

# WHN WARNS PUBLIC OF "TAX ON SOULS"

## NEW PAUL REVERE HITS AT "KING TELEPHONE"

### Gotham Station Makes Nightly, Stirring Appeals to Fans to Protect Broadcasting

NEW YORK.—Each night Station WHN puts its case before millions of listeners—puts not only its own case but that of every independent, "unlicensed" broadcaster in the United States. C. P. Caldwell, attorney for the station, takes up the story some times, at others George Schubel warns of the aims of the A. T. & T. company, "King Telephone."

One of Mr. Schubel's addresses is particularly interesting in the parallel he draws between Paul Revere and WHN. After telling of the bitter fight that Henry M. Shaw, president of the Shaw Insulator company, had with the big Radio interests and how Mr. Shaw's partner died of a broken heart after his persecutions by the "Radio octopus," he goes on:

#### Draws Paul Revere Parallel

"Oppression never changes. It simply comes to us in different form. Over a hundred and fifty years ago, men like Henry Shaw and his wife, Anna, tried to get along peacefully with the world, but the power represented in the vested interests of a king stepped in and said: 'I'm going to put a tax on your tea, on the furnishings of your simple home and on everything you use. If you resist, I'm going to enforce my vested rights by sending hirelings to shoot you down.'

"As Americans, we know what finally happened. When the first farmer was shot down in cold blood, Paul Revere jumped on his charger and through the night notified every hamlet, and every home possible to reach, and the bells rang from every countryside, and it was not long before the soul of resistance to oppression was organized.

#### How "King Telephone" Would Tax

"Today oppression again reaches out. It comes in the familiar form of money-power. It says: 'We have certain vested patent interests; we have cornered the market in patents like the other crowd corners the market in wheat; some patents we have gotten by the power of money, some Radio patents by the power of threat or coercion, and some by means we might blush to see in public print. We must protect these vested patent interests, not by putting a tax on your tea like old King George did, not on the furnishings of your little home, nor on your oil and your coal and on your bread on your table,—there is another crowd taking care of these taxes upon your material needs; we are going to put a tax, by heaven, upon your very lips and heart and soul, for under the patent laws, we claim to have a right to do this.

"If some Americans among you want to broadcast something which we approve, then, we, the vested interests in Radio are going to tax you ten dollars a minute for saying it, no matter how important your message to your fellow-countrymen may be! Yes, we are going to put a tax, not only upon your lips, but upon your ears.

#### Urges Radiophans Writing Senators

"The spirit of Paul Revere is still alive. His spirit is riding over the air tonight. The fire of righteous indignation, the consciousness of a good cause which burned in his breast, and impelled him to ride out into the night, we are sure burns in the breast of everyone of those who write to us asking how they can help in the present fight for Radio freedom, in the breast of everyone within the reach of our voice tonight.

"Write to your Congressman, write to your Senator. If you don't know who he is, address your envelope as follows: To My Congressman and to My Senator. Then put your own name and address on the upper corner. The letters will be delivered to them."

It is now possible to burn fifteen vacuum tubes with less current than it took a year ago to burn one tube.

# FATTIES FATTEN ON WLAG "DAILY DOZEN"

MINNEAPOLIS.—The fat ones are getting fatter and the thin ones thinner when they listen to Tess Cooperman of WLAG, giving her weekly Radio exercises to the tune of "Just a Girl That Men Forget." The assistant program director of WLAG, Earl R. Buell, who tips the scale at two hundred and eighty some pounds, after one lesson, added only five pounds.

# CRYSTAL SETS GET A THRILL—AND LOSE IT

WINNIPEG, MAN.—Crystal set users of this city were surprised recently to hear, "This is Station KYW, Chicago," come in as loud as their local plant, CKY, the Manitoba Telephone company. But it turned out to be CKY rebroadcasting KYW which had been received by a CKY engineer and relayed by telephone wire to the local plant's studio.

# LIKES HER "BACK STAGE" SET



Dorothy Stone is the charming daughter of Fred Stone, world famous comedian, and finds much on the air to interest her while waiting "back stage" for her cue. She is co-starring with her dad now in "Stepping Stones" and carries the diminutive single tube receiving set with her while on air. The unusual form of the receiver is worthy of note. It can be carried in a brief case—but usually is found on Miss Stone's dressing room table. Wide World Photo

# KDKA Finds Friend's Address

PITTSBURGH.—While visiting Moissy, France, Mrs. Russell Lewis of this city recently sent an urgent cablegram to her

sister-in-law here, whose address she did not know. French Consular Agent Letevy requested KDKA to broadcast for the missing address. Two hours later the sister-in-law had the cablegram.

# HOOVER GIVES HINT OF AIR CENSORSHIP

## "HANDS OFF" POLICY ON RECEIVING SETS

### Commerce Secretary Holds Little Hope for Use of Radio in Private Communication

WASHINGTON, D. C.—Following a policy of having as little government regulation of Radio as possible, Secretary Hoover, it has become known here, feels that the Department of Commerce would better not touch the problem of receiving sets. This applies to regenerative outfits.

Mr. Hoover, it is understood, believes the Radio manufacturers will take care of the matter of regenerative sets by perfecting their manufacture. He does not consider the subject one for legislation or governmental regulation.

It is understood also that among the opinions held by the Secretary with regard to Radio is one that indicates the possibility of an air censorship should there be much broadcasting for advertising purposes. While Mr. Hoover is not in favor of such censorship, it is said, he desires to keep the air as clear as possible for desirable programs.

#### "No Private Radio"—Hoover

The use of Radio for private communication will never be realized, in the opinion of Secretary Hoover, unless there is some unexpected and seemingly impossible development in the art. It is possible that a new series of wave lengths may be discovered and a method for their utilization be perfected which will make private communication feasible, but no such development is in sight, according to Hoover. He regards the ether as already too crowded with public matter.

Declaring that the air is the inalienable possession of the people a bill introduced by Senator Howell of Nebraska was approved by the Senate interstate commerce committee. The bill would restrict to two years' duration all Radio licenses and other privileges for the use of ether, with power vested in the President to annul them in time of war or other emergencies.

WASHINGTON, D. C.—The White Radio bill is lying dormant with the Radio subcommittee of the Merchant Marine and Fisheries Committee of the House.

The fact that Representative White accepted the chairmanship of the special House Committee to investigate the Shipping Board is militating against quick action on the bill. There does not seem to be any very serious opposition to the issue, but it is possible that some pressure is being brought to bear upon members of Congress to keep it under cover for the time being, especially inasmuch as the Federal Trade Commission has before it the complaint against the American Telephone & Telegraph company, and others.

# HINTS PLOT BACKS MUSICIANS' MOVE

### Broadcast Leader Sees Effort of American Society Behind Wage Demand

NEW YORK.—Charges that the demand of the Chicago Musicians' union for \$8 for three hours or less for Radio engagements was inspired by members of the American Society of Composers, Authors, and Publishers were made in an interview given out recently by Paul Klugh, executive chairman of the National Association of Broadcasters.

Mr. Klugh, who has been conferring in New York for several days with Gene McDonald of Chicago, president of the association, declared Chicago stations have no intention of complying with the union's demands, "even though it means throwing union music out of hotels."

The question will come up before the next annual convention of the musicians.

# THE ANTENNA BROTHERS

Spir L. and Lew P.

Mrs. Partington Speaks Out



# SEVEN WAVES GIVE ONLY ONE PROGRAM

## FAN IN CUBA PICKS UP ENTIRE "CHAIN"

Gets Same Program Simultaneously from Each Station; Seven Different Waves

NEW YORK.—When Radio engineers conceived the idea of linking together by Radio six powerful broadcasting stations to simultaneously reach an audience approaching fifty million in number with the same program, little did they realize that certain persons, favorably situated, would be able to hear all six stations in the 7,000-mile "chain."

Successful reception from the six stations is the claim of Frank H. Jones, however, owner of station 6KW in far-away Tuinuca, Cuba, the night of March 7, when the Annual alumni dinner of the "Boston Tech" society was being broadcast by Stations WJZ, at New York city, WGY, at Schenectady, and rebroadcast after the program was extricated from the air by sensitive receivers at four other stations, KDKA, Pittsburgh, Pa.; KFKX, Hastings, Neb.; KGO, Oakland, Cal., and 2AC, Manchester, England.

### Cuban Fan Hears Seven Waves

Broadcasting stations always find many interesting and revealing letters in the mail after such an unusual experiment, but the experience Mr. Jones relates in a letter is unique and extraordinary.

# SEE "TRUST" SMASH IN NEW YORK'S WAR

## "KING TELEPHONE" LOSES FIRST ROUND

Sudden Shift of Westinghouse Attitude Arouses Hopes for Broadcast Peace

NEW YORK.—For months Commissioner Whalen of New York city has tried to get a broadcasting plant owned and operated by the city. On all sides he was informed that the only concern that could supply him was the Western Electric company. The American Telephone & Telegraph company which controls Western Electric, also owns Station WEAJ and he found the A. T. & T. officials inclined to force him to use WEAJ or stay off the air. The commissioner's battle to get a plant of his own has filled the press for some time; the Commissioner is a battler and no combine was going to stop him.

### Westinghouse to Erect Plant

Recently the attitude of the Westinghouse Electric and Manufacturing company, a member of the alleged trust whose activities in the field of manufacture of Radio sets is under fire by the Federal Trade Commission, has been reversed and Mr. Whalen got the surprise of his life when informed by Westinghouse that it would not only sell the City of New York a broadcasting outfit of 1000 watts power, but would erect it and guarantee its operation on the Municipal building at 100 percent efficiency.

Westinghouse officials further assured the commissioner that they would endeavor to make this station one of the best in the East and placed their expert Radio engineers at the service of the Department of Plant and Structures of New York City.

### Radio "Trust" Breaking up?

The Radio world gasped and read the announcement again. Close observers of the recent broadcasting war interpreted this action on the part of the Westinghouse company as the breaking up of the agreement between the five big companies. Under the terms of the agreements, the Western Electric company is the only company permitted to sell broadcasting apparatus and the Westinghouse company is confined to the manufacture of receiving apparatus which can be sold only by the Radio Corporation of America.

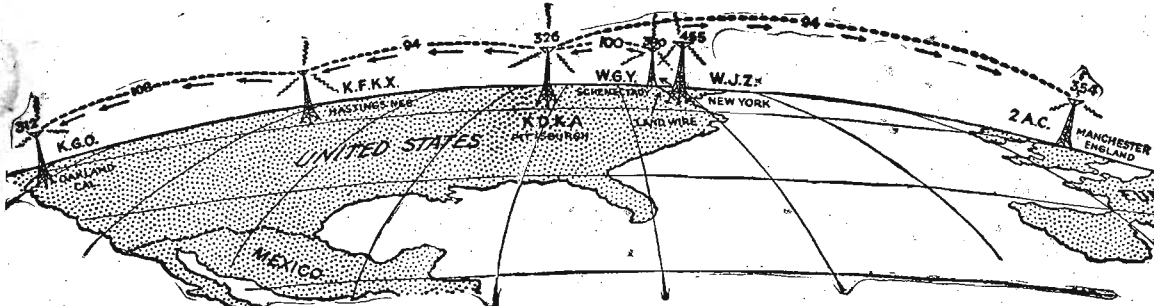
The plant which has been purchased is a high power assembly of apparatus similar to the old WJZ equipment at Newark when that station was the hub of the Radio universe, and similar to the present plant at KDKA which reaches out all over the world. It was first installed by the Westinghouse Company for the Brazilian Centennial Exposition at Rio de Janeiro and was in operation from September 7, 1922 to March 31, 1923. During the time it was in operation and known as "SPC" it had a tremendous range and was heard with great consistency in Hawaii, a distance of 7,000 miles.

### Want Big Spokane Station

SPOKANE, WASH.—The chamber of commerce here is making plans for raising money to erect a large broadcasting station comparable with the population of the city.

# SIX-STATION REBROADCAST SPANS 7,000 MILES

How six stations were recently linked by short waves for the purpose of rebroadcasting the same program. MANCHESTER, 2AC; New York, WJZ; Schenectady, WGY; Pittsburgh, KDKA; Hastings, KFKX; and Oakland, KGO, were the plants linked



Mr. Jones reported using two receiving sets, one for waves between 300 meters and 500 meters and a shorter wave set to receive on wave-lengths between 80 meters and 300 meters. Both are untuned Radio frequency sets, the longer wave set working on a loop, while the short wave set picks up the signals upon a thirty-foot indoor antenna.

Excerpts from the letter follow:

"I was first listening in on KDKA's 100-

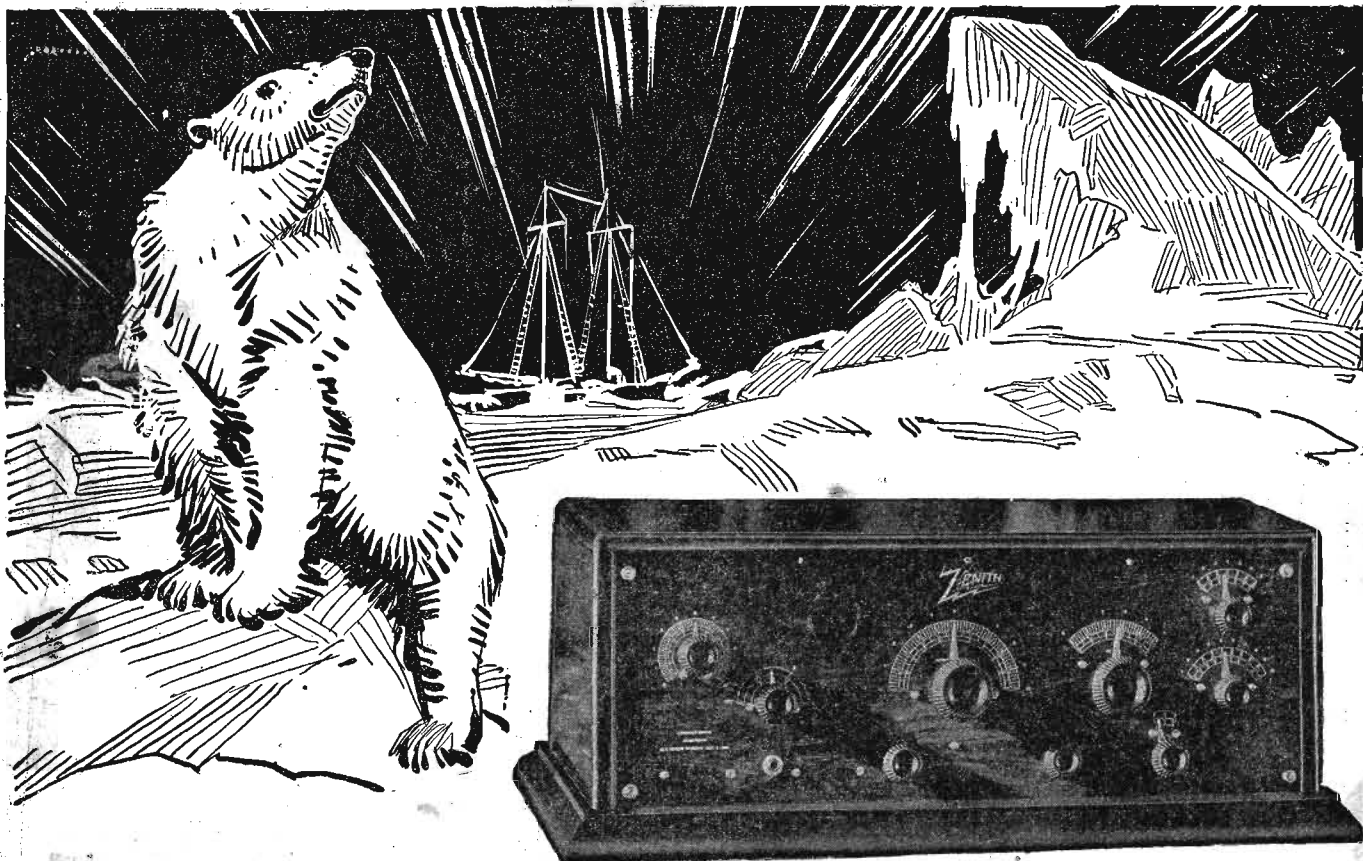
meter wave and heard the announcement about broadcasting the meeting of Massachusetts Institute of Technology from New York. I then checked them on their 326-meter wave. In going back to their 100-meter wave I ran into WGY at about 105 meters with the same broadcast, much to my surprise. I then checked WGY on their 380-meter wave and had the proceedings coming out of two loud speakers at the same time, one from WGY on 380 and

the other from WGY on 105 meters.

"I then did the same stunt with KDKA's two waves. Then put KFKX and KDKA together. I then got KGO, Oakland, on the loop.

"I kept both loud speakers going on all the combinations I could think of."

In the scale from 100 meters to 455 meters, Mr. Jones heard the same program on seven different wave lengths.



Licensed under Armstrong U.S. Patent No. 1,113,149

# Eleven Degrees from the North Pole

Ice—endless miles of ice, as far as the eye can see. And frozen fast in the ice, amid the deadly stillness and the unearthly lights of the Arctic, a staunch little eighty-nine foot schooner! But Donald B. MacMillan and his band of brave explorers are not alone tonight.



Under their ice-bound hatches they listen eagerly to the news of the outside world, broadcast to them from the Zenith-Edgewater Beach Hotel Broadcasting Station, Chicago—to violins in Newark, Schenectady, Los Angeles—to singers in Atlanta—to a lively orchestra in Honolulu.

Stations in all these cities—and in several hundred others—they have readily tuned in; yet the Bowdoin tonight is only eleven degrees from the North Pole!

Out of all the radio sets on the market, Dr. MacMillan selected the Zenith exclusively—because of its flawless construction, its unusual selectivity, its dependability and its tremendous REACH.

And you can do all that Dr. MacMillan does, and more, with either of the two new models described at the right. Their moderate price brings them easily within your reach. Write today for full particulars.

**Model 3R** The new Zenith 3R "Long-Distance" Receiver-Amplifier combines a specially designed distortionless three-stage amplifier with the new and different Zenith three-circuit regenerative tuner.

Fine vernier adjustments—in connection with the unique Zenith aperiodic or non-resonant "selector" primary circuit—make possible extreme selectivity.

**2,000 to 3,000 Miles With Any Loud-Speaker**

The new Zenith 3R has broken all records, even those set by its famous predecessors of the Zenith line. Satisfactory reception over distances of 2,000 to 3,000 miles, and over, is readily accomplished in full volume, using any ordinary loud-speaker. No special skill is required.

The Zenith is the only set built which is capable of being used with all present-day tubes as well as with any tubes that may be brought out in the future. The Model 3R is compact, graceful in line, and built in a highly finished mahogany cabinet ..... **\$160**

**Model 4R** The new Zenith 4R "Long-Distance" Receiver-Amplifier comprises a complete three-circuit regenerative receiver of the feed-back type. It employs the new Zenith regenerative circuit in combination with an **audion detector** and **three-stage** audio-frequency amplifier, all in one cabinet.

Because of the unique Zenith "selector," unusual selectivity is accomplished without complication of adjustment.

The Zenith 4R may be connected directly to any loud-speaker without the use of other amplification for full phonograph volume, and reception may be satisfactorily accomplished over distances of more than 2,000 miles..... **\$85**

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Gentlemen: Please send me illustrated literature on Zenith Radio.

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MCCORMICK BUILDING, CHICAGO

# BEFORE THEY THOUGHT OF "MIKES"

Two more to guess about! Note the little gentleman (lower right) hanging onto the pop gun. He was born day after April Fool's day, 1885, and spent most of his life in a city noted for its smoke. (Which includes many cities, no doubt.) We'll call him Mr. S until next week. Now the young fellow at our right wearing skirts (he did then), has a name that is peculiar, inasmuch as it is duplicated by the name of another announcer down East. Ought to be easy to guess. Oh yes, the photo was made in 1900 when the subject was but two years old. Tell you more next issue.



The gentleman above with the specs is the almost unclothed babe of yesterweek, referred to as Mr. E. His full name is C. R. Emery, WGI. The dressed up baby last issue is represented by the gent below tickling the keys, Lester Palmer, WOAW. Read more about them below.



flapper; and he is doubly watchful this leap year. But—now don't crowd out of line ladies, and be particular about the brand you perfume your letters with!

### C. R. Emery, WGI

ORCHESTRAS are often comprised of more than one piece with more than one man playing the various instruments, but from what has been learned of C. R. Emery—announcer and recently promoted to program director of Station WGI, American Radio and Research Corporation—sometimes one man can be the whole orchestra. Mr. Emery is one of these exceptional men. He plays the piano, organ, trumpet and French horn, and sings between times.

A brief biographical sketch shows Mr. Emery to have been born August 12, 1897 at Abington, Mass. He was with the Castle Square Stock company at Boston in 1917, and was assigned to the U. S. Photographic School at Columbia university during the war period. In 1921 he was in vaudeville with a well-known male quartet which traveled extensively throughout the East. In 1922 he directed theatrical productions for a Boston department store, leaving in 1923 to assume his first duties before a "mike" as announcer at WGI. Now he is program director.

He was the founder of the Amrad Big Brothers' Club (picture on back page) which has won much mention over the country and has even had poems written and dedicated to him by ardent admirers, masculine and feminine. Next time you hear a "one man band" you may at least hazard a guess that you've tuned in C. R. E., of WGI, Medford Hill-side.

**Lester M. Palmer, WOAW**  
**L**P. MIGHT mean "look pleasant" or "likes pie." Both in fact are appropriate to this young gentleman. But when he tacks his shingle out some day to announce his advent into the legal "world" it will have graven upon it, Lester Palmer, with a luxurious Merton sandwiched between to fill up the extra space. By gazing on the smile twisted physiognomy of this diminutive midwesterner, you would not suspect that his heart was being torn in anguish by an eternal, no, not triangle; but—polygon, for

there are so many sides to the activities in which he figures that he is having a terrible time deciding to which he should devote himself exclusively.

You guessed it, the ladies are in the lead, having captured his heart. And the law college has taken his head, the piano his hands, fraternity dances his feet, and WOAW his voice, so that there seems little left for himself. However, if by any chance, he should not be fully claimed, there is golf, chess, "shooting" WOAW publicity stories and the editing of the WOAW Radio Bulletin to fill

up his spare time. Occasionally, he has brief success in meeting old man Morpheus. His favorite night is Wednesday, "silent night," to which he looks forward each week as the one night in the week to get twelve hours sleep. When it rolls around, he usually goes to a dance, etc., (you know how it is, boys and girls) and gets home in time to beat dad to the morning paper.

Palmer developed his snappy voice by wrangling with the other kids on the debating team in high school, and he got so good at it that they made him Captain of the University of Illinois debate team. Mr. Palmer is supremely modest, or subtle, and due to either one of these traits, you will hear him playing the piano under various pseudo-monikers, including Jack Stuart, Of Wahoo, John Jones and De Pachman. Concerning the latter, it is said you can't tell Palmer from the original. So far, Palmer has got by without becoming the property of some carnivorous

## CANADA'S AIR CHAIN NEARS COMPLETION

### FIVE PLANTS NOW FROM COAST TO COAST

Winripeg, Saskatoon, Regina, Edmonton, Calgary Already O.K.'d; Vancouver Also to Join

MONTREAL, QUE.—Arrangements having now been completed for the establishment of stations in five cities in western Canada, there remains only Vancouver to complete the transcontinental chain of Radio stations that will make the Canadian National Railways operator of the greatest chain of non-commercial broadcasting stations in the world.

Advices have been received at general headquarters in Montreal, from W. H. Swift, radio engineer of the National System, that he has completed all arrangements for the establishment of stations in Winnipeg, Saskatoon, Regina, Edmonton and Calgary.

These stations are not new, like CKCH in Ottawa, but are stations already existing with which the Canadian National Railways have come to agreement for the broadcasting of programs.

#### Chain of Stations and Schedules

In Winnipeg the Manitoba Government Telephone Station (CKY), 450 meters, will broadcast from the Canadian National Railways every Thursday evening; from Saskatoon, the Radio Supply station, (CFQC), will broadcast every afternoon between 3 and 4 o'clock from Regina, the Leader station, (CKCK), 420 meters, will broadcast each Tuesday evening; from Calgary, Grant station, (CFCN), 440 meters, will broadcast every Wednesday evening and the Herald station (CFAC), 430 meters, every Thursday evening; from

Edmonton, the Journal station, (CJCA), 450 meters, will broadcast every Friday evening.

The east is already well covered by station CKCH in Ottawa and stations CKAC, CFCF and CHYC in Montreal. Stations in the Maritimes and Toronto may be added later.

## LADY HARVEY TALK CAUSES COMMENTS

Station CKY, Winnipeg, Answers Critical Listeners In on Non-Censorship Policy

WINNIPEG, MAN.—Quite a sensation among listeners in was created by Lady Martin Harvey's recent address at Central Congregation Church here, broadcast by CKY. The eminent actress denounced alleged activities of the Communists among children, and made statements which were warmly contradicted by listeners who telephoned the broadcasting station.

CKY issues the following statement:

"The responsibilities of broadcasters for remarks made by speakers during church services or on public platforms has not yet been defined. To make broadcasting authorities responsible for opinions expressed by speakers would surely be to impose hardships tending to restrict freedom of speed and to curtail the use of Radio.

"Many excellent sermons and addresses would never have been heard had the broadcasting director been expected to insist on their being written out in advance and censored."

The establishment of a broadcasting service at Nagoya, Japan, is being contemplated by local capitalists and business men, who anticipate the approval of the Japanese government.

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# "UNCLE BOB" HOLDS HEARTS OF KIDDIES

## STORIES AND SONGS WIN LOVE OF THOUSANDS

### Letters Prove Walter Wilson Is Idol of Many a Young Life; Parents Voice Appreciation

CHICAGO.—There is one man to-day whom thousands of kiddies will remember when they are grown up and aged, and that man is Walter Wilson.

Children throughout the west and middle west know him better as "Uncle Bob" when he tells the bedtime stories from KYW here and "Uncle Walter" when he sings his never to be forgotten songs, "Dream Daddy" and "My Daddy's Dream-time Lullaby," both on their way to record sales.

Parents, too, are voicing their appreciation of Mr. Wilson, and complimenting him on the good work which he is doing.

Clarissa and Robert Reynolds of Tiskilwa, Ill., write: "We have been listening to your bedtime stories almost every night since we got our Radio, but we wish they were a little longer. I bet you never heard of this town before. We'd like to hear you pronounce 'Tiskilwa' over the Radio."

#### Mother Says "Nice Things"

Some of the letters "Uncle Bob" receives are very humorous, while some are the other extreme.

Here is one from a little fan who writes: "My mother says a lot of nice things about you, too; but my Dad will not let me put them in the letter."

Another reads: "I had the mumps and now I have a gum boil under my lip and it made my face swell up to my eyes. I had to stay in the house three weeks. I had a temperature and hardly ate a thing."

While still another reads: "dear uncle bob my name is Violette and i wanted to write you a little letter for a long time so to night i, heard you sing that Sweet little song to us kiddies it is so nice of you. you are Just one Big kind man and until i seen your picture i thought you was a little thin man imagine my surprise."

## CHILDREN ALL LOVE UNCLE BOB OF KYW



And so it goes, hundreds of letters every day from his little admirers and friends.

#### Asks Prayer for Little Friend

Recently Mr. Wilson received a letter from a mother who wrote: "My little daughter is very ill and your bedtime stories always cheer her up, won't you say a personal word to her?" That night Mr. Wilson asked his friends in the in-

visible audience to say a prayer for this little girl. The following day, the mother wrote and said that the little girl was feeling much better.

A lot of the other daddies are going to appreciate how much it means to win the love and admiration of their own children and find that the really big thing in life is to develop that corner in their hearts which is being usurped by the "dream daddy."

Mr. Wilson is a married man who weighs in at 285 pounds, ringside, and every pound of it is good-natured. Always smiling and cheerful, with a kind word and a laugh for everyone he meets.

## Far Points Hear Debut of Ottawa's New Plant

### Applause Cards from Southern U. S. Indicate CKCH's Reach

OTTAWA, ONT.—In Ottawa, the capital city of Canada, the Canadian National Railways have erected the most powerful broadcasting station in the Dominion. This station, whose call letters are CKCH, was opened recently with a program heard from the Atlantic seaboard in Canada and the United States, as far north as civilization extends in Ontario, south to Carolina and westward to cities beyond the Mississippi in the United States. At least applause cards and letters have been received from these points and that is the only practical means of checking up on the radius of broadcast of a station at the present time.

## LEARN TO HAMMER PIANO BY AIRPHONE

### LESSONS WILL BE GIVEN FROM STATION WCAE

#### Pittsburgh Plant Inaugurates Novel Method of Instructing with Series of Nine Broadcasts

PITTSBURGH.—Attempts have been made by various broadcasting stations to include as part of their regular programs the teaching of novelty piano playing, but these have heretofore proved unsuccessful. Now the Pittsburgh Press-Kaufmann & Baer, station WCAE, of this city, has obtained a series of lessons whereby the pianist may become proficient in playing novelty, popular or "jazz" music.

Henry Reinert, pianist of the Egizi orchestra, Olympic theater, Pittsburgh, will present his entire series of nine lessons, two each week, Mondays and Wednesdays at 7:45 o'clock, Eastern time.

#### How Lessons Will Be Given

Every pianist who can read music and who has a working knowledge of the scales in all the keys will readily understand and play the lessons. They are given in simple form to enable the student to write notations and also hear each subject properly played to demonstrate the explanation.

Each student will devote practice time to each lesson as he would in individual instruction. An average of five hours' practice will be sufficient to master each lesson.

MR. BOWDEN WASHINGTON, CHIEF ENGINEER OF THE

# Cutting and Washington

RADIO CORPORATION

says: "All-American Audio Frequency Transformers were adopted as standard for the Cutting and Washington Receiver after thorough tests in our laboratories demonstrated that they faithfully reproduce broadcasted music and voice with excellent volume and stand up in service better than any other transformers we have tested. We consider All-American Audio Frequency Transformers the best on the market."

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Many other leading set builders have similarly standardized on the best the market affords: All-Americans! Why not benefit by their experience and make certain of the best amplification by adding All-Americans to your set now? The reason for the popular prices at which All-Americans sell everywhere, is their popularity.



#### The All-Americans Always Lead!

Close on the heels of the sensationally successful All-American Power Amplifying Transformers for "PUSH-PULL" circuits, has come the new All-American Long Wave Radio Frequency Transformer which—although just out—is already being acclaimed as another All-American achievement.

Not only does the All-American lead with the latest! The regular audio and radio frequency models are also being continually improved.

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Frequency Amplifier  
Assembly Details  
Tuning Instructions  
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# MODERN MINSTREL WINS YUKON PRAISE

## ALASKA POEM HITS SOUR- DOUGH TWIXT EYES

W. H. F. Tenny's "When the Ice Goes Out in Spring" Draws Letter from Frozen Valley

BUFFALO.—Like the minstrels of old who used to write poems and tales and sing or recite them in the banquet halls of great leaders on festive occasions, so W. H. F. Tenny author of "Songs of the North," reads the poems of which he is the writer to the audience on the "other side of the microphone" from Station WGR here.



W. H. F. TENNY

Mr. Tenny has often spoken in the WGR studio while the red light was burning and has drawn great numbers of fan letters from all parts of the United States and Canada. He is probably the most popular reader with WGR's Canadian audience because of the fact that many of his poems concern life among the French-Canadians.

### Alaskan Poem Draws Applause

One of his poems on life in Alaska which is called "When the Ice Goes Out in Spring," drew a letter from an enthusiastic sourdough from the Yukon Valley who happened to hear Mr. Tenny when he was broadcasting one night in December.

This man from Alaska said that he had watched the ice of the Yukon go out three times and would again this spring. Mr. Tenny's poem, so to speak, hit this particular sourdough right between the eyes. It was "been there" stuff and the sourdough knew it.

This is the poem by Mr. Tenny which won applause from the Alaskan sourdough after its broadcasting from WGR by the author. It is quoted with the permission of The Ryerson Press, publishers:

### When the Ice Goes Out in Spring

When you're hibernated, frozen, and you're all but casking in,

# WLW TO SAW WOMAN IN HALF



WLW listeners who tune in the Crosley Radio Corporation station Thursday night, April 10, at eleven o'clock (Central time), will "witness" black magic put on the air. George Stock, master magician (left), and Powell Crosley (right) are here showing how the stunt is to be done

And the cold has seemed to get you, and to shrivel up your skin,  
And you've sworn and cursed and damned the North until you're sick and sore,  
And you've longed for something human, someone you have known before;  
Then you'll know the satisfaction, which no other thing can bring,  
Like the breaking of the Yukon, when the ice goes out in spring.  
(Continued on page 10)

## King George Has Set Installed in Palace

### Regent's Receiver Has Unique Device for Energy Collector

LONDON.—King George has joined the army of listeners in and has had installed in his palace a receiving set said to be unique.

No aerial or ground connections are used, their places being taken by copper plates set into the top and base of the cabinet. This substitutes for the loop aerial common to most sets not having outdoor aeriels.

## Clowns, Elephants Now Take the Air

### WJAX Will Bring Circus Into Radio- phans' Homes; Imagination of Listeners Must Aid

CLEVELAND.—Ever have a circus in your home? No, not that kind, but a regular honest-to-goodness circus with daring bareback riders, blaring bands and mirth-provoking clowns. It will be provided by the Cleveland News-Leader, April 15, on their Tuesday evening program from WJAX, when Robinson's Circus will be broadcast from the ring-side in the Cleveland Public Auditorium.

Arrangements have been made with owners of single circuit tuners to fill the air with hair-raising shrieks and howls to stimulate the atmosphere of a menagerie and family rates on peanuts and popcorn may be secured from your nearest confectionery store. "The Wave from Lake Erie" will dash out of its new 20-story home with every one of its 770 kilocycles loaded down with old-fashioned

# MAGIC TRICKS OVER AIR AT WLW PLANT

## WILL "SAW GIRL IN HALF" VIA BROADCASTER

Cincinnati's Experiment Is Trail Blazer in Field of Radio Optical Illusions

CINCINNATI.—Broadcast Black Art will take its place on Radio programs for the first time eleven o'clock (Central time) next Thursday night, April tenth, when Station WLW, the Crosley Radio Corporation here, will perform the act of "sawing a woman in half" via the ether. This is the first time magic has ever been broadcast.

Radiophans will hear the explanatory talk by the magician, George Stock, and will then hear the saw cut through a barrel containing the young lady to be "halved." She will have been tied securely by ropes held by a committee in the WLW studio. But after the barrel has been sawed into halves, the young lady is still found unharmed and securely tied as before the saw entered the wood.

### Can Audience Appreciate Magic?

Just how well a Radio audience can appreciate an optical illusion remains to be seen, as the attempt is a trail blazer. At any rate, Mr. Stock, who claims to be originator of the "sawing a woman in half" stunt, will do his best to microphone the trick without "exposing" his hand.

The Cincinnati master magician, president of the local magician's club of which Howard Thurston is an honorary officer, was the first to visualize the possibilities of putting "tricks" on the air, and can be thanked by the ever-restless listeners in for their newest diversion.

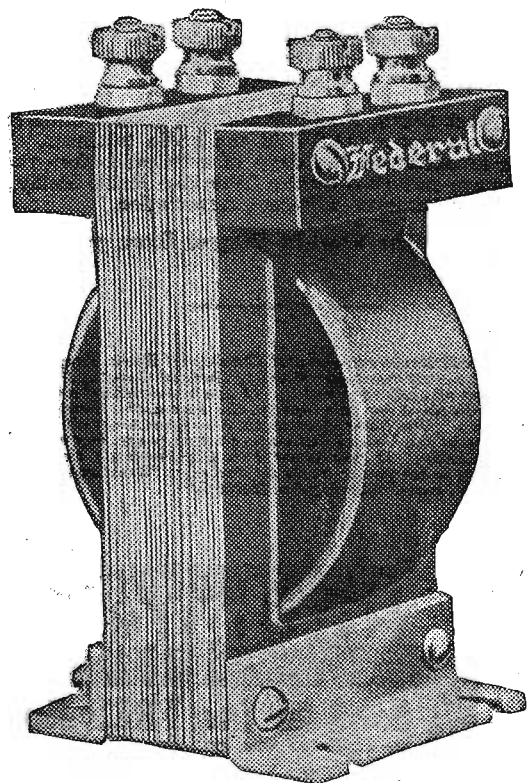
The picture of Powell Crosley and Mr. Stock rehearsing the trick is shown elsewhere on this page.

circus music and the scintillating repartees of the clown.

If you cannot see Mlle. LaEquestrienne in her short skirts and pink tights it will be because you have no imagination and you had best give the receiver to some one who has and can. All aboard for the big top! Everyone tuned in? Let's go!

# Reproduction So Natural

# You Can Hardly Believe Your Ears



Federal No. 65 Audio Frequency Transformer

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FROM the low, throbbing notes of the bass viol to the clear, sharp tones of the soprano—with an amazing fidelity never before attained by radio, Federal radio sets give you all the real thrills of radio receiving.

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# Federal

Standard RADIO Products

# KIN OF MACMILLAN HOLD GRAVE FEARS

## CHICAGO STATION TRIES VAINLY TO GET WORD

"Is No News Good News?" Relatives Ask as They Await Message from Arctic Radio

CHICAGO.—Is no news good news? That is the question that has been in the minds of friends and relatives of Captain Donald B. MacMillan and his crew aboard the Bowdoin, eleven degrees from the North Pole. Since February 16 no message has been received from WNP (Wireless North Pole), the station aboard the Arctic explorer's ship.

Fear has grown for the safety of the Bowdoin's crew.

Among those in Chicago somewhat anxiously awaiting news of the explorer is his sister, Mrs. Letitia Fogg of the Library Plaza hotel, Evanston, Illinois. Mrs. Fogg, whose home is in Freeport, Maine, has been a resident in Chicago since last fall, together with her daughter, a teacher at the New Trier High School.

### Sister Keeps in Close Touch

"I have kept in daily contact with the Zenith station at the Edgewater Beach hotel in the vain hope of hearing from my brother," said Mrs. Fogg last night. "This station has perhaps maintained a closer touch with Capt. MacMillan than other broadcasters.

"But I am not as yet really alarmed about my brother's safety," she continued. "I think it likely that he is absent from his ship upon a tour of the surrounding region. I know he had several such investigations planned for the early spring.

### MacMillan May Be on Trip

"And I am considerably comforted, too, by the thought that Capt. MacMillan rigorously enforced the rule that no Radio messages be sent from the ship during his absence. This, I am confident, accounts for the long silence."

Gene McDonald, president of the National Association of Broadcasters, admitted that he was uneasy about the Bowdoin and its crew, but also thought that Capt. MacMillan's announced intention of making several sledge trips accounts for the lack of tidings. Mr. McDonald accompanied Capt. MacMillan as far as Alaska and installed the Radio plant aboard the Bowdoin.

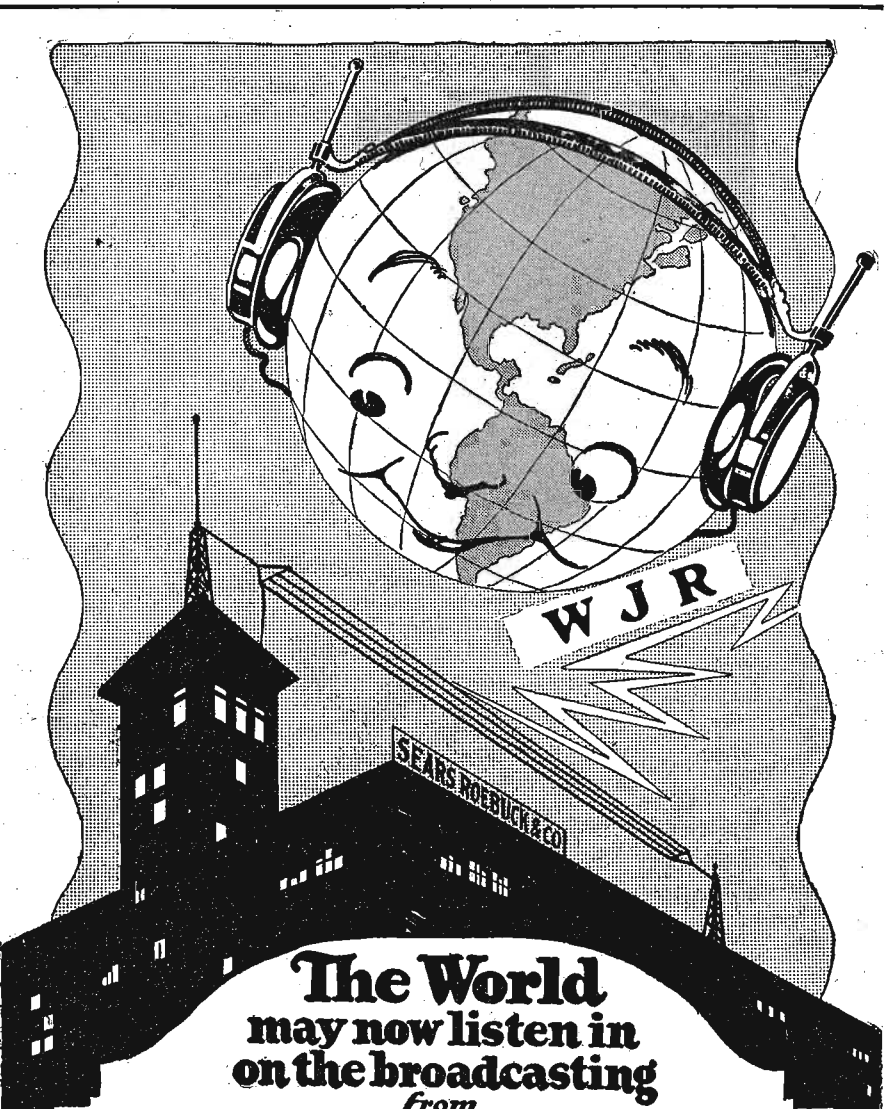
# MACMILLAN'S SISTER BROADCASTS TO HIM



Mrs. Letitia W. Fogg, who talks to her brother, Captain Donald MacMillan, near the North Pole on his ship Bowdoin, by broadcast from 9XN, the experimental license call letters of the Zenith-Edgewater Beach station, WJAZ. Mrs. Fogg, whose home is in Freeport, Maine, is spending the winter in Chicago with her daughter, a Chicago school teacher, where she may talk to her brother occasionally. Mrs. Fogg broadcast messages to him Christmas and New Year's Eve and was rewarded by relayed code messages in response telling her of his pleasure at hearing her. She talked again March 5 and 19. Friends are anxiously awaiting response from the last messages. No word has been heard since February 15. Where is MacMillan? Has he left the ship and pushed northward? His sister is anxiously waiting word from him.

## U. of P. Now Broadcasting Through KDKA, Pittsburgh

PITTSBURGH.—With a former classroom in State hall rebuilt into a studio, the University of Pittsburgh has made its first venture on the air. The studio is connected with Westinghouse station KDKA. Educational programs will be given two or three times each week. Extension courses with credits are also planned.



The World may now listen in on the broadcasting from

# The World's Biggest Store

Station W J R, located on the tower of Sears, Roebuck and Co.'s gigantic merchandise building at Chicago, will be in operation beginning the month of April.

Just another instance that the World's Biggest Mail Order Store is FIRST in everything worth while.

Those who have radio sets will appreciate the fact that our station will be the most modern in the air; every advance made in the science of radio, every successful invention making for clearer broadcasting and improved reception has been embodied in our station.

Station W J R, located on the tower of the World's Biggest Store—will be under government supervision. It is a class B station—the highest rank in broadcasting. It will provide entertainment and education to the world.

It is fitting that Sears, Roebuck and Co. should undertake this work because we were FIRST in the radio business. We encouraged the amateurs in the days of wireless before radio was known. We were endorsed by the American Radio Relay League and the National Amateur Wireless Association.

Now, as always, the World's Biggest Store proves its claim for leadership.

In addition to our Special Catalog of Radio Supplies you will surely want our New Big General Catalog if you have not already received it. It contains almost everything you need for the family, the home, the farm and the shop. We have sent it to one-fourth of all the families in the United States, so that they can buy most economically. If you want this Big Book all that is necessary is for you to write us and say: "Send me your New Big General Catalog No. 60R28G."



Magnavox Reproducer M1 is designed for use with dry battery receiving sets and gives splendid results. It is as simple to connect as a headset. Price \$35.00

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# OPERATING AND TROUBLE SHOOTING

For the Owner of a

## SLEEPER

MONOTROL

Reg. U. S. Pat. Off.

Type 52 Receiver

**"OPERATING and Trouble Shooting"** is a Radio Digest feature whose purpose is to study the late models of various standard receiving sets and to show the newly initiated broadcast listener, who has purchased such a set, how he can operate it to get the best there is in it and how he can overcome minor difficulties which may be causing some trouble. On pages 9 and 10 this week, the Sleeper Monotrol Type 52 Receiver is described. Radiophans with other sets will also find these articles worth reading particularly the notes on trouble finding.

**YOU** will find numbers on the back of the loop reading 1, 2 and 3 for the low, middle and high wires. Run the ends of these wires through the three left holes in the back of the cabinet to the three corresponding binding posts numbered 1, 2 and 3. Insert tips in the binding post and tighten them. The accessories required are one UV200 or C300 for the detector, three UV210A or C301A for amplifiers, one 6 volt storage battery, one 22½-volt and two 45 volt B batteries, one loud speaker and one set of head phones with plugs.

Connect the 6 volt storage battery (or A battery as it is called) to the respective binding posts on the set, being sure to connect the A minus terminals to the part marked A minus, and the positive or red battery terminal to the part marked A plus and B minus, as indicated in diagram.

Connect the two 45 volt B batteries "in series" as indicated. Next connect the minus terminal of the 22½-volt battery to the free minus terminal of the 45 volt B battery, which in turn is connected to the plus A battery terminal as indicated.

Run a wire from the plus 16 volt terminal of the 22½-volt battery to the binding post on the set marked plus 16, then another wire from the free plus 45 volt battery to the binding post marked plus 90.

Follow the diagram carefully in connecting batteries, and when all connections are made, check them over carefully before lighting the tubes. This is very important.

Plug in the loud speaker into the right jack hole (or should you plan to use head phones, plug them into the left jack hole). The left jack lights three tubes only, whereas the right jack automatically lights the power amplifying tube.

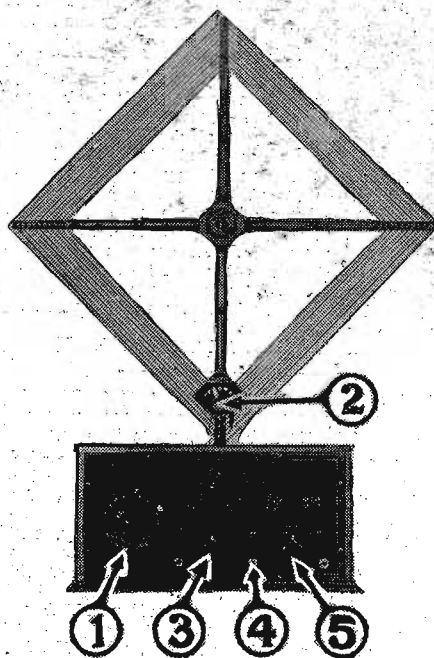
### Operating the Set

See that the button Number 4 at the bottom of the front panel is pushed in. This opens the A battery circuit, or puts out the light in the tubes. Once the set is adjusted and in operation the tubes may be lit or put out by pushing this switch in or out.

Next turn both the detector Number 5 and amplifier, Number 3, rheostat knobs on the front panel, counter-clockwise or to the left as far as they will go. Be careful not to force these knobs too much. Set the loop switch, Number 2, on the middle of the switch point. Insert 200 detector tube in the right socket and the three 201A tubes in the other three sockets as these are amplifiers. The set is now ready for operation.

Pull the button switch, Number 4, out at the bottom of the panel. Turn the left or amplifier rheostat knob, Number 3, to the right one-half revolution. This will light amplifier tubes.

The next operation is a very important one. Turn the right-hand or detector rheostat knob, Number 5, to the right until



a roaring or swishing noise is heard. This will require one-half or three-fourths of a revolution of the knob, depending on the particular detector tube. Now turn the detector knob to the left or counter-clockwise until the swishing noise ceases. The detector tube is now adjusted to its most sensitive point. It will be noted that the detector tube burns much brighter than the amplifier tubes.

Revolve the large dial, Number 1, on the front panel slowly until the broadcasting is heard. The small knob in the center of the large dial is a vernier or fine adjustment, and should be used after the station is tuned in with the large dial, to clear up the reception. (For best results keep amplifier knob, Number 3, turned completely to the right.)

If no broadcasting is heard, turn the loop switch, Number 2, to the next point to the right, and tune again with large dial, Number 1. Try also the last loop

switch point. When leaving your set, always press the button at the bottom to turn off the current.

### Directional Effect of the Loop

As you turn the loop you will note that the reception is louder at one time than another. The loop should be placed parallel or pointing to the broadcasting station that you desire to hear, not cross-wise. Note further that as you turn the switch, Number 2, on the loop from the left to the right you increase the intensity or volume up to a point where you overload the tubes, and distortion occurs.

When in close proximity to a broadcasting station, say twenty to twenty-five miles, it is seldom necessary to use either the last or next to the last loop switch points. For distance the last taps are required. Howling can be readily eliminated by turning loop switch to left.

### Chart of Stations

On the Monotrol you can exactly log your stations. You will always pick up the same station at exactly the same number on the dial and you can, therefore, make a note of the numbers of each station you identify and keep a chart of them. Then when you want to listen in, look at your newspaper, see what is on the air, select your program, and turn to the number on the dial that you know means that station, press the button and there it is.

### Miscellaneous Information

This set is capable of reception over great distances varying according to the particular location where it is used and with the season of the year. In general, Radio reception is from nine to ten times more efficient at night than during the daytime and working for distance is ever so much easier in winter than in summer.

To the novice, a Radio set is a great deal like one's first automobile. If you have never driven an automobile you cannot hop in one and drive it, immediately, through heavy traffic. With a little practice, however, having acquired the few tricks, it is a simple matter. The same applies to a Radio set. In this respect, though, the Sleeper Monotrol is a simple set to operate. Just learn its little tricks and it is "easy to drive."

All broadcasting stations operate on a certain wave length and obviously if two (Continued on page 10.)

## BRISTOL SINGLE CONTROL RADIO RECEIVER



### Most Simple to Operate

The set for those who want results with little effort. Anyone in the family can quickly learn to operate it because technicalities and guesswork are eliminated—One Control Dial does it all.

### Does Not Interfere With Your Neighbor

Other close by reception is not disturbed when you tune in with this non-reradiating Receiving Set. It gives you a comfortable sensation of freedom to be able to change from one station to another knowing that you will not interfere with your neighbor's receiving.

### Choice of Aerial or Loop

Where conditions make it difficult to install an outside aerial, as in congested sections of cities, good results can usually be had by using inside Loop. In fact, the directional feature of the Loop often brings in stations not possible with a stationary aerial.

Mounted in solid mahogany case with walnut finish, the Bristol Single Control Radio Receiver is handsome in appearance. The price is \$190.00. Bulletin AY-3013 describing this set will be mailed on request.

## BRISTOL

TRADE MARK  
**AUDIOPHONE**  
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## Loud Speaker



This is known everywhere as the Loud Speaker with the quality tone. Not only is the tone natural and without mechanical distortion, but is sufficiently big in volume to be easily heard in a large room or all through the house. Comes to you ready to use—no auxiliary batteries are required.

### Made in three models:

- Audiophone Senior . . . . . Price, \$30.00
- Audiophone Junior . . . . . Price, 22.50
- Baby Audiophone . . . . . Price, 12.50

THE BRISTOL COMPANY, Waterbury, Conn.



## The New GREBE Broadcast Receiver

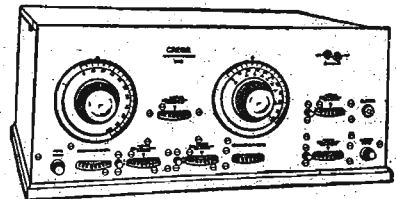


THE 20-foot silk-covered wire supplied with this Receiver is the only antenna required. This wire may be concealed behind the picture moulding or run along the baseboard.

Write for "Grebe Radio in the Well-Appointed Home"

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## A. H. GREBE & CO., Inc.

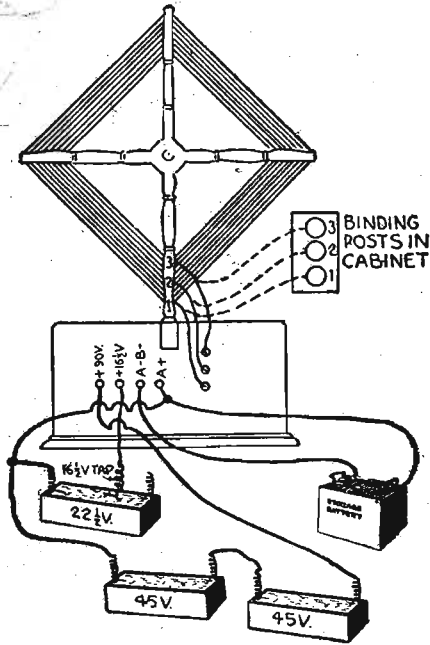
Richmond Hill, N. Y.

Western Branch—451 East 3rd St., Los Angeles, Cal.

### OPERATION, TROUBLES

(Continued from page 9)

stations are working on approximately the same wave length you will hear only the stronger or nearby one. This is one of the important reasons why long distance work is usually done late at night when



local or nearby stations have signed off. When your set does not work, the chances are one hundred to one that your storage battery has run down or perhaps that your B batteries have gone dead. It will certainly pay you to buy a simple voltmeter which need not cost over \$1. With this little instrument, in case of trouble, merely attach it to the battery and if it does not read the amount printed on the battery, the answer is recharge or renew. A batteries can be cheaply recharged at any garage or you can buy an inexpensive home charging machine to do it yourself right from your electric light socket. See that your connections are good at all times as sometimes with batteries on the floor, the industrious housewife disconnects wires with a carpet sweeper or broom. Certain noises in the Monotrol mean certain troubles. For instance: Con-

tinued howling, over the entire range of the dial means "inside" or local trouble. Probably an open or broken circuit. Howling or whistling over a limited range of the dial means that it is being caused by an outside disturbance. This is invariably caused by "spilling over" of the tubes due to too much Radio frequency. This can be eliminated by turning the loop switch to the left. No aerial or ground wires are needed with this set but if by reason of difficulties in your particular locality or the great distances from broadcasting stations you can use to advantage a single wire from twenty to thirty feet long around the picture molding or other support that does not touch the ground in through the back of your set to the post marked 1. This increases the strength of incoming signals. In certain unusual locations, better results can be secured by running a "ground" wire from the minus terminal of the A battery to a radiator or similar "ground." (ANOTHER SET NEXT WEEK)

### KLONDIKE POET IS HIT

(Continued from page 7)

When you've gone through eight months' winter with its weird, unearthly glow, And been prisoned in a cabin in a land of ice and snow; And you've fought it out with scurvy, and you've lived on beans and tea, And you've lost the very sense of time, would love a chimpanzee; Then you'll know the satisfaction which no other thing can bring, Like the breaking of the Yukon, when the ice goes out in spring. When you've stood the ghastly, ghostly glare until you're almost blind; When the very desolation seems to rob you of your mind; When there's no one else to talk to but a mangy, husky cur, And the quiet and the gloom is like a pent-up sepulchre; Then you'll know the satisfaction which no other thing can bring, Like the breaking of the Yukon, when the ice goes out in spring. And you've vowed and vowed that all the gold the Klondike can display, Will never get you back again, if once you get away. But you'll be like all other men as long as you can crawl, You'll wander back and wander back and answer Yukon's call. To know the satisfaction which no other thing can bring, Like the breaking of the Yukon, when the ice goes out in spring.

#### Panel Hole Filler

A good hole filler for black panels may be made in the following manner: Melt some sealing wax compound and mix tar or liquid shoe blacking with it until you have obtained the desired blackness.

Place a piece of metal over the hole on the front side of the panel and pour the compound in the hole from the back with a spoon. Keep the metal in place until the compound becomes hard, which will only take a few minutes.

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Parcel Post prepaid on all orders above \$5.00. Express Money Order, Certified Check, Bank Draft accepted; also C. O. D. Guarantee with all merchandise.

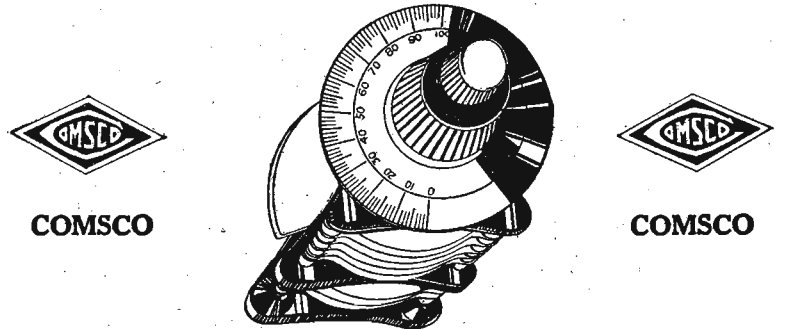
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Complete parts for FADA 5 TUBE NEUTRODYNE SETS. ALL GENUINE FADA PARTS. LIST PRICE \$65.00. OUR PRICE \$51.00. Assembled in cabinet ready to operate, \$71.50. Complete parts for FREED-EISEMANN 5 TUBE NEUTRODYNE SETS. GENUINE PARTS. LIST PRICE \$80.00. OUR PRICE \$62.50. FADA 160 NEUTRODYNE. Factory made machines. LIST PRICE \$120.00. OUR PRICE \$89.50. FREED-EISEMANN 5 TUBE NEUTRODYNE NB5. Factory made machines. LIST PRICE \$150.00. OUR PRICE \$125.50. FADA NEUTRODYNE KIT—3 NEUTROFORMERS—2 NEUTRODONS. LIST PRICE \$25.00. OUR PRICE \$21.00. FREED-EISEMANN NEUTRODYNE KIT—3 NEUTROFORMERS—2 NEUTRODONS. OUR PRICE \$22.50. SHAMROCK KITS—3 NEUTROFORMERS—2 NEUTRODONS. OUR PRICE \$15.45. SUPERDYNE COILS \$5.75.

<b>MISCELLANEOUS</b> Bell Socket, Bakelite Panel Mounting.....\$.69 Amsco 6 ohm Rheostat......95 Amsco 20 ohm Rheostat.....1.15 Amsco 30 ohm Rheostat.....1.25 Amsco 400 ohm Potentiometer.....1.40 Cutler-Hammer 6 ohm Rheostat, Plain......95 Cutler-Hammer 6 ohm Rheostat, Vernier.....1.20 ELECTRAHOT Solder Iron.....2.50 New Improved Cookaday Coil.....5.50 Pathé Pulsiformers.....\$8.50 New Improved Cookaday Coils, silk wound.....5.50	Cutler-Hammer 30 ohm Rheostat, Plain.....\$1.20 Cutler-Hammer 400 ohm Potentiometer.....1.20 Filkostat.....1.85 Bradleystat or Bradleyleak.....1.70 Bruno 14 Tap Inductance Sw......70 Sta-put Phone Plug......35 Phone Plug for 6 pr. Phones.....1.25 Phone Plug for 2 pr. Phones......60 Single Circuit Jacks......35 Double Circuit Jacks......45 4" Dials, Fada Type......45 3" Dials, Fada Type......30 Triple Sockets, Fada Style.....2.65 Marked Eby, Bind. Posts, Ea......17 Ambassador Coil.....5.95	Shelton Midget Vernier.....\$1.40 Freshman Grid Leak & Cond......75 Federal Sockets......95 General Radio 10 ohm Rheo.....1.20 General Radio 30 ohm Rheo.....1.20 General Radio Potentiometer, 200 ohms.....1.25 General Radio Potentiometer, 400 ohms.....2.85
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17 plate plain.....2.25	26 plate vernier.....4.50
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423 Broome Street NEW YORK CITY



# What's Wrong with Your Receiving Set?

## Chapter VII—Tuned Radio Frequency Amplification

By Peter J. M. Clute

UNDOUBTEDLY the most popular of all Radio circuits at the present time is that based on the so-called "neutrodyne" principle. The secret of this circuit lies in the elimination of all undesirable coupling between the different circuits in the receiver, and the reduction

Before discussing the detailed operation of the neutrodyne receiver, it may be advisable to first consider in some degree the very appropriate subject of tuned Radio frequency amplification. The neutrodyne circuit provides a means of direct efficient cascade amplification on the

and audio frequency type make use of that characteristic of the vacuum tube which causes it to act as an amplifier of high frequency alternating current. A slight variation in the voltage impressed upon the grid causes a much larger proportionate increase in plate current. The tube detector functions as a relay in which the amount of current flowing through it from a local battery is controlled by the feeble impulses of the signal received. In a regenerative circuit, instead of applying the potential of the plate circuit to the grid of another tube, it is fed back into the grid circuit of the same tube so as to increase the grid potential. This characteristic of the tube is employed to good advantage in the amplifying circuits,

coupling between tubes, as is shown diagrammatically, in Figure 1. The resistance in the plate circuit should be at least equal to the internal plate resistance of the tube itself, while the resistance inserted in the grid circuit should be one megohm or more.

The circuit shown in Figure 1 may be changed to a reactance coupling type by replacing the plate and grid resistances with choke coils having impedances at audio frequencies equal to the resistances replaced. Greater amplification is secured through reactance coupling than through resistance coupling inasmuch as the necessary potential drop across them is obtainable with much less loss of energy.

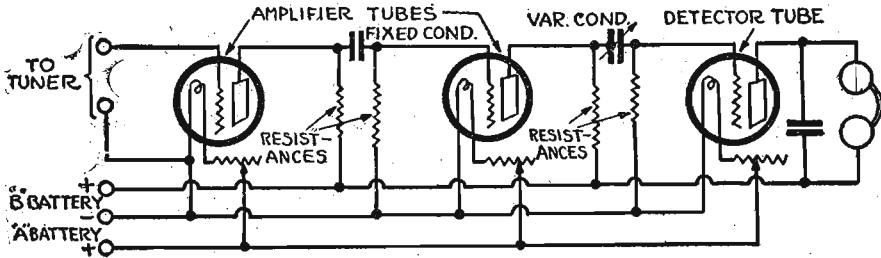


Figure 1

of all electrical losses to an absolute minimum. Elimination of troublesome coupling is accomplished by the precise adjustment of small balancing or neutralizing condensers, by the correct regulation of the relative positions of the neutrodyne coils, and by the proper arrange-

broadcasting wave lengths, and has been termed the perfect form of tuned Radio frequency amplification.

### Advantage of Radio Frequency

The chief advantage of Radio frequency amplification lies in the fact that it am-

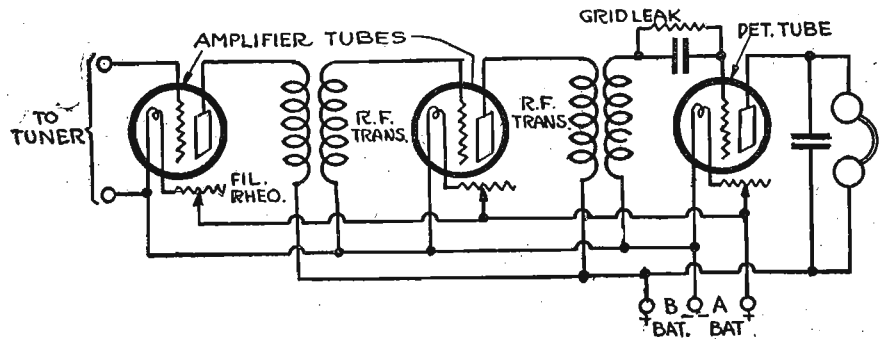


Figure 2

ment and spacing of the wiring. The usual losses are reduced to a minimum by the proper choice of good construction materials.

plifies only the wave and not the numerous slight irregularities existing in most receiving and amplifying equipment.

Amplifiers of both the Radio frequency

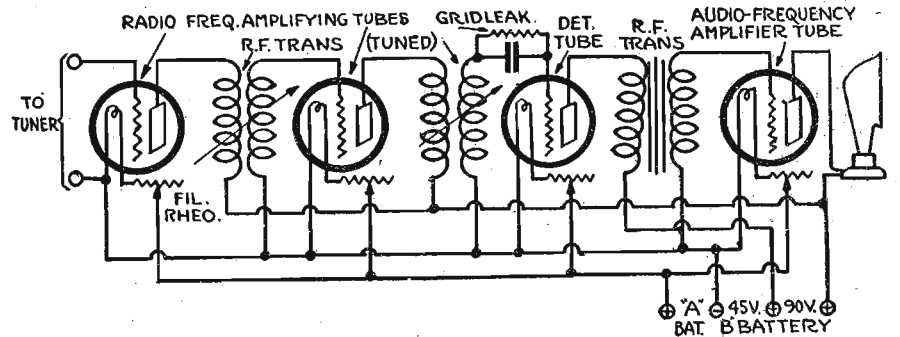


Figure 3

where the plate circuit of one tube is connected to the grid circuit of the next tube. By using one or more additional tubes, the incoming signals may be greatly increased in volume. Each tube has a certain value of potential impressed upon its grid and input circuit, and because of such relay action the potential is amplified and passed on to the next tube.

### Amplifiers

Amplifiers of the Radio frequency type are used in one, two or three stages. The simplest sort of Radio frequency amplifier is that which employs resistance

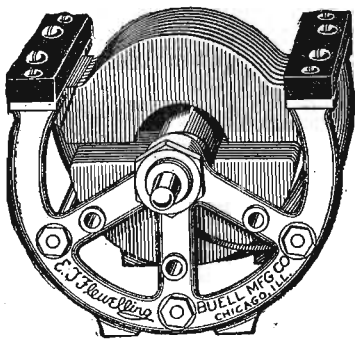
Transformer coupled Radio frequency amplification is shown in Figure 2. The Radio frequency amplifying transformer used for this purpose is designed for a particular band of wave lengths. It will not operate satisfactorily on wave lengths above or below its range. While the transformer coupling is the most common type in present use, its chief disadvantage lies in the fact that Radio frequency transformers are all definitely limited to a certain range of wave lengths. Furthermore, with such a transformer, there will be a particular point or peak at which

(Continued on page 21)

### RADIO TALKS

The use of a low resistance condenser or a low resistance tuner will so sharpen your tuning and increase your selectivity and distance ability as to make their selection a matter of vital importance.

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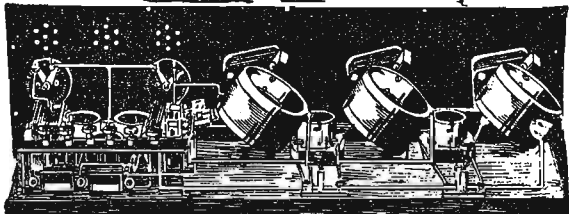
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| 1 Drilled Radion Mahoganite Panel engraved in Gold                       | 1 Baseboard  |
| 3 Mahoganite Dials, 4 inch, engraved in Gold                             | 20 feet Bus-bar  |
| 2 gold plated Jacks  | 1 .00025 Freshman Grid Condenser                         |
| 3 genuine Hazeltine Neutrodyne transformers mounted on Comsco Condensers | 1 Tubular Grid Leak                                      |
| 2 Hazeltine Neutrodons   | 1 Set Engraved Binding Posts                             |
| 5 Bakelite Sockets   | 1 .002 Micon   |
| 1 6 ohm Rheostat   | 1 .006 Micon   |
| 1 30 ohm Rheostat  | All packed in an Attractive Box                          |

Additional Accessories

These accessories, added to the above list of parts, are ABSOLUTELY ALL THE PARTS NECESSARY FOR A COMPLETE SET IN OPERATING CONDITION:

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|--------------------------------------|---------|
| 5 Tubes (Type 201A).....             | \$17.25 |
| 2 45 Volt "B" Batteries.....         | 6.00    |
| 1 60 Ampere "A" Battery.....         | 10.95   |
| 1 Pair Phones, 3,000 Ohms.....       | 3.75    |
| 1 Antenna Outfit.....                | 1.50    |
| 1 7x24 Cabinet, Mahogany Finish..... | 4.95    |

**\$44.40**

Read What These Delighted Fans Say:

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William Metzger, 623 Central Ave., Hot Springs, Ark.

"The set works fine, and picks up quite a few long distance broadcasting stations."

Elmer George, c/o Peoples State Bank, Wauseon, Ohio.

"I commend you for what you are doing to make Radio something that even the person in limited circumstances can afford."

A. J. Calleri, 527 Appar St., Oakland, Calif.

"I am perfectly satisfied in every respect."

Earl C. Lyon, New London, Wis.

"I received the shipment in very fine shape and am very well pleased. Consequently I am sending you another order."

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"I wish to thank you for your kind and courteous treatment, and to assure you that when I am in the market for any more Radio supplies, I will most certainly give The Radio Shack the first call, as any house that stands back of its guarantee in the manner that you do is worth doing business with."

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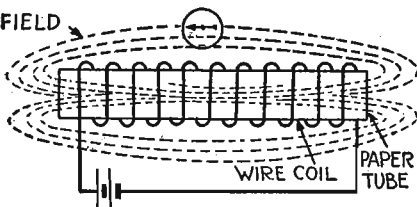
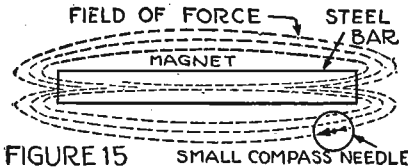
## Chapter IV—What Radio Inductances Do

By P. E. Edelman

**I**N this series of articles the story of Radio will be told in so simple a manner that the uninitiated can follow theory and practice whether he knows anything about electricity or its application to broadcasting and reception or not. The series will consist of twenty-five chapters, of which the five next will be:

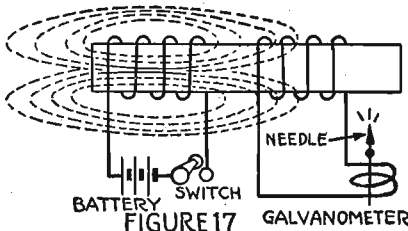
Chapter V—What Condensers Are Good For.  
Chapter VI—Uses of Resistance in Radio.  
Chapter VII—Essentials of Radio Electricity.  
Chapter VIII—The Key to Radio Circuits.  
Chapter IX—Radio's Cast of Characters.

**T**HE first thing noticed in most receiving sets is the coil or inductance which is used for tuning. Inductance coils are also used in amplifier transformers, headsets, and loudspeakers. Induc-



tances serve important purposes in Radio. An inductance is like a springboard in that it can take up and throw back Radio energy.

Looking at Figure 15, an ordinary bar magnet is illustrated. A magnet, as is known, attracts or can pick up pieces of iron. One end of the magnet is called

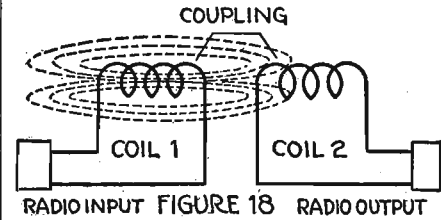


the north pole and the other the south. Invisible lines or a field of force extend from one pole of the magnet to the other. That this is so can be seen by moving a

small pocket compass needle near the magnet, for this needle will be moved and pointed by the force of these magnetic lines or field. A magnet sets up a field of force.

### Coils and Magnetism

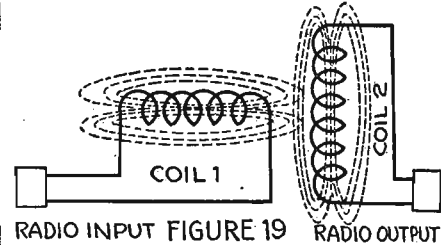
From Figure 16 it will be seen that a coil of wire wound on a paper tube can



serve as a magnet. Current from a battery through such an air core coil makes the coil act much the same as the magnet of Figure 15. A field of force is set up in and around the coil, and is called an inductance.

Now if a current of electricity through a coil makes it act like a magnet, what would happen if a magnet were thrown through a coil of wire? The reverse would occur and a momentary flow of current would be set up in the coil. Any time a magnetic field strikes through and cuts a coil of wire, a current is set up in the coil.

The various coupling coils, tuners, etc., used in Radio sets are often in the form of transformers, called couplers, variocouplers, etc. In Figure 17, transformer action is shown. Suppose a second coil 2 is brought near coil 1, as illustrated in Figure 16. Then if a current from a battery is thrown through coil 1, a magnetic field of force is set up in and around it. Part of this field of coil 1 will, however, extend through and cut coil 2, thus

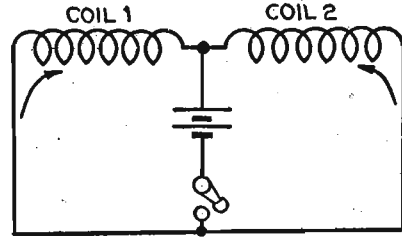


setting up a current in coil 2. The current in coil 2 will be set up according to the current set up in coil 1. If the battery current were sent through coil 1 in the opposite direction, a similar change of direction of the current set up or induced in coil 2 would occur. A galvanometer may be used to show this and comprises a

coil of wire whose field can influence a small compass needle. The induced current in the coil sets up a field and moves the needle.

### What Is Coupling?

The term coupling means in a sense the connection of a magnetic field of force between two coils. Though the two coils are electrically insulated, the field of force from one can cut the other, to induce a current in the second coil. The amount of coupling will be a maximum when the two coils are as close together as possible, and a minimum when they are widely separated or at right angles. This is shown in Figures 18 and 19. In Figure 19, two coils at right angles to each other have very small coupling so that only a weak

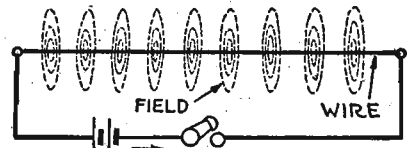


or negligible current is set up in the second coil by current through the first one.

### Transformer Action

The ratio of turns of the two coils may also be varied to affect the coupling, but usually this is done to change the ratio of the induced current and voltage. If coil 1 carries a changing current of one ampere and ten volts and has one hundred turns of wire, and coil 2 has the same dimensions, a current of one ampere, and ten volts will be induced in it when the coupling is close. But if the second coil contained two hundred turns, the current would be one-half ampere with twenty volts. In all cases, a steady direct current through one coil will not set up a current in the second coil. The current is always changing. A changing current

sets up a changing magnetic field. If the change amounts to a full reversal from one direction to another, it is called an alternating current. An alternating current or even a fluctuating current will set up a corresponding alternating or fluctuating field of force and can induce a sim-

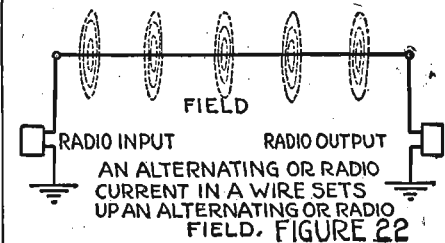


A STRAIGHT WIRE CARRYING CURRENT SETS UP A FIELD. FIGURE 21

ilar current in a second coil which is coupled to it.

If the input is Radio current, the output from the second coil will be Radio current of the same frequency. If voice current is sent through one coil, the second coil coupled to it repeats voice current.

If two coupled coils are each supplied with the same current as illustrated in Figure 20, the field of one will oppose the field of the other, and this can be arranged so that one field neutralizes the other.



A wire acts like a coil and has inductance.

Inductance so far has been mentioned as in a coil. But a straight wire also has inductance. The longer the wire the more (Continued from page 22)

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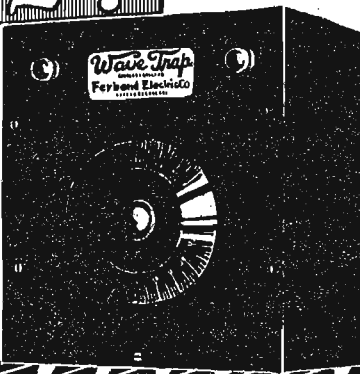
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Selectivity—which is merely the ability to cut out interference—is the dominating difference between the very expensive sets and the moderately priced ones. Why pay \$50.00 to \$200.00 extra for increased selectivity, when for \$8.50 you can get a FERBEND WAVE TRAP which will absolutely cut out any interfering station, no matter how loud, how close by or how troublesome.

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You will find it a valuable addition. It is designed and manufactured complete by us, after years of careful experimenting. It is not to be confused with imitations hastily assembled from ordinary parts. The price is \$8.50. Shipment is made parcel post C. O. D. plus a few cents postage. If you prefer, you can send cash in full with order and we will ship postage prepaid. Send us your order today.



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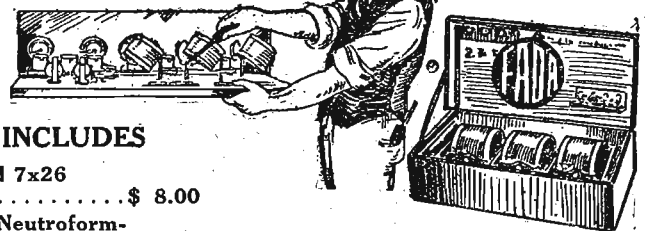
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Table with columns: Station and City, Met., Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Lists various radio stations and their broadcast times.

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. This table includes only the evening broadcasts, and, on Sunday, the late afternoon program.

Batteries Enclosed

In designing a set for the average home, it is usually advisable to get a cabinet large enough to enclose the batteries.

The cabinet need not be much larger if dry cell batteries are used, but if a UV-200 or C-300 tube is used for detector, storage battery must be used, and it is certainly advisable to enclose it.

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Tuesday, November 27, during the test period between 9 and 9:30 P. M., Rev. E. A. Cole in the residence of J. A. McIver, of Roodhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO., tuned in 2-LO, London, England, using receivers and but one tube. Later another tube was lighted and the loud speaker used, so that four people could hear the program and concluding announcement. The numbers, time, and the order in which they were played were

Officially Confirmed

by the St. Louis Post Dispatch in conjunction with the National Association of Broadcasters, who had charge of the tests. (See page 34, St. Louis Post Dispatch, Dec. 2, 1923.) This same hookup has been advertised extensively as the one which brings in stations 2000 miles overland on a loud speaker and one tube; and this has been demonstrated so often as to need no repetition.

Send a two-cent stamp for circular giving one, two, and three tube hookup, and price list of parts for this remarkable circuit. Address the

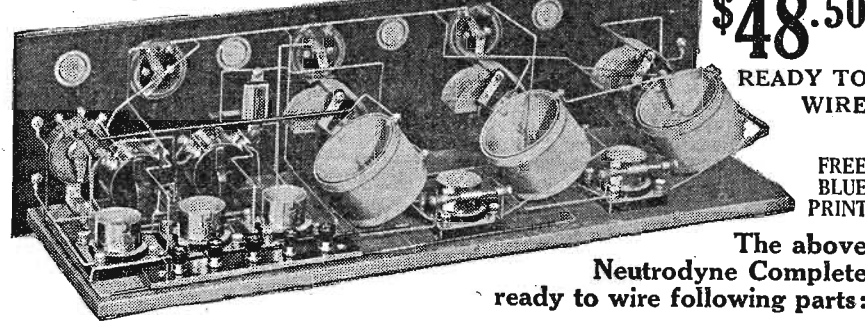
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Neutrodyne Cabinets \$12.50 ONLY FREE The Above CABINET with each Neutrodyne Set described below FREE for the next ten days only.

On account of this special offer you must pay the express Beautiful Mahogany Neutrodyne, Brings in Everything WHEN you get this magnificent looking set wired and hooked up, you will be able to hear all stations without interference. All parts are same as illustrated in Radio Digest, Feb. 2nd. Panel is mahogany with beautiful mahogany dials—a set fitted for the most exclusive home. Panel drilled, all parts mounted on panel and baseboard ready for wiring PAY NO MONEY Just Pay the Postman



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1 Rheostat, 6 ohms, Howard... .90
3 Air Core R. F. Transformers, mounted on condensers, and 2 balancing condensers... 20.00
1 Potentiometer, (850 ohms, Federal)... 1.85
3 Jacks, Carter... 2.70
2 .006 Condensers... .40
1 Grid Leak with Condenser, Walmart... .65
5 Sockets, Kellogg's... 5.00
2 Transformers, All American... \$ 9.50
9 Readem Binding Posts... .85
1 8x26 Mahogany Panel... 3.84
4 Bezels... .80
3 Dials, Mahogany, 4 in... 4.50
1 Baseboard... .50
24 ft. Square Bus Wire... .60
24 ft. Spaghetti... .30

Panel not mounted or drilled, only \$45.50 with blueprints FREE

- 5 Tubes... \$25.00
1 110 Ampere Storage Battery... 18.00
1 Deluxe Homecharger... 18.00
1 Headset... 12.00
1 Complete Aerial Equipment... 1.50
1 45 Volt B Battery... 5.50
2 22 1/2 Volt B Batteries... \$ 6.00
Loud Speaker... \$88.00
TOTAL... \$98.50

The above parts and equipment complete would cost you \$147.00! Our Price \$125.00

Special Sale on Webster Condensers, Fine for Super-Heterodyne

Variable Condenser, .0005 (same as 23 plate), \$2.98 Variable Condenser, .001 (same as 45 plate), \$2.98 list, \$5.50. While they last—Bargain at...

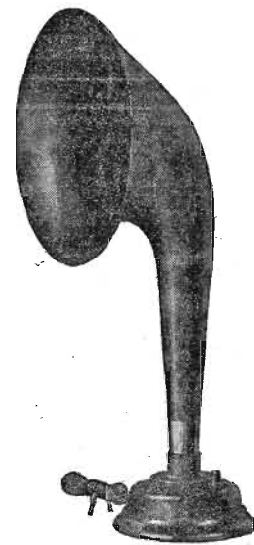
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# 62 PROGRAMS FOR EIGHT DAYS

## Tuesday, April 8

**CKAC, Montreal, Que., Can. (Eastern, 425), 4:30 p. m.**, Music; 7:00, Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Orchestra; Nap Dunsereau, cellist; 8:30, Studio concert; I. C. Houle, director; 10:30, Joseph C. Smith and his Mt. Royal Hotel Dance Orchestra.

**CKY, Winnipeg, Can. (Central, 450), 8:45 p. m.**, "The Teeth and Health," Member of Manitoba Dental Association.

**KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:20 p. m.**, Lenten services, Trinity Church, Dean Warren L. Rogers, director; 6:15, Dinner concert, Grand Symphony Orchestra; 7:15, "What a Chamber of Commerce Can Do for the Community," George R. Wallace; 8:00, "Cleanliness," from the autobiography of Benjamin Franklin, Dr. John Ray Ewers; 8:15, "The Contemporary Novel," Dept. of Eng. U. of Pittsburgh; 8:30, Concert, Women's Historical Society of Pa.; Schubert Women's Quartette; 11:30, Queen City Orchestra.

**KFI, Los Angeles, Calif. (Pacific 469), 6:45-7:30 p. m.**, Concert, 8:00-9:00, Concert, Ambassador-Max Fischer's Coconut Grove Orchestra; 9:00-10:00, Examiner Concert; 10:00-11:00, Entertainment presented by Motion Picture Stars.

**KFKB, Milford, Kansas, (Central, 286), 8:05 p. m.**, "Silage and Pasture for Dairy Cows," Prof. H. W. Care; 8:30, "Feeding for Winter Egg Production," Prof. D. J. Taylor; Elsie M. Smith, pianist; Harry Wilson, vocalist; College quartet; Lecture, Dr. J. B. Brindley.

**KFSG, Los Angeles, Calif. (Pacific 278), 3:30-4:30 p. m.**, Concert entertainment for "Shut-ins"; 7:00-7:30, Children's program, Bible story; 8:00-9:30, Musical program and evening service conducted by Sister McPherson.

## Headliners of the Week

THE WORLD'S greatest trumpeter, Ernest S. Williams, will be heard Tuesday from WFL. Mr. Williams now a member of the New York Symphony orchestra has toured the world twice with John Philip Sousa. Morgan L. Eastman, KYW's musical director, will lecture on the violin this same evening with Fritz Renk assisting him.

You will all, undoubtedly, tune for one Station Wednesday when you see the picture on the next page of Madame Homer Dubard. She will broadcast from WWJ.

WSB will give the best program ever on Thursday which will consist of a musical fantasia called "The Evolution of Dixie." Even the program director, himself, recommends it. WOS has a rival on the air; another prison band will seek freedom through the ether waves when the Eastern Penitentiary Prison Band will be heard over the microphone of WFL. This evening also means a great deal to WOAW. It is this Station's first birthday and we

wish it many happy returns of the day. Friday the Ostranders Plectral String Sextette will be heard via KFOA. A Plectral String Sextette is something exceedingly rare. There are only one or two in the whole United States.

Have you wondered and puzzled over the Einstein theory until your hair grew gray? Never again, WFAA promises to clear up this matter once and for all Monday night. Let us know if you really find out what it is. To rest your minds try for WMAQ Monday afternoon, a whole mouth-organ club will play. The Radio certainly exposes things never thought of before.

Sometime ago a certain Station in the South promised to broadcast a circus and disappointed its invisible audience. Never mind, WJAX will reproduce the Robinson circus for you Tuesday, the band, the jokes of the clowns, the applause of the audience will all be there. All you must do is to imagine the smell of sawdust. Let's go!

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

**WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m.**, Organ recital, Mary E. Vogt; 12:02 p. m., Wana-maker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

**WQZ, Kansas City, Mo. (Central, 360), 2:30 p. m.**, Popular music from Liberty Theater; 8:00, Music by Sickman's Society Orchestra.

**WSB, Atlanta, Ga. (Central, 429), 12:00 p. m.**, Noon concert, Mrs. Carroll Sumner; 3:30 p. m., Howard theater overture and prologue; 5:30, Bonnie Barnhardt's songs and bedtime story; 8:00-9:00, Gospel songs, First Methodist Choir and quartet; 10:45-11:45, Georgia Serenaders.

**WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m.**, Setting-up exercises; R. J. Horton, Y. M. C. A.; 9:45, Fred Shaw, pianist; 12:00 p. m., Edward Barnes, baritone; LeRoy DeTurk, tenor; 3:00 p. m., News Orchestra; 8:00, News Orchestra; Vocal numbers, Archibald Jackson; Lenten speaker.

## Wednesday, April 9

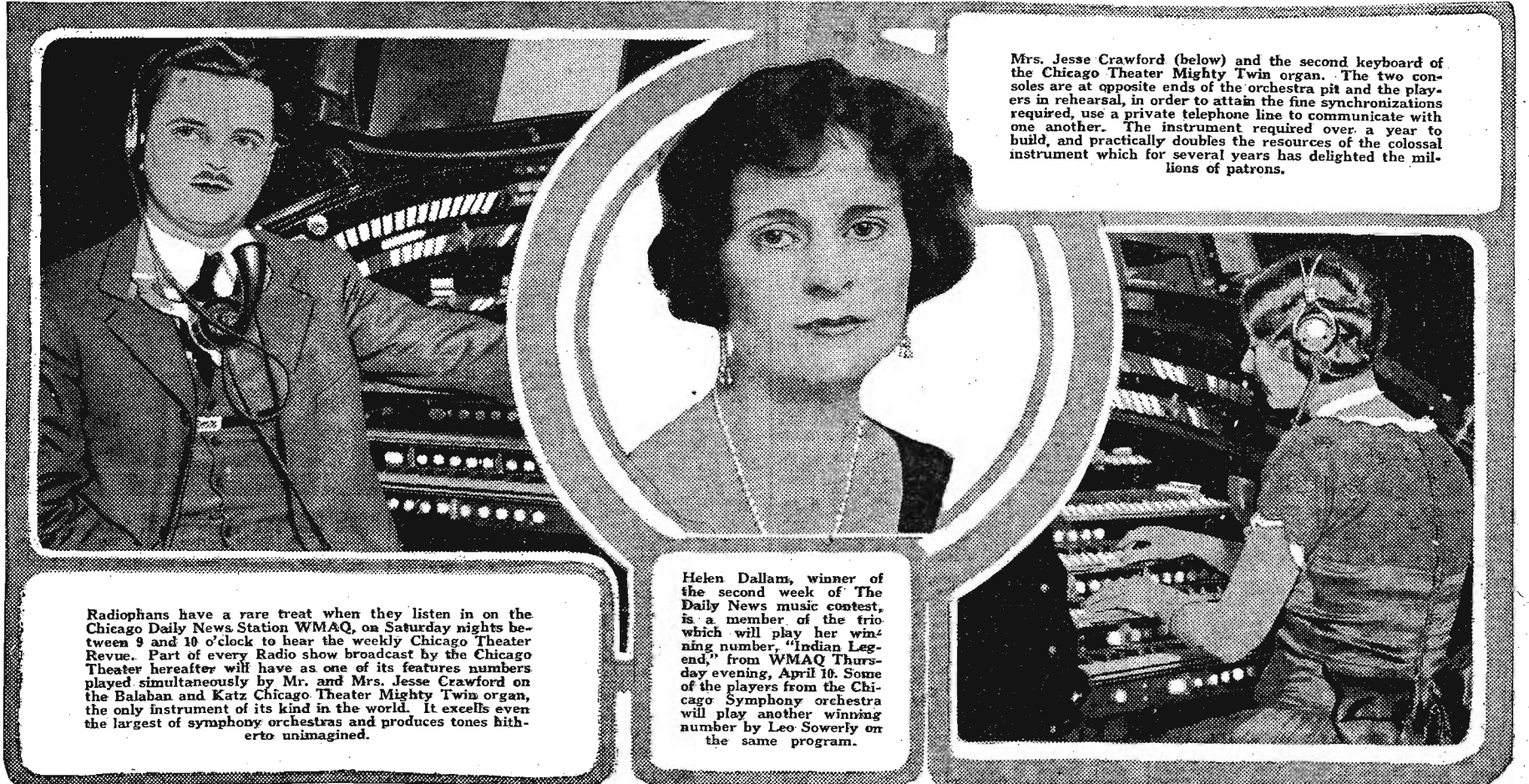
**CKAC, Montreal, Que., Can. (Eastern, 425), 1:45 p. m.**, Mt. Royal Hotel Concert Orchestra; 4:40 Mt. Royal Hotel Dance Orchestra.

**CKCH, Ottawa, Can. (Eastern, 435), 8:00 p. m.**, Program, Kiwanis Club Ottawa, Boys' Choir; Short talk on Ottawa Boy's Choir, H. S. Bates; Toddy Kirby, boy soprano; Songs, Dr. W. McKay; Song, Frank Hearn; Short talk on Kiwanis, Past Lieut.-Gov. W. G. Koddie; Kiwanis Glee Club; Howard Baguley, boy alto; Songs, N. B. MacRostie; Chateau Laurier Orchestra.

Radiophans have a rare treat when they listen in on the Chicago Daily News Station WMAQ, on Saturday nights between 9 and 10 o'clock to hear the weekly Chicago Theater Revue. Part of every Radio show broadcast by the Chicago Theater hereafter will have as one of its features numbers played simultaneously by Mr. and Mrs. Jesse Crawford on the Balaban and Katz Chicago Theater Mighty Twin organ, the only instrument of its kind in the world. It exceeds even the largest of symphony orchestras and produces tones hitherto unimagined.

Helen Dallam, winner of the second week of The Daily News music contest, is a member of the trio which will play her winning number, "Indian Legend," from WMAQ Thursday evening, April 10. Some of the players from the Chicago Symphony orchestra will play another winning number by Leo Sowerby on the same program.

Mrs. Jesse Crawford (below) and the second keyboard of the Chicago Theater Mighty Twin organ. The two consoles are at opposite ends of the orchestra pit and the players in rehearsal, in order to attain the fine synchronizations required, use a private telephone line to communicate with one another. The instrument required over a year to build, and practically doubles the resources of the colossal instrument which for several years has delighted the millions of patrons.



**KGO, Oakland, Calif. (Pacific, 312), 8:00 p. m.**, II Trombone; KGO Orchestra.

**KMW, Portland, Ore. (Pacific, 492), 11:15 a. m.**, Checkered basket; 12:30 p. m., Concert, Civic Music Club; 3:30, Talk, Jeanette P. Cramer; 7:45, Talk for farmers.

**KHL, Los Angeles, Calif. (Pacific 395), 12:30-1:15 p. m.**, Program, Major and his orchestra; 2:30-3:30 Program, Barker Brothers; 6:45-7:30, Children's program presenting Alice Gieschen, 16-year-old pianist; Weekly visit of the Sandman and Queen Titania; 8:00-10:00 Program for French-Canadian compositions; Dr. Thomas Lutmann, lecturer; 10:00-11:00, Art Hickman's Orchestra.

**KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m.**, Rudy Seiger's Fairmont Hotel orchestra; 2:30-3:30, Program, Joseph Carey, blind composer; 4:30-5:30, Rudy Seiger's Fairmont Hotel orchestra; 5:30-6:30, Children's hour, stories by "Big Brother," of KPO, Book Knowledge; 6:30-7:00, "Cleveland Six," Gunzendorfer, director; 7:00-7:30, Rudy Seiger's Fairmont Hotel orchestra; 8:00-9:00, Program, Hazel Huff, soprano; 9:00-10:00, Walter Wenzel, pianist; 10:00-11:30, E. Max Bradford's Versatile Band.

**KSD, St. Louis, Mo. (Central, 546), 8:00 p. m.**, Studio recital, Marcus Epstein, director; Bernadette Bostick, pianist; Mario Fallon, baritone; Theresa Owen, accompanist; Address, Prof. T. Emmett Reynolds.

**KYW, Chicago, Ill. (Central, 536), 11:35 a. m.**, Table talk, Mrs. Anna J. Peterson; 2:35 p. m., Studio program; 4:00, "Bringing the World to America," Editors of "Our World"; 7:00, Bedtime story, Walter Wilson, Uncle Bob; 7:00-7:30, Dinner concert, Congress Hotel, Joska DeBabary and his orchestra; Clyde Doerr and his orchestra; 8:00, Lecture, "The Violin," Morgan L. Eastman; Violin demonstrations, Fritz Renk; 8:20, Program, American Farm Bureau Federation, B. H. Critchfield, B. H. Heide; 8:48 Musical program; 9:10, Talk, Rev. Daniel J. McHugh, "Astronomy."

**WBAP, Fort Worth, Texas, (Central, 476), 7:30-8:30 p. m.**, Concert, Panther City Orchestra, J. N. Wimple, director; 9:20-10:45, Ladies' Glee Club and student quartet, Southwestern Baptist Seminary.

**WBAY, Columbus, Ohio, (Eastern, 390), 12 m.**, Piano music, Ila Lorbach Owens.

**WEZ, Springfield, Mass., (Eastern, 337), 7:00 p. m.**, "The Vegetable Garden," William H. Wolff; 7:30, Bedtime story for the Kiddies; 7:40, Carlotta E. Webster, bass-baritone; Mrs. Harold C. Warner, accompanist; Mrs. Follis Gould, soprano; Pearl Leahy, pianist.

**WCAE, Pittsburgh, Pa., (462), 4:30 p. m.**, The Sunshine Glee; 6:30 Dinner Concert; 7:30, Uncle Kaybee; 7:45, Special feature; 8:30, Musical program by The Tar Ken-Ton Troubadours.

**WCAI, Northfield, Minn. (Central, 360), 9:45 a. m.**, St. Olaf college chapel service; 11:30 a. m., Concert, quartet.

**WCX, Detroit, Mich. (Eastern 517), 6:00 p. m.**, Dinner concert, Hotel Teller; 8:15, Lenten talk, Rev. John A. McCloy, S. J.; 10:00 Red Apple Club.

**WDAF, Kansas City, Mo., (Central, 411), 3:30 p. m.**, Johnnie Campbell's Kansas City Club Orchestra; 6:00, E. O. Moffatt travelogue, children's story, information man, Fritz Hauelin's Tri-tone Ensemble; 11:45, Night-hawks.

**WDAP, Chicago, Ill. (Central, 360), 7:00-8:00 p. m.**, Drums concert, Ensemble and Blackstone Quintet; 8:00-8:30, Ralph Emerson, organist; 10:00, Rosemary Hughes, Voice Workday, Fred Asgard, Jack Chapman's orchestra.

**WDAB, Philadelphia, Pa. (Eastern, 395), 11:45 a. m.**, Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; Lenten services from Studio; Arcade Cafe Concert Orchestra; 2:00, Arcade Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 7:50, Play review, Arnold Abbott.

**WEAF, New York, N. Y. (Eastern, 492), 4:00-4:30 p. m.**, Reid's Instrumental Quartette; 4:30-5:00, Harriet Sink, Sopr.; 5:00-5:30, Children's stories; 7:30-7:40, Thornton Fisher; 7:40-8:00, Grace Fisher, Reeves, Jean sopr.; 8:05-8:30, Helen Schafmeister, pianist; 8:30-9:00, Brooklyn Eagle News Review; 9:20, Lincoln High School Orch.; 9:20-9:30, Penn. Mutual 10:15, Louis Ziadler, tenor, and Dudley Warwick, bass; Ins. Co., 9:30-9:45, Columbia Phonograph Co.; 9:45-10:15-10:45, Lincoln High School Orchestra.

**WFAA, Dallas, Texas, (Central, 476), 12:30-1:00 p. m.**, Address, DeWitt McMurray; 8:30-9:30, Program, Texas Women's Chamber of Commerce; 11:00-12:00, Adolphus Hotel Orchestra, Lawrence Morrell, director.

**WFL, Philadelphia, Pa. (Eastern, 395), 1:00 p. m.**, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Mabel E. Baum, soprano; Jolly Five Orchestra from Egg Harbor City; 6:00, Bedtime stories by Sunny Jim; 6:30, Meyer Davis Bellevue Stratford Orchestra; 8:00, Ernest S. Williams, trumpeter; 8:30, C. Emerson Brown, director Phila. Zoological Gardens; Recital, Suite Opus 71 by Moszkowski; Florence Baerle, Oscar Langman, Mildred H. S. Ackley; 9:00, Vaughn de Leath, Original Radio Girl; 10:10, Charlie Kerr and his Symphonic Dance Orchestra.

**WGI, Medford Hills, Mass. (Eastern, 360), 6:30 p. m.**, Meeting of the Amrad Big Brother Club; 7:00, "Africa from Cape Town to the Congo," A. S. Flint; Big Brother Club.

**WGN, Chicago, Ill. (Central, 370), 7:00-8:00 p. m.**, Address; Elsie Staab, contralto; Oriole Orchestra; 9:00, Sue Sener, pianist; Oriole Orchestra.

**WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.**, George Albert Bouchard, organist; 2:30-4:00, The Radio Dealers' Musical program; 6:00-7:30, Chamber music recital.

**WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m.**, "Rosalia," Max Maury; 6:30, Dinner music, Instrumental Trio of Hotel Ten Eyck; 7:45, "H. M. S. Pinafore," WGY Light Opera Company.

**WHAA, Iowa City, Iowa (Central, 484), 8:00 p. m.**, Concert by faculty of music, University of Iowa.

**WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m.**, Strand Theater Orchestra; Walnut Theater Orchestra; Alamo Theater organ; 7:30, Louisville Syncopaters; Reading, Mrs. Cordi Greer Feltie.

**WHB, Kansas City, Mo. (Central, 411), 12:35-1:00 p. m.**, Popular music, Sweeney Radio orchestra; 2:00-3:00, Ladies' hour program, Sweeney Radio orchestra; 7:00-8:00, Sweeney Radio orchestra; "Gardens," Mrs. Paul Briggs; 8:00-9:00, Program, Saint Agnes Academy; 9:00-10:00, Election returns.

**WHN, New York, N. Y. (Eastern, 360), 3:30-4:30 p. m.**

Bob Schaefer and His Entertainers, assisted by the Original Georgia Five; 9:30-10:00, Fletcher Handerson's Alabama Club Orchestra; 10:00-10:45, Shapito Eemstein Music Co.; 10:45-11:15, Lorraine Society Dance Orchestra, Arnold Miller, leader.

**WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m.**, Recital, Karl Bonawitz; 3:00, Esther Maddux Tennent, soprano; Six Saxophone Serenaders, direction Keach and Green, Charles T. Janke, baritone; 6:35, Die Regan and his WIP Orchestra; 7:00, Uncle Wip's bedtime stories; Dorothy Bodig, eleven-year-old pianist; 8:00, Elliott Lester, dramatic talk; 8:15, Philadelphia Police Band; 9:00, St. Alban Glee Club; 10:15, Ted Weems and his Cafe L'Aiglon Orchestra.

**WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m.**, Program furnished by Cleveland News-Leader; Bedtime story, E. G. Johnson; Radio Chalk Talk Cartoon, Don Palmer; Solos and duets, Marcella B. Francis and Dorothy Smith Lenz; Talk, "Child Labor," Member League of Women Voters; Dance program.

**WJY, New York, N. Y. (Eastern, 405), 7:30 p. m.**, Blanche Winograd, pianist; 8:00, Field and Stream sport talk; 8:15, American orchestra concert; 9:15, New York Society Military and Naval Officers of the World War Dinner, Speakers, Lieut. George Lunn, Gen. Robert Lee Poulard, Admiral Charles Plunkett.

**WJZ, New York, N. Y. (Eastern, 457), 12:00 p. m.**, Lenten services, Trinity church, Rev. Canon Shear; York Board of Education program; 3:00, Special ford; 1:00 p. m., Hotel Ambassador Trio; 2:00, New afternoon Auditorium concert; 4:00, Fashion talk, Ethnor Gunn; 4:15, "Right Habits of Reading," Prof. Howard R. Driggs; 4:45, "The Home Beautiful," Dorothy Ethel Walsh; 5:00, Popular songs, Jack Nelson; 5:15, Evelyn Simon, soprano; 7:00, "Business Conditions," U. of the Air talk, Dr. Warren F. Hickenell; 7:15, Supper music, Paul Specht's Alamac Hotel orchestra; 8:15, Bertha Brainard broadcasting Broadway; 8:30, "Joseph Conrad," Doubleday Page and Co.; 8:45, Josephine Vellanti, soprano; 9:00, Waterway League of America Meeting; "Development of Waterway Front of New York for Recreational Purposes," Hon. Murray Hulbert; 11:00, Dance music, Hotel Astor Grill orchestra, Al Eps, leader.

**WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m.**, Topics of Interest to Women; 10:00, Concert, Kidwell Music Store, Chris Gottschalk, Mrs. Dora Stevenson, Dorothy Kidwell, Bay Ruttle, Master Freddie Morgan.

**WMAQ, Chicago, Ill. (Central, 447.5), 4:20 p. m.**, Items of interest to women; 4:30, Pupils, Glenn Dillard Gunn School of Music; 5:00, Weekly Child-life talk for children; 7:00, Travel lecture, Clara E. Laughlin; 8:00, Talk, Harry Hansen; 8:40, LaSalle Orchestra; 9:00, Lecture, University of Chicago; 9:15, Eyon and Healy program.

**WMC, Memphis, Tenn. (Central, 500), 8:30 p. m.**, Program, Correse Brothers; 11:00, Pipe organ recital, Harry O. Nichols.

**WOAW, Omaha, Neb., (Central, 526), 6:30 p. m.**, Dinner program, "The Original Music Masters"; 9:00, Musical program, arranged by Corrine Paulson Thorson, pianist and instructor.

**KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:15 p. m.**, Dinner concert, Pittsburgh Athletic Association Orchestra; 7:15, Address, representative Civic Club of Allegheny County; 8:00, Program, League of American Pen Women; 8:30, Concert.

**KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m.**, "The Burden of Armaments," Prof. Yoder; Horticulture talk, C. L. Vincent; "Where Our Styles Come From," Mrs. Nellie Jacobs; Readings; "Early Orchard Tillage," E. L. Overley, horticulturist; "Farm Water Supply," A. B. Crane.

**KFI, Los Angeles, Calif. (Pacific 469), 6:45-7:30 p. m.**, Detective stories presented by Detective Nick Harris; Concert; 8:00-9:00 Evening Herald concert; 9:00-10:00, Examiner concert; 10:00-11:00, Concert, Hollywood Community Orchestra; 11:00-12:00, Concert, Ambassador-Max Fischer's Coconut Grove Orchestra.

**KFKB, Milford, Kansas, (Central, 286), 8:05 p. m.**, "The Kansas Wheat Pool," Prof. W. E. Grimes; 8:30, "The Outlook for the Poultry Industry in Kansas," Prof. Morris Evans; Robert Gordon, cellist; Allene Rhodes, contralto; Leslie E. Putnam, vocalist; Lecture, Dr. J. R. Brindley.

**KFNH, Shenandoah, Ia. (Central, 266), 7:30 to 9:00 p. m.**, Concert of old-fashioned music.

**KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m.**, Wilbur Westerman, violinist; Program, pupils, Silvio Riesgar, Campbell sisters in duets; Dorothy Greenberg, solo numbers.

**KFSG, Los Angeles, Calif. (Pacific 278), 2:30-4:30 p. m.**, Divine Healing service conducted by Almee Sample McPherson; 7:00-7:30, Children's program; Bible story; 8:00-9:30, Concert and Bible service by Almee Sample McPherson.

**KGW, Portland, Ore. (Pacific, 492), 11:15 a. m.**, Window shopping; 12:30 p. m., Concert, Darty's Orchestra; 3:30, Children's program; 8:30, Orchestral concert, Harold Bayley, director; 9:00, Alexander Hamilton Institute business talk, James Albert; 10:00, Dance music, George Olsen's Metropolitan orchestra.

**KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m.**, Program presenting Henritta Weismann, contralto, accompanied by Elsie Aspit; 2:30-3:30, Program, presented through courtesy of Barker Brothers; 6:45-7:30 Children's program presenting Berenice Van Loan Gaines compositions, with Richard Headrick, Billie Haynes and Rosalie Tusso, Bedtime story; "Uncle John"; 8:00-10:00, Program presented by courtesy of the San Jacinto (Calif.) Chamber of Commerce; an "Evening in Bonoma-land," Dr. Mary P. Baumgardt; lecture on Astronomy; 10:00-11:00, Art Hickman's Orchestra.

**KLX, Oakland, Calif. (Pacific, 509), 8:00-10:00 p. m.**, Irvin Johnson, baritone; KLX Instrumental Quartet; Mid Pacific Quartette, Hawaiian numbers.

**KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m.**, Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Jack Paul's Entella Cafe orchestra; 4:30-5:30, Rudy Seiger's Fairmont hotel orchestra; 5:30-6:30, Children's hour, stories for children, "Big Brother" of KPO, Book Knowledge; Dale Adams, 7-year-old pianist; 7:30-7:30, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-12:00 midnight, E. Max Bradford's Versatile Band.



# RUMPETER AND EINSTEIN ON AIR



Mme. Homer Du Bard, whose charming soprano voice will be heard over the microphone Wednesday evening, April 9, from WWJ. Mme. Du Bard is heard very often over this station.

Ethel Guyon, flutist, of the KLX Instrumental Trio, which will be heard Wednesday, April 9, from the Oakland station.

Five Character Men in WGY Players who appear in a thrilling radio drama, "Pierre of the Plains," at WGY, Friday night, April 11. Left to right they are: Charles S. Baumes, Frank Oliver, H. A. Thompson, Edward H. Smith and Maurice G. Randall.

## Where to Hear Talks

TALKS, instructive, serious, humorous and even frivolous, are broadcast daily and below are listed the stations.

- Tuesday:** CKY, KDKA, KFKB, KGW, KHJ, KSD, KYW, WAAM, WBZ, WCAE, WCAL, WDAF, WDFW, WEAF, WFAA, WGI, WGY, WHB, WIP, WJAX, WJY, WJZ, WKAR, WLAG, WMAQ, WMC, WOC, WSB, WWJ.
- Wednesday:** KDKA, KFKB, KFAE, KFKB, KGO, KGW, KPO, KYW, WAAM, WBAH, WBZ, WDAF, WDFW, WEAF, WFAA, WGI, WHA, WJZ, WHAR, WLAG, WMAQ, WOC, WOR, WOS, WWJ.
- Thursday:** KDKA, KFKB, KYW, WAAW, WAAM, WAAW, WBZ, WCAE, WDAF, WDFW, WEAF, WFAA, WGI, WGY, WHAS, WHB, WIP, WJAX, WJY, WJZ, WKAR, WLAG, WMAQ, WOC, WOR, WWJ.
- Friday:** CKY, KDKA, KFAE, KFKB, KGW, KHJ, KYW, WAAW, WBZ, WCAL, WDAF, WFAA, WGI, WGY, WHA, WHB, WJY, WJZ, WLAG, WMAQ, WOAW, WOC, WOS, WWJ.
- Saturday:** KDKA, KYW, WBAH, WBAP, WDAF, WFAA, WFI, WGI, WIP, WLAG, WMC, WOAW, WOC, WWJ.
- Sunday:** KYW, WGI.
- Monday:** KFAE, KFKB, WAAM, WAAW, WBZ, WDAF, WEAF, WFAA, WGR, WGY, WHAZ, WIP, WLAG, WOC, WWJ.
- Tuesday:** KFKB, WAAM, WDAF, WHB, WIP, WMAQ, WOC, WWJ.

**WDAP, Chicago, Ill. (Central, 360), 7:00-8:30 p. m.**, Drake Concert Ensemble and Blackstone Quintet; 10:00, George Hill, Jr., tenor; Ralph Emerson, organist; Jack Chapman's Orchestra.

**WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m.**, Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 1:30, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; Radio playlet by Walter Greenough and his WDAR Players; 10:10, Howard Lavin and his Arcadia Cafe Dance Orchestra; Special "Morning Glory Club" Program musical comedy stars from Philadelphia's leading theaters.

**WEAF, New York, N. Y. (Eastern, 492), 12:00 noon.** Lenten Church Services; 4:00 p. m., Helen Jenks Dietrich, pianist; 4:30, George O'Brien, baritone; 5:00, Children's Hour Stories; 7:30, Thornton Fisher; 7:40, Carl Von Lantz, pianist; 8:00, Billy Jones and Ernest Hare; 8:30, World Mutual Insurance Program; 9:00, Actor Coffee Dance Orchestra.

**WEO, Columbus, Ohio (Eastern, 360), 4:00 p. m.**, lecture, member agricultural college faculty of Ohio State University; music, university talent.

**WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m.**, Address, Dr. Robert S. Hyer; 8:30-9:30, Varied program, Entertainers from Palmer, E. H. Morgan, director.

**WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m.**, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, piano recital, Loretta Kerk; 6:00, Sunny Jim's bedtime stories; 6:30, Meyer Davis Bellevue Stratford Orchestra.

**WGA, South Bend, Ind. (Central, 360), 7:00-8:30 p. m.**, Dr. K. H. Robinson, pianist; Hotel La Salle Big Five Orchestra; WGAZ Orchestra.

**WGI, Medford Hills, Mass. (Eastern, 360), 6:30 p. m.**, Amrad Big Brother Club; 7:30, Selected verses, Charles L. H. Wagner, Radio Poet; "Paralysis," American Red Cross; Tufts College program.

**WGN, Chicago, Ill. (Central, 370), 7:00 p. m.**, Address; Baritone solos; Oriole Orchestra; 9:00, Jessie Pringle, soprano; Luther Carter, tenor; James Johnson, pianist; Oriole Orchestra.

**WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.**, Radio Dealers' Musical Program; 6:30-7:30 and 11:30, Vincent Lopez Hotel Statler Orchestra; 8:45-9:00, George Porter, baritone; 9:00-9:45, Musical program by the Girl Reserves from the foreign communities of Buffalo; 9:45-10:00, Musical Frankenstein, pianist; 10:00, Concert, George Albert Bouchard.

**WGS, Schenectady, N. Y. (Eastern, 380), 2:00 p. m.**, "The 1924 Easter Parade," Paul Brown; 6:30, Children's program; 7:45, Health talk, Dept. of Health; 7:40, "The Humane Movement," N. J. Walker; 7:45, "Pierre of the Plains," WGY Players; WGY Orchestra; 10:30, Elite Quartet; Helen B. Thomas, soprano; Mrs. Willard C. Miller, pianist; Willard C. Miller, tenor; Nannie B. Howard, contralto; Ernest Whiting, violinist; Edwin J. Vaughan, baritone.

**WHA, Madison, Wis. (Central, 360), 7:30 p. m.**, "The Quality of Literature that Lives," Prof. F. Bruns.

**WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m.**, Branch Theater Orchestra; Strand Theater Orchestra; 7:30-9:00, Hoosier Male Quartette; Reading, An interesting Historical Episode.

**WHB, Kansas City, Mo. (Central, 411), 12:35-1:00 p. m.**, Popular music orchestra; 2:00-3:00, Ladies' hour program, Sweeney Radio Orchestra; Arthur Winters, trumpeter; 7:00-8:00, Program, Kansas City branch of League of American Pen Women, Lenora Anthony, director.

**WHK, Cleveland, Ohio (Eastern, 283), 9:00 p. m.**, Dance program of Cleveland Radio Dealers' Association, Louis Rich and his Orchestra.

**WHN, New York, N. Y. (Eastern, 360), 2:15-2:40 p. m.**, Original Indiana Five; 3:45-4:15, Dinty Moore's Hunter Island Inn Orchestra; 4:30, Rose Wolfe, soprano; 4:45-5:15, Snappy Trio; 5:30, Gene Herber's Orchestra; 11:00-2:00 a. m., Lesa Bickman, soprano; Harry Hock Entertainers; Victor Wilbur, baritone; S. Jay Kaufman and his celebrities; Ross Fowler, baritone; 12:30, Stars from Little Jessie James at Little Theater.

**WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m.**, Gimbel Brothers' Tea Room Orchestra; 6:00, Baseball dope by Monte Gross; 6:05, Jordan-Lewis Dance Orchestra; 7:00, Uncle Wip's bedtime stories.

**WIY, New York, N. Y. (Eastern, 405), 7:30 p. m.**, Ellsworth B. Morse, baritone; Herbert E. Rector, tenor; Fred Hildner, accompanist; 7:30, "Income Taxes," Frank Shevitz; 8:00, Ellsworth B. Morse, baritone; Herbert E. Rector, tenor; 8:15, Frances Kirsch, soprano; 8:30, "Work of the New York Assembly," Hon. Julius Berg; 10:30, John Doherty, baritone.

**WJZ, New York, N. Y. (Eastern, 455), 12:10 p. m.**, Noon hour of music, Brook Presbyterian church; 1:00, Hotel Ambassador Trio; 2:00, New York Board of Education program; 3:00, Hotel Astor organ recital, Leo Riggs; 4:00, Elinor Gunn's fashion talk; 4:10, Vivian Marlowe, soprano; 4:20, Women Lawyers' association; 4:50, Arts and decorations; 5:00, "The Larger Aspect of World Affairs," International Interpreter; 6:15, "Systematic Psychology," Dean James E. Lough; 7:00, Carl Temple's Radio Boxing Lesson for Boys; 7:10, Leonidas Leonard, pianist; 8:00, Mildred Delma, soprano; 9:00, Concert, auspices R. E. Johnston; Carmela Ponselle, soprano; Frederick Gunster, tenor; Edward Tankow, bass; Rudolph Bach, violinist; 10:30, Dance program, Paul Specht's Alamo Hotel Orchestra.

**WMAQ, Chicago, Ill. (Central, 447.5), 2:35 p. m.**, Concert, Lyon & Healy Recital hall; 4:20, Items of interest to women; 4:30, Pupils, Bush conservatory; 7:00, Weekly "Wide Awake club," Mrs. Frances M. Ford; 7:30, Music memory contest, Mrs. Marx E. Oberdorfer; 8:40, LaSalle Orchestra; 9:15, Musical program, Excelsior Literary Association, of Omaha.

**WMC, Memphis, Tenn. (Central, 500), 8:30 p. m.**, Program, Exchange Club of Memphis, Dr. T. R. Ogden, director; 11:00, Midnight frolic, Charlie McCauley, director.

**WOAW, Omaha (Central, 526), 6:30 p. m.**, Harmo Jazz Orchestra; 9:00, Oakland (Ia.) Band, Joseph D. Andrea, director; Address, 10:30, Radio, Yesterday, Today and Tomorrow, J. Helden Morgan, of Omaha.

**WOC, Davenport, Iowa (Central, 484), 12:00 m.**, Chimes; 3:30 p. m., "The Peripheral Nerve," R. G. Maybach; 5:45, Chimes; 6:30, Sandman's visit; 7:00, "Art Appreciation," R. J. McKinney; 7:20, Sunday School Lesson, Dr. Frank Willard Court; 8:00, Tri-City Florists Club, Erwin Swindell, director; 9:00, Weekly Tourists' Road Bulletin.

**WOO, Philadelphia, Pa. (Eastern, 509), 10:00 a. m.**, Organ recital, Mary E. Vogt; 12:02 p. m., Wana-

## Saturday, April 12

**CKAC, Montreal, Can. (Eastern, 425), 7:00 p. m.**, Kildie stories in French and English; 7:30, Rex Battle and his Royal Hotel Orchestra; 8:30, Fench Folklore, Conrad Gauthier, director; 10:30, Joseph C. Smith and his Mt. Royal Hotel Dance Orchestra.

**KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:20 p. m.**, Lenten services, Trinity Church, Rev. Homer A. Flint; 1:30, Concert, Daugherty's Orchestra; 6:15, Dinner concert, Westinghouse Employees' Band; 7:30, Story, Dr. Daniel L. Searles; 7:45, Last Minute Helps to Teachers of and Secondary Classes; 8:00, Cammie Johnson; 8:00, Feature; 8:15, "More Fish and Better Fishermen," Dr. Charles Reittel; 8:30, Concert, Westinghouse Band.

**KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m.**, Concert of instrumental numbers; 8:00-9:00, Concert program of vocal and instrumental selections; 9:00-10:00, Examiner concert; 10:00-11:00, Concert of instrumental and vocal numbers; 11:00-12:00, Concert presented by Ambassador-Max Fischer's Coconut Grove Orchestra.

**KFNH, Shenandoah, Ia. (Central, 266), 7:30-9:00 p. m.**, Program by employees of Henry Field Seed Co.

**KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-4:30 p. m.**, Concert by members of Children's Church; 7:00-7:30, Children's hour.

**KGO, Oakland, Calif. (Pacific, 312), 8:00 p. m.**, Program, Scripist Club, Scripist quartette; Accordion solo, John L. Zunino; William Edward Johnson, baritone; Mrs. Evelyn Comstock, pianist; Rose Bell, reader; Hawaiian Guitar duets, W. F. Drury and Virgil M. Holden; Irma Randolph, soprano; Address, Mrs. Leola L. Baird, Oakland Realtors' Glee Club; Pearl Bateman, saxophonist; Mrs. Howard L. Bacon, contralto; George Mox Ward, baritone; "Women in the Business and Professional World," Violet Richardson; Cantillations, Evelyn A. Roach.

**KGW, Portland, Ore. (Pacific, 492), 3:30 p. m.**, Children's program, story, Aunt Nell; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

**KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m.**, Concert; 2:30-3:30, Concert program presented through the courtesy of Barker Brothers; 6:45-7:30, Children's program, presenting Helene Pirie, silver-sheet juvenile; Mrs. Norman Hassler, soprano; Bedtime story, "Uncle John"; 8:00-10:00, Program, Mrs. Norman Hassler, soprano; Norma Hassler, baritone; Eleanor Steeth, violinist; Clarence Kellogg, pianist; 10:00-11:00, Art Hickman's Orchestra.

**KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m.**, Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Sgt. Burkhead, bass; J. H. Colet, accompanist; J. H. Colet, pianist; Orrie R. Peterson, banjoist.

**KSD, St. Louis, Mo. (Central, 546), 8:30 p. m.**, Missouri Theater Orchestra concert and specialties.

**KYW, Chicago, Ill. (Central, 536), 11:35 a. m.**, Table talk, Mrs. Anna J. Peterson; 6:45 p. m., Bedtime story, Walter Wilson, Uncle Bob; 7:00, Dinner concert, Joske DeBary's Orchestra; Clyde Doerr's Orchestra; 8:00, Ann Kelley, soprano; Staro Chaspi, baritone; Lillian Lewis, pianist; Antoinette LeRoux, accompanist; Hammond Troubadours Male Quartet; Mrs. Lillian Mikesch, accompanist; W. Schillo, 1st tenor; L. Otto, 2nd tenor; G. Calder, baritone; R. G. Brush, bass; 9:05, "Safety First," Elkins; 9:15, "Under the Evening Lamp," Youth's Companion; 10:00-12:00, Late Show, Congress Hotel student orchestra.

**WBAP, Fort Worth, Texas (Central, 476), 7:00-7:30 p. m.**, Review of the Sunday School Lesson and Radio Bible Class, Mrs. W. F. Barnum.

**WBAV, Columbus, Ohio (Eastern, 390), 12 m.**, Piano music, Ha Lorbach Owens.

**WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m.**, Dinner concert, Hotel Kimball Trio; 7:30, Bedtime story for the Kiddies; 7:40, Concert, Norman Dash, baritone; Mrs. Welton Donovan, soprano; Dudley Chase, tenor; Mrs. Alexander Thomson, contralto.

**WCAE, Pittsburgh, Pa. (462), 3:00 p. m.**, Special musical program, 6:30, Dinner concert from Wm. Penn Hotel; 7:30, Uncle Kaybee; 7:45, Lew Keegan, will sing several late popular numbers. Miss Irene Schuler at the piano; 8:30, Musical program.

**WCAL, Northfield, Minn. (Central, 360), 12:00 mid-night.** Musical program.

**WCA, Detroit, Mich. (Eastern, 517), 4:15 p. m.**, Music; 6:00, Dinner concert, Hotel Tuller.

**WDAP, Chicago, Ill. (Central, 360), 7:00-8:30 p. m.**, Drake Concert Ensemble and Blackstone Quintet; 10:00, Harmony Girls; Bob Brown and his Kalele; Betty Holmes, soprano; Jack Chapman's Orchestra.

**WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m.**, Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 1:30, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; Edna Finestone, pianist; 4:30, Dance music hits by Cotton Picker Orchestra; 7:30, Dream Daddy's bedtime stories.

(Continued on page 18)

RAM THE ERS

and to dial

KHJ, KYW, WFI, WIP, WLW, WOB

today KGW, KSD, BAP, WHN, MAQ, WOS

today KFI, J.KPO, DAP, WFI, WIP, WJZ, WOR, WWJ

today KPO, DAP, WFK, WJZ, WTAS

today KFO, KYW, WFAA, WGY, WIP, WOR, WWJ

today KFAE, WOS

Saturday, April 12

(Continued from page 17)

**WEAF, New York, N. Y. (Eastern, 492), 4:00 p. m.**, Carolinians Orchestra; 5:00, Viola Sherwood, soprano; 7:00, Rata Present, pianist; 7:30, Janet Bush, flautist; Katherine Pitt Jones, reader, and Mr. Holland, violinist; 9:00, Program by Theta Chi Fraternity from Hotel Astor; 11:00, Vincent Lopez Orchestra.

**WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m.**, "The Labor Movement in England," George F. Thomas; 8:30-9:30, Mrs. Joseph B. Rucker, pianist; 11:00-12:00, Dance music, Adolphus Hotel Orchestra, Lawrence Morrell, director.

**WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m.**, Meyer Davis Bellevue Stratford Orchestra; 6:00, Sunny Jim's bedtime stories; 6:30, Meyer Davis Bellevue Stratford Orchestra; 7:00, Dan Creamings and his Kings of Harmony Dance Orchestra; 8:00, Medical Talk, Dr. S. Solis Cohen; 9:00, International Sunday School Lesson by Dr. William T. Ellis; 9:30, Banquet of reserve officers, Seventy-ninth Division, United States Army; 10:10, Charlie Kerr and his Symphonic Orchestra.

**WGI, Medford Hills, Mass. (Eastern, 360), 7:00 p. m.**, Talk, Current events, David M. Cheney; 8:00, New England Business Industry, Arthur R. Currier; Musicale.

**WGN, Chicago, Ill. (Central, 370), 7:00 p. m.**, Address; Hugo Tulen, violinist; 9:00, Program, Mid-West concert management, C. E. Boots, director; Oriole Orchestra.

**WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.**, George Albert Bouchard, organist; 2:30-4:00, "The Radio Dealers' Musical program; 6:00-7:30, Chamber music recital.

**WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m.**, Dance music, Romano's Orchestra.

**WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m.**, Strand Theater Organ; Walnut Theater Orchestra; Alamo Theater Organ; 7:30-9:00, Gobber-Tripit Orchestra; Reading, An Interesting Historical Episode.

**WHB, Kansas City, Mo. (Central, 411), 12:40-1:00 p. m.**, Dance program, Sweeney Radio Orchestra; 2:00-3:00, Ladies' hour concert, Sweeney Radio Orchestra.

**WHN, New York, N. Y. (Eastern, 360), 2:45 p. m.**, Tom Banks and His Colonial Inn Orchestra; 3:45, Harnett Donaldson and His Society Orchestra; 4:30, Dick Coster's Ukiele Club; 5:15, Mrs. Marie Heckman, soprano; 7:30-8:00, Al Reiser and His Dancing Carnival Matinee Orchestra; Jimmie Flynn; 8:15, Phil Dolan and Tom Bracken Singing Harmony; 8:30, Alice Glasser in songs; 8:45, Ted Newkirk's Harmonica Orchestra; 9:00, Joseph Fiedel, baritone; 9:15, Bob Emmerich, piano solos; 9:30, Flo Johnson in popular songs; 9:45, Harry Romaine, tenor; 10:00, Frances Bolon, soprano, classical selections; 10:15, Irving Cherin in songs at the piano; 10:30, George Roberts and Jimmy Doyle in songs; 11:45, Rubey Cowan and his Entertainers.

**WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m.**, Gimbel Brothers' Tea Room Orchestra; 3:00, Mixed Quartet from Grace Lutheran Church, Norristown, Pa.; 6:05, Harold Leonard's Redjackets, from Club Madrid; 7:00, Uncle Wip's bedtime stories; 8:00, "Hellum and Other Rare Gases," Professor Ed. J. Hughes, Philadelphia College of Pharmacy and Science; Matinee Musical Club program, direction Helen Pulaski Innes; Address, Elizabeth Hood Latta; 10:15, Harold Leonard's Redjackets from Club Madrid.

**WJZ, New York, N. Y. (Eastern, 455), 8:00 p. m.**, Metropolitan Music Co. Ethel R. Burdard and orchestra; 8:30, Reginald W. Erskine, baritone; 8:45, Ethel R. Burdard; 4:00, Tea concert, Hotel Belmont String Ensemble; 5:00, Rosa Zarin, soprano; 5:15, Philip E. Sigals, pianist; 7:00, Howard Garis, "Uncle Wiggly Stories"; 7:20, "Be Kind to Animals," Mrs. E. E. Bucher; 7:30, Katherine Jagel Wier, pianist; 8:00, Eudward Kipling, Doubleday; 8:15, Leon Gilbert, baritone; 8:45, "The Wedding of Harp and Spark," Dr. Alfred N. Goldsmith.

**WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m.**, Orchestra concert, Herzl school; 9:00, Balaban & Katz Chicago Theater revue.

**WMC, Memphis, Tenn. (Central, 500), 8:30 p. m.**, Program, Grand Opera Selections, J. L. Gargaro, director.

**WOAW, Omaha (Central, 526), 6:30 p. m.**, Lenn Kelly's Harmonians; 9:00, Adams Saxophone Orchestra, Harmony Makers and D. L. Desdunes, violinist.

**WOC, Davenport, Iowa (Central, 484), 12:00 m.**, Chimes; 3:30 p. m., "Making Coal Tar Dyes," C. C. Hall; 5:30, Chimes; 6:30, Sandman's visit; 9:00, Palmer School Radio Orchestra, Erwin Swindell, director; V. B. Rochte, baritone.

**WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m.**, Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

**WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m.**, Children's Program; 6:15-7:00, "Music While You Dine," Paul Van Loan's Sinfonella Orchestra; 7:15-7:30, Fred J. Bendel on Sporting News Up to Minute; 8:00-9:00, Gene Ingraham's Bell Record Orchestra; 9:15-10:30, Concert under direction of Karolyi Wells Bassett; 10:30-11:00, White Way Entertainers.

**WSB, Atlanta, Ga. (Central, 429), 12:00 m.**, Entertainment; 3:30-4:00 p. m., Howard theater overture and prologue; 5:00, Music; 5:30, Bonnie Barnhardt's songs and bedtime story; 8:00-9:00, U. S. postoffice staff entertainment; 10:45-11:45, Week-end revue, Mrs. Kathleen Rogers Page, international pianist.

**WTAM, Cleveland (Eastern, 390), 9:00 p. m.**, Dance program, WTAM Dance Orchestra; solo numbers, favorite entertainers.

**WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m.**, Setting-up exercises, R. J. Horton, Y. M. C. A.; 12 m., Edward Barnes, baritone; LeRoy DeTurk, tenor; 3:00 p. m., New Orchestra; silent evening.

Sunday, April 13

**CKAC, Montreal, Can. (Eastern, 425), 4:30 p. m.**, Sacred concert.

**KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m.**, Church service by L. A. Church, Federation; 4:00-5:00 p. m., Vesper services by Federated Church Musicians; 6:45-7:30, Concert; 9:00-9:30, Concert presented by Ambassador Hotel; 9:00-10:00, Examiner concert; 10:00-11:00, Orchestra concert.

**KFNH, Shenandoah, Ia. (Central, 266), 6:30-7:30 p. m.**, Sacred song service; old-fashioned hymns.

**KFSG, Los Angeles, Calif. (Pacific, 278), Entire Church services broadcasted at 10:30 a. m.-12:30 p. m.; 2:30-5:00 p. m.; and 7:30-10:00 p. m.**

**KGW, Portland, Ore. (Pacific, 492), 6:00 p. m.**, Church services; 7:00, George Olsen's concert orchestra.

**KHJ, Los Angeles, Calif. (Pacific, 395), 10:00 a. m.**, Organ recital and entire church service from First M. E. Church; Arthur Blakeley, organist; Rev. E. E. Helms, pastor; 7:00-7:30 p. m., Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, De Luxe Concert.

**KLX, Oakland, Calif. (Pacific, 509), 9:30 p. m.**, Church services, Rev. John Snape, pastor.

**KPO, San Francisco, Calif. (Pacific, 423), 11:00-12:00 m.**, Radio church services, Dr. Marion L. Lawrence, speaker; solos and duets, Mr. and Mrs. A. N. Mellor; 8:30-11:00, Rudy Selger's Fairmont Hotel Orchestra.

**KYW, Chicago, Ill. (Central, 370), 11:00 a. m.**, Central Church service; 7:00, Chicago Sunday Evening Club service; Imperial Male Quartet; "What Jesus Stood For," Clifford W. Barnes; 7:40, Organ recital, Stanley Martin; Choir of 100; Offertorium "The Palm," John B. Miller; Address, "The Best Religious Appeal," Dean Charles O. Brown.

**WBAP, Fort Worth, Texas (Central, 476), 11:00-12:15 p. m.**, Complete services, First Methodist Church, Rev. J. W. Bergin, pastor; 4:00-5:00, Organ concert, Margaret A. White; 11:00-12:00 midnight, Popular concert, Fred Cahoon's WBAP Southern Serenaders Orchestra.

Where to Hear Dramas

DRAMAS, humorous, serious, musical comedies and even, operettas are broadcast during the week and below are the stations and dates.

**Tuesday: KGO, "Il Trovatore,"** WGY, "HMS Pinafore," WGY, Light Opera Company.

**Thursday: KGO, "Kindling,"** KGO, Players; WGI, Radio drama, Boston Stage Society; WJY, Stockbridge Stocks, one-act play.

**Friday: WCAE, "One-act comedy,"** "Aunt Dinah's Quilting Party," WDAE, Radio playlet, Walter Greenough and his WDAE Players; WGY, "Pierre of the Plains," WGY, Players.

**Monday: WHAZ, "The County Chairman,"** The Masque of Troy.

**WAL, Northfield, Minn. (Central, 360), 11:00 a. m.**, Church services, St. John's Lutheran church; Nils Kleven, pastor; 8:30, Sacred program, Mrs. A. D. Stauffacher, soprano; Thony Genevieve Felland, pianist; Mrs. A. E. Lippert, accompanist; Dean J. Jorgen Thompson, speaker.

**WCX, Detroit, Mich. (Eastern, 517), 10:30 a. m.**, Services Central M. E. Church, Dr. Lynn Harold Hough; Guy Filkins, organist; Hudson quartets; 2:30 p. m., Radio chapel service.

**WDAP, Chicago, Ill. (Central, 370), 5:00-6:00 p. m.**, R. D. Emerson, organist; 9:15, Drake Concert Ensemble; Mme. Joan Young, soprano.

**WDAR, Philadelphia, Pa. (Eastern, 395), 2:00-4:00 p. m.**, Program of popular classical numbers by Arcadia Cafe Concert Orchestra, direction Feri Sarkoz.

**WEAF, New York, N. Y. (Eastern, 492), 2:00 p. m.**, Federation for Support of Jewish Philanthropic Societies; 2:45, N. Y. Federation of Churches; 3:45, Dr. S. Parkes Cadman; 7:20, Capitol Theatre Orchestra and Staff of Artists; 9:00, Skinner Organ Recital.

**WFAA, Dallas, Texas (Central, 476), 6:00-7:00 p. m.**, Radio Bible class, Dr. William M. Anderson; 9:00-10:00, The Singers; 10:11-11:00, Jack Gardner's Honeybees' Orchestra.

**WFI, Philadelphia, Pa. (Eastern, 395), 3:00 p. m.**, Services, Rev. V. C. Gutelius, pastor Grace Reformed Church; 7:30, Arch street Presbyterian Church services.

**WGI, Medford Hills, Mass. (Eastern, 360), 4:00 p. m.**, "Adventure Hour," Youth's Companion; Concert, Weltman Conservatory; 8:30, Talk, auspices Greater Boston Federation of Churches; Loretta A. Monahan, soprano; William McRobbie, tenor; Anne Marie de Guichard, violinist, pianist; Arthur de Guichard, accompanist.

**WGN, Chicago, Ill. (Central, 370), 6:00-9:00 p. m.**, Artist service program; Stella Wren, soprano; Katherine Wade-Smith, violinist; Dean Kemnick, pianist; Oriole Orchestra.

**WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m.**, Vesper service, the Rev. Henry F. Wind, city superintendent Lutheran Institutional Missions; 4:00, Laurence H. Montague, organist.

**WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m.**, Services, First Dutch Reformed Church of Albany, Rev. Robert Wyckoff, pastor; 3:30 p. m., GY Synagogue, Rev. William S. Fay, baritone; 7:30, First Dutch Reformed Church.

**WHAA, Iowa City, Iowa (Central, 484), 4:00 p. m.**, Easter music, University of Iowa organizations; 9:00, Familiar hymns, Helen Orcutt.

**WHAS, Louisville, Ky. (Central, 400), 9:57 a. m.**, Organ music; 10:00, Church service, Broadway Baptist Church, Rev. Dr. Russell Johnson Pirkey, pastor; H. U. Goodwin, organist and choir director; 4:00-5:00 p. m., Concert, Alice Monroe, director.

**WHK, Cleveland, Ohio (Eastern, 289), 8:00 p. m.**, Selections, WHK Orchestra; Solo numbers, Mrs. J. P. O'Donnell, soprano.

**WHN, New York, N. Y. (Eastern, 360), 3:15 p. m.**, Queens County C. E. Union; 4:30, Ace Brigade and El Fourteen Virginians, from Gallagher's Monte Carlo Restaurant; 5:00, Wm. D. Bosler, of the National Security League, in talk on "Thomas Jefferson's Birthday"; 9:45, Program by the Music Students' League of America; 10:15, Hildagard Fisher, soprano, singing semi-classical.

**WIP, Philadelphia, Pa. (Eastern, 509), 10:30, Church service, Rev. Floyd Tompkins; 9:30 p. m., Concert from Germantown Theater, direction Karl Bonawitz and Ben Staud.**

**WV, Cincinnati, Ohio (Central, 309), 9:30 a. m.**, School, Editorial Staff of Sunday School Publications, Methodist Book Concern; 11:00, Services, Church of the Covenant, Dr. Frank Stevenson; 2:30, Memorial service, Cincinnati Lodge No. 2, Loyal Order of Moose; 7:30, Church services, 100th anniversary of the Madisonville M. E. Church, Dr. L. Seward, minister; 8:15, Concert, Western and Southern Orchestra, Ister; 8:15, Concert, Western and Southern Presbyterian Church; Flora Sears Nelson, organist.

**WOC, Davenport, Iowa (Central, 484), 9:00 a. m.**, Sacred chimes concert; 1:30 p. m., Orchestra concert; P. S. C. Orchestra; 7:00, Pipe organ; 8:00, Church service; 9:30, Palmer School Radio Orchestra.

**WOO, Philadelphia, Pa. (Eastern, 509), 10:30 a. m.**, Services from Bethany Presbyterian Church; 2:15 p. m., Services from Bethany Sunday School.

**WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m.**, Church services, First Presbyterian Church, Rev. W. Hooper Adams, pastor; Mrs. Mary Armstrong, organist; Mrs. John V. Joba, director of vested choir.

**WSB, Atlanta, Ga. (Central, 429), 11:00 a. m.**, First Presbyterian Church service, Rev. J. Sproule Lyons, pastor; Dr. Charles A. Sheldon, organist; 5:00-6:00 p. m., Central Baptist Church, Rev. 7:30, Wesley Memorial Church service, Rev. Marvin Williams, pastor; Mr. and Mrs. A. C. Boatman, musical directors.

**WWJ, Detroit, Mich. (Eastern, 517), 11:00 a. m.**, Services, St. Paul's Cathedral, Dean Warren L. Rogers; 2:00 p. m., News Orchestra.

Monday, April 14

**CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m.**, Mt. Royal Hotel Classic Orchestra; 4:40, Mt. Royal Hotel Dance Orchestra.

**KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m.**, "Economic Effects," Prof. E. F. Dummer; Palouse Council Boy Scouts program.

**KFKB, Milford, Kan. (Central, 286), 8:05 p. m.**, "Cash Crops for the Wheat Belt," Prof. L. E. Call; 8:30, "The Importance of Meat Production Animals in a Prosperous Agriculture," Dr. C. W. McCampbell; Alletta Jackson, vocalist; Lecture, Dr. J. R. Brinkley.

**KGW, Portland, Ore. (Pacific, 492), 3:30 p. m.**, Literary program, Portland Library Association; 8:00, Joseph P. Mulder, tenor; 9:30, Musical program.

**KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m.**, Concert.

**KLX, Oakland, Calif. (Pacific, 509), 8:00-10:00, p. m.**, Program, University of California, members of "Parthenia" cast.

**KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m.**, Rudy Selger's Fairmont Hotel Orchestra; 2:30-3:30, Kathryn M. Clark; 4:30-5:30, Rudy Selger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour stories by "Big Brother" of KPO, Book of Knowledge; 7:00-7:30, Theodore J. Irwin, organist; Mme. Natali Albine, soprano; 9:00-10:00, Program, San Francisco Conservatory of Music, Ada Clement, director; 10:00-11:00, E. Max Bradford's Versatile Band.

**WAAM, Newark, N. J. (Eastern, 255), 7:00-7:15 p. m.**, "Star Spangled Banner," Malsion Dixie's Saxophone Sextette; 7:15-7:30, Fred Austin and Jack Berger, vaudeville stars; 7:30-7:45, James V. Moore and His Clover Club; 7:45-8:00, Victor Wilbur, baritone; Joseph Macy, pianist; 8:00-9:00, Nelson Rogers

Bonnie Barnhardt's songs and bedtime story; 8:00-9:00, Paraphrase of Atlanta's 1924 Metropolitan Opera season, Signor Emil Volpi's operatic quartet, chorus, soloists; 10:45, Old Wheat Street Baptist Church, colored quartet in darky spirituals; 7:30, W.W.A., Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton, Y. M. C. A.; 12:00 m., Edward Barnes, baritone; LeRoy DeTurk, tenor; 3:00 p. m., Detroit Symphony Orchestra; 7:00, News Orchestra; George F. Abbott, tenor; H. Rebitzke, tenor; Judge Victor L. LeBlanc, baritone.

Tuesday, April 15

**KFKB, Milford, Kansas (Central, 286), 8:05 p. m.**, Business Methods in Dairying," Prof. H. W. Cave; 8:05, "Marketing the Egg Crop," Prof. L. F. Payne; Mrs. William T. Miller, vocalist; Jessie Bogie, pianist; Charles Stratton; pianist; Lecture, Dr. J. R. Brindley.

**KGO, Oakland, Calif. (Pacific, 312), 8:00 p. m.**, Anton Trio; Lucy Vance, soprano; Irving Krick, pianist; Glenn Chamberlain, tenor; Blanche Adella Hawkins, whistler; "My Friend the Dog," Otto Riehl; French horn solos, William Snow; Bruce A. Wilson, saxophonist; "That Something," Guy E. Kibbee.

**KGW, Portland, Ore. (Pacific, 492), 12:30 p. m.**, Concert, Civic Music Club; 3:30, Talk, Jeanette P. Cranner; 7:45, Talk to farmers, Oregon Agricultural College extension service.

**KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m.**, Rudy Selger's Fairmont Hotel Orchestra; 2:30-3:30, Theodore J. Irwin, organist; 4:30-5:30, Rudy Selger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour, stories by Big Brother of KPO, Book of Knowledge; 6:30-7:00, "Cleveland Star" Orchestra.

**WAAM, Newark, N. J. (Eastern, 255), 7:00-7:30 p. m.**, "Star Spangled Banner," Bluecrest Dance Orchestra; 7:30-8:00, Jimmy Clark and His Broadway Melody Entertainers; 8:00-8:15, Alice Carter and Jimmy Johnstone; 8:15-8:30, Arundel Colter, of Wall Street Journal, talking on Samuel Vaucilar, president of the Baltimore Locomotive Works; 8:30-8:45, Mercedes Gilbert, monologist; 8:45-9:00, Irving Bachelor and Leo St. Cloud, duets; 9:00-9:30, Continuation program by Bluecrest Dance Orchestra; 9:30-9:45, "Paintings and Their Place in the Home," talk by Iola Dalton Kiro; 9:45-10:00, Robertson Kiddle, Edna and May; 10:00-10:30, American Warblers; 10:30-11:00, George Williams, John Hill and the Trionon Melody Ensemble; 11:00-11:15, Chas. Le Roy, pianist; 11:15-11:30, Bob Schafer and Dave Bing, songbirds.

**WAOW, Omaha, Neb. (Central, 526), 8:00 p. m.**, Lenton services, conducted by Rev. E. T. Otte, pastor of St. Paul's Lutheran Church, of Omaha.

**WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m.**, Concert, E. Clyde Whitlock, violinist, and pupils; 9:30-10:45, Concert, Mrs. Louis Morris, vocalist and artist.

**WBAV, Columbus, Ohio (Eastern, 390), 12:00 m.**, Piano music, Ila Lorbach Owens.

**WBAP, Chicago, Ill. (Central, 370), 7:00-8:00 p. m.**, Drake Concert Ensemble and Blackstone Quintet; 8:00-8:30, Ralph Emerson, organist; 10:00, Rosemary Hughes, Voice Worthily, Fred Agard, Jack Chapman's orchestra.

**WBAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m.**, Daily almanac; 12:02 p. m., Organ recital, Stanley Theater; Lenton services; Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories.

**WEAF, New York, N. Y. (Eastern, 492), 11:30 a. m.**, Motion Picture Talk; 11:45, Board of Education; 12:00 noon, Lenton Church Services; 4:00, Blue Horse Instrumental Quartette; 5:00, Children's Hour Stories; 7:00, Christiana Thompson, pianist; 7:20, Reid Ice Cream Co.; 7:30, Thornton Fisher; 7:40, Claire Lampman, contralto; 8:00, Corn Products Orchestra; 8:30, Brooklyn Eagle News Review; 9:00, Ashley Ropps, baritone, and Nina Altieri, soprano; 9:30, Columbia Phonograph Co.; 10:00, Eveready Program.

**WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m.**, Address, W.W.A. McMurtry; 8:00-9:30, Nash Symphony Six Orchestra; 11:00-12:00, Katherine B. Peoples, pianist.

**WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m.**, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Philadelphia Musical Club, Women's Symphony Orchestra of Philadelphia, Navel Swint Ewer, president; J. W. F. Lehman, conductor; Florence Haenle, soloist; 6:00, Sunny Jim's bedtime stories; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 8:00, Lenton Cantata by Charles H. Maskell, Choir Mt. Hermon Reformed Church; 8:30, Wilson A. Chest, tenor, Henry L. Booth, baritone; 10:10, Charlie Kerr and his Symphonic Dance Orchestra.

**WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.**, George Albert Bouchard, organist; 2:30-4:00, "The Radio Dealers' Musical program; 6:00-7:30, Chamber music recital.

**WGY, Schenectady, N. Y. (Eastern, 380), 7:45 p. m.**, "The Real Present Day Undergraduate," Dean Sara Ward, Elton G. Scott, pianist; Eugene Belloni, Campbell, MacRae, William J. Riddell, pipers; Jean H. Gray, contralto; Robert MacNeish; Mrs. Harry Bertram, soprano; Robert Stewart, baritone.

**WHAA, Iowa City, Iowa (Central, 484), 8:00 p. m.**, Interpretative reading of "Romeo and Juliet," Helene Blatner, Vance Morton.

**WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m.**, Strand Theater Orchestra; Walnut Theater Orchestra; Alamo Theater Organ; 7:30-9:00, Louisville Flute Club; Reading, An Interesting Historical Episode.

**WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m.**, Recital, Earl Bonawitz; 3:00, St. Sabina Serenaders; 6:05, Dick Regan and his WIP Symphony Orchestra; 7:00, Uncle Wip's bedtime stories; 8:15, Philadelphia Police Band; 10:15, Ted Weems and his Cafe d'Algon Orchestra.

**WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m.**, Topics of interest to women; 10:00, Entertainment, Band of the Hamilton County Knights of the Ku Klux Klan; Lenore Pilgrim, Schubert presents The Pilgrim; Ellen Pilgrim, pianist; Norma Pilgrim, trombonist; Gertie Pilgrim, cornetist; Leonore F. Schwab, soprano; Masked Serenaders.

**WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m.**, Pupils, Glenn Dillard Gunn School of Music; 7:00-8:30, Clara Laughlin, travel talk; Talk, Dr. H. E. Pine; Music, Loyola university; 8:40, Hotel LaSalle Orchestra; 9:15, Lyon & Healy program.

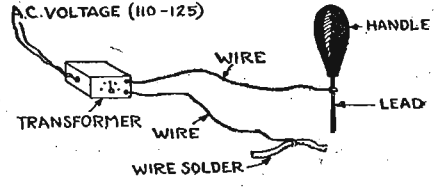
**WOAW, Omaha (Central, 526), 6:00 p. m.**, Lions Club program; 9:00, Vocal students of J. Edward Carnal.

**WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m.**, Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

**WSB, Atlanta, Ga. (Central, 429), 12:00 m.**, Entertainment; 3:30-4:00 p. m., Howard theater, overture and prologue; 5:00, Music; 5:30, Bonnie Barnhardt's songs and bedtime story; 8:00-9:00, Yaarab Temple Million Dollar Shrine Band; 10:45-11:45, DeMolay "On to Washington" concert.

Homemade Electric Soldering Iron

After borrowing my neighbor's soldering iron and blowtorch several times I decided I would not rely so much on his generosity but provide my own means of soldering connections. I procured a transformer whose output was from 14 to 25



volts, then I took a common lead pencil, some number 18 wire, some wire solder and the handle from an ice pick and constructed the soldering iron as follows: The lead was removed from the pencil and

put in the handle, then a piece of copper wire was wound around the lead, in a close coil 2 inches from the end. The other end of the wire was attached to one binding post of the transformer. Likewise a piece of copper wire was wrapped around a length of solder wire and the other end of the copper wire was attached to the other side of the transformer. Apply flux to the parts to be soldered, attach the lead from the transformer to the electric light socket and turn on either 14, 16, 20 or 25 volts, and you are ready to solder.

Touch the pencil lead to the solder and allow it to heat until the solder flows. Do not touch the solder to the wire connected to the lead. A clutch pencil may be used if the wire is connected to the pencil and part of the pencil wrapped with tape for use as a handle, but the lead in such a pencil usually is small and breaks easily. —Edwin Rust, Phoebus, Va.



# New Simple and Compact Radio Receiving Set

## Part I—Ideal Set for the Fan

By H. J. Marx

**A**MONG that vast multitude of Radio fans there is an ever increasing number who are seeking a hook-up that with the minimum number of parts, will give them good, loud speaker reception for local broadcasting and that at the

**Discussion of Circuits**  
There is no question relative to the efficiency of neutrodyne circuits, likewise no one doubts the economy of reflex circuits. So provided the final circuit doesn't have the numerous tubes of the neutro-

and in addition one two element tube is required. The circuit is equivalent to two stages of tuned Radio frequency, detector and two stages of audio frequency amplification. Only one jack is used for phone and loud speaker connections. This jack at the same time acts as filament control inasmuch as it shuts off the filament current to the amplifier tubes when not plugged in. One rheostat is used for the two amplifier tubes and another for the two element tube. This tube has a separate single dry cell battery which is not connected in the series of voltage for the amplifier tubes, since it was found that this materially cuts down the volume. So the fan may anticipate, if he attempts to use the same battery for lighting the two element tube as for the amplifiers, that the circuit will not deliver the volume that can be expected as when the directions are followed.

**Installation Details**  
In order to make the illustration as complete as possible and to assist those new fans who are somewhat in doubt as to how to connect the set after it's finished, the illustration in Figure 1 presents not only the circuit diagram but also the antenna, ground and battery connections. It will be noted as stated above that a single dry cell is used for lighting the two element tube. A six-volt storage battery is connected for the filament circuit of the two amplifier tubes. The plate batteries consist of three 22½-volt units connected in series, or one 45 and one 22½-volt units, as the case may be. The antenna should consist of a single wire aerial anywhere from 50 to 100 feet in length. A good ground connection is essential.

### List of Parts

The table of parts required is given. In the original set the amplifier tubes were of the A type. UV-199's or C-299's can be substituted, if desired. Two audio frequency transformers are necessary but should not have a higher ratio than 5 to 1. The two variable condensers .00025 mfd. capacity should be of the highly efficient

(Continued on page 26)

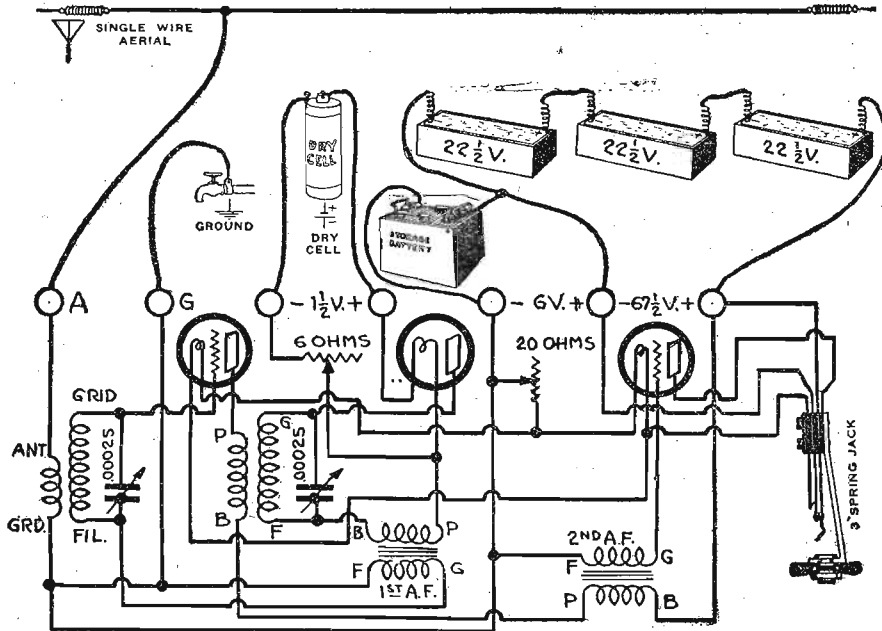


Figure 1

same time will have the ability to bring in long distance stations although not necessarily with loud speaker volume in every case. The ideal set is one that can be assembled by the fan without the usual complications characteristic of the numerous multitude of hook-ups now available.

dyne and avoids the complex difficulties of the reflex type, then we can anticipate some form of combination of the two ideas. Inasmuch as the neutrodyne is nothing but a development on efficient tuned Radio frequency coupling, this later form was employed. But the question of balancing or neutralizing has been eliminated not only because of the difficulties that fans have found in the compensation of the plate to grid capacities but also because of the rather doubtful value of this feature.

Reflex action is utilized in a more or less simplified form with the total elimination of fixed condensers making use of the internal capacity of the transformer windings acting as by-passes where required. The crystal detectors both fixed and adjustable are not always what they should be whereas the average detector tube would only increase the necessary parts required and complicate the hook-up. So, in their stead a two element tube is used. This eliminates the uncertainty of the action of the crystal detector and at the same time doesn't increase the drain on the batteries to any marked extent.

The circuit used practically coincides with the Harkness which has attained considerable popularity in the East. Two three element amplifier tubes are used,

### Parts Required

- Two—Amplifier Tubes
- Two—Sockets
- One—Two Element Tube
- One—Socket for above
- Two A. F. Transformers
- Two—Variable Condensers .00025
- One—Rheostat, 20 Ohms
- One—Rheostat, 6 Ohms
- One—Three Spring Jack
- Seven—Binding Posts
- One—Panel, 7x12x½"
- One—Sub Panel, 7x8x¾"
- Two—Brass Angles
- Two—Pieces Tubing 2½" Dia. x 2" Long
- ¼ Lb. Spool No. 24 Ssc. Wire
- One—Cabinet
- 25 Ft. Lead Wire
- 6 Ft. Spaghetti Tubing

The parts required should be standard and easily assembled by the constructor. The finished set should be as compact as possible so that it can be made portable or will not take up an unnecessary amount of room when hooked up for operation.

## The Twitchell Auxiliary Tuner

Patents Pending. Name Registered.

### MORE THAN A WAVE TRAP

A TWITCHELL AUXILIARY TUNER connected to any make of tube receiving set will positively cut out any local broadcasting or code stations so you may tune in all long distance stations any time regardless of local conditions.



Unlike any wave trap, THE TWITCHELL AUXILIARY TUNER does not ever decrease but in many cases increases the volume from distant stations.

These TUNERS are in daily use within 400 feet of large broadcasting stations and enable their owners to easily and completely cut out the local station and bring in distant stations at any time on a loud speaker.

This instrument will also enable you to bring in programs sent out on longer waves than you can tune in without it, thus bringing all the broadcasting stations within the wave length range of the many sets of limited range now in use.

Copyrighted diagram of this tuner, 50c, or with all parts, \$9.00. Complete instrument in walnut cabinet, ready to use, \$15.00.

A New and Wonderfully Efficient Coil for the Reinartz circuit for those who want the best. Price \$4.00, or with blueprint for either one or three tubes, \$4.50.

This circuit brings in both coasts loud and clear and is the most successful Reinartz modification yet produced.

All goods prepaid. These instruments are easy to build, easy to operate. Everything clearly shown

1925 WESTERN AVENUE S. A. TWITCHELL MINNEAPOLIS, MINN.

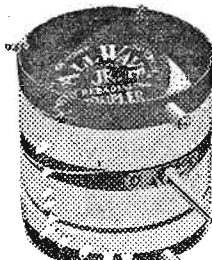
## COAST TO COAST

Get Real DX on One Tube with the Genuine

### "SHEPCO" "ALL WAVE" JR.

TRADE MARK—PATENTS GRANTED AND PENDING

### NON-RADIATING DX COUPLER Combination Flat and Bank Wound



All the SELECTIVITY of TUNED RADIO FREQUENCY at a small fraction of its cost. Eliminates use of all variometers, vario couplers and loading coils. Permits building most efficient, sharp-tuning, loud long distance receiver at lowest cost. May be used in single, double or triple circuit. Guaranteed not to radiate when used in "All Wave" triple circuit furnished with Coupler and to bring in distant stations clear and loud on one tube. Log your stations and get them at the same setting every time. Only one dial to tune.

WALLA WALLA, WASH., TO CONNECTICUT  
Mystic, Conn., March 10, 1924.

I am having great luck with the "All Wave" Coupler used in one of the hook-ups that came with it. Here are some of the distant stations I have tuned in: FWX, Cuba; WGF, Des Moines, Ia.; WDAF, Kansas City; KFKX, Hastings, Neb.; WPA, Fort Worth, Tex.; KFCF, Walla Walla, Wash.; KEFW, Towanda, Kan., and many others. Compares with more expensive sets around me.

Lucius Pendleton.

Set of six efficient hook-ups packed in every box or sent on receipt of 10c in stamps to cover cost of mailing.

**SHEPARD-POTTER CO.**  
INCORPORATED  
PLATTSBURGH, N. Y.

Guaranteed Wave Length  
150 to 1,000 Meters  
in single circuit

150 to 700 Meters  
in triple circuit

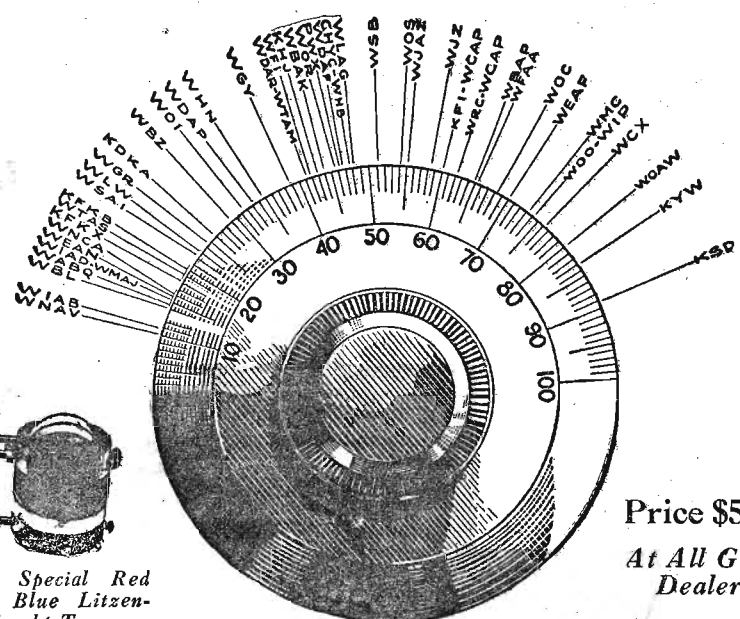
Absolute Money-Back Guarantee

At all dealers in Standard Radio parts or sent prepaid on receipt of price. **\$6**

## 8½ HOURS ON THE AIR

with two tubes

A Committee in Philadelphia hears 49 stations, from Cuba to Los Angeles, actually sign off.



Price \$5.50

At All Good Dealers

The Special Red and Blue Litzen-dracht Tuner

### THE UNCLE SAM Master Tuning COIL DID THE TRICK

This is a calibration of a set submitted to a committee of engineers. Remember, the same stations will be heard at the same points on the condenser night after night. Ask your dealer or write us for free diagram of Ambassador Circuit.

UNCLE SAM ELECTRIC CO.

Plainfield, N. J.

# Radio Digest

EVERY WEEK **Illustrated** TEN CENTS  
REG. U. S. PAT. OFF. AND DOM. OF CANADA

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## About Patent Monopolies They Ask It but Do Not Claim Control

THE editor of the Record, Aledo, Illinois, has penned a few words that are touching in regard to those who would sell us the air within a few weeks if it is possible for them to corral the breeze. He says:

Aesop's fable of 2,500 years ago about the man who took the frozen serpent into his bosom to warm it to life only to be bitten by the riviving reptile is paralleled by the action of the American Telephone and Telegraph Company (the Bell monopoly) in suing under the patent laws to gain control of Radio broadcasting, and, logically, control of the entire industry as well.

Radio lay like the frozen serpent, unprofitable to monopoly, until the hundreds of thousands of Radio enthusiasts had popularized it; but, when the people have nourished the scientific wonder to vast business possibilities, a great corporation, like the serpent, would step in and sting them.

The great telephone monopoly seeks to gain control and then reduce the 500 odd broadcasting stations to 50. Its president says:

"The only body which can legally provide regulation is the congress of the United States. Whenever congress acts we shall gladly accept its regulations. We have no desire to control the air." And he goes on to say that when Radio became popular his company "arranged so that these inventions could become available to the public by purchase of apparatus at reasonable prices."

But lawyers suing for the telephone monopoly under the patent laws are quoted as saying:

"That's what patents are for—to obtain monopolies." The United States patent law was made to encourage invention, not to create monopolies. But when patents are used to breed monopolies to feed on the people that gave these very patent laws, then the servant becomes greater than the master, and it becomes the duty of congress to step in.

Monopoly needs only the entering wedge. Control of broadcasting by the American Telephone and Telegraph company logically would lead to nothing but ultimate control of the entire industry, unless the company that constantly is fighting for increased telephone rates all over the United States is sprouting angelic wings in Radio alone.

Although its president says the telephone company has no desire to control the air, even potential control under the patent laws is too vast a power to give to a corporation with a capital of \$750,000,000 and \$2,000,000,000 of assets. As the newest method of democratic expression, the people cannot afford to give to one company the virtual censorship of its broadcasting.

The whole idea of Radio control is tainted with possibilities of absolutism more vicious than rule of oriental potentate. The absolute monarch's own personality limits his capabilities for good or evil. But in the eyes of science, Radio knows no limit. And knowing no limit, the people cannot afford to see it monopolistically controlled.

## Fishing Holds More Interest

Breaking into the Unknown Is Where You Get the Thrills

ONE ardent Radiophan claims that he has but recently heard the latest in Radio—neutrodynes, superhets and all the other hyfaluten sets and claims the whole darn Radio business is becoming too perfected and certain for real enjoyment.

Radio has two classes of followers—masters and fishermen. One gets the sense of power and dominion that comes with exact, certain results. The other is a gambler, subject to the laws of chance, as surely as the angler casting a fly or plug into unknown waters.

Fishing would be a dull pastime if we got a strike every time we tossed a baited hook into the river or lake. There is no fishing thrill like the strike that comes after hours without any results at all. What the sportsman wants to know, in advance, is the size of the fish he has hooked. Land him first, then learn.

Often all of us wish we could know the future—rend the mysterious veil and learn what is in store for us. But how drab and unexciting life would be if the future were not unknown, uncertain and mysterious in its possibilities.

## RADIO INDI-GEST

### "G-Bye"

Oh Radio! My Radio!  
You gotta go. I told you so.  
The wimmen just won't lissen where  
They can't talk back, so have a care;  
The hand that smashed the demijohn  
And plucked the apple at the dawn  
Now turns "thumbs down" on you and so  
You gotta go. You gotta go.  
Oh Radio! My Radio!

CACTUS JACK.

### Yes, if You Jump off the Woolworth Building

Dear Indi: Being a jeweler, I have noticed that my tweezers often become magnetic. When I throw them to the floor so that their points stick in the wood floor, the magnetism disappears.

Having noted this, I, as a Radiophan wonder why it wouldn't be a good thing for Radio if the idea I am about to propose would work. I am often troubled by body capacity. Now, what I wonder is, if I were to jump on the floor from some height, hitting the floor with my feet first, whether or not this scheme would knock the body capacity out of me?

I. D. CLAIRE.

### Dedicated to Doc Marx, Tech. Ed.

Dear Indi: There's Harry Marx, the Radio fiend. In fact he's the worst I've ever seen. Why, he'll take a wire or two you bet, and make a box he calls a Radio set. He'll sit up all night till break of day, listening to what the birdies say.

SIMPSON JINX.

### Mrs. Partington Says

Dear Indi: Mrs. Partington says she listens to lots of places none of the Radio maps shows, and the pronouncers are not all Static and Clear like K. D. and K. A. at Mr. Westings House, or Mr. Wm. C. at Memphis, who is alright only too close to the wharf so steamboat whistles bother some.

She heard one pronouncer say he was in Cuba with some twin Cuckoos, and specs if they would own it they had some Cane Juice too. Another one says he is where all the Rivers meets all the Railroads, and one says he is in WATCH-AR State, and he's from Missouri, but she can't show him; others are where the West begins, while another keeps on waving from Lake Erie someplace.

Several places talk in Dago, and there's one foreign place sounds like J-a-w-w-g-h-y-u-h-h, and she would love to know where it is at. She wants you should have Ran & McNulty get out a newer and correcter map of Radio so listeners can tell who they are listening at.

SIGNING OFF.

### The Radiophan's Lament

Since Radio has come to stay, I think I'll buy a set. There are so many kinds I really don't know what to get. Now Brown just bought a Souperdyne, he says it can't be beat. And Jones who has a flookerdyne lives just across the street. The Sockadyne and Bulladyne are two that I could buy. So how in heck am I to know just which one I should try.

Now the Floozee circuit just came out, they say it is a dream. While Cockadoodle claims that he employs the better scheme. There is a circuit called the Flew, still it's not a disease. The man who made it claims that it's the best one if you please. As long as I have got the bug, I will not try to stall. But buy enough accessories to make and try them all.

I hope some day inventors will relieve me of my plight. And not change over circuits in just a single night. These hook-ups drive me nutty. I think and then I purr. I feel just like a squirrel, and believe I'm growing fur. So if they don't stop changing these circuits every day. I'll land right in the "Booby Hatch" and that's where I will stay.

BURT B. BARSOOK.

### Puzzle: Find the Customary License

Dear Indi: I submit a problem for Indi-Gest readers: Mr. A bought a dog from Mr. B, paying a dollar for it. Mr. B sold the dog to Mr. A because he (the dog) howls.

Now since the transaction Mr. B has been trying to make Mr. A pay him another dollar because other people (C, D, E, etc.) hear the dog howl.

Problem: Find out if Mr. B is related to the American Sissity of Composers, Ink-Slingers and Tin Pan Alleyites, or might it be that he is the secret agent of the Amer-Ash-Can Telefunny company. If not, why don't he join?

INS. U. LATION.

### We Award You the Porcelain Switch Point

Dear Indi: Have heard enough of these long distance records from these "armature" braggers. I've a real one. I just let the waves keep wasting their way encircling the globe until I get ready to pick them up, probably a month or two later. Then I tune in and get any program I want to hear for that time back. Do I win?

BLEW A. BOTTLE.

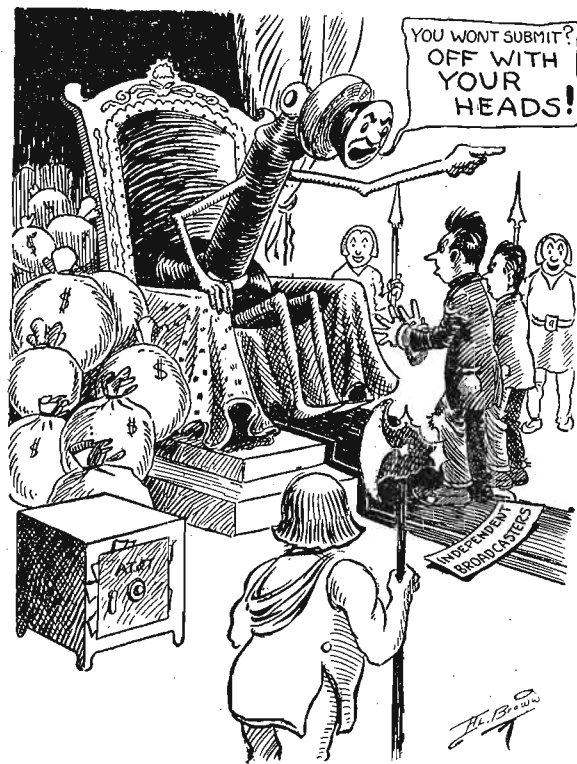
### How'll Soozzee Do, Noa?

Indi, darling: "Can I cook?" You bet I can! Strawberry shortcake and everything, Yum, yum! The important question is not, "Can I cook?" but "WILL I COOK?" I simply MUST see Noa's photograph before answering. Isn't it dear of Noa to offer the EXCLUSIVE use of his receiving set on Sunday nights? Of course the other six nights I wouldn't want it *exclusively*. An hour or two each evening while he washed the dishes and vacuum cleaned the ark would be enough for

UNSELFISH SOOZZEE.

P. S. Confidential. Indi, be a dear, and tell me if Mama H. is my only rival. Pleeze, Indi. (No, Soozzee, we've received tons of mail for him in feminine handwriting.—Indi.)

## "King Telephone" Holds Court



## Condensed

By DIELECTRIC

Whenever we suffer a severe snow or sleet storm the blessings of Radiophony are emphasized. With telephone wires down and the telegraph lines unable to function, trade and traffic are paralyzed—unless we have access to a broadcasting plant. In case of another serious winter storm in the vicinity of Chicago local broadcasters are organized to transmit train dispatchers' orders, so as to facilitate the movement of all railway carriers. Outside news may reach isolated sections and they in turn broadcast conditions, by the aid of Radiophony.

It begins to look as if the plan to have a "few" broadcasting stations serve the entire Radio public in this country was on the way to realization. At least, this may happen unless something can be done about it. With the recent move on the part of the A. T. & T. Co. in mind, we listeners should begin to sit up and take notice. Are all set owners satisfied to tune only to a limited few stations and accept what they may choose to offer? Requests for financial support of the Music Fund have already started some to thinking. Pay as you hear. Yes?

The subject of a universal language for use in broadcasting has occupied the attention of many interested in international communication by Radiophony. It is still being discussed. Just now I believe Esperanto to be the only language actually employed in this manner. A recent adoption of Esperanto for conveying speech intelligible to other nationals was that by the Czecho-Slovakian Radio service, when M. Pitlik, Minister of Commerce, spoke in the language. Perhaps we will have reports on the number of listeners in who understood him.

In New York city, as nowhere else in the world, the public school system is being brought to the attention of its citizens through Radio broadcasting. Station WJZ is employed in giving to all listeners opportunities of hearing pupils go through their class room work, which educates the public to appreciate what is being undertaken for the welfare of their children. Superintendents of the various departments of the Board of Education take this means of acquainting the public with their aims and methods. It is a timely and commendable innovation.

Mr. Sarnoff, vice-president of the R. C. A., while addressing the conference in Washington on Radio control, suggested that the day was coming when all radiating receiving sets would be under a ban. No set capable of creating interference could be sold. Why wait? Many manufacturers have recognized the sales value of non-radiating sets with the result that this feature stands out in their advertising. You, the public, are coming to demand that your set shall not be a public nuisance, nor the one your neighbor buys. The thing will right itself.

Pathologists have affirmed the usefulness of Radio in certain forms of disease, such as tuberculosis, neurasthenia and some others, but nowhere have I seen prescribed the proper form of Radio entertainment for those suffering a nerve breakdown due to spending too many late night sessions at the dials. A United States army captain wandered from Fort Omaha to Fort Ontario while suffering from aphasia, and his wife explains the case by attributing to him such a passion for Radio as caused him to neglect sleep. When will the million others collapse?

# What's Wrong with Your Receiving Set?

(Continued from page 11)

it will work best. In other words, the transformer will be more efficient at the frequency to which it is nearest in resonance than it will at any of the other frequencies it passes. Hence, there will be a gradual decrease in signal strength as soon as station wave lengths on either side of this resonance point are tuned in. Using taps on the transformer windings to regulate the peak will not remedy matters to any great extent, because the resulting dead end losses may be disadvantageous to DX reception.

### Tuned Radio Frequency Amplification

This leads to the most satisfactory method of accomplishing these results, namely, "tuned" Radio frequency amplification, a typical hook-up being given in Figure 3. With such a system, each of the circuits can be tuned into resonance with the wave being received. Thus there is obtained not only the maximum possible amount of amplification, but also the maximum energy transfer between stages, and

at first be supposed. If the receiver will not work exactly as desired, it is only necessary to do a little tuning with the transformers to bring them up to the proper position of resonance.

### Weak Signals Strengthened

It will be well to remember that unless the incoming signals are strong enough to work the detector alone, no amount of audio frequency amplification will enable the listener in to hear them. If, however, Radio frequency amplification is applied, weak signals will be amplified to sufficient strength before reaching the detector tube. Thus, the Radio frequency transformer and amplifier perform their functions before the detector tube gets to work. The signals conducted to the detector are at Radio frequency, and by doing this it is possible to tune in a station whose signal may be so weak that it would not work the detector alone. By passing such a signal through several stages of Radio amplification, it may be possible to make it sufficiently strong for the detector to perform its function so that the audio

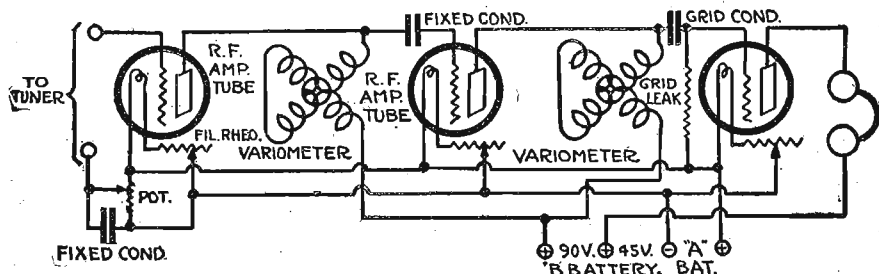


Figure 4

the greatest selectivity. By tuning these transformers, signals can be obtained at the height of their intensity, which is more than can be secured with the straight transformer coupled type. Tuning in this way also eliminates the dead end loss present in the tapped variety of transformer.

Transformers used for tuned Radio amplification may be made from a regular variometer with its rotor and stator windings separate. There is thus supplied a regular transformer with the rotor as primary and the stator as secondary. By revolving the rotor within the stator, the characteristics of the transformer are so changed that it may be tuned as desired. A small variable condenser connected across the rotor or primary winding will be found of great assistance in tuning and will make possible the fine variations in adjustment, which it is difficult to secure with the straight tuning of the Radio frequency transformer.

Employment of tuned Radio amplification, in which each stage will have to be tuned separately, results in more controls to manipulate. However, this control complication is compensated in some degree by the good results obtained with this type of amplification. A little experience with the various controls will demonstrate that the operations involved are not as complex or difficult as would

amplifiers will be able to perform their duties.

The addition of fixed Radio frequency amplification, while making the weak signals louder, also brings with them a multitude of whistles and squeals. Whenever the antenna tuning dial is moved such noises will be heard, each representing some station whose carrier wave has been amplified until it is of sufficient strength to cause the detector to function. Stations which are normally beyond range can thus easily be brought in by using Radio frequency amplification. With the tuned variety of Radio amplification most of these bothersome whistling noises may be eliminated, because the circuits are tuned into resonance with only the wave it is desired to receive. It is in this way that maximum selectivity is obtained. Each stage is so tuned as to allow only those waves to pass through that are in exact resonance.

### Control Adjustments

The interstage coupling of a Radio frequency amplifier may be made simple or complicated as best suits the fancy of the builder. Obviously, the more control adjustments employed in tuning between stages, the more accurate it will be, although such fine adjustments call for very delicate manipulation. Figure 4 illustrates a tuned Radio amplification hook-up, employing ordinary variometers for coupling between stages. Variometers de-

signed to cover the range of broadcasting wave lengths should be used for this purpose.

Referring to Figure 4, it will be observed that the plate battery is connected to one coil of the variometer and not directly to the grid terminal of the vacuum tube. If the latter connection were made, the entire potential of the B battery would be impressed across the filament and grid of the succeeding vacuum tube. With such a connection, the tube would cease to function. A fixed bypass condenser connected in the grid circuit as shown in the illustration, will allow the Radio frequency currents to pass and will prevent the current from the plate battery from reaching the grid circuit.

Perhaps, the greatest advantage offered by tuned Radio frequency amplification lies in the fact that each dial used for interstage coupling can be calibrated for wave length settings. This holds true, not only for the modified variometer coupling shown in Figure 3, but also for the straight variometer interstage coupling illustrated in Figure 4. Obviously the relative position of the dial on the shaft and the rotor of the device must remain unchanged.

In the preliminary tuning, the dials are adjusted so as to bring in certain stations operating on definite wave lengths. The readings of the dials are then recorded for future reference, or the settings for a number of stations are plotted on a curve sheet, with the dial setting as abscissa and the wave length as ordinate. This so-called "graphical selectivity" makes the operation of a tuned Radio frequency receiver almost an automatic procedure, once the calibration charts for the various tuning dials have been made. It is only necessary in most cases to set the coupling dials in their recorded positions and effect the requisite fine tuning in the antenna circuit.

This discussion of tuned Radio amplification and its method of tuning leads us directly to the so-called neutrodyne circuit, which is simply a refined adaptation of that type of Radio frequency amplification. The succeeding article will take up in more detail, Professor Hazeltine's remarkable development.

(TO BE CONTINUED.)

In most cases it is not practical to use three stages of audio frequency amplification.

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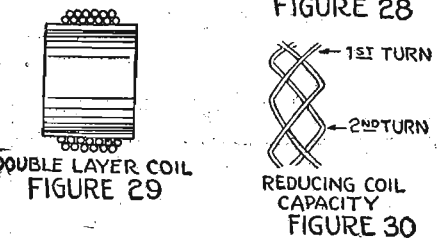
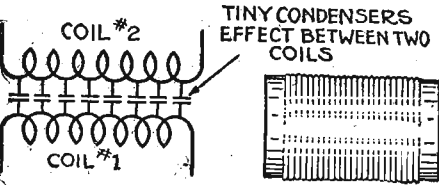
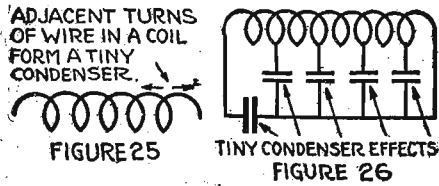
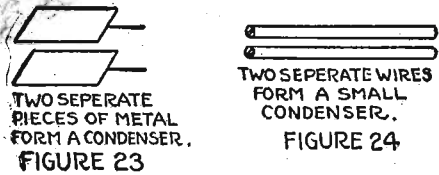
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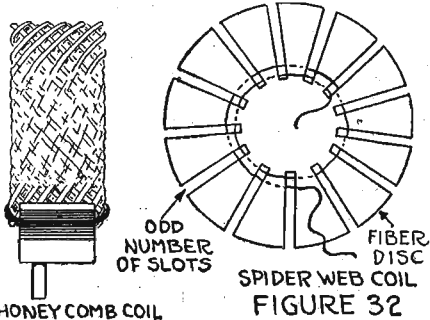
(Continued from page 13)

inductance it has, so you will see that in a sense inductance is a length dimension. When current is sent through a wire as illustrated in Figure 21, a circular field of force is set up around the

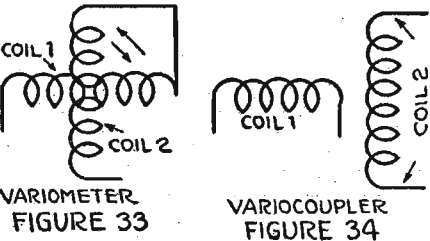


wire. If a fluctuating or alternating current supply is used, a similar field is set up. The distance at which such a field can be detected depends on the power used. The field set up by an ordinary low frequency power line can be detected vigorously up to, say 100 feet from the wire, but if the wire were carrying high or Radio frequency current, the field set up could be detected much further.

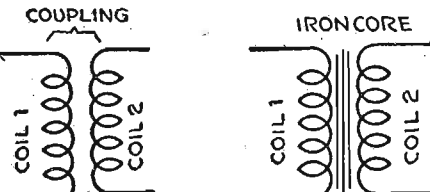
If a Radio current, Figure 22, is carried by a wire, a rapid Radio field is set up around the wire. If the wire is ar-



ranged as an aerial, part of this field will be thrown off as waves. Inductance is practically never found



without a condenser effect termed capacity. Two pieces of metal separated, form a condenser, as illustrated by figure 23. These two pieces of metal could be two



wires as in Figure 24. The two wires might even be two successive turns of a coil, to form a very tiny condenser. Any

such condenser acts as a temporary storage package or little tank for electrons.

**Condenser Effects in Coils**

A coil, as in Figure 26, acts at Radio frequencies as though it had a number of tiny condensers connected. This is spoken of as the capacity effect of the coil. In Radio apparatus using coupling coils there is also a capacity effect between coils. This is shown in Figure 27. For instance, there is a marked capacity effect between the primary and secondary windings of most transformers used in Radio sets.

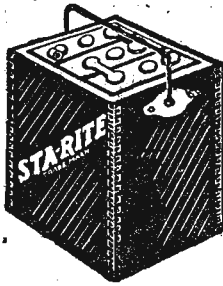
The single layer coil, Figure 28, is popular in Radio receivers because it is simple

to make. It has a very small capacity effect. When two or more layers are wound, Figure 29, there is a large jump in the capacity effect. Capacity effects are usually not wanted in Radio inductances so various special forms are made to reduce capacity. Thus, Figure 30, one turn is wound on so that it will not be in direct contact with the next turn. There are various windings called honeycomb, basket ball, sine, curkoid, etc., designed to minimize capacity effects.

Figure 35 shows a honeycomb coil. A similar coil called D. L. or duo-lateral, alternates the spacing of successive lay- (Continued on page 24)

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# Re-Radiation Interference with Radio Reception

## Single-Circuit as Well as Two-Circuit Sets Offenders

By S. M. Kinter

**I**NTERFERENCE, its causes and results, is now a most popular topic of conversation among Radiophans. Interference from one cause or another has been experienced by every Radiophan, but few of them know the real reason for this trouble and how to take measures that will assist in reducing it.

These interferences are caused by: Another broadcast transmitting station so close or so powerful as to make it difficult to "tune out"; another transmitting station operating on a wave length so near to the one being received as to cause interfering beats at a beat frequency which is sufficiently low to bring it within the audible range; a nearby amateur transmitting station operating on a spark set, or an A. C. tube set; atmospheric disturbances, called "static" and particularly apt to be present during the summer months, and the interference caused by "birdies" so-called on account of their supposedly bird character of sound. While there are times when quick "tweet" sounds may be heard, I have always thought that the "howling of winter winds" or the "wail of lost souls" was more truly descriptive of the sensations produced by this type of interference.

### Tuning Interference

As "birdies" is the interference produced by one listener with another I will direct your attention to it in order that you may better understand the cause of it and adopt a plan of tuning which will cause you to interfere with your neighbor as little as possible. Remember that a Radio listener tuning in late on a program can be just as much of an annoyance to those near him as can one arriving late at the theater in the middle of an act, carelessly stumbling over things and making a lot of unnecessary noises while finding his seat.

An antenna at a receiving station re-

radiates a certain part of what it picks up. This is true, in varying degrees, of all such antenna. When, however, one permits their detecting tube to oscillate, which is done by too much tickler, the radiating tendencies of their antenna are increased many fold. When the tube is oscillating the receiving station becomes a transmitting station, sending out waves of frequency at which the tube is oscillating.

### Tube Oscillation

As the tube oscillation frequency is controlled by the tuning of the set, it is apparent that when the tuning of the set is changed while the tube is oscillating, the radiations sweep over that band of waves just like the note of a siren is changed as its speed is altered.

This sweeping across a wave to which someone else may be listening causes this kind of interference with them, if they are within about a mile of the offending party. In the majority of instances the operator of such a set is unaware that he or she is causing such disturbance.

It is hard to believe that anyone would knowingly drag across the various wave bands to find the beat of the carrier wave of the desired station any more than one would drag their arm over the heads of the occupants of seats in a theater in order to more easily find an empty one. Each act is equally rude, although the Radio tuner may for a time be excused on the score of ignorance.

The care that need be exercised in tuning to avoid annoying your neighbors depends upon where you live. If you are in the country where Radio receiving sets are miles apart, little or no thought need be given to this as a possible cause of interference with some one else. If, however, you are in a city where there are many Radio receiving sets near you, you should, as an act of courtesy and consid-

eration, use every care against tuning while your tube is oscillating.

### Two Things Necessary in Tuning

You will want to know two things in your efforts to carry out such a plan of tuning: How to know when your tube is oscillating and how to find the distant station. This whole practice is associated only with hunting such, without the tube oscillating.

You can always tell when your tube is oscillating by a peculiar change that takes place at the beginning of oscillations. There is a slight swish or rustle as the tickler reaches the oscillation position, and it should be backed slightly below this point.

Your search for the distant station should always be made with the tube near to, but always below, the oscillating point and the tuning can then be done with no inconvenience to anyone. You will recognize the distant station by the sounds of the music or speech, if in operation, or by a slight noise of the transmitter if you chance to hunt it during a quiet period but with the normal antenna radiations unmodulated going out.

### Two-Circuit Sets Not Immune

There is a mistaken popular impression that the single-circuit sets are the real offenders in this trouble and that sets having two circuits are immune from it. Such is not the case, as repeated tests have shown. A two-circuit receiving set with the tube oscillating in the second circuit, when properly adjusted to receive the maximum strength of signals, will act as a radiator of signals to just the

same extent as the single-circuit set. That such a condition should be expected, is apparent when we remember that the largest and most powerful transmitting sets are constructed with two circuits arranged in exactly that manner.

The advantage of regeneration in the antenna is very great in attaining distance and, if kept below the oscillating point of the tube, causes no disadvantage to others.

The British broadcasting service was started with a strict prohibition of regeneration, but it was soon found that this imposed a hardship that was unnecessary and at present regeneration below the oscillating point is permitted.

The particular point that I desire to make, is that the practice of hunting a distant station with the tube oscillating is impolite and that there is no difference in this respect, between a single and a two-circuit set.

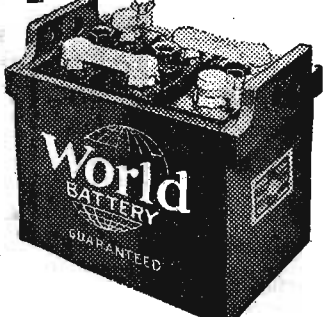
### Inefficient Tube Sockets

Beware of the tube socket with no name on it. With some of the low price receptacles, the resistance between the grid and the filament connection posts has been measured and found to be as low as .5 megohm. The leakage through such a socket quite often makes a set inoperative.

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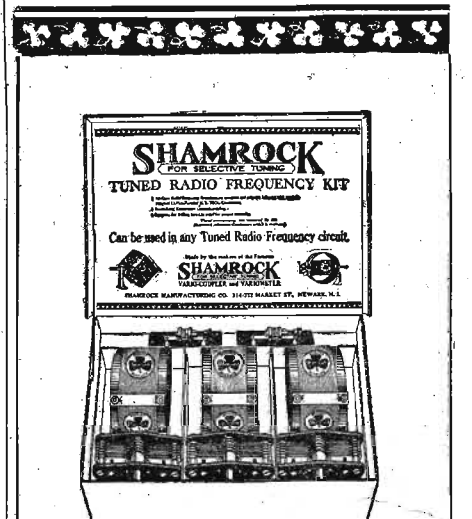
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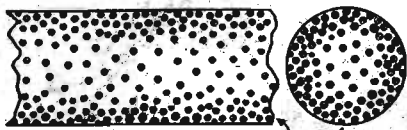
**THIRTY MINUTE A-B-C**

(Continued from page 22)

ers. An easily constructed coil is the spiderweb, Figure 32. It is wound on a disc with an odd number of slots. Successive turns come on opposite sides of the disc.

**Variometer and Variocoupler**

A variometer is a name for two coupled



CROSS SECTION OF WIRE. HIGH FREQUENCY CURRENT CROWDS TO OUTSIDE OF WIRE. FIGURE 37

coils which are connected together. The inductance is varied by turning one coil with respect to the other so that the fields of each coil aid or oppose. Variometers find much use in so-called regenerative sets which require a variable inductance. A variocoupler is much the same but has two windings separate for use in different circuits. Such circuits are said to be coupled magnetically, and dials are arranged to adjust the position of one coil with respect to another. A split variometer is simply one in which a tap is taken out between the two coils.

The coupled coils, Figure 35, form an air core transformer. Such transformers

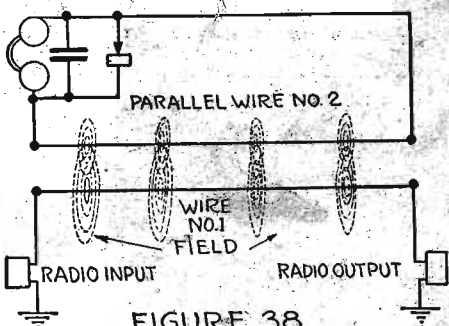


FIGURE 38

are used for connecting Radio amplifiers. The coupling is said to be close or tight if the two coils are close together, and loose or weak if the fields of the two coils are much separated. Transformers for audio frequency currents usually are wound on iron cores. This is done to in-

crease the inductance as the presence of iron increases the magnetic field concentration set up by the current in the windings. This increase is very considerable. In order that the iron itself may not act as a coil of wire and absorb current by induction, the iron used is made up in thin sheets or laminations which are cut as little as possible by the field, and alloys such as silicon steel are much employed to further reduce the current which can be set up in the core itself. In Radio transformers, powdered iron or tissue thin sheets must be used if iron is to have any effect at Radio frequencies, as desired.

**High Frequency Current on a Wire**

Whereas direct or low frequency current goes through a wire by pushing the electrons instantly, a high or Radio frequency current does not go through the whole wire but only the outside shell of it. As fast as the high frequency starts through the wire it is pushed out again,

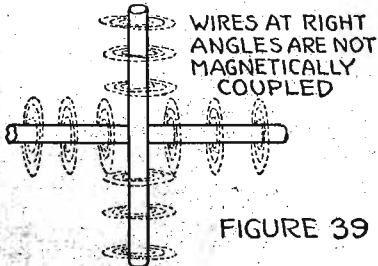


FIGURE 39

so must flow at the surface layer. This is clearly shown in Figure 37.

Parallel wires act much like coupled coils, in that a current in one wire, Figure 38, sets up a current in the other. Sometimes nearby electric wires induce steady or momentary interference or transient currents in Radio apparatus, and that is why listeners can hear power line hum, signal buzzers, elevators motors, etc., in some localities. When the two wires cross at right angles as in Figure 30, the effect is minimized and that is why it is well to locate an aerial on this principle where possible in a locality where a nearby power line may induce such current on an adjacent aerial wire.

**Self Inductance, Impedance**

If a coil can induce current in another coil near it, it is reasonable to expect that a coil can in a sense induce current in itself. In circuits, a single inductance coil often has such an effect, which is called "self inductance." In such cases a coil is used as an impedance where a temporary storage of Radio energy much as one stores mechanical energy in a clockspring.

When the current goes through the coil, a field is set up, but when the field collapses back on reversal of the current, a counter current is sent back on the coil.

The practical unit used to express values of inductances in Radio, is the microhenry, or MH.

"What Condensers Are For" will next be taken up in this series.

(TO BE CONTINUED.)

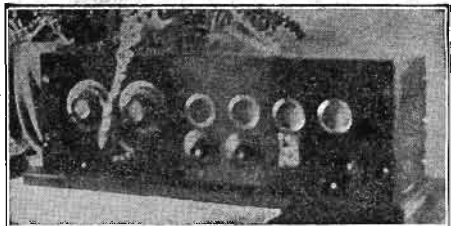
**Proper Connections**

If capacity effects are noticed in tuning with an antenna condenser, try reversing the leads from this condenser. If a condenser is used in the ground circuit, the rotor (movable plates) should always be connected to the ground wire.

**Reverse Tickler Leads**

In any type of regenerative set, where proper regeneration does not seem to take place, it is frequently advisable to reverse the wires that run to the tickler coil.

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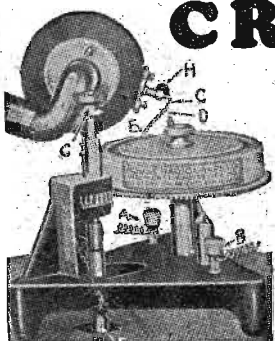
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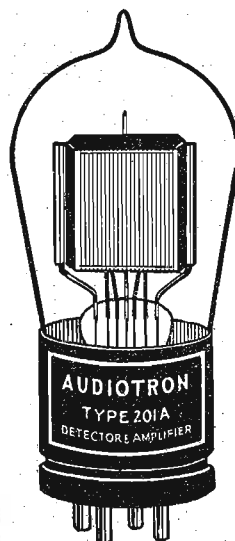
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# Selection of Sets Having Desirable Hook-Up

## Part I—The Fallacy of Trick Circuits

By Thomas W. Benson

IT IS customary to start an article by stating the reason for its being written and this is a very logical start. I have hundreds of reasons for writing it and they are the seemingly endless stream of trick circuits published in the Radio magazines at the present time. My purpose is to prove the fallacy of these circuits and point out a higher and better aim for the misguided enthusiasts who swallow these circuits, hook, line and sinker.

Now get this straight. There are two forms of trick circuits, the regenerative circuit and the super-regenerative. Of the latter we have the basic Armstrong circuits which include the Flivver, two-tube and three-tube circuits as well as the Autoplex, there are the Flewelling modifications and the little known Logwood. We have no argument with them but with the trick straight regenerative circuits that are daily appearing we will deal and show the fallacy of testing every change that man's mind can conceive.

### Regenerative Circuit

The principle of regeneration is fairly well understood, basically it means feeding some of the energy from the plate circuit back into the grid to be reamplified. All well and good, we also know that this process carried to excess results in the tubes breaking into oscillations and destroying the signal. Therefore, we can carry regeneration only so far and when that limit is reached the tube will do no more. Briefly, then, you can get so much regeneration, and when it is exceeded, the circuits act as an oscillator instead of detector-amplifier. Then why bother trying this and that circuit, searching for the wonder circuit, when any old regenerative circuit, the simpler the better, will give you all the amplification you can get out of a tube if proper attention is paid to the design and arrangement of the apparatus?

### Design and Arrangement of Apparatus

And there is the whole secret of DX reception, proper attention to the design and arrangement of the apparatus. Has anyone heard of trick circuits taking any prizes in listening in contests? Hardly, it is the old-time circuits, tried and true, used by the old school amateurs, that

hang up the records day after day. And in this article I will attempt to show, how by proper analysis of your present receiver you can bring it to that high pitch of efficiency that will beat every trick circuit known and give you consistent, reliable operation under all conditions and at all times.

We can list the requirements of the ideal receiver from the present Radio viewpoint as follows: A high degree of selectivity; sensitive to weak signals; ease of operation, and fair volume.

Selectivity is but a relative term at best. A set that proves selective in the country falls down bad when used in the city with several broadcasters. To obtain real selectivity we must use a loose-coupled circuit. This eliminates the single circuit tuner. Wait, I know they have seemed selective—I have a little one myself that seems selective—but just tie a single tuned circuit into a really efficient receiver and see how selective it is. Furthermore, the fact that the entire resistance of the aerial circuit is included in the tuned circuit, effectively prevents really sharp tuning. A coupled circuit tuner will give louder signals than a single circuit because it is resonant at one point for a given frequency, whereas a single circuit tuner is resonant at two points a slight distance apart. Notice I have not mentioned particularly the burning question of re-radiation, but that enters later on.

### Sensitive to Weak Signals

To obtain the greatest signal strength in our receiver we must conserve every particle of energy that reaches the tuned grid circuit. When one fully realizes the infinitely small amount of energy picked up from a distant Radio station then one begins to wonder how half the receivers function at all. We must eliminate every chance or possibility of energy loss from our receiver. At high frequencies the greatest energy thief is capacity. For high efficiency keep down the capacities between different parts of the set. Every time the capacity across the secondary of a tuned circuit receiver is increased, the voltage applied to the grid is reduced and the vacuum tube works on the voltage applied to the grid. Keep that voltage as high as possible and the stuff is bound to pound in.

With the idea of reducing capacities across the secondary, we first of all decide upon inductance tuning which implies a variometer. But full inductance tuning is not the best thing for sharp tuning, so we compromise a little and use a small 3-plate vernier condenser across a portion of the secondary to obtain selectivity. Bear in mind the difference: Full inductance tuning in the secondary gives loudest signals, but a little capacity under proper control gives selectivity.

To reduce capacity we do not shellac the windings of the coils and eliminate the shielding. The latter brings up the question of body capacity, which we will consider a little later. Having reduced capacities and obtained maximum grid voltage between the grid condenser terminals and the filament, we will consider the most efficient method of applying the voltage to the grid.

### Grid Leaks and Condensers

For some reason it has become almost universal practice to employ a fixed grid condenser with an adjustable leak across it. There may be some good reliable leaks on the market that can be adjusted and will stay there, but I have never been lucky enough to obtain one. On the other hand the fixed leaks are reliable and cheap. The leak and condenser have to be balanced against each other, that is, the condenser must be of such size that the maximum voltage is applied to the grid by the rectifying action of the tube, while the leak must drain the energy just fast enough to prevent the grid from loading and becoming so negative as to shut off the plate current entirely. There is a certain best value for both, and for best results we make use of a small variable condenser in the grid circuit with a fixed grid leak. This arrangement will permit closer adjustment of applied grid voltages and obtain maximum results from the detector tube.

### Adjusting Current on Filament

We find furthermore that the filament of a soft detector tube is critical in adjustment. By all means use a vernier rheostat but use a good one; there are a number of good vernier rheostats that may be used, but select one that has as few parts as possible and one in which nothing can go wrong.

Likewise the plate voltage is critical. A potentiometer is the logical device for controlling the plate voltage and will be included in the circuit for efficient operation. The dry cell tubes, being hard, are not so critical to either filament current or plate voltage, and the latter refinements are not a necessity with these tubes.

The next chapter will cover regeneration control and general assembly of the ideal set.

(TO BE CONTINUED.)

### Care of Storage Battery

Proper care of the battery will double the usual reception of the set. Always remove the acid or water from the top of the battery, as the moisture will sometimes cause unnecessary noises. Never place the battery near window curtains, as the fumes will ruin them. Do not set the battery on or next to a rug as the acid might leak and ruin it. If battery is in good condition it will not freeze. The care of the Radio battery is more important in the summer time than in the winter, because many people are not inclined to use their sets in summer. If the battery is not used for a long time and is left in a discharged condition, sulphation will result. This condition can sometimes be remedied by a prolonged charge. Many times it is necessary to dismantle and repair.

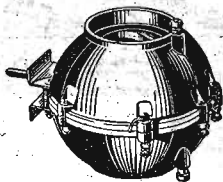
Those who have charging rectifiers should be careful not to use too high a charge rate, as it may cause buckling, shedding and overheated plates. Occasionally a complete cycle of charge and discharge will increase the capacity of your battery. Sometimes it is advisable to take it to a battery station and have it given the water cure.

### Avoid Oscillation

The main difficulty with homemade Radio frequency amplifiers is that the tubes go into oscillation, and in such condition the only thing received will be howls and squeaks. The same applies to a neutrodyne set, unless the neutralizing condensers are properly adjusted. In this latter type of set the squeals and whistles are supposed to be neutralized out.

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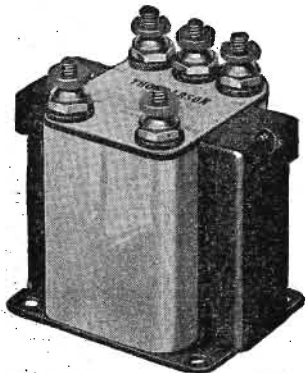
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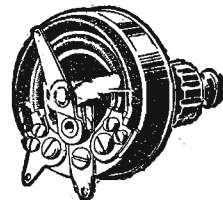
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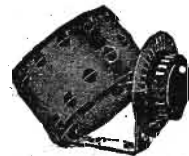
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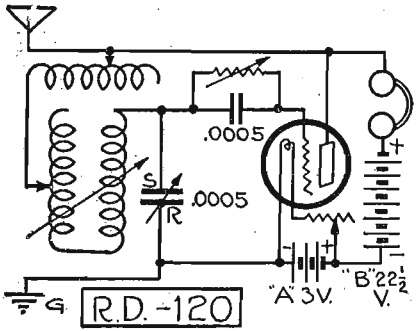
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"The variocoupler is home made, using a 4-inch tube for the stator, wound with number 22 dcc. wire, using 56 turns tapped every seventh turn. The rotor is wound on a 3 1/2-inch tube with number 24 dcc. wire, making 42 turns, connecting the bottom leads of the stator and rotor together. The upper lead of rotor is connected to the grid leak.

"Herein is given a list of stations that I can pick up most every night: KDKA, WHB, CYB, KHJ, KSD, KYW, PWX, WBAP, WCAP, WCBW, WDAF, WDAF, WDAF, WFI, WEAF, WFAA, WGR, WGY, WHAS, WHK, WJAX, WJAZ, WLAG, WLW, WMAQ, WMC, WOAI, WOAW, WOC, WOR, WOS, WRM, WSAI, WSB, WSY, WTAM, WWJ.

"I am using a single wire antenna about 120 feet long, 35 feet from the ground with 2 3/8-foot lead-in.

"To operate the set, place the rotor at right angles to the stator for best results. Turn the rheostat up all the way and use the condenser until you get the whistle, then retard the rheostat until station comes in clear. A UV-199 tube is used."



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EAST—Am more than pleased with the parts ordered from you. The first night I hooked it up and received Omaha. Since then Minneapolis and Los Angeles. It works better without amplification than most sets with two stages.—Donals, S. C. WEST—I am sending you a list of some of the stations heard on one tube: WSB, WGY, KDKA every night, FWX, WWJ, WTAM, WLW every night, CFAC, CHCB. Not long ago I purchased another set of parts from you and first night got WGR, Buffalo, and KDKA. Ione, Calif. NORTH—Received coils O. K. If I have same results with these that I had with last will be wanting more. I am 1,500 miles from nearest station and have picked 56 to date. Chicago, Havana, Mobile, New Orleans and TWO IN ENGLAND. Lunenburg, Canada.

Send stamp for further information

BOX D-117  
Vesco Radio Shop OAKLAND, CALIF.

**COMPACT RECEIVING SET**

(Continued from page 19)

type. A single 20 ohm rheostat is used for the two amplifier tubes while the two-element tube necessitates a 6-ohm resistance. The jack is the three-spring type with a make contact for connecting in the filament circuit when the phones or loud speaker are plugged in. The panel used is 7 by 12 inches. The sub-panel 7 by 8 inches. The standard size panel is 7 by 9 inches so this will have to be used for the sub-panel and 1 inch cut off from the long end. Two small brass angles are necessary for mounting the sub-panel onto the main panel.

The air core transformers can be purchased or constructed as desired. They require two pieces of mica or hard rubber tubing as desired, 2 1/2 inches in diameter and 2 inches long, and 1/4-pound spool of number 24 ssc. wire is necessary for the windings.

The cabinet should conform to the main panel size and should be slightly over 8 inches deep in order to permit proper clearance for the sub-panel.

(TO BE CONTINUED)

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# Selective Circuit Employing Ultra-Audion Parts

## Pet Circuit the Best in the Author's View

Did you ever ride with anyone who owned a fivver, especially an old one? It was always the best car in the world. Never knew a man in my life who owned

### WORKSHOP KINKS? EARN A DOLLAR—

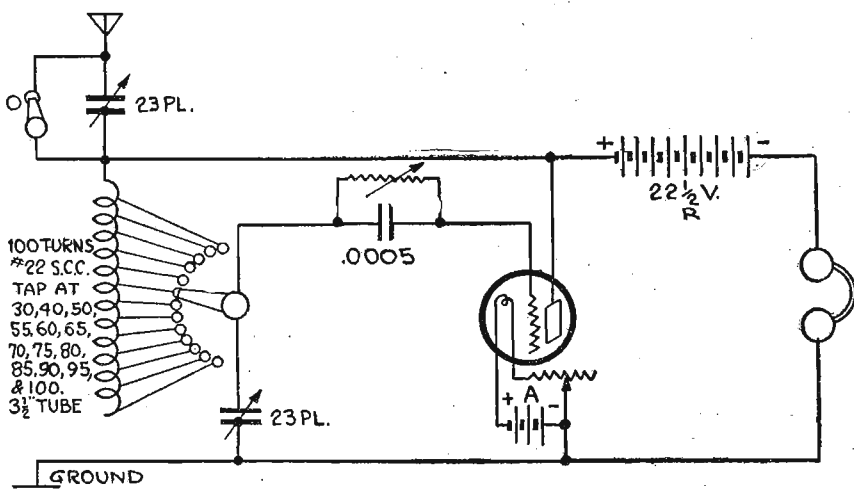
**T**HERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. 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,  
Radio Digest,  
123 W. Madison St., Chicago

a fivver who did not have the best one there ever was.

Same way with Radiophans. Everybody has a pet hook-up and it is always the best in the world. Got 'em all skinned. Well, I am no exception. Yep, I have a "hook-up," that I am submitting herewith, and some time when you have a little spare time and have the old soldering iron hot and a few extra parts lying around, just put it together and give it a trial. You'll get a surprise and a real kick and you will undoubtedly agree with me that it is a regular old "He" receiving set that will go out and get 'em and bring 'em in and is simple and easy to tune. And volume. Well, just get it going good and hang the headphone on the

## SELECTIVE AND DISTANCE HOOK-UP



wall; then back off 20 or 30 feet and hear each word of a program, clear as a bell.

Or hook this little one-tube boy on to a loud speaker on local stations and see what you get. Yes! Or try it on a loud speaker on any station within, say, 150 or 200 miles. Or put on two stages of audio and on local or nearby stuff you will want to plug her back to the first step. 'Cause there will be too much volume for good modulation, or whatever you call it.

Then go after the long distance stuff. I live in Denver. My aerial is about 30 feet high, right in the middle of a net

of electric light and telephone wires and a bunch of dot-and-dash amateurs all around me, and I have had both KHJ and KFI, Los Angeles, on the loud speaker—  
(Continued on page 28)

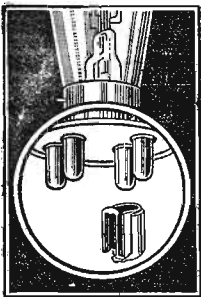
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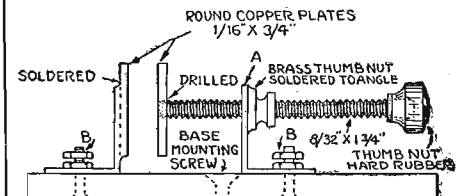
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## Homemade Neutrodyne for Neutrodyne Set

Having a great deal of trouble in neutralizing my neutrodyne grid circuit, I made a set of neutrodyne, as shown in the illustration, with good results. It can be seen that the adjustment is



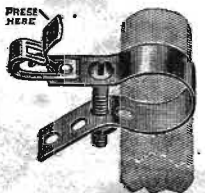
very easy and with the hard rubber thumbnuts it is not necessary to remove the hand after adjustment.—J. M. Wood, Flint, Mich.

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to hear concerts from out of town. If you want to get new stations ON YOUR CRYSTAL SET write me today. I get new records every day from people using my plans who hear programs on Crystal from stations 400 TO 1000 MILES AWAY

No tubes, batteries or amplifying apparatus necessary. I hear KDKA (Pittsburgh Pa.) on Galena. You may already have everything you need and just have it connected up wrong. Send self-addressed envelope for picture of my set, and reasons why you need my plans.  
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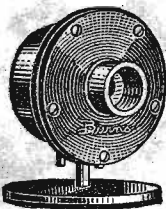
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### ULTRA-AUDION CIRCUIT

(Continued from page 27)

and a homemade one at that, with one tube—loud enough to be heard all over the room. Have also had two Kansas City stations on the loud speaker with the one tube.

With this hook-up I can tune right through the local stations and go outside like a top, with the exception of KLZ, which is only located a block or two away from my home. The only way I could get rid of them would be to take the set out in the yard and bury it.

I can get any of the local stations with both aerial and ground disconnected and have received both San Francisco and Los Angeles with no aerial. Just the ground connected.

I have just built the Miloplex circuits. Have tried out both the King and the Wizard, and I cannot see that they have anything on this little fellow. You get as much volume, I believe more; it is simpler and easier to build, easier to tune, is just as selective and it has absolutely no body capacity. Static bothers it very little. Last summer, when static was very bad and a dozen of my friends who have good sets were not able to get anything, I could bring in Los Angeles, San Francisco, Kansas City, Calgary, Chicago and Fort Worth right along every night, and when I say get 'em, I mean get 'em good enough to enjoy their stuff.

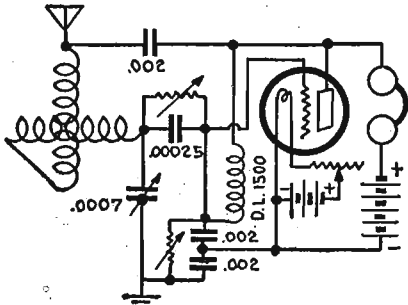
You will note this circuit is built along the lines of the ultra-audion, but with a few changes, and I think these changes are what does the work. Observe that there is a two-point switch shunted around the variable condenser in the aerial. I generally use it with this switch closed, cutting out the condenser except for fine tuning or to tune out a local station. I have a hunch it might work a little better with the feedback wire connected ahead of the condenser instead of behind it, but have not tried it out that way so far.

Also some day I am going to try it with a variometer in place of the tapped coil and see what it will do. But for the present it has been good enough and does the work, and that's all anybody wants, but I would appreciate your giving it a trial and letting me know the result.

The coil is wound on a 3 1/2-inch cardboard tube, 100 turns of 22 scc. wire, tapped at 30, 40, 50, and then every 5 turns. Condenser values are shown in the diagram. I get best results with 16 to 18 volts on the plate. Use a 6 volt tube and 6 volt storage battery.—U. G. Tuttle, Denver, Colo.

### Circuit Mixture

As will be seen by the accompanying illustration, there is a mixture of the Flewelling, ultra-audion and the Kaufman, and it seems to have the good characteristics of all of them. How or why it



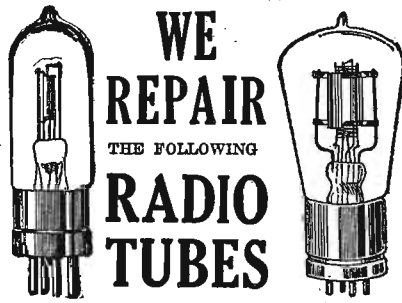
works I do not know, but it does. The volume is great. The first station heard was Hastings, Nebraska, which is about 1200 miles from here. Sixteen other stations ranging from 100 to 900 miles away were picked up on the same night.

It is very easy to tune, there being only two main controls, the variometer and condenser. Although the values given are the ones I found to work best, there is much room for experimenting on the circuit. I am passing the circuit along

for other Radiophans and hope they will get as good results as I have.—Douglas Withington, Toronto, Can.

### Radio Ear

The "Radio ear" is a new affliction of some fans who sit for long periods at their receiving sets. It is accompanied by noticeable pains in the head, near the ears, which cause thoughts of possible abscess or other serious trouble. This can be overcome by loosening up the spring in the headphones which press on some of the nerves of the head.



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# Windshield Glass Makes Good Panel Material

## Drilling Done With File Ends

By Charles U. Read

IN a recent issue of Radio Digest, I read with interest the splendid article on glass panel drilling, and thought perhaps I might offer an acceptable hint or two on the subject. With a little care and no attempt to rush matters, glass drilling will be found but a trifle more difficult than ordinary cutting. I have drilled 30 holes up to 1/2 inch in diameter in a panel in a couple of evenings.

Auto windshield glass makes excellent material, and because of numerous broken windshields, pieces large enough can often be obtained at garages at little or no cost. A glazier will cut the glass to the proper size for a few cents. I use three rat-tail files of different sizes, a small one to drill through the glass, a second with the end a little smaller than the largest part of the first, and the third with the small end a trifle smaller than the largest part of the second. I sharpen a point on the small file, front and side views of which are given, and keep it sharp with an emery wheel.

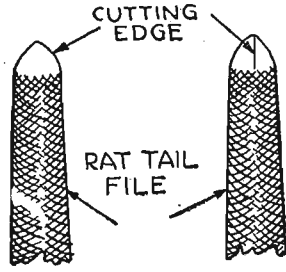
### Work Table

A table of medium height with a smooth top makes an excellent drilling place. I have never found it necessary to put pads under the glass, and sometimes when it is not fastened down I put my foot on it to hold it steady when reaming. I have never yet broken a piece.

Put the small rat-tail file in a brace and be sure to turn the brace from left to right instead of from right to left as in ordinary drilling, that is, when the handle is nearest the body it should be going left to right. This is important, especially in reaming, as a slight turn in wrong direction will generally chip the top of the hole. Use turpentine and the way up the

drill, letting it run down, rather than on the glass itself, as in this way it feeds better into the hole.

Bore the hole about two-thirds through from one side, then turn the panel over and finish from the other side. In order to



keep the brace steady and apply needed pressure, I generally keep my forehead against my hand on top of the brace. This will also enable one to keep the hole straight. Whenever the grinding sound ceases it is time to resharpen the point. A little practice will enable one to grind the drill so that a small hole may be drilled in two or three minutes. For this the drill may be turned quite rapidly and pressure applied; but for reaming, the drill

should be turned slowly and the weight of the brace will feed it through. If a 3/4-inch hole is bored through the table top the hole in the panel may be placed over this for reaming.

### Reaming the Hole

Ream with the small file, frequently turning the panel over. If the first file does not make a large enough hole, use the second after the largest portion of the first has been reached, and the same with the third to make a still larger hole. Start at one end of the panel and work toward the other end, holding down by the end not weakened by drilling. Fit each piece of apparatus as the holes are drilled for it, and in this way it will not be necessary to work back over the glass after holes are drilled.

### Panel Layout

I generally make a chart of the panel on white paper, place it on panel over car-

bon paper and with some sharp instrument, such as a stylus, mark the holes. The carbon will make slight black marks on the glass. Then if the chart is placed under the glass and the marks showing through the glass coincide with the carbon marks, the center of all the holes may be permanently marked by a few turns of the small drill.

A glass panel in a wooden case is more attractive than an entire glass case.

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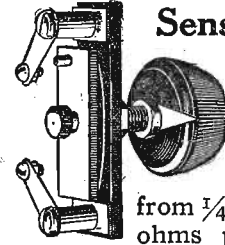
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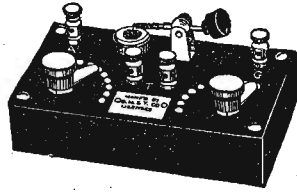
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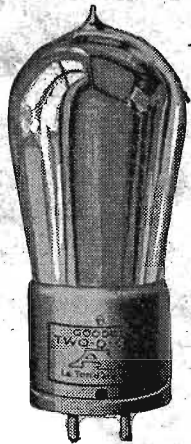
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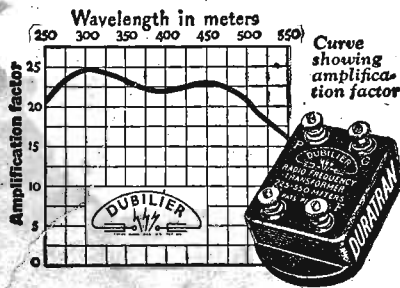
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# Questions and Answers

**Job and Miloplex**  
(07272) HRS, Baltimore, Md.

Job did not commit suicide, the last straw was lacking, the King X was not developed during his sojourn on earth.

We have built the King X in accordance with your hook-up, January 19 of Radio Digest. The first try out brought in Omaha and Davenport.

The signals when right are wonderfully clear and distance seems to make little difference in signal strength.

I now must add a stage of audio frequency. How can it be done?

A.—Job may, at that, be reincarnated in the Mystery Man. Did he not have that same proverbial patience which is exemplified in our latter day Saint?

King X can further demonstrate by adding audio frequency as shown on page eleven of the November 7 issue of Radio Digest, which we trust you have conveniently at hand.

**Split Variometer**  
(07211) CAL, Harvey, Ill.

I have recently built a regenerative Simplex set that was shown in the January 26 issue of Radio Digest. I tried it out last night and could not get it to work.

I bought two variometers and was told that they could be split. In the center between the windings the wires were joined together, the stators and the rotors. I separated these wires. Should I have done this? Does it make any difference whether the connections are made to the movable or stationary plates of the variable condensers?

A.—We are advising in your inquiry that from your description you are of the opinion that you have not split variometers correctly. This is accomplished

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in a way to permit of the use of stator and rotor each as separate coils.

Connection of rotor plates of condenser to the ground reduces any body capacity effect that might be encountered and the method is advisable on that score, otherwise it is immaterial which sides of plates are connected in position in circuit.

**July 28th Simplex**  
(05593) JNS, Windsor, Ont.

I would like to ask you a few questions regarding your one-stage R.F. detector, one-stage A.F. Simplex diagram on page 14 of the July 28 issue.

If I use WD-11, or WD-12 tubes, would the B battery voltage remain the same as suggested in your hook-up?

Of what resistance should the potentiometer be? Also the rheostats, when using these tubes.

What ratio transformers would you suggest?

Would you advise the use of a jack between the detector and stage of A.F. amplification? If so, how should it be connected up?

Are vernier adjustments necessary with this hook-up?

A.—The plate potential will be the same when employing WD-11 and 12 tubes as indicated.

The potentiometer and rheostat are to be of 400 and 6 ohms' resistance, respectively.

Any standard Radio frequency and audio frequency transformers will serve.

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Audio frequency should be of 10 to 1 ratio on first, and 3 or 4 to 1 ratio on second stage.

It is quite likely that you will desire to use the one stage of audio frequency whenever circuit is in operation, in which case it will not be necessary to employ a jack.

A vernier variable condenser is recommended.

**Measuring Grid Leaks**  
(05918) CCH, Joplin, Mo.

Would like to be able to test and determine the values of variable grid leaks. Is there any publication that will give the desired information? Also is there an instrument, say like a voltmeter, manufactured that is used for this purpose?

Will appreciate any information you can give on the subject.

A.—The value of variable grid leaks can be determined with a very sensitive Wheatstone bridge or resistance box. Generally, aside from properly equipped laboratory research there is no demand for the value as the best for use can be determined with a little experimentation. The grid leak usually does not require sufficiently critical adjustment to neces-

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state obtaining exact resistance value. For rough readings megohmmeters are now being made.

**Wave Trap**  
(07306) HSF, Charles City, Iowa.  
Will a wave trap eliminate re-radiation from a set using the ultra audion circuit?  
A.—A wave trap will not reduce re-radiation in a regenerative circuit, but will minimize interference of that nature caused by improperly tuned circuit.

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