Plainfield. No definite schedule.

WEAN, Providence, R. I. 273 meters. 100 watts. The Shepard Stores. Daily ex Sun, 12-1, 4-5, 6-7, music, reports, weather, concerts. Tues, Thurs, 8:15-10, concert. Wed, 10:30-12 midnight, concert. Sun, 10:45-11:30 am, 7:30-8:45 pm, church service. Eastern.

WEAO, Columbus, O. 360 meters. 500 watts. Ohio State Univ. Daily ex Sun, 1:30 pm, 4, reports, music. Thurs, 8-10 pm, lecture, concert. Central.

WEAP, Mobile, Ala. 360 meters. 100 watts. Mobile Radio Co. Daily ex Sun, 4-5 pm, music. Daily ex Mon, 7:45-8:45 pm, music. Central.

WEAR, Baltimore, Md. 360 meters. 50 watts. News & American Pub. Co. Tues, Thurs, Fri, 7-10 pm, music, weather, sports. Eastern.

WEAS, Washington, D. C. 360 meters. 50 watts. The Hiecht Co. Temporarily discontinued.

WEAU, Sioux City, Ia. 360 meters. 100 watts. Davidson Bros. Co. Slogan, "The Heart of the Corn Belt." Daily ex Sun, 10 am, 11, 2 pm, 5. Mon, Wed, Fri, 8-9 pm, concert. Central.

WEAY, Houston, Tex. 260 meters. 1000 watts. W. H. Horwitz (Theater) Slogan, "Where All the Greats Meet At the Ballroads." Daily ex Sun, 11 am, dinner hints, news; 12 in, music, 12:57-1 pm, time, 2:30 pm, music, 6 pm, news, Fri, Sat, 8-10 pm, concert. Sun, 11 am, 8 pm, church services. 9 pm, concert. Central.

WEB, St. Louis, Mo. 360 meters. 500 watts. The Benwood Co., Inc. Tues, 9-10:30 pm, Wed, 8-9:30 pm. Sat, 7:30-9 pm, 11 pm-1 am. Central.

WEV, Houston, Tex. 360 meters. 500 watts. Hurlburt-Hill Elec. Co. Daily ex Sun, 10 am, 5 pm, weather, roads. Tues, Thurs, 10 pm, concert. Central.

WEW, St. Louis, Mo. 261 meters. 100 watts. St. Louis Univ. Daily ex Sun, 9 am, 10, 2, 5 pm, reports. Central.

WFAA, Dallas, Tex. 476 meters. 500 watts. Dallas News and Dallas Journal. Slogan, "Working For All Alks." Daily, 10:30 am, reports; 12:30-1 pm, address; 2:30-3:30, reports, news; 6:15-7, bedtime story; 6:45-7, sports, news; 8:30-9:30, concert. Wed 1-2 (silent Wed). Tues, Sat, 11-12 pm, m. l. 8:15-9-30 pm, Bible class, 9:30-11 pm, music. (C. U.).

WFAB, Syracuse, N. Y. 234 meters. 200 watts. C. P. Woese. Daily ex Sun, 8:30 pm, Wed, 8:30-11 pm, Sun, 9:30-10 pm, Service; 10-11, orchestra. Eastern.

WFAF, Poughkeepsie, N. Y. 273 meters. 20 watts. H. C. Spratly Radio Co. Temporarily discontinued.

WFAH, Port Arthur, Tex. 236 meters. 150 watts. E. C. Supply Co. Tues, Thurs, 10-11 pm, concert. Central.

WFAJ, Asheville, N. C. 250 ml. Ill-Grade Wireless Instrument Co. Temporarily discontinued.

WFAM, St. Cloud, Minn. 360 meters. 20 watts. St. Cloud Daily Times. Daily ex Sun, 3:30-4 pm, markets. Mon, Wed, 7:30-9 pm, entertainment. Central.

WFAN, Hutchinson, Minn. 360 meters. 100 watts. Hutchinson Elec. Service Co. Slogan, "Gateway to the Ten Thousand Lakes of Minn." Daily, 11:5 am-12:30 pm, program, news, time, weather. Tues, 8-10 pm, program. Special hours. Central.

WFAQ, Cameron, Mo. 360 meters. 10 watts. Missouri Wesleyan College.

WFAT, Sioux Falls, S. D. 360 meters. 100 watts. Daily Argus Leader. Daily ex Sun, 9:15 am, 11:15, 12:30 pm, 1:30, reports, music; 7:30, baseball, music. Central.

WFAV, Lincoln, Neb. 275 meters. 500 watts. Univ. of Neb. Slogan, "The Home of the Cornhuskers." Daily ex Sun, 10 am, 12:40 pm, weather, news, road reports, Wed, 8:30 pm, concert.

WFI, Philadelphia, Pa. 395 meters. 500 watts. Strawbridge & Clothier. Daily ex Sun, 10:15 am, reports; 1 pm, orchestra; 1:50 reports; 3-4:30, concert; 6:0, orchestra; 7-7:30, children's hour. Tues, Thurs, Sat, 8 pm, concert. Sun, 10:30 am, 7:30 pm, church services; 4:30, chapel service. Eastern.

WGF, Tulsa, Okla. 360 meters. Goller Radio Service.

WGAL, Lancaster, Pa. 248 meters. 10 watts. Lancaster Elec. Supply & Construction Co. Slogan, "Garden Spot of the S. A." Mon, Wed, Fri, 7:30-9 pm, concert, lecture. Sun, 3-3:30 pm, church service. Eastern.

WGAN, Pensacola, Fla. 360 meters. 50 watts. Cecil E. Lloyd.

WGAQ, Shreveport, La. 360 meters. 100 watts. Glenwood Radio Corp. Daily ex Sun, 12:30-1:30 pm, 6:30, 7:30, music. Sun, 11 am, 7:30 pm, church service. Central.

WGAR, Fort Smith, Ark. 360 meters. 20 watts. South-west America. Discontinued temporarily.

WGAW, Altoona, Pa. 261 meters. 100 watts. Ernest C. Albright. Slogan, "The home of the world's largest railroad shops." Tues, Wed, 9-11 pm, music. Sun, 9-10:30 pm, music. Eastern.

WGAY, Madison, Wis. 360 meters. 100 watts. Northwestern Radio Co. Daily ex Sun, 10 am, weather; 4:30, news. Mon, Thurs, 8:30 pm, concert. Sun, pm, music. Central.

WGAZ, South Bend, Ind. 360 meters. 50 watts. South Bend Tribune. Daily ex Sun, 12:30-1 pm, market music. Mon, Wed, Fri, 7-8 pm, concert. Central.

WGI, Medford Hillside, Mass. 360 meters. 500 watts. Am. Radio & Research Corp. Slogan, "Amrad. The Voice of the Air." Daily ex Sat, Sun, 12 m-1 pm, concert. Tues, Thurs, 7-8:30, concert. Wed, Fri, Sat, 7:30-9:00, concert. Daily, 5:30-6:45 pm, Children's Hour, reports, codes. Tues, Fri, 3 pm, Amrad Women's Club. Sun, 4-5 pm, 8:30, church services; 10, concert. Eastern.

WGL, Philadelphia, Pa. 360 meters. 500 watts. Thos. F. J. Howlett. Irregular schedule.

WGR, Buffalo, N. Y. 319 meters. 500 watts. Federal Tel. & Te. Co. Slogan, "Key City of Industry." Daily, 10:45 am, weather; 12 m, reports; 12:30, organ music. Daily ex Sat, Sun, 12:30 pm, 2:30, 3:30, 4, 5, reports. Daily ex Sun, 6:30, music; 7:30, news. Mon, Wed, Fri, 9-11 pm, concert. Daily, 10:45 pm, weather. Fri, 8:45, road reports. Sun, 3 pm, vesper services; 4, organ. Eastern.

WGV, New Orleans, La. 350 meters. 100 watts. Interstate Elec. Co. Slogan, "Where the Mighty Mississippi Makes a Crescent Near the Gulf." WGY, Schenectady, N. Y. 380 meters. 1000 watts. General Elec. Co. Daily ex Sun, 12:30-1 pm, 6, reports, time, sports. Mon, Tues, Thurs, Fri, 2:20-3 pm, 7:45, concert. Fri, 10:30 pm, special. Sun, 10:30 am, 7:30 pm, church service. 2:30 pm, Symphony Orchestra. Eastern.

WHA, Madison, Wis. 360 meters. 800 watts. Univ. of Wis. Mon, Wed, Fri, 7:30 pm, lectures, news, ag programs. Central.

WHAA, Iowa City, Ia. 263 meters. 100 watts. Univ. of Iowa. Irregular schedule.

WHAB, Galveston, Tex. 360 meters. 200 watts. Clark W. Thompson. Slogan, "The Gateway to the Southwest and Treasure Island of America." Daily ex Sun, 9:45 am, 11, 3:30 pm, 5, reports, music news. Tues, Fri, 9 pm, entertainment. Sat, 8:20, special. Sun, 11 am, 7:30 pm, church service. Central.

WHAC, Waterloo, Ia. 360 meters. 20 watts. Cole Bros. Elec. Co. Daily, 6 pm, news, sports. Mon, Wed, Fri, 9:30 pm, concert. Sun, 11 am, church services. Central.

WHAD, Milwaukee, Wis. 280 meters. 100 watts. Marquette Univ. Wed, 7:30-8:30 pm, music, entertainment. Central.

WHAG, Cincinnati, O. 222 meters. 200 watts. Univ. of Cincinnati. No definite schedule.

WHAH, Joplin, Mo. 360 meters. 250 watts. Hafer Supply Co. Tues, Thurs, 8-10 pm; Sat, 10:30-11:30. Central.

WHAI, Davenport, Ia. 360 meters. 50 watts. Radio Equip. & Mfg. Co. Temporarily discontinued.

WHAK, Clarkburg, W. Va. 253 meters. 15 watts. Roberts Hdw. Co. No definite schedule.

WHAM, Rochester, N. Y. 283 meters. 100 watts. Univ. of Rochester. Rochester Times-Union. Democrat and Chronicle. Daily ex Sun, 3 pm, 4:15, 6:50, 7:30, 7:35, 7:40. Sat, 10:45-12:30 pm, dance music. Sun, 3:15, Radio Chapel. Eastern.

WHAP, Decatur, Ill. 360 meters. 50 watts. Otto & Kuhns. No definite schedule.

WHAQ, Washington, D. C. 242 meters. 10 watts. Semmes Motor Co. Mon, 7-8 pm, lecture on automobile upkeep, music. Eastern.

WHAR, Atlantic City, N. J. 231 meters. 10 watts. Paramount Radio & Elec. Co. Daily, 2-3 pm, 7-9. Eastern.

WHAS, Louisville, Ky. 400 meters. 500 watts. Courier Journal and Louisville Times Co. Daily ex Sun, 4-5 pm, 7:30-9. Sun, 9:57-10:45 am, 4-5 pm, church service. Mon, night, silent. Central.

WHAW, Wilmington, Del. 360 meters. 50 watts. Wilmington Elec. Spec. Co. Slogan, "The First Road; casting Station of the First City of the First State." Sun, 10-11 pm. Eastern.

WHAZ, Troy, N. Y. 380 meters. 500 watts. Rensselaer Polytechnic Inst. Slogan, "Transcontinental at the Oldest College of Engineering." Club, R. I. I students. Mon, 9-10:30 pm, concert, educational talks. Transcontinental second Monday of each month. 12-1:30 am, music. Eastern.

WHB, Kansas City, Mo. 411 meters. 500 watts. Sweeney Auto & Electric School. Slogan, "Heart of America." Daily ex Sun, 8:25 am, 9:25, 10:25, 11:25, 12:25 pm, 1:25, 3, reports. Daily, 12:30-1, 2-3, 7-7:45 pm, music. Tues, Thurs, Sun, 8-10 pm, concert. Central.

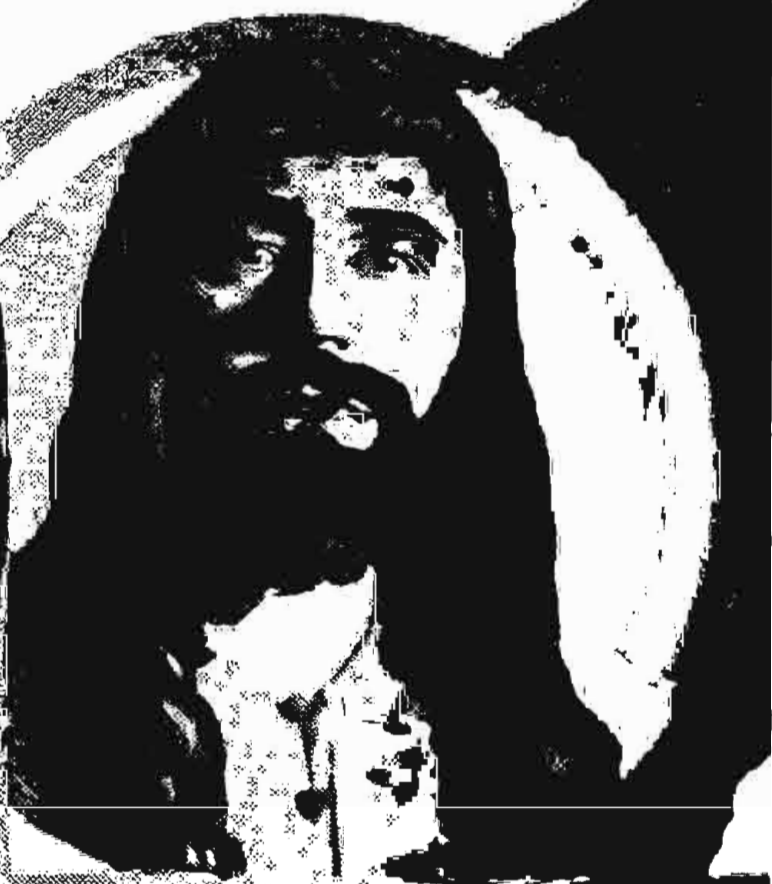
(The third part of the station schedules will appear next week.)

Radiophans

Radio Illustrated



Here is another tenor who has joined Chicago's civic opera this year. He is Harry Steier and is presented above as "Mime" in "Siegfried." As will be remembered Mime is the dwarf who is told that his commission to repair Siegfried's father's sword can only be executed by one totally void of fear—the very emotion here expressed



Fernand Anseau, Chicago Civic Opera tenor, as "Samson" in Saint-Saëns' opera "Samson and Delilah." He is familiar to Radiophans as "Don José" in "Carmen" which was broadcast from KYW last Saturday. He is a newcomer to the Chicago Opera this year and has won many admirers

The ballet corps of the Chicago Civic Opera Company this year is second to none, not only in professional skill but also in physical beauty. Little need be said of Anna Ludmila, the "prima ballerina," here seen standing in a pose of unsurpassable grace, but Vivian Gouschar, the girl that kneels at her feet, seems a close rival in both respects