New Grill Set; Miloplex; Learning the Code

Radio Digest Illustrated

EVERY WEEK — TEN CENTS

REG. U. S. PAT. OFF. & DOM. OF CANADA

Vol. VIII — Copyright 1924 By Radio Digest Publishing Co. — SATURDAY, JANUARY 12, 1924 — No. 1

FANS WANT JAZZ MUSIC

SETS NOW RANK AS FIXTURES IN HOMES

RADIO ENTERS BUILDING SPECIFICATIONS

Details of Installation of Outfits Being Included in Plans

By Carl H. Butman

Radio is fast becoming indispensable as a household service, not unlike permanent features such as light, power and heat. Radio receiving sets are now considered by architects as fixtures, and the details of wiring, battery space and antenna installation are being written into specifications.

One of the first Radio homes—that is,

(Continued on page 2)

HITS DEFEAT CLASSICS IN POPULARITY

Close Result Shows Immense Invisible Audience Wants Variety Above All

Think 13,170,500 Listen

Program Vote of Chicago Stations Indicates Total Number of Sets Is Underestimated

CHICAGO.—In the days of Babylon, perhaps in the years before, and in those that followed, mighty potentates, even their lowliest subjects, worked wonders which later were listed by the world until they numbered seven.

Few if any were added to astound or confound the minds of men until Radio came into their ken. This was the conclusion of noted scientists who recently observed another notable achievement here of the ether wave. These analysts readily appended the electromagnetic impulse to the index of the world's wonders although they realized, they said, that practicable Radio was young when compared with the hanging gardens and the pyramids.

Listeners Vote Gets Recognition

That which compelled the recognition of the scientists and the wonderment of peoples dotting almost one third of the earth's girdle was the avalanche of an-

(Continued on page 2)

Specht Breaks Ice for Sale of British Songs

"Music Trust" Puts Foot on Popular Yankee Tunes

NEW YORK.—Because of the ruling of the American Society of Composers, Authors and Publishers that no Radio station unlicensed by the society be permitted to broadcast any songs of its members, Paul Specht and his Alamac Hotel orchestra were forced to confine their program to English compositions only the other night over Station WJZ from a direct wire from the hostelry here.

Publishers, pluggers and Radiophans were angered and puzzled when their requests for the rendition of reigning American hits were ignored.

And who are the fair ladies this week? Left is Pauline Frederick, who needs no introduction, and who played in "Let Not Man Put Asunder," broadcast from WOR, Newark. Next is the profile of pretty Leila Bennett, who made her ether debut at WJZ, New York, when "Chicken Feed," in which she was starring, was put on the air. And last but not least, hiding in the lower right corner, is Maryon Breau, gifted young soprano, who has been heard many times via KYW and WMAQ, Chicago.

FANS TELL WHAT THEY WANT

(Continued from page 1)

swers to the questionnaire, via the air, of Stations WJAZ, WDAP and KYW of t is city as to what kinds of programs their listeners in liked best. "Popular" music made good its name, but was followed closely by requests for the classics. The tabulations are given below.

Although the period of time for the receipt of replies was limited to twelve days the three plants received, according to their latest compilation, 263,410 pieces of mail, that is, answers. Using what was said to be a conservative ratio as to responses—50 to 1—according to the experience of advertising experts, the managements of the trio of stations estimated that the number of persons who heard the announcements as to the questionnaire was 13,170,500.

Program Choice Requested

Nothing in the fables of the ages was so wondrous, it was said, as the flight of voices from the metropolis of the lakes through the ether, over mountains and seas to the ears of men, women and children far away, even unto the tropic sun, even unto the night of the frigid North.

While a young man calmly announced in Chicago that Station Soandso requested the musical preferences of its hearers, his measured tones struck perhaps a native Hawaiian girl who, although thousands of miles away, indicated by nod and smile, by flurry of leis, that she understood and would answer forthwith. And even as the fronded palms waved lazily in the sun of the South Seas the words of the announcer were hurled through space into the frozen fastnesses of the Arctic.

Listeners Everywhere Respond

Every state in the Union was represented in the army of those who answered. Letters came from as far east as Cuba and Bermuda, as far West as Hawaii, as far North as Alaska and as far South as Mexico. Even the land of "Miscellaneous" was represented; more than 2,000 missives were thus classified.

Listeners in of Illinois polled the heaviest vote—10,880. Ohio was next—6,861. Third in the list was Iowa with 6,435. The other votes were: New York 6,245; Pennsylvania, 5,964; Wisconsin, 5,950; Minnesota, 4,421; Kansas, 3,899; Michigan, 3,707; Missouri, 3,677; Indiana, 3,482; North Dakota, 3,429; Nebraska, 3,146; Texas, 2,971; Oklahoma, 1,992; South Dakota, 1,642; Massachusetts, 1,323; Colorado, 1,172; Tennessee, 1,138; Arkansas, 1,004; Alabama, 425; Arizona, 66; California, 315; Connecticut, 635; Delaware, 90; District of Columbia, 134; Florida, 59; Georgia, 399; Idaho, 24; Kentucky, 798; Louisiana, 358; Maine, 123; Maryland, 457; Mississippi, 416; Montana, 524; Nevada, 12; New Hampshire, 148; New Jersey, 983; New Mexico, 128; North Carolina, 271; Oregon, 62; Rhode Island, 98; South Carolina, 193; Utah, 6; Vermont, 220; Virginia, 403; Washington, 126; West Virginia, 870, and Wyoming, 203.

WJAZ Reaches Million in One Night

Canada, as a whole, sent 4,076 ballots. Mexico forwarded 12. From Cuba came three; Central America, one; Bermuda, one; Alaska, three and Hawaii, one. The grand total, according to count, was 122,974 votes. But these numbered only those which were received during the first ten days of the poll. More than a hundred thousand were listed before the close. Many more were received after the close of the vote. Hundreds of thousands of listeners did not vote, in the opinion of those in charge of the questionnaire.

Station WJAZ was deluged by 170,699 pieces of mail; WDAP, 54,811; KYW, 37,900. In one day Station WJAZ received 20,152 pieces of mail, representing an audience, according to the management, of more than 1,000,000 in one night. Based on the 50-to-1 ratio the number of listeners in reached by WJAZ alone was 8,534,950.

Popular Music Scores Top Position

The greatest number of votes was cast for "popular" music, 30.3 percent. But those who preferred classical music were almost as many, 26.7 percent. The other percentages were: for "jazz", 19.4 percent; old-time songs, 5.7 percent; dance music, 2.9 percent; band music, 2.7; vocal selections, 2.1, sacred music, 2.1; grand opera, 1.7; Hawaiian music, 1.0; dramatic music, .3; Mexican music, .3; male solos, .3; orchestra, .9; pipe organ, .5; instrumental quartette, .3; male quartette, .2; mixed quartettes, .8; religious music, .5; saxophone, .7; symphony, .6 percent.

Of those who responded to the questionnaire 32.5 percent were women and 67.5 percent were men.

SQUIER RETIRES AS ARMY SIGNAL CHIEF

WASHINGTON, D. C.—Maj. Gen. George O. Squier, Chief Signal Officer of the Army, retired December 31. He will devote a great portion of his time in the future to the continuation of his experimental work with Radio. Gen. Squier is well known to the amateur Radiophans of the country and has invented numerous Radio devices of note.

Canadian Fans Renege at Receiving Licenses

One-Third Pay Fee Compared to Total Last Year

OTTAWA, Ont.—"Good evening; do you prefer a fine to a fee?" may be the query soon to disturb the atmosphere and to be broadcast to about 35,000 Radiophans in Canada unless a livelier response to the appeal to take out their private receiving licenses by paying a fee of $1 is met by the Radio Branch of the Department of Marine and Fisheries here. Officials of that department intimated recently that their patience and leniency are about exhausted and that some drastic steps will have to be taken so that Radio users will comply with the law.

It is roughly estimated that there are at least 50,000 receiving sets in Canada.

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Looking Ahead

The Long Promised Increase in Size Comes Next Week—with eight more pages of vitally interesting features. Every department of the Digest will be increased in size. Just look over the line up for next issue.

Dr. A. Meissner of Germany—will begin his first short series on "The Black Sheep of the Air—Atmospheric Electricity." His articles, every one of them, should be followed closely by Radio technicians wishing to be fully informed.

How to Install, Operate and "Shoot Trouble" on your new receiving set. Watch for next issue with this new series with simple but detailed instructions covering the essentials the beginner most needs. Many standard receiving sets will be discussed.

Grill Will Tell How to Operate his excellent single circuit three-tube set. Mr. Grill's set does all claimed for it—and more.

Thompson on Audio Amplification will devote his discussion next week to the theory of "A. F." He'll tell how the mysterious, unseen, unheard ether vibrations are changed to audible signals, or rather, to music and voice.

Marx Will Discuss the Super Heterodyne next issue, and will consider various of the "Rolls Royce" circuits from the standpoint of practicability for home construction.

Mystery Man of the Miloplex has a few more tricks to divulge. He's working on a new hook-up said to beat the best of his former ones.

"The New Born Colt" is the fanciful name of the hook-up to be given as R.D.-111 next week. O. P. Klein amplified a Miloplex and renamed it, because it had such a kick, we presume.

But in the Above We Have Only Touched on the High Spots—The full appreciation of the larger Digest will come with the reading. Watch for it!

Decide Washington Fans Need No Aerial Permits

Commissioners Rule Against Licenses Despite Fatality

WASHINGTON, D. C.—The Commissioners of the District of Columbia have decided that Radio is not subject to regulation by the electrical department of the District under the permit system.

The local fans have been up in arms for some days because of the proposal to require permits for receiving aerials, but the Commissioners have now concluded that the only regulation of Radio apparatus shall be the question of making certain that outside aerials are erected on private property and at a safe distance from telephone and high tension wires.

RADIO IN HOME PLANS

(Continued from page 1)

with facilities for Radio built into the house—is that of L. E. Whittemore, secretary of the Governmental Inter-Department Radio Advisory Committee. Before construction was begun, Mr. Whittemore explained his Radio requirements to the architect, who included in the plans all Radio facilities required by this engineer and enthusiast.

Built in Loops; Aerial Fixtures

A non-metallic conduit pierces the study wall for a lead-in wire; another goes below to a special space in the cellar reserved for the batteries, while a third is for the ground lead.

Besides fixtures for erecting an aerial on the house top, the owner plans to install two single, vertical loops in the north and west wall spaces of his study, the wires terminating in special sockets for an antenna plug connected with his set. This feature will give him certain directional selectivity, as he can use, at will, the loop facing east and west.

Newsstands Don't Always Have One Left

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Radio Digest

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Very light!

flexible and easily adjusted

Mother, granny and little Willie who hangs on to his end until he is gently guided to bed by the ear—even Dad himself stays until the furnace fire is low and the house is as silent as a morgue—they all appreciate this dandy little head set with wide receiving range and unusual sensitiveness because it is so light and easy on the ears. Not hard to take at all! Band is especially adaptable; receivers are instantly adjustable.
Dispense with your "heavy artillery" and get this light, flexible, easily adjustable Kellogg head set. The price? Oh, $10.00, but don't worry about that if you are after better results.

Use is the Test

KELLOGG SWITCHBOARD & SUPPLY COMPANY
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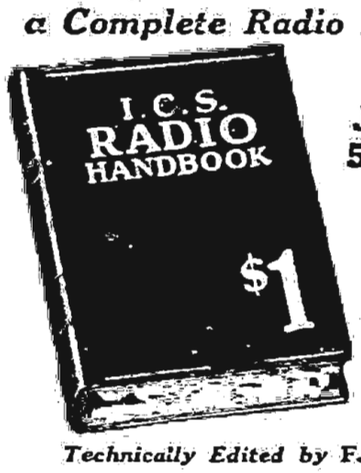
Every Question ANSWERED for only $1

At last you have under one cover a Complete Radio Handbook



JUST OUT
514 PAGES

Compiled by
HARRY F. DART, B.S.E.E.

Formerly with the Western Electric Co., and U. S. Army Instructor of Radio.

Technically Edited by F. H. DOANE

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RADIO BILL READY; CONFAB DISCARDED

ACTION BY WHITE THIS WEEK, HOPE

Hoover Says New Tentative Plan Is Based on Old Outline

WASHINGTON.—There will be no general radio conference in Washington in the near future, Secretary of Commerce Hoover announced recently. The Commerce Department is rapidly completing the details of a tentative regulatory Radio bill, based on the old White Bill, he explained. He believes that this can best be done without further conference.

Hope to Have Bill This Week

When it is attempted to draw up legislative recommendations or bills with a large body of diversified interests, it usually takes several months. Early action on the new Radio bill is necessary and it is hoped that a tentative bill can be delivered to Representative White of Maine for introduction this week if possible.

A delegation of Radio interests representing the press, clubs, engineers, broadcasters and amateurs called upon President Coolidge and the Secretary of Commerce recently, urging that a general conference be called, in an effort to reduce interference from ships affecting commercial, amateur and general broadcasting. The Secretary explained that interference was decreasing due to the voluntary adoption of regulations laid down last year and that any recommendations which the committee desired to make in writing would be considered by the officials now working out the revisions to the existing Radio laws established in 1912.

Need Commercial Station Standards

Officials point out that many difficult questions arise when regulatory legislation is attempted. Such questions as monopolistic control, it is believed should be handled by courts under existing laws, and not incorporated in Radio legislation. The question of whether or not Radio is a public utility is not essentially necessary in a law which should be regulatory, it is believed.

Some definite standards of operation and equipment, especially in the commercial fields must be included, however, it is asserted, so that Secretaries of Commerce will have some basis for their decisions.

New Interference Problems to Regulate

Recently new interference problems have arisen, over which the Department has no control under existing laws. Complaints received report interference from regenerative or re-radiating receiving sets, violet ray machines, electrical precipitation plants, bell-ringing magnetos on telephone lines, and leaking insulation on power transmission lines. Government regulations, should, it is believed, give the Commerce Department power to prevent such interference.

After the presentation of the tentative bill in the House, and its assignment to the Merchant Marine and Fisheries Committee, it is understood that public hearings will be held at which time all interests may appear to present their suggestions and recommendations.

It Takes a Heavy Fist to Play These 28 Bells

ST. PAUL, MINN.—A new kind of music was heard from WLAG beginning with the new year. It is made by the carillion of the House of Hope Presbyterian Church here. Some folks may think they're chimes but R. Buchanan Morton, who plays the instrument is very particular that it be called a carillon.

The carillon which is made up of twenty-eight bells imported from Belgium and operated by a special keyboard. In addition to a musical education it is necessary to have a heavy fist to play the carillon for it is operated by a blow on the key or lever which actuates the clapper of a bell.

NEW YEAR'S STATIC? NOPE; JUST "LINGO"

NORTHFIELD, MINN.—Did you tune in New Year's Eve to a lot of static? Well, it wasn't really. It was only Station WCAL here, St. Olaf College, giving greetings in twenty-one different tongues. Languages used in the novel celebration were: Persian, English, German, Norwegian (Sogning), Norwegian, Italian, Spanish, Chinese, Scotch, Swedish, Danish, French, Dutch, Bohemian, Icelandic, Polish, Japanese, Greek, Welsh, Gaelic, American.

MASKED SINGER IS MYSTERY AT WTAM

CLEVELAND.—There have been plenty of masked dancers, speakers, wrestlers and boxers but a masked singer presents a new wrinkle, especially in broadcasting. The unknown was once a well-known figure to vaudeville goers, but seeing no future he retired and went into business. Hence his insistence that his identity remain hidden when he broadcast recently from WTAM, Willard station here. Many letters guessing who the singer was, were received.

ONLY A PART OF THE AUDIENCE

Miss M. King, former commercial Radio operator aboard ship, holds only two armfuls of the 263,410 letters received in the recent Chicago program vote conducted by Stations WJAZ, KYW and WDAP. The screened in ballot box contained the rest, with the exception of several unopened mail bags in the lower left corner. See page 1 for story.

Special Wire for Applause

FORT WORTH, TEX.—Station WBAP, Star-Telegram, Radiophans have been so generous in their congratulatory wires to performing artists, that the local Western Union office has arranged to furnish gratis a special operator to take care of the appreciative messages. The new arrangement provides for the messages to come direct to the studio from the point sent, without relay at the local office of the telegraph company.

INDEPENDENCE HALL RINGS IN NEW YEAR

PEALS OF RELIC HEARD BY WHOLE NATION

WOO Broadcasts Strokes for First Time; Cheers of Merry-Makers Join Ceremony

PHILADELPHIA.—Station WOO, Wanamaker Store here, broadcast for the first time the ringing in of the New Year by the traditional bell in the great clock of old Independence Hall. At fifteen minutes of midnight Chief Harry T. Baxter, of the Philadelphia Bureau of Public Properties, speaking into a microphone at Independence Hall, told the story of the three great bells that have occupied Independence Hall belfry.

The first of them was the Liberty bell, which first rang out the proclamation of American Independence on July 4, 1776. It was cracked when tolling for the death of Chief Justice John Marshall, in 1835, and has been silent ever since. It was replaced in the tower by a new bell, which in 1877 was removed to Germantown Town Hall. The present bell has occupied the tower since 1877.

Custom 147 Years Old

Ringing out the old year and ringing in the new with the bell of Independence Hall is a traditional custom. It dates back to the beginning of the nation and it is a custom regarded in this city with peculiar reverence. On New Year's eve people assemble in dense throngs in Independence Square and crowd the streets in all directions, awaiting the stroke of midnight on the great bell. The hour of midnight is struck on the bell by clockwork and immediately afterwards the bell-ringers begin to count off the years of American Independence.

The whole ceremony—the introduction by Chief Baxter, the twelve strokes of midnight, the 147 strokes proclaiming the age of the nation and the shouts and cheering of the merry-makers—all were broadcast by WOO from the belfry whence the nation's birth was first proclaimed.

New "Tone-Sharpener" Improves KHJ Service

Energy No Longer Radiated on Undesirable Lengths

LOS ANGELES.—After two days of silence except for the Children's program and the 8 p. m. concert, Station KHJ, the Los Angeles Times, recently returned to the ether in better form that it has ever been before.

The silence was the result of the desire for improved broadcasts. Now a new harmonic suppressor or tone sharpener has become a part of the KHJ transmitter. In the field for which it was designed—that of eliminating all outgoing frequencies other than 750 kilocycles (which is equivalent to saying a wave length of 395 meters) upon which KHJ broadcasts—it has proved to be a splendid success. The carrier wave of KHJ is now sharper than it was, no energy being radiated on wave lengths either above or below 395 meters.

India Grants First Permit

CALCUTTA.—The government of India has issued its first private Radio transmitting and receiving license to the Radio Club of Bengal. Under the terms of this license weather reports, concert and student programs and nonpolitical lectures, but not news items, can be transmitted to members of the Radio club only.

Radio Chain for Greece

ATHENS.—Radio telegraph communication throughout Greece will be established by the British Marconi Company under an agreement which has just been signed. It is proposed to erect stations in all the principal cities.

THE ANTENNA BROTHERS — Spir L. and Lew P. — Drowning out the (?) Signals

SIXTH LAST DANCE LESSON BROADCAST

REVIEW OF FIVE LESSONS ENDS MURRAY SERIES

Dance Etiquette Considered—How to Leave Partner—Asking for Dance—Introductions

(Editor's Note.—The following article ends the Murray series of dancing lessons which were broadcast by over a score of high power stations in co-operation with Radio Digest.)

Lesson VI—Review of Course

By Arthur Murray

WE HAVE now completed the most important steps one should know to become a good dancer. The final lesson, as broadcast, is a review. Study over the first five lessons. Read carefully and practice diligently.

There are several points in dance etiquette the beginner will do well to have in mind before ending this series. I will discuss them here briefly.

After dancing with a girl, if a young man wishes to seek another partner, he should leave his first partner with friends or the chaperons and seek another gentleman to dance the next dance with his original partner. He can leave his partner by explaining that he wishes to hunt a friend whom he is anxious for her to meet.

When a hostess sees some neglected girl, she will seek out a partner for her and present him with some word of pleasantry, "Miss West, may I present Mr. Adams? He hopes that you can spare him a dance," or, to a closer friend, "Lucia, Mr. Adams has asked to be presented to you. My friend Miss Kent, Mr. Adams."

Introductions and Asking for Dance

To a strange young man, the hostess may say, "Mr. Brown, my sister would like to know you. May I introduce you?"

It is the duty of the hostess and other chaperons to make introductions whenever possible, especially among the younger people, and see that the dancing men are presented to the young women, so that no one will be neglected.

The gentleman places himself in the position of asking for the favor when he asks the lady to dance. At the end of the dance he thanks her and makes some complimentary remark to the effect that he enjoyed the dance. Perhaps the most commonly used form of asking for a dance is to say, "May I have the pleasure of a dance?" or, "May I have the next dance?" It is poor taste to say, "Have you the next dance?" And then if a negative answer is given, to ask for the dance. Often a girl does not like to admit that her dances are not taken and this question is not at all pleasant.

(THE END.)

Short aerials tune very sharply.

ONE OF THOSE WHO PUT OPERAS ON AIR

By birth a Canadian of Polish parentage, but for several years a citizen of the United States, Irene Pavloska is one of the most charming of the Chicago Civic Opera's famous singers—and also one of the most useful. Radiophans will remember her, among other rôles, as "Hansel" in "Hansel and Gretel," as "Myrtale" in "Thaïs" and in Andrea Chenier," which have all been broadcast.

GREBE RADIO

The Ideal Radio Instrument for the Home

The New GREBE Broadcast Receiver

THIS Receiver is contained in a beautiful walnut cabinet that has compartments for all necessary batteries. The 20-ft. silk-covered wire is the only antenna required.

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

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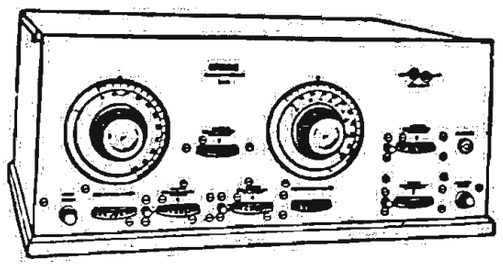

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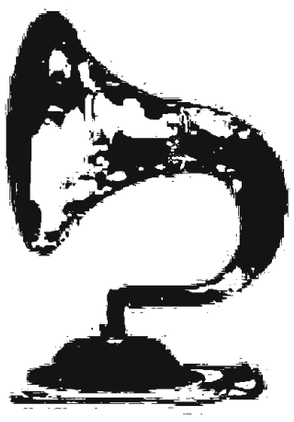

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RADIO TALKS

A Radio frequency or neutrodyne receiver with poor sockets in it will be a poor receiver no matter how good the other parts of it are. Radio is advancing through attention to just such small items as this. It might pay you to check up this point in your receiver.

E. T. Flewelling

E. T. Flewelling Tuner

A tuner in which simplicity of design, simplicity of control and efficient operation are paramount. Its successful performance is due to the elimination of solid dielectrics in the coil field and all unsightly, loss producing taps.—There are many things we could tell you about this tuner but to try one yourself is to be convinced. Install one on your set. Then see for yourself how well it brings them in. Note the clarity and volume. Note the big difference in your set. This tuner is designed by Mr. E. T. Flewelling to attain as great reception efficiency as is possible.

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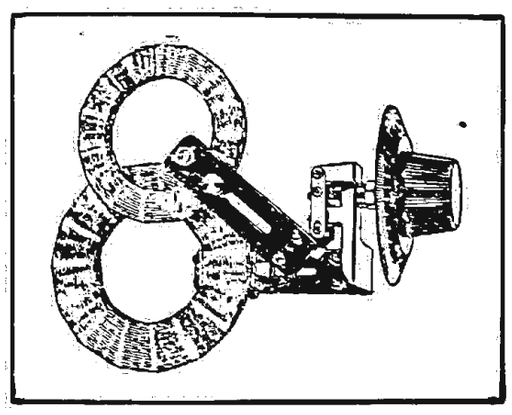
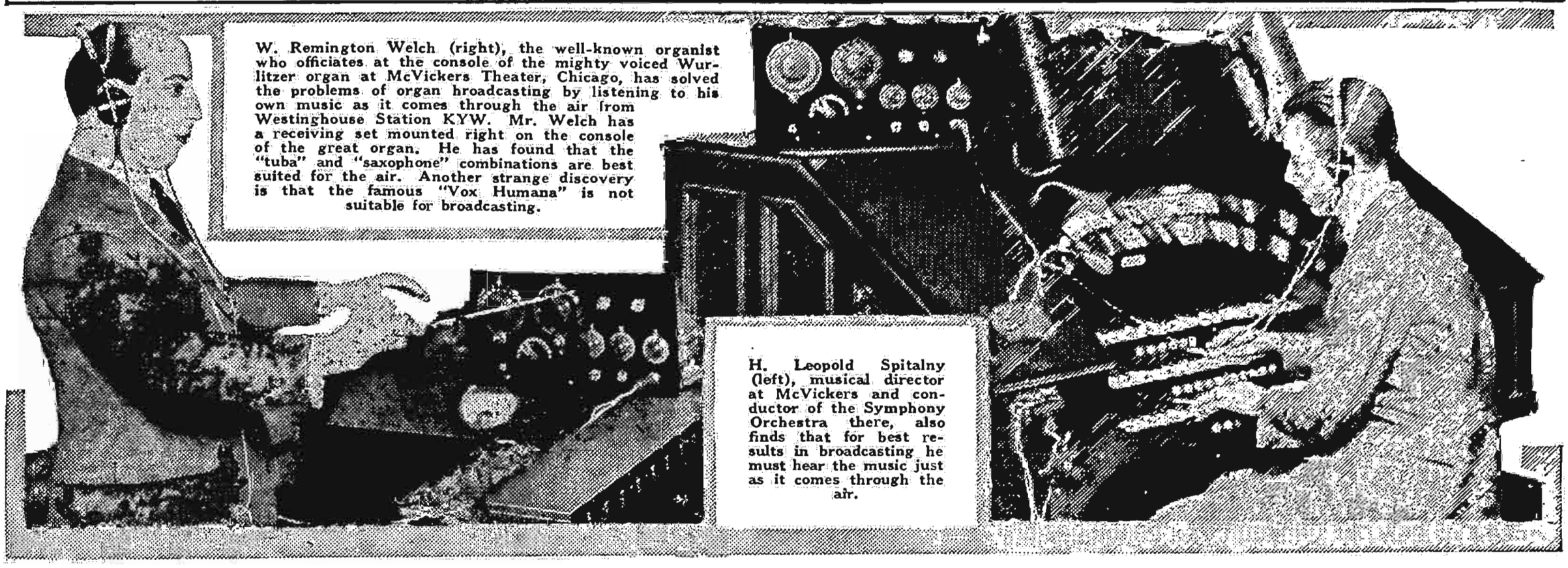
CHICAGO



$8.00 At your dealers or post paid.

ORGANIST COMPARES KYW BROADCAST



W. Remington Welch (right), the well-known organist who officiates at the console of the mighty voiced Wurlitzer organ at McVickers Theater, Chicago, has solved the problems of organ broadcasting by listening to his own music as it comes through the air from Westinghouse Station KYW. Mr. Welch has a receiving set mounted right on the console of the great organ. He has found that the "tuba" and "saxophone" combinations are best suited for the air. Another strange discovery is that the famous "Vox Humana" is not suitable for broadcasting.

H. Leopold Spitalny (left), musical director at McVickers and conductor of the Symphony Orchestra there, also finds that for best results in broadcasting he must hear the music just as it comes through the air.

DE FOREST WINS BADGE OF MERIT

HONORED BY INSTITUTE FOR 3-ELEMENT TUBE

Inventor's Address Predicts Wide Use of Triode in Medical Research

NEW YORK.—In every field of endeavor there is some high honor which is conferred upon man when he has performed some work of outstanding importance. Radio is no exception.

The Institute of Radio Engineers stands today as the leading body devoted to research in this newest of sciences and the highest reward within its power to bestow is the Medal of Honor. Each year, those scientists whose names are familiar to us all decide who is worthy of this honor and in 1922 it was agreed that insufficient recognition had been given to the inventor of the three-element vacuum tube which is the heart of every broadcasting station and every receiving set worthy of the name. So, to Dr. Lee De Forest goes the medal for that year.

Tells History of Audion

The medal was presented at a meeting of the Institute held here recently—a meeting attended by such leaders as Professor Morecroft, Dr. E. E. Mayer, Professor Pickard, Dr. Alfred Goldsmith and General Squier.

After outlining De Forest's career as an experimenter and engineer, General Squier told the Institute that De Forest's outstanding achievement was the grid of the audion and that, in his opinion, it was more than an invention, that it was a new principle or instrumentality and one which opened a new era in electrical engineering.

Dr. De Forest, in reply, plunged into a brief history of the audion's development.

In concluding his address he touched upon the future of the three electrode tube in Radio.

"As to its future new applications in this art," he said, "we have many concrete ideas, although doubtless today no one of us can foresee what the future developments hold in store. But it is interesting to note what Dr. Henry Smith Williams stated recently as to the utility of the three electrode in medical research:

Agent of Importance

" 'Until recently electricity has played a minor role in practical medicine. It is destined, I believe, to become an agent of the utmost significance. And the transition will be effected, I strongly suspect, through studies connected with apparatus made available by the Radio engineer. For no available apparatus except the triode has the qualities of sensitive response and amplifying power that are indispensable for the effective investigations of electrical currents of such tenuousness as those which we must assume are associated with the operation of individual bodily organs, and in particular with the functioning of that organ of organs, the brain.' "

'Twas No Lonesome Visit for This Mr. Tom Ragan

DETROIT.—Fraternal spirit exists even in Radio clubs. Recently Tom Ragan, a member of the Red Apple Club, here, chanced to be in Cleveland. Before leaving Detroit he mentioned that he was to be out of the city to C. M. Tomy, the Detroit Free Press Red Apple Club's chief. Mr. Tomy announced over WCX that Mr. Ragan was in Cleveland and probably was lonesome. He gave Ragan's address. On his return Ragan called Tomy up and said he had been flooded with telephone invitations from Red Apple enthusiasts of Cleveland to visit their homes.

FORT WORTH GIVES 3 SERMONS ON SUNDAY

Trio of Churches Offer Services to World

FORT WORTH, TEXAS.—Over WBAP, Star-Telegram here, complete morning services of three Fort Worth churches are now available at 11 a. m. to 12:15 p. m. (C. S. T.) each Sabbath.

In addition to the First Methodist Church, which services have been furnished for over a year, permanent wires direct to the studio of WBAP have been installed, availing the Radio public of Sunday morning services of the First Christian Church and First Presbyterian Church.

WBAP also has lines running to the Chamber of Commerce, Rialto Theater and De Luxe Ballroom.

Hot Springs C. of C. Gives Trial Program Over WMC

HOT SPRINGS, ARK.—For some time the local Chamber of Commerce has been contemplating installing a 500-watt broadcasting station to bring before the Radiophans of America the fact that Hot Springs is "The Nation's Health Resort," but in order to arouse sufficient interest in the project locally, Manager F. L. Body of the chamber secured the co-operation of Station WMC, The Memphis Commercial Appeal. WMC dedicated a recent evening to Hot Springs. Following each selection the listeners in were requested to write the Hot Springs Chamber of Commerce. The object of this announcement was to prove by actual test that a broadcasting station does reach the masses. According to Mr. Body four days after the program was given the chamber had received replies from twenty-two states and seventy-seven cities.

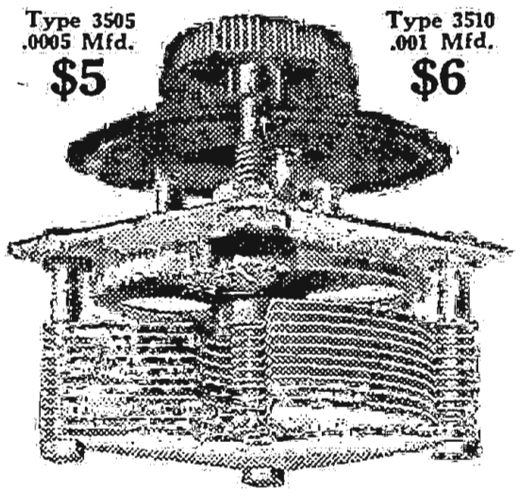
Coto
"Built First to Last"

New Coto Compact Variable Air Condenser with Vernier

Rugged and electrically efficient. Constructed on rigid metal plate from which condenser plates are perfectly insulated. Both rotor and stator plates are of copper, soldered firmly in place. Size only 2⅞ x 2⅞ inches. Positive, delicate vernier action.

Type 3505 .0005 Mfd. $5

Type 3510 .001 Mfd. $6



If your Dealer cannot Supply you, write us, giving his Name.

COTO-COIL CO.
87 Willard Avenue Providence, R. I.

BRANCH OFFICES:
Los Angeles, 329 Union League Bldg.
Minneapolis, Geo. F. Darling, 705 Plymouth Bldg.
Atlanta, C. P. Atkinson, Atlanta Trust Co. Bldg.

PERFORMANCE

THE performance of a radio receiver, like any other mechanical piece is only as good as its weakest part.

The Federal Telephone and Telegraph Company manufacture 130 different radio parts, which carry the Federal guarantee of perfection, due to more than 25 years' research by experts in the radio field.

To insure 100% performance specify Federal when purchasing a complete radio or parts.

All reliable dealers carry Federal Standard Radio Products.

Price
2200 OHMS
$7.00

Federal
Standard RADIO Products
Federal Telephone and Telegraph Company
Factory: Buffalo, N. Y.
Boston New York Philadelphia Chicago San Francisco Pittsburgh
Bridgeburg, Canada London, England

AN EVENING AT HOME WITH THE LISTENER IN

(SEE INSTRUCTIONS FOR USE BELOW)

Station and City	Met.	Monday	Tuesday	Wednesday	Thurday	Friday	Saturday	Sunday
CFCN, Calgary, Alta	440	12:00- 1:00	Silent	11:00- 2:00	Silent	Silent	11:00- 1:00	Silent
CKAC, Montreal, Que	430	Silent	6:00- 8:30	Silent	6:30-10:00	Silent	6:30-10:00	3:30- 4:30
CYB, Mexico City, Mex	425	Silent	Silent	8:30-10:00	9:00-11:00	Silent	8:30-10:00	Silent
CYL, Mexico City, Mex	440	Silent	10:00-11:30	Silent	Silent	10:00-11:30	Silent	Silent
KDKA, E. Pittsburgh, Pa	326	5:00- 9:00	5:15-11:30	5:30- 9:00	5:15-11:30	5:15- 9:00	5:15- 9:00	6:30- 7:30
KDZE, Seattle, Wash	455	10:30-12:30	Silent	10:30-12:30	Silent	10:30-12:30	Silent	Silent
KFAE, Pullman, Wash	330	9:30-11:00	Silent	9:30-11:00	Silent	9:30-11:00	Silent	Silent
KFAF, Denver, Colo	360	9:00-10:00	9:00-10:00	Silent	8:30- 9:00	9:00-10:00	9:00-10:00	Silent
KFI, Los Angeles, Calif	469	8:45- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	10:00- 1:00
KGW, Portland, Ore	492	9:30-12:30	9:30- 1:00	9:30- 1:00	9:30- 1:00	9:30- 2:00	9:30- 1:00	8:00-10:00
KHJ, Los Angeles, Calif	395	8:45- 9:30	8:45- 2:00	8:45- 2:00	8:45- 2:00	8:45- 2:00	8:45- 2:00	10:00-12:00
KLX, Oakland, Calif	509	Silent	10:00-12:00	10:00-12:00	10:00-12:00	10:00-12:00	Silent	Silent
KPO, San Francisco, Calif	423	10:00- 1:00	10:00- 1:00	10:00-12:00	10:00- 1:00	Silent	10:00- 2:00	10:30-12:00
KSD, St. Louis, Mo	546	8:00- 1:00	8:00- 1:00	8:00- 1:00	8:00-10:30	Silent	7:30- 9:00	Silent
KYW, Chicago, Ill	536	Silent	8:00- 9:30	8:00-12:30	8:00- 9:30	10:00-12:00	8:00- 9:30	Silent
NAA, Radio, Va	435	5:45- 7:20	6:05- 7:20	6:25- 7:40	5:45- 7:40	7:05- 7:40	Silent	Silent
PWX, Havana, Cuba	400	Silent	Silent	7:30-10:00	Silent	Silent	7:30-10:00	Silent
WBAP, Fort Worth, Texas	476	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:00- 7:30	5:00- 6:00
WBAV, Columbus, O	390	8:00-10:00	Silent	Silent	Silent	8:00-10:00	Silent	4:00- 5:00
WBZ, Springfield, Mass	337	6:00- 9:00	6:30- 9:00	5:00-11:00	6:30- 8:00	5:00-11:00	6:30- 8:00	5:45- 8:30
WCAE, Pittsburgh, Pa	462	7:30- 8:30	7:30- 8:30	7:30- 8:30	7:30- 8:30	7:30- 8:30	7:30- 8:30	5:30- 6:30
WCAP, Washington, D. C	469	Silent	6:30- 9:00	Silent	6:15-11:00	Silent	6:30-11:00	6:20- 9:00
WCBD, Zion, Ill	435	8:00-10:00	Silent	Silent	Silent	8:00-10:00	Silent	2:30- 5:30
WCX, Detroit, Mich	517	7:30- 9:00	7:30-11:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	Silent	6:15- 7:15
WDAF, Kansas City, Mo	411	8:00- 1:00	11:45- 1:00	8:00- 1:00	11:45- 1:00	8:00- 1:00	11:45- 1:00	Silent
WDAP, Chicago, Ill	360	Silent	7:00- 1:00	7:00- 1:00	7:00- 1:00	7:00- 1:00	7:00- 1:00	9:15-11:15
WDAR, Philadelphia, Pa	395	6:30- 9:55	6:30- 7:00	6:30-10:00	6:30- 7:00	6:30-12:00	6:30- 7:00	Silent
WEAF, New York, N. Y	492	6:30- 9:00	6:00- 9:00	6:30- 9:00	6:00-11:00	6:30- 9:00	6:30-11:00	6:20- 9:00
WFAA, Dallas, Tex	476	8:30- 9:30	8:30-12:00	Silent	8:30- 9:30	8:30- 9:30	8:30-11:00	6:00-11:00
WFI, Philadelphia, Pa	395	6:00- 6:30	6:00- 8:00	6:00- 6:30	6:00- 8:00	6:00- 6:30	6:00- 8:00	6:30- 7:30
WGI, Medford, Mass	360	Silent	6:05- 7:30	6:30- 8:00	6:00- 7:30	6:30- 8:00	6:30- 8:00	7:30-10:00
WGR, Buffalo, N. Y	319	5:30-11:00	5:30- 7:45	5:30-11:00	5:30- 7:45	5:30-11:00	5:30- 7:45	2:00- 3:00
WGY, Schenectady, N. Y	380	6:45- 9:00	6:45- 9:00	Silent	6:45- 9:00	6:45-10:30	8:30- 9:30	6:30- 7:30
WHA, Madison, Wis	360	7:30- 8:30	Silent	7:30- 8:30	Silent	7:30- 8:30	Silent	Silent
WHAS, Louisville, Ky	400	Silent	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	4:00- 5:00
WHAZ, Troy, N. Y	380	8:00- 9:30	Silent	Silent	Silent	Silent	Silent	Silent
WHB, Kansas City, Mo	411	7:00- 7:45	7:00-10:00	7:00- 7:45	7:00-10:00	7:00- 7:45	7:00- 7:45	8:00-10:00
WHK, Cleveland, O	283	5:00- 5:30	5:00- 5:30	5:00- 5:30	5:00- 5:30	5:00- 9:00	5:00- 5:30	7:00-,8:30
WHN, New York, N. Y	360	6:30-11:00	8:30-11:00	6:30-11:00	8:30-11:00	8:30-11:00	6:30-11:00	8:30-11:00
WIP, Philadelphia, Pa	509	5:00- 6:30	5:00-11:00	5:00- 6:30	5:00-10:00	5:00- 6:30	5:00-11:00	Silent
WJAR, Providence, R. I	360	Silent	6:00- 7:00	6:00-11:00	Silent	6:00- 9:00	Silent	Silent
WJAX, Cleveland, O	390	Silent	6:30- 8:30	Silent	7:00- 9:30	Silent	Silent	Silent
WJAZ, Chicago, Ill	448	Silent	10:00- 2:00	10:00- 2:00	10:00- 2:00	10:00- 2:00	10:00- 2:00	6:00- 9:00
WJY, New York, N. Y	405	Silent	6:30-10:30	Silent	6:30-10:30	6:30-10:30	Silent	7:00- 9:30
WJZ, New York, N. Y	455	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00- 9:30
WKAQ, San Juan, P. R	360	Silent	7:00- 8:30	6:00- 7:00	Silent	7:00- 8:30	Silent	Silent
WLAG, Minn.-St. Paul	417	Silent	Silent	9:15-10:45	Silent	9:15-10:45	9:15-12:30	7:45- 9:15
WLW, Cincinnati, O	309	10:00-12:00	10:00-12:00	8:00-10:00	10:00-12:00	Silent	Silent	Silent
WMAQ, Chicago, Ill	448	Silent	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	Silent
WMC, Memphis, Tenn	500	8:30- 9:30	8:30-12:00	Silent	8:30- 9:30	8:30-12:00	8:00- 9:30	Silent
WNAC, Boston, Mass	278	Silent	7:00- 9:00	8:00-10:00	7:00- 9:00	7:00- 9:00	8:00-10:00	5:30- 7:30
WOAI, San Antonio, Texas	385	Silent	9:30-10:30	Silent	7:30- 8:30	Silent	Silent	9:30-10:30
WOAW, Omaha, Neb	526	6:00-11:00	6:00-11:00	Silent	6:00-11:00	6:30-11:00	6:00-11:00	9:00-11:00
WOC, Davenport, Ia	484	8:00- 9:00	Silent	8:00-11:00	8:00- 9:00	8:00- 9:00	9:00-10:00	7:00-11:00
WOO, Philadelphia, Pa	509	6:30-1:000	Silent	6:30-10:00	Silent	6:30-10:00	Silent	Silent
WOR, Newark, N. J	405	5:15-10:00	5:15- 6:30	5:15-10:00	5:15- 6:30	5:15- 6:30	5:15-10:00	Silent
WOS, Jefferson City, Mo	441	8:00- 9:30	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent	Silent
WRC, Washington, D. C	469	7:00- 9:00	Silent	7:00- 9:00	Silent	7:00- 9:00	Silent	Silent
WRM, Urbana, Ill	360	Silent	7:00- 9:30	Silent	8:30- 9:30	Silent	Silent	Silent
WSAI, Cincinnati, O	309	Silent	8:00-10:00	Silent	8:00-10:00	Silent	10:00-12:00	Silent
WSB, Atlanta, Ga	429	8:00-12:00	8:00-12:00	10:45-12:00	8:00-12:00	8:00-12:00	8:00-12:00	7:30- 9:15
WSY, Birmingham, Ala	360	8:00- 8:45	Silent	8:00- 8:45	Silent	8:00- 8:45	Silent	8:00- 9:00
WTAM, Cleveland, O	390	Silent	Silent	7:00- 9:30	Silent	Silent	8:00-10:00	Silent
WWJ, Detroit, Mich	517	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30-11:00	7:30- 9:00	Silent	4:00- 5:00

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.

Complete Parts for Miloplex Circuit—Cabinet Free

1 .0005 Variable Condenser, Vernier $6.00
1 Estru Variometer 5.00
1 .00025 Variable Condenser 2.00
1 Variable Grid Leak ..... .75
1 .00025 Mica Fixed Condenser ..... .40
2 .002 Phone Condensers ..... .80
3 3½-Inch Dials, each 75c $2.25
1 Potentiometer, 1850 ohm 2.20
1 Rheostat 1.00
1 Socket Bakelite Base ..... .90
1 Bakelite Panel 9x14x3/16 ..... 2.50
1 WD-12 Tube 6.50
1 B Battery, large, 22½ volt $3.00
3 Dry Cells 1.35
12 ft. sq. brass bus wire ..... .30
1 Set Readem Bind. Posts ..... .75
TOTAL $35.70

Our Price Only $28.50 Blue print FREE only with order for complete parts

Complete Parts for One Tube Reflex

1 Radiometer ..... $ 3.00
1 23 Plate Condenser 3.00
1 Tricoil Transformer 2.00
1 Audio Transformer 4.00
1 199 Socket ..... .90
1 199 Tube 6.50
1 Baseboard, 7x9 ..... .25
1 7x9x3/16 Bakelite Panel 1.25
1 Set Readem Binding Post ..... .75
2 .002 Micon Fixed Condensers ..... .80
1 Type B. B. Metal Detector 1.50
1 Cabinet, 7x9x8 ..... 2.50
Complete OUR PRICE ONLY ..... $22.45 TOTAL $26.45

Complete Parts RD 99 Long Distance Receiving Set

(See Radio Digest, September 29th issue)

3 Bakelite Base Sockets ..... $ 2.25
3 Rheostats 3.00
2 A. F. Transformers 8.00
2 Double Circuit Jacks 1.80
1 Open Circuit Jack ..... .75
1 Estru Variometer 5.00
1 Variable Grid Leak and Condenser 1.00
1 .0005 Variable Condenser with Vernier 6.00
1 .005 Fixed Condenser ..... .75
1 75-turn Honeycomb Coil, mounted 1.20
1 Single Coil Mounting ..... .50
1 Set Readem Binding Post ..... .75
1 Panel Bakelite, 7x16x3/16 ..... 2.25
1 Cabinet, 7x16x8, fine mahogany finish 6.00
Our price complete with panel drawing and blue priot. ONLY ..... $30.25 TOTAL $39.25

Complete parts for a Neutrodyne Tube Set. Nothing extra to buy in parts. The complete parts are of the highest quality apparatus.

NEUTRODYNE

This is your opportunity to secure the parts for this famous set at a decided reduction in price. Nothing extra to buy, as this price includes all parts essential to build it $45.50

Same parts complete with 1 UV-200 and 3 UV-201A Tubes; 3 22½-volt large size B Batteries; 1 Storage A Battery, 110-ampere; Baldwin Head Phones and Aerial Equipment $92.15
This set would cost you $181.65 if it was bought ready made.

Crystal Set Complete

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

Above Set alone, without Phones or Aerial Equipment $2.50

CABINETS

9x14x8, mahogany finish $3.25
7x 9x8, mahogany finish 2.75
7x21x8, mahogany finish 3.50
MUST SEND POSTAGE

SPECIAL PRICE ITEMS

SPECIAL Tri-Coil Reflex Radio Frequency Transformer $1.90

PHONES

	List	Our Price
Economical Double Phones, guaranteed, with head-bands	$6.00	$3.89
Double Phone Cord	1.00	.75
Genuine Baldwin Type C Unit	6.00	4.39
Genuine Baldwin Type C Double	12.00	7.95
Loud Speaker Cord, 20 ft., 4 tips, our price		1.00

RHEOSTATS AND SOCKETS

MARVEL Rheostat, 6 ohms ..... $ .35
MARVEL Rheostat, 20, 25 and 30 ohms ..... .45
MARVEL Rheostat, 40 ohms ..... .55
MARVEL Rheostat, 50 ohms ..... .65
Potentiometer, 200 ohms ..... .75
Potentiometer, 400 ohms ..... .75
Potentiometer, 1,850 ohms 2.00
Standard Sockets, bakelite base, $1.25 ..... .75
Na Ald Sockets, 35c; 3 for 1.00
All-American Audio Transformers, 1-5 or 1-10 ..... 3.95
Webster Audio Transformers, 1-4 or 1-8 ..... 3.39
SPAGHETTI, black or yellow, 36" ..... .10

VARIOMETERS

Moulded Variometer $8.00 $4.39
Estru Split Variometer 4.50
Variometer, All Circuits 5.50
Readem Binding Posts. Set composed of 1 antenna, 1 ground, 1 A Battery +, 1 A Battery —, 2 telephones, 1 B Battery +, 1 B Battery — ..... $ .75

Phone Plugs ..... $ .39
Knock-down Loop Aerial, Special ..... .95
UV-199 Adapter ..... .69
UV-199 Socket ..... .69
WD-11 Socket ..... .69

VARIABLE CONDENSERS

	Our Price
Variable Condenser, .0005 (Same as 23 plate)	$1.95
Variable Condenser with Vernier, .0005 (Same as 23 plate)	3.45
Variable Condenser, .001 (Same as 45 plate)	2.35
Variable Condenser, with Vernier, .001	3.95
Walnart Variable Condenser, .00025	1.75
H. C. Coil Mounting Geared	$4.50
C. R. L. Grid Leak and Condenser	$1.59
C. R. L. Grid Leak	1.29
C. R. L. Potentiometer, 1,850 ohms	2.00
Marco Armorclad Potentiometer, 600 ohms	1.75
3-Coil Mounting, geared	$4.50
3-Coil Mounting (Crown)	3.85
Radion Panels, black or mahogany—all standard sizes, 1¾c per square inch.	
$3.00 Electric Soldering Iron, guaranteed	$2.45
Spagbetti, yellow or black, 36 inches	$ .10
Tait Dials, 3 inch	$ .90
Tait Dials, 4 inch	1.39
1 Special Voltmeter, from 0 to 50 volts, for your A and B Batteries	$1.19

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Everything in Radio Write Us

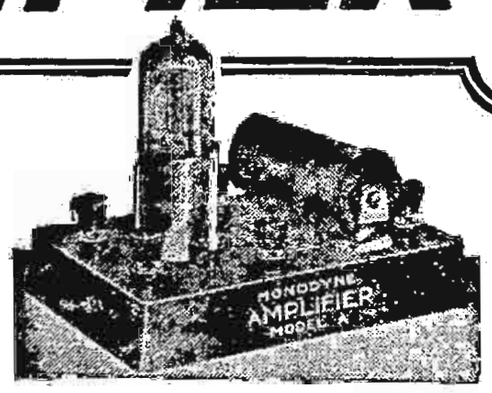
All Orders Mailed Promptly. Parcel Post Prepaid on $5.00 or Over. No Stamps Accepted. Send Money Orders.
Quality Merchandise at Low Prices

Economical Radio House

4600 Lincoln Avenue, Chicago

We Personally Guarantee All Goods

Ready!! the New Monodyne Audio AMPLIFIER



NATIONAL MONODYNE
TRADE MARK
TUBE SET
MODEL GT-1

$10 WITHOUT TUBE

Only One Tuning Control

Local and DX broadcasting comes in clear and loud without distortion.

Simple — No technical knowledge required to operate.

Amplifies without distortion or howling.

One or more stages will operate a loud speaker.

A worthy companion of the Monodyne single tube set or any other set.

Use any standard tube preferably WD-12.

If your dealer cannot supply you, write direct to us.

$8.50

NATIONAL AIRPHONE CORPORATION
REG. U.S. PAT. OFF.
18-22 HUDSON STREET
NEW YORK

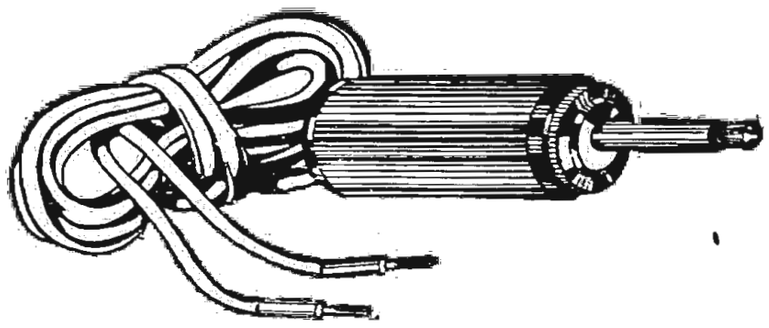
CLEAR AND SWEET—

You've tried many expensive tricks to improve reception on that set of yours, but do you know that for the cost of one necktie you can get real results?

THE ORIGINAL COMSCO

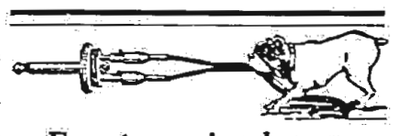
AUTOMATIC
BULL DOG GRIP PLUG

(Licensed under Pat. Pend. Serial No. D 3010—No. 578540)



IS THE LAST LINK IN PERFECT RECEPTION

Simple to Operate
Insert connecting tips by a single touch. Release by pressing a small knob and the tips slide out easily without pulling the electrical contacts.



For one pair phones $1.00
For two pair phones $1.50

Bull Dog Grip
The COMSCO AUTOMATIC BULL DOG GRIP PLUG saves you from short circuits and battery kicks. No more burned-out phones or ruined transformers. No more broken finger nails.

FOR SALE AT YOUR DEALER
Otherwise send purchase price direct to us and you will be supplied

GENERAL INSTRUMENT CORP.

123 Liberty Street
NEW YORK CITY

HOLDS BRIGHT HOPE FOR RADIO IN 1924

DEALERS "TICKLED" OVER YEAR'S PROSPECTS

Farmers Swell Sales; Interest Grows Rapidly as Industry Becomes Steadier

By Carl H. Butman

WASHINGTON.—A good Radio year is in prospect according to Chief Radio Supervisor W. D. Terrell who has just returned to his office in Washington after a tour of all the Radio districts of the country. Today very little interference is reported from amateurs during the silent evening periods. Sales are now much better than was anticipated by forecasters of this business a few months ago. Dealers with whom he talked during his trip find it difficult to keep enough stock to meet the demand. Everyone connected with the industry with whom he came into contact is "tickled to death" with the prospects of continued good business.

Farmers Taking Hold of Service

Reports from Radio sales agents state that in many districts farmers are coming to town from near and far to buy themselves receiving sets. In some sections of the country practically all farmers living at considerable distances from news and market centers, already have or are buying sets. Besides the practical value of weather, market and stock reports, it is pointed out that the farmers and suburban residents take great delight in the excellent evening entertainments broadcast daily by over 500 stations.

The growing general interest in broadcasting is reported healthy, both among the broadcasting station owners and the listeners in, due to the fact that the industry and art is getting on a stable basis. In general, Mr. Terrell believes that people have gotten to the point where they feel they cannot get along without Radio.

King of Greece May Talk from Troy, N. Y.

Royal Visitor Expected to Choose Farming as Topic

TROY, N. Y.—The King of Greece in all probability will visit Troy during his visit to America and speak from Station WHAZ at the Rensselaer Polytechnic Institute, which extended the invitation through Major C. D. Morris, Secretary of the Near East Relief Commission to Greece for the last year. Major Morris said:

"The king has indicated that he desires to make his trip to America a very quiet one, as he comes to observe and study farming in America. He will not permit any public receptions or public speeches. But I think he can be persuaded to make a Radio speech. As the king is an enthusiastic farmer he may choose to speak upon a subject connected with farming."

Navy Short 500 Operators

WASHINGTON.—Recent orders of the Naval Bureau of Navigation promoted sixty-seven Radiomen and established 210 men as Radiomen third class. Despite the appointments and promotions, there is still a shortage of approximately 500 operators in the navy sea and land service.

BROADCAST PROGRAM OF PEACE FROM WDAR

The eighth annual meeting of the American Council of the World Alliance for International Friendship was marked by a Radio session held at Station WDAR, Philadelphia, the first in the history of the world-peace movement. "Broadcasting a constructive program for peace" was the order of the day, and several nationally and internationally known men delivered such messages via the ether to a listening world. Among them were the New York philanthropist and statesman, Oscar S. Straus, seen above in front of the microphone, and Doctor Edward Cummings of Boston, general secretary of the World Peace Foundation, in the circle at the left

OFFICIALS MEET TO STANDARDIZE TUBES

Will Ask Manufacturers Criticisms of New Specifications

WASHINGTON. The first step toward standardizing Radio equipment purchased by several departments of the Government in considerable quantities annually, was taken recently when a conference of manufacturers and Government officials met to adopt for the Government a vacuum tube for reception.

The sub-committee on technical problems of the Inter-Departmental Radio Advisory Committee invited representatives of several large companies to meet with them in Washington to give them data and advice on receiving tubes. The technical sub-committee now has the information sought and will at once draw up specifications for a standard Government receiving tube.

Tentative specifications for a small, low-power-consuming tube will be sent to all manufacturers of Radio tubes for criticism and suggestions. Many tubes are purchased annually by the Navy, Signal Corps, Shipping Board, Post Office and Coast Guard, and a single standard tube is desired.

This first conference is the beginning of Government Radio standardization, it is understood. As soon as receiving tube specifications are adopted, the committee will take up transmitting tubes.

WTAM'S Lost Bureau Finds Brother for Fan

And Then Calls for Aid Become Too Numerous

CLEVELAND.—WTAM, broadcasting station of the Willard Storage Battery Company here, recently functioned as a local lost-and-found bureau. This was for one night only, however, as calls for help became too numerous.

Before the bureau ceased to operate, however, WTAM found H. P. Rudd in Cleveland for his brother in Toronto, Canada. Rudd was working in a local bank. A query was broadcast in answer to a telegram from the brother who knew Rudd was in Cleveland, but did not know where.

This encouraged others. A man called to tell WTAM he had just lost a 350 bid in pinochle and another to say he had lost his home-brew recipe. Neither of these was found but a third man informed WTAM that he had just picked up a "kitty" worth $300. The previous owners of the "kitty" did not apply for it.

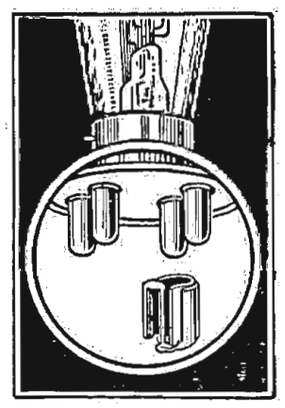
Radio in Australian Show

MELBOURNE.—Radio will be featured at the electrical exposition in the Australan capital next September. The electrical exhibition, under the auspices of the Victoria Electrical Federation, will be held in Melbourne.

FLASH!

Another tube gone—"B" battery wires crossed for only an instant. Radeco Fuses would have saved it—they are saving thousands of tubes for satisfied radio fans.

Read this letter



Radeco
Safety Fuses

may be attached in an instant to any standard tube going in any standard socket.

In ordering, specify type of tube used

Price 50c each
At your dealer's or by mail postpaid

Radio Equipment Co.
Dept. 6, 20 Stuart Street, Boston, Mass.
New England's Oldest Exclusive Radio House
DEALERS: Write for our proposition

1358 Washington Street,
West Newton, Mass.

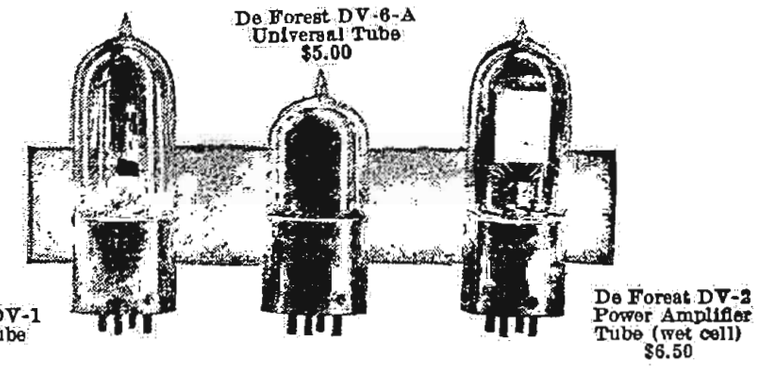
Radio Equipment Co.
20 Stuart Street, Boston.

Gentlemen:

I am writing to give you an experience which I recently had which may be of interest to you.

I am a Radio fan, and have experimented with many types of hook-up. I have also had the unfortunate experience of "blowing" several Radio tubes. Recently a friend of mine recommended your fuses, and I purchaaed three for my three-tube set which I am now using. Shortly after installing these fusea, in attempting to tighten a loose connection, my screwdriver accidentally touched the "B" battery lead. All three fuses were blown, and I realized that if it had not been for the Radeco Fuses I would have lost all the tubes in my set. I am inclosing herewith $3.00 for which please send me six fuses for UV201A tubes, as I do not wish to be without them. You are at liberty to use this letter in any way.

Very truly yours,
FRANK J. BODAY.



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

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

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

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

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

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

De Forest Radio Tel. & Tel. Co.
Dept. R. D. 4 Jersey City, N. J.

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

DE FOREST

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

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

LISTENING IN FROM WAY UP NORTH

By Vera Brady Shipman

Rain but no snow. Wild things seeking shelter from the whistling blast: the moon over the fringe of pines, framing its cold beauty.

I hear WOC telling of old folks listening in for the first time on brand new sets. A grandad in Jersey of 85, a grandma of 70-odd from Oshkosh, many of them sixty to eighty "years young," listening in for the first time.

WFAA of Dallas is playing "Gondoliers" of Nevin and I dream of gondola nights. The MacDowell sisters singing for a group of cowpunchers listening in at Wilson's Texas ranch. KFI of Los Angeles was playing Handel's "Largo" until Sweeney of Kansas City drowned it out. WHB was giving its second Sunday night concert at midnight. Their announcer was calling "'Look for the Happy Ending,' by the Sweeney School," and "'You Can't Make a Fool Out of Me' in the next number." You feel sure that even the chickens stay up late out West.

Mrs. MacDowell, wife of America's greatest composer, the late Edward MacDowell, broadcast a brief talk on Peterboro, New Hampshire, and its aim as a creative art colony, with a group of MacDowell piano compositions, from WMAQ, Chicago, lately.

Philip Warner played some excellent program choices from WJAZ the other night. After being "Rhapsodied" to death and "Nocturned" to sleep, "Golliwog's Cakewalk," by Debussy, and Carpenter's "American Tango" were refreshing. Two new stations heard on the air this week, WRM of Urbana, the University of Illinois, and WWAT of Joliet. The Rubini sisters entertaining from KDKA, and the Cornstalk Fiddle Band from WBAP, Fort Worth Star-Telegram, telling the world how Winslow, Arizona, Memphis and Pawtucket "likes 'em."

The Christmas message to MacMillan near the North Pole, with sister and nieces sending personal greetings over WJAZ, fills one with the sense of the infinite. How small we are when we can talk and be heard at the North Pole and at the Samoan Islands, 7,000 miles in the opposite direction, as WJAZ's official distance record shows!

Jazz from WCX, Detroit, Hawaiians from WMC, Memphis, and through it all, every half hour all day and all night, "The World Crier" of KYW, Chicago, tells the news which is fit to "air."

Darkness follows the moon shadows. A brush wolf cries afar. Night is silent in the woods.

Specialize in Research

MILWAUKEE, WIS.—The technical committee of the Milwaukee Radio Amateurs' Club, Inc., is no longer represented by one man investigating and reporting at meetings, but is now the society's largest committee and perhaps its most active. Typical reports now heard are "The Relative Efficiencies of Battery-Charger Rectifiers," by R. E. Lathrop, 9ATX, city, "An Amateur's Notion of the Heaviside Layer Theory," by M. H. Doll, 9ALR, West Allis, and "The Remote Control System at Station 9AAP" by M. F. Szukalski, Jr.

10-Watt Texas Station Pushes Way to Canada

WDAG Heard in Ontario over Single Tube Set

AMARILLO, TEX.—Station WDAG here, recently "pushed" music across the United States and into Canada, while broadcasting an experimental program on a power of ten watts. A. Laurance Martin, operator and owner of WDAG, received a letter from N. Etheridge, Brantford, Ontario, Canada, which stated that with a single tube receiver he picked up the fourteenth number on the WDAG program. The report states that the music was clear with little fading.

The transmitter at WDAG consists of four five-watt tubes in a Heising modified modulation circuit with .06 amperes in the plate circuit and .75 amperes in the antenna. The Western Stars Dance Orchestra under the direction of Joseph Goldforb gave the musical numbers that were heard in Canada.

WDAG wishes to learn the quality and intensity of its signals. A wave of 1,140 kilocycles frequency or 263 meters length is used.

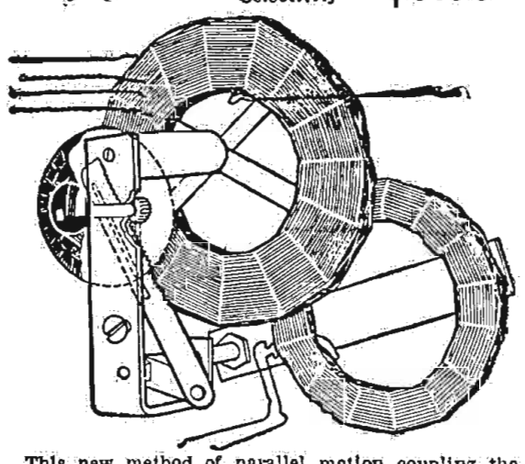
New Batteries from Santy Eliminate Station's Hum

CINCINNATI.—Great rejoicing attended the recent visit of Santa Claus at the Radio plant of the United States Playing Card Company, Cincinnati, when the white-whiskered competitor of the cough drop brothers arrived with a sackful of storage batteries to be used to furnish transmitting power for Station WSAI.

The batteries were first used in a test program on New Year's Eve and replaced two motor generator sets.

A receiving station set up at Port of Spain through the enterprise of the Trinidad Guardian is picking up news broadcasts in the United States.

TUNING UNIT
For any circuit
Pfanstiehl
A Marvel of Efficiency and Selectivity **$5.00**



This new method of parallel motion coupling the flat magnetic fields produced by these coils gives a much more efficient and smooth variation of mutual inductance than is possible with the old-fashioned variometer and variocoupler. Try this in your favorite circuit and hear stations you never heard before.

At all good dealers or direct on receipt of purchase price.

PFANSTIEHL RADIO SERVICE CO.
Highland Park, Ill.

LATEST, MOST EFFECTIVE RADIO "A" BATTERY

SEND TODAY

Solid Rubber Box furnished either with strap or side handles.

6 Volts
80 Amperes

Sahara Storage Battery—It's Dry

Think of its advantages. There is no liquid acid to spill and ruin floors, rugs or creep up posts and ruin clothes—ideal for portable sets. Recharges quickly—easily—and cannot be harmed either by overcharging or drawing down too far.

These exclusive features are what you want. We guarantee them. It is not a gelatin battery. It's dry and "chock full" of pep and life. Be the first in your town to have one of these remarkable batteries.

Order Today—*Send no Money*

We ship C.O.D., subject to your inspection, carrying charges to be paid by you. The price is $25 if you order at once. Shipments made same day order is received. Remember there is no liquid—It's Dry. Orders are coming in fast. Get yours in today.

SAHARA DRY BATTERY CO.
Dept. B, PAWTUCKET, R. I.

DEALERS: There is a big business for you if you show this battery now. Send for discounts and get exclusive rights in your territory.

CRL Potentiometers

No. 110 (400 ohms) . . $1.75
No. 111 (2000 ohms). 2.00
By Parcel Post 10c extra

You'll find these instruments everywhere — the most popular devices of their kind.

Every CRL instrument is carefully tested before it leaves the factory and is fully guaranteed.

HOW TO PICK OUT A CRL NON-INDUCTIVE POTENTIOMETER

First, note the CRL trademark on the brass disc on which the contact shoe rides. You can see it thru the transparent cover. Turn the knob and note that the shoe does not rub on the resistor but simply presses the disc down to make contact.

This arrangement gives noiseless adjustment through an infinite number of steps, and frees the resistor from all wear.

The resistor itself is a thin strip of graphite which is absolutely non-inductive. This permits the free passage of the delicate high frequency current of the received signal and so does not damp the regenerative oscillations as does a wire-bound potentiometer with its unavoidable inductance.

This instrument, together with a CRL Adjustable Grid Leak, which has replaced thousands of the uncertain pencil mark types, gives you complete control over two of the most important elements in your set, the plate potential and the grid bias.

CENTRAL RADIO LABORATORIES
312 16th Street MILWAUKEE, WISCONSIN

SUPER VALUES
REINARTZ CIRCUIT COMPLETE

	List Price	OUR Price
Genuine Reinartz Coil endorsed by John L. Reinartz and bearing his signature. The only genuine coil for this circuit on the market. All others are imitations	$ 2.50	$2.00
One 7x10x3/16 Radion Panel	1.25	1.00
National Bakelite Socket	1.00	.40
Kiesner Vernier Rheostat with Dial	1.50	1.00
Two 23-Plate Variable Condensers at $3.00 each	6.00	3.00
Switch Points and Nuts	.80	.40
Six Switch Stop Points and Nuts	.40	.20
Freshman Grid Leak and Condenser	1.00	.65
Seven Binding Posts	$ .70	$ .35
25 ft. Tined Bus Bar	.50	.30
3 Switch Levers with Knobs	.75	.35
One Baseboard for mounting	.75	.40
One Fixed Phone Condenser	.40	.25
One Single Jack	1.00	.25
Blueprints with complete instructions for assembly and mounting	.50	.50
Regular Price	$19.05	
OUR PRICE		$11.05

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

FADA-HAZELTINE NEUTRODYNE PARTS for 4-Tube Fada Model 160; GENUINE PARTS, Complete. List Price, $64.00. OUR PRICE $50.15

ATLAS AMPLITONE LOUD SPEAKER. List Price, $25.00. OUR PRICE $19.50

CONDENSERS

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

AUDIO TRANSFORMERS

List Price		OUR Price
$4.50	All American, 3 to 1 Ratio	$3.95
4.75	All American, 5 to 1 Ratio	4.10
4.75	All American, 10 to 1 Ratio	4.10
7.00	Amertran	5.55
7.00	Federal No. 65	5.55
$3.25	Star, 3 to 1 Ratio	$2.70
3.75	Star, 6 to 1 Ratio	2.95
5.50	Jefferson, 6 to 1 Ratio	4.40
4.25	Jefferson, 3.75 to 1 Ratio	3.40
7.00	Jefferson, 3.1 to 1 Ratio	5.55

WE GIVE A 20% DISCOUNT
On All Standard Radio Apparatus Not Listed Above
Write for Our Catalog B

ALL MAIL ORDERS SHIPPED PROMPTLY. SEND MONEY ORDER, INCLUDING POSTAGE.
The RADIO MAIL ORDER HOUSE—Known for Low Prices.

HANES-ZENER CO.
3 WEST 29TH STREET, NEW YORK CITY

Thrills from Radio

No. 10 of a Series Featuring Experiences of "ALL-AMERICAN" Users

Being Heard 4 Blocks Away

By U. Cuevas, Cuevas, Miss.

"I am using a 10 to 1 and a 3 to 1 'All-American' Audio Frequency Transformer in an all-wave receiver.

"Must say they are the best I have ever used. Using only two 'B' Batteries and a Magnavox, the set is being heard about four blocks away."

Without distortion, "All-Americans" bring in distant and nearby stations with volume and tone-quality that mean real thrills.

All-American Audio Frequency Transformers come in three ratios: 3:1, 5:1, 10:1.

They are the best known, most widely used transformers on the market. Standard equipment on the better sets. Why experiment? Over 500,000 radio enthusiasts, like Mr. Cuevas, have already proved "All-Americans" best.

SPECIAL OFFER

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

All the better dealers sell "ALL-AMERICAN"

RAULAND MFG. CO., 200 N. Jefferson St., CHICAGO
PIONEERS IN THE INDUSTRY

AUDIO AND RADIO FREQUENCY — POWER AMPLIFYING INPUT AND OUTPUT

ALL-AMERICAN
AMPLIFYING TRANSFORMERS
Largest Selling Transformers in the World

Further Details of the Famous Miloplex Hook-Up

Part XV—New Loop Circuits Promised

By the Mystery Man

QUITE some little circuit, said the first fan in with a letter after putting that honeycomb or loop trick together, but, man, where did I get such a crazy name for it? And the answer is, I guessed it; you know it's a good deal like trying to figure out why they ever named a kid Reginald. No, that hain't the answer; the real truth is I think this comedian "Pullwitt" had a long name with a kick like a forty-five in it, but getting him to open up conversation is about as hard as trying to get a chicken to kick dust in the bad man's eyes. You know what I mean, or as Maggie says, "It's all a matter of 'form.'" One very clever fellow shot me an idea for this or any other circuit which should work out nicely. You know, in place of swinging the tickler coil away from the main inductance in a horizontal plane—much as they now do with honeycomb mountings—he suggests rotating the tickler through a 90 or even 180° angle. Not so bad; in fact a real idea, and I'm just wondering why someone doesn't put such a trick on the market. I'd buy and so would you. Well, I should worry—I, a variometer hound—but I'd buy anyway. I had a lot to say about this new circuit, but my mail on the King is piling up, so think I better go over it again in detail than asking and answering many of your letter questions. No, certainly I am going to answer your stamped envelope letter (I did yours, didn't I); but here goes for the crowd.

First, you fellows that are using 43-plate condensers in your aerials, now that you have cut them down to single wire 100 footers, you can use an 11-plate and tune much sharper. No, I'm not changing my mind; I wanted to say 11-plate in the first Wizard, but realized it wouldn't handle big uncalled for aerials, and when you're writing for 130,000 customers you have to get them—their aerials—corrected first. Atta boy!

Once more, let the King hum! It will practically all leave when your station comes in. Remember now. And of course you don't hear it when your tubes are turned down; you can't, boy, when the baby isn't "osculatin'."

And now, why, oh, man, why keep telling me you are using a dandy variable condenser with a vernier plate. I still don't know why they build them and wonder if they know. Besides, the King just can't use them; he uses entirely too much Radio frequency to take any chances. Adjustments? Both the variable grid leak and potentiometer need watching. I'll say they do.

You know, the only reason I gave you the Wizard or Miloplex I was to show you a real simple little fellow that would talk for anyone and make someone sit up and take notice. Nearly 1,400 satisfied fan-friends have written saying it's the "flea's pajamas."

All right; then I sprung the King for the lads who wanted a regular "he" single tube circuit, but, listen: I very definitely stated it was for the advanced experimenter, not the fellow who was building his first, second or seventh. But, by golly, outside of the 1,400 Wizard fans, every one seemed to be an advanced experimenter.

It can't be done—stick to the Wizard until you and "Raydeo" are better acquainted. It's a bear cat, but when you start building circuits that possibly have a chunk of super and heterodyning in them, you must know—well, I have 17 real honest-to-the-maker-of-the-universe engineers guessing. So you stick to circuit one this wonderful Radio winter.

And to try and help those of you who have landlords that think an antenna is an invitation to a fire, I have opened up on loop circuits—yes, new ones. You know, a loop can be made to "loop-the-loop" for some distance if you give it a chance.

You fellows who messed around with the Xmas circuit now know that.

Maggie—I'm almost going to call her "sweetie," 'cause she gave me a standardized Xmas present, certainly a standardized Xmas present for a man is a box of City Hall specials or a necktie—I drew a necktie, one of those that say "I hope you choke" kind; well, no matter, Maggie desires that I inform each of you that the postal cards are coming in nicely.

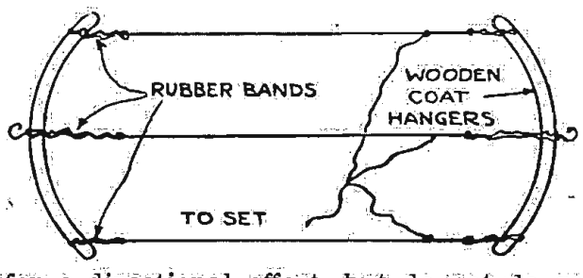
Where do I get these new circuits? Howler brings them in. No, that hain't the answer. The real answer is an 8 by 10 room with the door locked and Maggie knocking, about 2:30 a. m., to announce, "You must quit or I'll cut your ground wire"—you know what I mean.

They are 99.2 perspiration and .8 inspiration—which spells—work—work—work.

(TO BE CONTINUED.)

Directional Aerial

Many Radiophans would like to try placing the aerial in different directions



for a directional effect, but do not do so because aerials are difficult to construct. In the illustration is shown an aerial construction that can be easily shifted from one direction to another. It is made of coat hangers for spreaders. These may be hooked onto insulators held by posts set at convenient positions.—James A. Miller, Grand Rapids, Mich.

RADIO PANELS

Cut exactly to size and a guaranteed 12 hour shipment. ¼" thick .01½c per square inch, 3/16" thick .01¼c. Made of the highest grade black fibre. This material possesses electrical strength of 200 volts per mil, is inexpensive, unbreakable, easy to work and takes a fine finish. We pay postage.

RADIO INSTRUMENT AND PANEL CO.
564 West Monroe Street Chicago, Illinois

TUBES $5.43

Genuine R. C. A. Radiotrons
UV199, UV201A, WD11, WD12
Guaranteed Firsts in Original Packages

Brandes "Superior" Phones	$4.76
Brandes "Table Talker"	8.12
Bremer Tully Vernier Tuner	3.96
3-Amp. Tungar Type Battery Charger	9.38
"Erla" Reflex or Audio Transformers	3.96
All American Transformers (All ratios)	3.82
"Pacent" New Style Phones	3.12
"Como" Push-Pull Transformers (pr.)	9.87
0 to 50 Pocket Volt-Meter	1.12
"Gold Seal" Homecharger	14.79
Acme Audio Transformers	3.97
23-Plt. Vernier Condenser, Knob and Dial	2.13
23-Plt. Variable Condenser	1.14

Include postage.—Send for complete list.
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Add to Your Radio Pleasure by Keeping Permanent Radio Records

WHERE I GO BY RADIO

New record book makes keeping records easy. Every line complete record. Among special features accurate list stations to November 15th. Just what you want and need.

Popular edition, each copy space for 300 records, 2 copies, $1.00; Holiday Gift Edition, more attractive, 700 records, only $1.00.

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STA-RITE AutoRadio BATTERIES SAVE YOU 50%

This large saving is made possible by coming direct to you, instead of going thru Jobbers, Distributors, Branch Houses, Dealers, Salesmen etc. Sta-Rite Batteries are guaranteed for 2 yrs. in writing and are made by one of the Largest batteries factories in the Country, and who have been building batteries for over 8 years.

TRY TO BEAT THESE PRICES

AUTOMOBILE BATTERIES

6 Volt, 11 Plate, Ford, Chev. Hup. Buick Cleveland, Durant $11.50
6 Volt, 13 Plate, Overland, Nash, Buick, Reo, Page Hudson, Studebaker, Essex, Willys etc. $13.25
12 Volt, 7 Plate, Maxwell, Dodge, Franklin, $16.00
OTHER SIZES ON REQUEST

RADIO BATTERIES

2 volt for W.D.11 & W.D.12 tubes run 300 hours on 1 charge $4.00
4 volt for U. V. 199 $7.55

6 volt 60 amp. hr.	$7.90
6 " 80 " "	8.85
6 " 100 " "	10.60
6 " 120 " "	12.10
6 " 150 " "	14.50

All batteries are fully guaranteed in writing and shipped subject to examination. Send 10 per cent. with order, balance on arrival. Deduct 5 per cent. if full cash accompanies order. Shipped same day order received. Act now.

STA-RITE BATTERY CO., Louisville, Ky.

This Radio Catalogue FREE

Save 1/3 on Guaranteed Radio Equipment

Write us a post card—Address Dept. 41-R

and we will send you free this 52 page catalogue of radio sets and parts. It also contains explanation of radio terms, map and list of broadcasting stations and much radio information, including an explanation of successful hook-ups and circuits.

You will be amazed at the low prices Ward's quote. A complete tube set having a range of 500 miles and more, including tube, head set, batteries, and antenna equipment, as low as $23.50.

This catalogue contains everything for the expert and amateur. Complete sets and every improved part for building sets, all the most up-to-date devices—at the lowest possible prices.

Headquarters for Radio

Montgomery Ward & Co. is headquarters for Radio, selling everything direct by mail without the usual "Radio-profits." Why pay higher prices? Ward quality is the best and the prices will often save you one-third. Everything sold under our Fifty Year Old Guarantee—Your Money Back if You Are Not Satisfied. Write today for your copy of this complete 52-page Radio Book.

Write to our house nearest you
Address Dept. 41-R
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Established 1872
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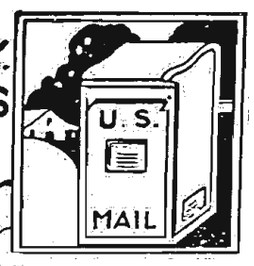
The Oldest Mail Order House is Today the Most Progressive

RADIO AT N.Y. PRICES via Daily Parcel Post



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These are very strong strain type Insulators.
D158 Moulded insulator shown above. Each.....10c; Dozen.....$1.10

JACKS AND PLUGS

Jacks are polished nickel constructed with pure silver contacts.
D118 One spring open circuit.....$ .39
D119 Two spring closed circuit..... .49
D120 Round plug as illustrated..... .49

DIETZEN SUPER HEAD SET

D181 2200 Ohms.....$2.95
Reg. Price, $5.00 per Pair.
Since we are wholesale distributors for this wonderful headset we pass this bargain on to you. The Tone quality is of unusual volume. These phones can be used as a loud speaker unit. Sold with a money back guarantee, if not satisfactory.

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Simplifies tuning. Eliminates interfering stations, thereby improving the selectivity of your set. Selects between conflicting stations. Special while quantity lasts.
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MISCELLANEOUS

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D164	Synthetic Crystal	.30
D165	Ground Clamps	.17
D166	Black Rubber Binding Posts	.05
D167	Nickel Plated Binding Posts, 2 for	.05
D168	No. 18 Annunciator Wire, half lb. coil	.39
D169	6 ft. Phone Cord with Tips	.79
D170	20 ft. Extension Cord with Tips	1.95
D171	Wall Insulators, Porcelain	.05
D172	Tubular Porcelain, Lead-in Insulators, 6-in.	.10
D173	Reinartz Coil	1.45
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D175	2 in. Dial and Knob	.25
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D177	Switch Arm Tapered Knob	.19

Moulded Bakelite Variometer or Variocoupler

D79 Each $4.95. List.....$7.00
A high grade instrument. Takes in the wave lengths from 250 meters to 800 meters. Table or Panel Mounting.

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D70 Tri-coil for 201A or 301A tubes $1.95
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D72 Erla AB1 ..... 3.75
D73 Erla AB2 ..... 3.75
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This attachment fits all phonographs; will take any headset. It converts your phonograph into a loud speaker.
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List price $8.00.

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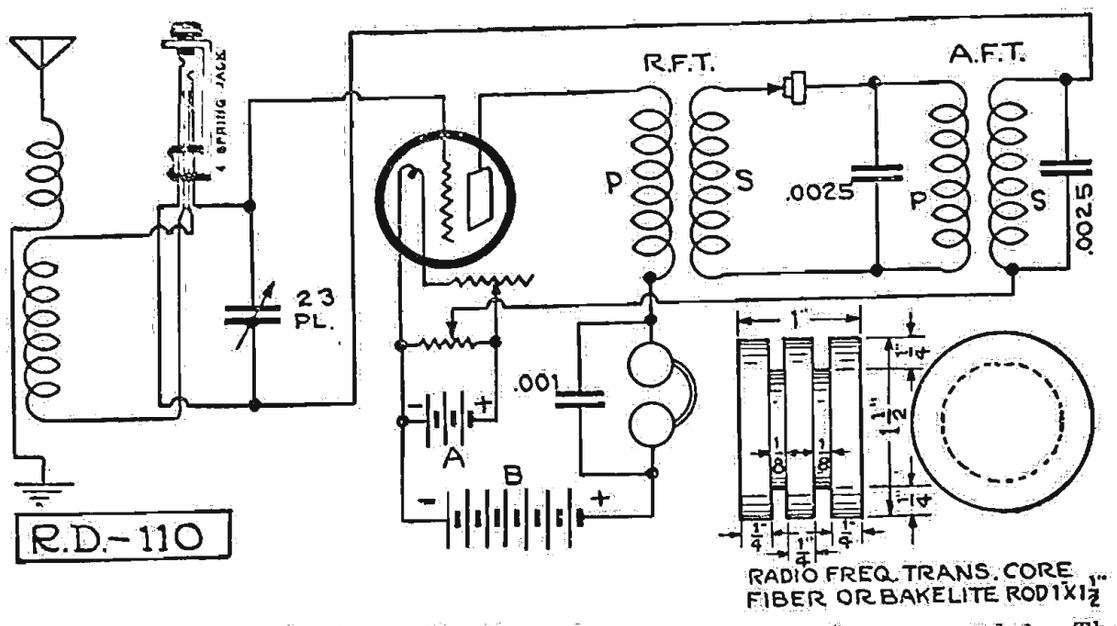
ELEVEN NEW YORK STORES

ONE TUBE REFLEX TYPE R. D.-110



HERE'S another circuit by Mr. Geo. C. Ellwood of San Jose, Calif. It is of the one tube reflex type, using a crystal detector. Mr. Ellwood constructed his own Radio frequency transformer. The core is detailed in the illustration. In one slot 175 turns of number 36 sc. or enameled wire forms the primary and the same amount of wire in the other slot forms the secondary. Mr. Ellwood uses the wire from a Ford coil for this purpose. The audio frequency transformer is of no special type but higher ratios than four to one are not recommended. The tuning unit consists of a fixed coupler with an 8-turn primary and 48-turn secondary, number 20 or number 22 double-covered wire wound on a 4-inch tube. The plate battery voltage can be varied from 45 to 90 volts for best results. For loop aerial work a four spring jack is added in the secondary circuit. The potential of the tube grid is taken care of by means of the potentiometer. The circuit is easily assembled and will give very good results.

Condenser Insulation

A small insulating bushing set in the metal end plates of a variable condenser causes a concentration of the electrostatic field, resulting in large losses. As a consequence such condensers work very poorly compared with those having a larger area of insulation.

Kinds of Aerials

A flat top aerial is an aerial that has more than one wire in it arranged so that it is parallel to the earth. The T aerial is the same type with the lead-in coming from the center. In the inverted L aerial, the lead-in comes from one end. The cage aerial is the type that has several wires arranged on hooks forming sort of a cage. The single wire aerial is as efficient as any when used for receiving only.

Voltage is the pressure behind electrical current. Amperage is the current.

BE MASTER OF YOUR RADIO—Avoid service charges—get the "Trouble Shooter." Explains noises, howls, rattles, dead circuits, weak signals; gives simple tests that locate trouble quickly any type receiver; trouble key answers hundreds questions; includes instructions for professional repairman; only one on market; NOT a dry treatise on theory of radio stale from age but a brand new system. You MUST have it. Send 50c to Radio Information Service, 909 21st Street, Galveston, Texas.

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Clearness
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These are only three features of the Bremer Tully Vernier tuner. In Chicago with four high power stations, outside stations can be brought in clear and loud eliminating local interference.
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Third edition now ready (free with each Tuner). Tells you why and shows you how. Ask your dealer today to see the B-T Vernier Tuner.
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The MAGNATRON DC-201A—newest of the Magnatrons. It excels in any circuit! The MAGNATRON DC-201A, like the MAGNATRON DC-199, has the all-moulded standard base without brass shell. This eliminates capacity effects.
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This pioneer radio arrester is backed by 31 years' experience in lightning arrester design.
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Genuine Supertrons will make your set work better. These tubes oscillate in all circuits and amplify wonderfully.
Type WD12, Type UV199 and Type UV201A, each a genuine tested Supertron.
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This is a one-tube set, complete with drilled panel, that operates a loud speaker. The tube, batteries, phones and all are included..... $29.75

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These variometers are moulded of an excellent compound that is leak proof and that is not affected by moisture. Pigtail connections are provided.
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These are GENUINE NEUTRODYNE PARTS licensed under HAZELTINE PATENTS. Beware of unlicensed parts!
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2 Star Transformers
1 Single Closed Jack
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2 .006 Westinghouse Fixed
1 .00025 Mica with Grid Leak
3 Shacton Dials
3 23 pl. Brunswick Variables
Look over this list of parts. Compare it with others. Then you will realize what a special price this is.
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A very sensitive well made headset. These phones are easily worth more than the special price of..... $2.95

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22½ VARIABLE
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STAR AUDIO TRANSFORMERS
The Star Audio Frequency Transformer will make your amplifier deliver real results. Plenty of volume and no distortion. You can use a Star in each stage without fear of howling.
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Fans Should Know International Morse Code

System Is Simple and Easily Learned

By R. H. Allison

PRACTICALLY every owner of a receiving set has a desire to know the meaning of those dots and dashes that he hears so often on the air. The genuine Radiophan is not satisfied until he can read the continental Morse code.

The student of Radio code grows impatient and wonders how anyone can be so stupid. He is too harsh with himself.

Even when the student has progressed more or less steadily and is almost fast enough to secure a commercial license, his mind seems to make no progress for weeks and even months at a time. Some students quit in disgust at such a time, little knowing that success waits just around the corner and that their minds have been working faithfully all the while.

How Speed Comes

Success does not come by speeding up the progress of copying down the letters as they are sent, but by forming new habits of hearing entire words and even phrases without paying specific attention to individual letters which form them.

The Radio code is similar to a foreign language. No one could speak a language fluently if he stopped to spell each word to himself, no matter how fast his mind might work. He must think in phrases that he has often heard. His mind forms them almost automatically. The operator who copies 35 to 40 words a minute usually is under less strain than the beginner who copies 6 or 8 words per minute. His mind doesn't work any faster than the mind of the beginner, but merely works with fewer acts. He thinks in words or sentences, and not letters.

Good Operator at Ease

An experienced operator sits at his typewriter copying an important message, perhaps involving hundreds of thousands of dollars. He changes blanks in his machine. He even tells a joke to another operator beside him and maintains his normal rate of speed. He is at ease, and has none of the worries of the beginner who strains to catch every letter separately as it comes to him.

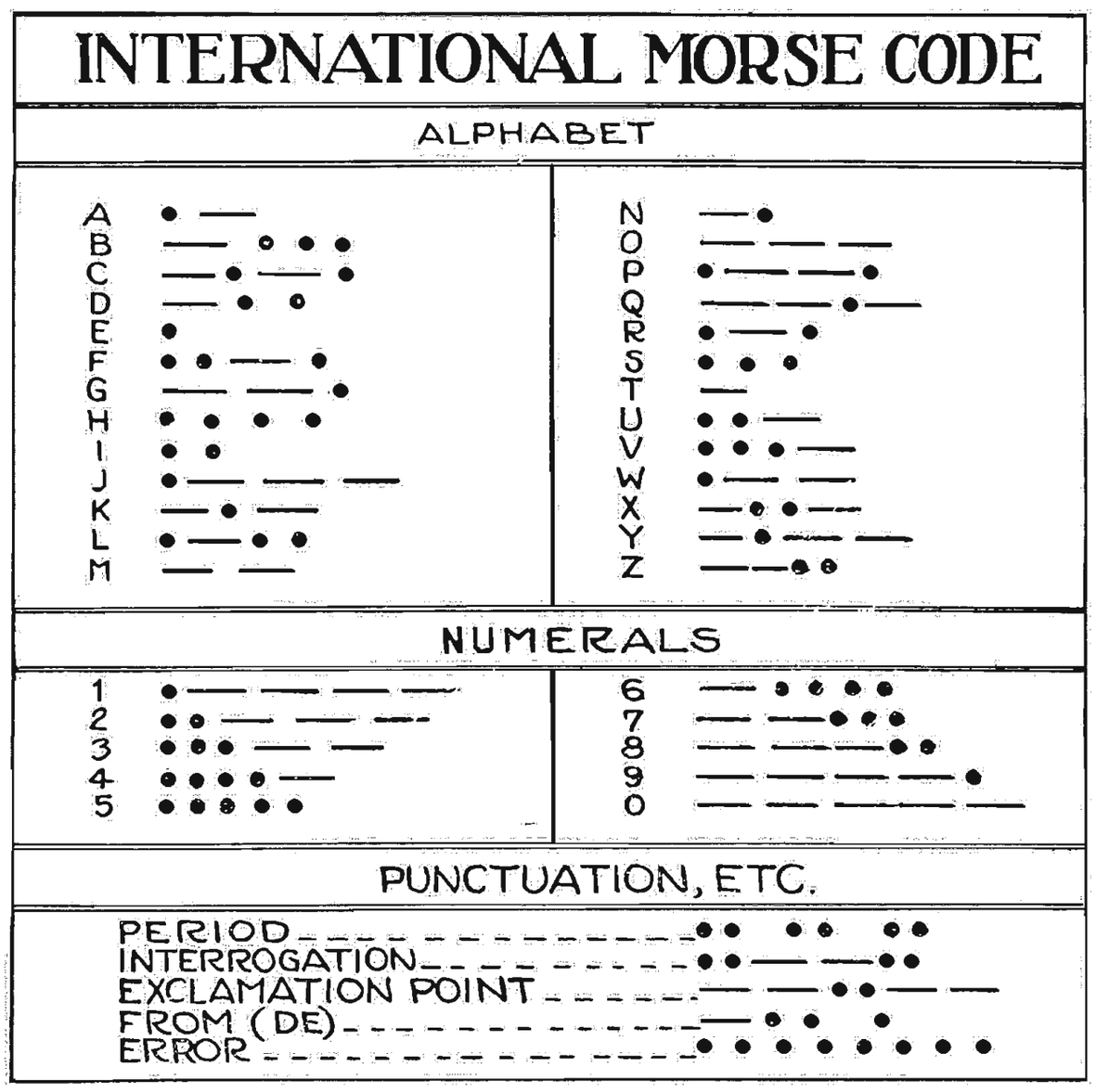
But he, too, was a beginner once and he strained his mind before he learned the better way. The majority of schools prefer that the students learn the letters by sound only and never allow them to look at charts which show the dots and dashes used for each letter. The sense of hearing is the one most concerned and must be developed. Not all minds are alike, however, in their process of learning. The mind with the strongest visual memory makes the best progress at the start by looking at the chart, but such a mind must listen to the buzzer for the auditory sensation of the letter and refer to his visual memory to identify the letter on the chart.

The visual process is a roundabout way and must soon be discarded for the simpler system of auditory memory. The beginner with a keen visual memory sometimes startles his friends with his rapid start. But his friends soon overtake him. You must bear in mind that learning the code is a true art which has few short cuts.

Learning the code is much like solving a puzzle. It's easy enough once you get the proper start.

How Code Impresses Mind

As the buzzes come to the ear in a complex maze, at first the mind strains and can make nothing out of the confusion, no matter how slow the signals are made, until suddenly some feature catches his ear and helps fix the signal in his mind. As a rule the single dash for T and the single dot for E are the first letters distinguished. Then dot letters, such as S, H, etc., and the other combinations of dots and dashes come more slowly. He must not be discouraged if his pencil stands still when the buzzer sounds the letter F to him, even though he knows a second later that it was F.



If the mind is kept continually open and sensitive to the signals, it will after a time eliminate errors and discover short cuts. During the process of learning the code, there are dull days, weeks and even months in which the student seems to make no progress at all. The period most noticeable comes usually about the fourth or fifth month.

Mind Gets Fresh Start

To progress from this stage it is not necessary to increase the speed of receiving letters, but to learn new habits of hearing words and even sentences in their entirety. Such new habits can come only from continued practice; while the mind seemingly has gone stale, in reality it is unconsciously getting a fresh start in a new direction.

Students should not become discouraged, because it comes to all beginners regardless of their ability. The student should by all means learn to "copy behind"; that is, write down the words several seconds after they are sent. This is the only safe method, for if he tries to keep up with the buzzes he is apt to anticipate what is coming; i.e., on hearing the first part of a familiar word, write the whole word out, thus making mistakes. There are twice as many breaks caused by "copying ahead of the sender" as by copying four to six words behind. To shift from copying letters to words often stumps the student and he is sure to miss many words.

Receiving Words Instead of Letters

He should realize that he is starting all

(Continued on page 14.)

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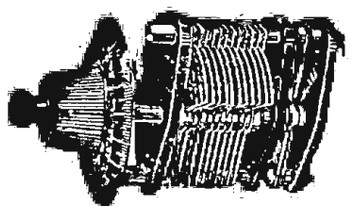

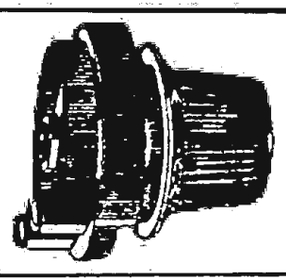

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3 Plate Variable; value, $1.75	$1.05
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17 Plate Variable; value, $3.50	1.85
23 Plate Variable; value, $3.50	1.35
43 Plate Variable; value, $4.50	1.95
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23 Plate VERNIER; value, $6.00	4.00
43 Plate VERNIER; value, $6.50	4.25

BEST QUALITY JACKS, Single Circuit; value, 65c; special at	$ .30
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MULTIPLE POINT INDUCTANCE SWITCH with Knob and Dial (15 Switch Points)	$1.25
LIGHTNING ARRESTERS approved by underwriters	$ .90
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GALAXY OF ATTRACTIONS MA

The Week's Headliners on the Air

MOVIE fans can hear Charles Ray Tuesday night at WEAF. Wednesday all Rotarians are promised a treat from WLAG when the Minneapolis Rotary Club will give the feature of the year. Thursday if you like Russian music listen in to David Yaroslavsky at WJZ.

Let me attract you to two WJY features Friday, the Radio travelogue by Wirt Barnitz, and Negro Plantation Songs and Melodies by Marshal Bartholomew. For those who do not dance, the lecture Saturday night on "Modern History Comments," by George S. Thomas from WFAA may be interesting. Sunday WJAZ is giving some particularly fine programs of operatic music, and Monday WHAZ will give a midnight s ow with the Rensselaer Polytechnic Institute Students' Symphony Orchestra and Glee Clubs.

—THE PROGRAM LADY.

Above is presented John D. Wells, well-known author and conductor of the Buffalo Times' column "From Grave to Gay." He is not unfamiliar to Radiophans and those who have not heard him may do so by tuning in WGR. Judith Roth, at the right, is featured weekly by WHN in popular numbers.

Station WOC, Davenport, Iowa, "Where the Wes Begins," boasts a splendid pipe organ installed ex pressly for broadcasting. The gentleman seated a the console (the pipes are concealed overhead) i the famous concert organist, Mr. Clarence, who performances are real treats. Hear him in recit at 8:00 p. m., Sunday, January 13. In the circle i Mme. Louise Homer as "Delilah" in the oper "Samson and Delilah," to be broadcast from one o the Chicago stations this week.

Tuesday, January 8

CKAC, Montreal, Que., Canada (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel Concert Orchestra; 4:00, Musical tea; 7:00, Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Concert Orchestra; 8:30-9:15, Studio entertainment; 10:30-11:30, Joseph C. Smith and his Mt. Royal Hotel Dance Orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Fort Pitt Hotel Orchestra; 7:45, Children's period; 8:15, Address, Dr. John R. Ewers, pastor; 8:30, Allegro Mandolin Sextet, Percy Lichtenfels, conductor; William Kottman, tenor; Ira Keefer, reader; 11:30, Special Late Evening Concert, Queen City Orchestra.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., California Federation of Music Clubs concert; 10:00-11:00, Special moving picture talent program.

KFKX, Hastings, Nebraska (Central, 283), See program for KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Talk by Jeannette P. Cramer, Home Economics Editor of the Oregonian; 8:30 Talk for Farmers, from Extension service, Oregon Agricultural College; 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's Hour, presenting Dorothy Bartosch, reader, 10 years, Helen Rockwell, pianist; Doris Green, pianist; 8:00-10:00, De Luxe program; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-10:00 p. m., Glee Club of the Olympic Club; 10:00-11:00, Palace Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Studio recital, Marion Niedringhaus, baritone; Mrs. Alden Kimball, pianist; Address, H. G. Bristow; 11:30, program.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 2:35 p. m., Studio program; 6:50, Children's bedtime story.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert; 9:30-10:45, Concert, Virginia Jackson, director.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., "Making Better Farm Homes," Prof. Lucile W. Reynolds; 7:30, Twilight tales for the kiddies; "What Education and Training Can Do for Better Homes," Agnes H. Craig; 8:00, Concert, Harold Corbett, baritone; Miss Rogers, pianist; Mrs. Berwick, violinist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Erma Blaiue McKendry, reader; Rosemary Hughes, soprano; Frederick W. Agard and Bob Cougle; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Orchestra; 2:00-3:00 p. m., Arcadia Cafe Orchestra; 7:30, Dream Daddy with boys and girls; 7:45, Dramatic review, Arnold Abbott.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Address, DeWitt McMurray; 8:30-9:30, Musical recital, Mozart Choral Club, Earle D. Behrends, director; 11:00-12:00, Reuben Davies Club.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The American Hostess—Her Dinners," Mrs. C. H. Pearce; 7:45, Operetta, "The Bo'sn's Bride." WGY Light Opera Company; "A Few Moments with New Books," L. L. Hopkins; WGY Augmented Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks;" Strand Theater Orchestra; Alamo Theater organ; 7:30-9:00, Al Gorman's Novelty Orchestra; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:30 p. m., Will Tyler's Orchestra; 4:45-5:15, Cosmopolitan Singers; 9:30-10:00, Ben Le Vitz and His Orchestra; 10:15-10:30, Hon. Milton W. Sutton of Natl. Security League; 10:30-10:45, Avy La Skere, double voiced singer; 10:45-11:15, Shapiro Bernstein Music Co.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Concert program arranged by the Cleveland News-Leader; Bedtime story by E. G. Johnson; Popular dance program, Joe Smith-Martha Lee Club Orchestra; Vocal solos, Miss Irene Stanley.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m., 2 a. m., Signe Anderson, soprano; Leona Jordan, guitarist; John Logan, pianist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., Charles Wold, musical glass player; 7:45, "Etiquette," a Doubleday Page talk; 8:15, Charles Wold; 8:45, Samuel S. Aronson, pianist; 9:00, "Opera," Isabel Fosta; 9:15, Samuel S. Aronson, pianist.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Afternoon Auditorium Concert; Wanamaker Auditorium; 4:00, Harper's Bazar Fashions; 4:15, Harriet Youngs, soprano; Madeline Marshall, pianist; 7:00, Supper music, Paul Specht and his Alamac Hotel Orchestra; 8:00, "Alexander Hamilton," William E. Martin; 8:15, Fourth American Orchestral Society Concert; 10:30, Dance program, Hotel Astor Grill Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Florence Burton of the League of Women Voters; 2:35, Musical program; 4:00, Short story; 5:30, Children's hour, Antoinette Zwinggi, story teller; 6:00, Sport review, George Barton; 7:30, Farm lecture program; 10:15, Test concert with the New York Evening World.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Current topics for women; 10:00, Indra Consistory Choir, J. Lincoln Newhall, conductor; Carl Hugo Grimm, pianist; 11:00, Special popular program.

WMAQ, Chicago, Ill. (Central, 447.5), 7:45 p. m., Opera.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Charlie McCauley, director; 11:00, Special midnight frolic.

WDAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Jaffy's Music Masters; 9:00, Program, by Woodmen of the World.

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

WDR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Marguerite Cortwright, soprano; 2:45-3:00, Dorothy Drumon, pianist; 3:00-3:15, Mrs. Mary Austin, lecturer—"The Indian Question;" 3:30-3:45, Marguerite Cortwright; 3:45-4:00, Dorothy Drumon, pianist; 6:15-6:30, Halsey Miller and His Orchestra; 6:30-6:45, Man in the Moon Stories; 7:00-7:15, Halsey Miller and His Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 9:45, "Ironing Day" special program, Fred Shaw; 3:00 p. m., Detroit News Orchestra; 7:00, Detroit News Orchestra; Charlotte Myers, soprano; Program, Chamber Music Society.

Wednesday, January 9

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel concert orchestra; 4:30, Musical tea.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:30, Pittsburgh Athletic Association Orchestra; 7:45, Children's period; 8:15, Address; 8:30, Concert, artists from studio of Chester C. Humphreys, Irene Jones, soprano; Mrs. Harold Tonor, contralto; Walter Stroud, tenor; J. Herbert Pearson, baritone; Margaret Gunderman, accompanist; Ralph Lowmiller, trombonist.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "How to Prepare for One's Vocation," Dr. D. W. Hamilton; Guitar solos, Ray Kromer; Frederica Kershaw, pianist; "Danger of Untested Seeds," by Dr. Hanna Aase; "Marketing," E. F. Dummeier.

KFI, Los Angeles, Calif., (Pacific, 459), 6:45-7:30 p. m., Nick Harris detective stories and concert; 10:00-11:00, Hollywoodland Community Orchestra dance music.

KFKX, Hastings, Nebraska (Central, 283), Re-broadcasts program of KDKA.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Program, Abergh's concert ensemble, Arne Arnesen, violinist; 11:00, Hotel Statler dance music, Rodemich's orchestra.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Children's programme, music and story; 8:00 p. m., Orchestra concert; 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra, Isabella Needham Kidd, mezzo-soprano.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Hazel Hoffman, soprano; 8:00-10:00, Program presented by Pasadena, Calif., Lodge of B. P. O. Elks.; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-9:00 p. m., Verne Kelsey, pianist; Mrs. Samuel F. Reed, violinist; Melva Farwell, flutist; Frank Miller, baritone; 5:30, Children's half hour; 9:00-10:00, Palace Hotel Dance Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:58, Adalia Nomar, soprano; Edna Cunningham, soprano; Sallie Menkes, accompanist; Horace Gray, baritone; The Mariners (orchestra); 9:05, Reviews of the latest books, Llewellyn Jones; 10:00-12:30 a. m., Midnight Revue: Wendell W. Hall, KYW's music maker; Herbie Mintz; "Our Sallie" Menkes, accompanist; 11:00, Program, McVicker's Theater, W. Remington Welch, organist; 12:00, Clyde Doerr's orchestra.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Mrs. Pearl C. Davis, director; 9:30-10:45, Concert, George Freeman's Texas Hotel Orchestra.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, Humorous program; 7:30, Twilight tales for the kiddies: "The Importance of Cleanliness in Caring for Chicks," Joseph H. Bodwell; Story for grown-ups, WBZ Quintette, Mrs. Antha Munsell Root, soprano.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Program, John Loring Cook; Jack Chapman's orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Orchestra; piano solos, Edna Finestone; 2:00-3:00 p. m., Concert, Arcadia Cafe Orchestra; 4:30, "Care of Children," Mrs. Louis Love; 5:15, Versatile Serenaders; 7:30, Dream Daddy with boys and girls; 7:45, Dramatic review, Arnold Abbott.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "Self Help in Education," J. O. Mahoney.

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

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra: "Just Among Home Folks;" Walnut Theater Orchestra; Dancing lesson No. 6, especially prepared for WHAS by Arthur Murray, Marguerietta A. King, pianist; 7:30-9:00, Concert, auspices of Mr. John E. Harmon, Jr.; Barney Rapps Orchestra.

WHN, New York, N. Y. (Eastern, 360), 2:30-3:15 p. m., Sam Wooding's Creole Syncopators; 3:45-4:30, Jimmy Clarke's White Way Entertainers; 7:30-8:00, Clover Gardens Orchestra; 8:15-8:45, Music Students League; 9:30-10:00, Kew Gardens Society Orchestra; 11:30-12:00, S. Jay Kaufman and His Celebrities.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Jerry Kutak, pianist; 3:15, John Marshall, baritone; 4:30, Tea concert, Hotel Commodore Orchestra; 7:00, "When the Land Ran Away," Shadowland Story, Florence S. Vincent; 7:30, Irving Selzer and his Cafe Boulevard Orchestra dance program; 7:45, "The Progress of the World," a Review of Reviews talk; 8:00, Irving Selzer and his Cafe Boulevard Orchestra; 8:30, "City Official Series of Talks," Honorable Alfred A. Taylor, Commissioner of the Dept. of Street Cleaning of the City of New York; 8:45, The Phoenix Male Quartette; 9:00, "Olives and Oils, the Health and Pleasure of Them," Anne Lewis Pierce; 9:15, United States Army Night program, Speech, Brigadier General Amos Fries, Chief of the Chemical Warfare Service; Music, 16th Infantry Band.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Esther Whitington, soprano; Banjo James, banjoist; Fred Langley, cellist; Oriole Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Women's Club; 2:35, Daylight concert; 4:00, Short story; 5:30, Children's hour, Mrs. Robert Cargill, atory teller; 6:00, Sport hour; 8:15, Osborn's Minneapolis Athletic Club Orchestra; 9:30, Minneapolis Rotary Club program.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Program for shut-ins, Wurlitzer Concert Company, Macdowell and American composers; William Afspring, reader; Mrs. William Duning, pianist, Mrs. O. B. Kaiser, Mrs. C. A. Rehbun; 8:00, 10th Infantry Band, Ernest Fischer, director; Beatrice W. Chipman, singer; Schima Kaufman, violinist; Edwin Weldinger, singer.

WMAQ, Chicago, Ill. (Central, 447.5), 1:30 p. m., Chicago Association of Commerce Luncheon; 4:30, Cosmopolitan School of Music; 7:00, George Faulkner, story lady; 7:30, Weekly talk, Northwestern University; 9:15, Program, Thomas McBurney, director.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., Clyde G. Kern, lecturer; 6:30, Sandman's visit; 7:00, "The Value of the Pure Bred Sire," Adolph P. Arp; 8:00, Erwin Swindell, organist; Marguerite M. Kraemer, contralto; 10:00, Program, Howlette Sisters.

WOR, Newark, N. J. (Eastern, 405), 2:30-3:00 p. m., Margaret Lyman, cellist assisted by Ella Drews, contralto; 3:10-3:15, Etta V. Leighton, Secy. of Natl. Security League; 3:45-4:00, Fritzie Leighton & Co. popular songs; 6:15-6:30, Wm. Royal, tenor, formerly with Manhattan Opera Co.; 6:30-6:45, Albert E. Sonn; 6:45-7:00, Wm. Royal, tenor; 8:00-8:15, Gustao Ludenthal, M. E., builder of Hell Gate Bridge over East River will speak on "Fifty-ninth Street Bridge to New Jersey;" 8:30-9:15, Arthur Murray Dance Lessons; 9:15-9:30, Dramma Walters, prima donna, soprano of N. Y. Opera Guild; 9:45-10:00, Drama Walters, prima donna; 10:00-11:00, Dancing to Williams Orchestra of New York.

WDS, Jefferson City, Mo. ((Central, 440.9), 8:00 p. m., Dance program, S. C. Stancill's Novelty Six Orchestra.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Concert program by the WTAM Orchestra; Special numbers, Dorothy MacIntosh, soprano; Frank Hruby, saxophonist; Leigh Hunt, baritone; Ben Silverberg, violinist; Max Schmitt, cellist; A. Hruby, trumpeter; Marimba duet by Mr. and Mrs. A. D. Jagl, Miss Clara Sharp, pianist.

Thursday, January 10

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel concert orchestra; 4:00, Musical tea; 7:00, Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Orchestra; 8:30-9:15, Studio entertainment; 10:30-11:30, Joseph C. Smith and His Mt. Royal Hotel dance orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Fort Pitt orchestra; 7:30, Weekly Chat with Farmers, Frank E. Mullen; 7:45, Children's period; 8:15, Farm feature; 8:30, KDKA Little Symphony Orchestra; Mrs. Mable S. King, soprano; Mrs. Patti R. Bladridge, contralto; Bertram Webber, accompanist; 11:30, Special late evening concert.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Opera story and Y. M. C. A. program; 10:00-11:00, Vocal and instrumental program.

KFKX, Hastings, Nebraska (Central, 283), Re-broadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Woman's programme. Story reading; 8:00 p. m., Dramatic programme; 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra under direction of Herman Kenin; solos.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Doras Caulkins, pianist; Lilla Bone, pianist; 8:00-10:00, De Luxe Program; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-9:00 p. m., Harold Montague Schulteis, organist; 9:00-11:00, Max Bradfield's Band.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., St. Louis Symphony Orchestra, Rudolph Ganz, conductor; Michel Gusikoff, violinist.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 2:35 p. m., Studio program; 6:50, Children's bedtime story; 8:00-8.28, Twenty Minutes of Good Reading, Rev. C. J. Pernin; 8:30-9:30, Musical program, Bush Conservatory of Music.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert; 9:30-10:45, Concert, Fort Worth Euterpean Club.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., "Preparation of Federal Income Tax Returns," Thomas McCarry; 7:30, Twilight tales for the kiddies; Letter from the New England Homestead; 8:00, Charles H. Young, tenor; Mrs. Miriam M. Thomson, accompanist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Chicago Conservatory of Music; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Concert; 7:30, Dream Daddy with Boys and Girls.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Music, Red Head Girl; Talk on Lincoln, Judge J. C. Muse; 8:30-9:30, Gibson Mandolin and Guitar Club, Tom D. Collins, manager.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "Women as Jurors," Mrs. Edward E. Hale; 7:45, Paula E. Smith, pianist; Beatrice Zollinger, soprano; Paula E. Smith, pianist; Thomas F. O'Neill, violinist; Lorena A. Kehoe, contralto; Address, Leo M. Doody.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks;" Strand Theater Orchestra; 7:30-9:00, Concert, auspices, Carolin Chrisman; Four-minute digest of International Sunday School lesson; Four-minute Radio Forum Talk.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:00 p. m., Shapiro Bernstein Music Co.; 9:30-10:15, Lou Gold's Wigwam Orchestra; 10:15-10:45, Jerome H. Remick.

WJAX, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Phil Barker, "The Harry Lauder of Cleveland" in Scotch songs and ballads; "The Singing Sherwoods," Gale Sherwood, director; F. C. Lake, baritone; The Cleveland Music School Settlement Trio. Violin, piano, and cello, in popular selections.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Laura K. Elberg, pianist; Florence K. White, soprano; Richard Guderyahn, violinist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., Brooklyn Mark Strand Theater program.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Afternoon Auditorium concert, Wanamaker Auditorium; 4:00, Helen Eastman, soprano; Creighton Allen, accompanist; 4:45, Avy La Skere, double voice entertainer; 7:00, "Jack Rabbit Stories," David Corr; 7:30, David Yaroslavsky, operatic singer; 7:45, The World's Work; 8:00, David Yaroslavsky; 8:15, Organ recital, J. Thurston Noe; 9:00, Dinner of the Society of Automotive Engineers; 10:30, Dance program, Hotel Commodore Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Woman's Club, dancing lesson, Tess Cooperman; 2:35, Renning's Leamington Orchestra; 4:00, Short story; 5:30, Children's hour, Tess Cooperman, story teller; 6:00, Sport hour, Dr. J. S. Dick, Jr., "Dogs;" 6:15, Osborn's Minneapolis Athletic Club Orchestra; 7:30, Farm lecture program.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Piano solos, Adelaide Apfel; 10:00, Concert program, Crosley Radarians, Kathryn Reece, soprano; Garner Rowell, violinist; Jack Paton, cellist; Prewitt Williams, pianist; Leah Fred, soprano; Radario comedy in one act: "Between the Soup and the Savory;" Conservatory Trio; 11:00, Justin Huber dance orchestra.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., First of series of programs, Illinois Federation of Women's Clubs; 7:00, Weekly talk to Boy Scouts; Talk by Automobile Editor; "Rockford College," Katherine W. McCullough; 8:00, Opera.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Concert, Chisca Hotel Philharmonic Orchestra, Clara Ahern, director.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, "Song without Words," Mrs. Fritz Hansen, pianist; Orchestra, O Sol Mio, Melody in F, One Fleeting Hour, Romona Judson, pianist; Grayce Miller, clarinet; Edythe Miller, saxophonist; Chester Robertson, mandolin; Vocal Duets, A Restless Sea; Roses of Picardy, Edythe Miller, soprano; Glen Weldon, tenor; Male Quartet selections; A. R. Nieman, first tenor; N. S. Lawrence, second tenor; W. B. Gilkerson, baritone; R. W. Richardson, bass, vocal duet, Viola Cress and Opal Swailes, Piano duet Reading, "The Duel," Violet Farres, Talk on Magnolia, James C. Arnold; 9:00, Operatic program, Omaha Concert Mixed Quartet; Mr. Hobbs, Dodds; Mrs. Miller; Mrs. Wylie.

WDC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Cirrhosis of the Liver," Karl

S CURRENT WEEK'S PROGRAMS

Gail Sherwood (left) is the vivacious director of "The Singing Sherwoods," and she sang recently from WJAX on a program arranged by the Cleveland News-Leader. Above, Mrs. Frances Ford, director of the Wide Awake Club program, featured by WMAQ.

G. Stephan; 5:45, Chimes; 6:30, Sandman's visit; 8:00, P. S. C. Orchestra; V. B. Rochte, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Louise Machine, soprano; 2:45-3:00 Francis Mayer, violinist; 3:00-3:15 Louise Machine; 3:15-3:30, Francis Mayer, violinist; 3:30-3:45, Mrs. Henry Meskowitz of the U. S. Housing Committee, "Housing Conditions in the U. S."; 6:30-7:30, Tom Cooper's Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 3:00 p. m., Detroit News Orchestra; 7:00 p. m., Detroit News Orchestra; Elsie Bond, soprano; 10:00, Dance music, Jean Goldkette's orchestra.

Friday, January 11

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and His Mt. Royal Hotel Concert Orchestra; 4:00, Musical tea.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m.; Noon-day concert; 6:15, Organ recital, Lucile Hale; 7:15, Radio Boy Scout meeting, Richard Victor, Scoutmaster Troop No. 1; 7:45, Children's period; 8:15, Sunday School lesson for January 13, Dr. R. L. Lanning; 8:30, Girls' Glee Club.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Mrs. Ruth Bradley-Keiser, pianist; "Taxation," Dr. H. W. Cordell; Verle Keiser, tenor; "New Novels," Alice Lindsey Webb.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Wa-Wan Juniors concert; 10:00-11:00, Vocal and instrumental concert.

KFKX, Hastings, Nebraska (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Lecture by Margery Smith, Oregon Agricultural college extension service; 8:15, George Olsen's Metropolitan orchestra in studio programme; 9:00, Lecture, "Developmsnt of Oregon Resources," E. E. Faville, subject, "Marketing Agricultural Product"; 10:30, Hoot Owls with Pantages frolic.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Richard Headrich, screen juvenile; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, Program presenting Chorus of Broadway Department Store, Ruth Annette Sabel, director; 10:00-12:00, Art Hickman's Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 12:30 p. m., "The Progress of the World," Review of Reviews; 6:50, Children's bedtime story; 10:00-12:30 a. m. Midnight Revue: Wendell W. Hall, KYW's Music Maksr; Walter Wilson, Harry Davis, songsters; Herbie Mintz, pianist; R. D. Hinkle, singer; "Sen" Kaney, specialty act.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert Orchestra of the North Texas State Teachers' College; 9:30-10:45, Concert, College of Industrial Arts.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, "By Flashlight," Youth's Companion; 7:30, Twilight tales for the kiddies; Current Book Review, R. A. MacDonald; 7:50, Farmers' Period; 11:00, WBZ Quintette; Mrs. Cecelia Cox Denton, contralto.

WOAP, Chicago, Ill. (Central, 360), 10:00 p. m., Ebba Sundstrom, violinist; George R. Hill, Jr., Cambridge Sisters, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Concert Orchestra; piano solos, Edna Finestone; 10:00, Howard Lanin's Arcadia Cafe Dance Orchestra.

WFAA, Dallas, Texas (Central, 476), 12:00-1:00 p. m., Address, Dr. Robert Stuart Hyer; 8:30-9:30, Faculty recital, North Texas State Teachers' College.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The Woman Who Paints," Modern Priscilla; 6:30, Children's program; 7:45, Selections, "Carmen"; 10:30, Radio drama, "Arms and the Man," WGY Players; WGY Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; "Just Among Home Folks;" Walnut Theater Orchestra; 7:30-9:00, Delta Omicron Sorority, Mrs. Carl D. Jones, soprano; Reading: An Interesting Historical Episode.

WHK, Cleveland, Ohio (Eastern, 283), 9:00 p. m., Concert program arranged by the Cleveland Radio Dealers' Association; Orchestral numbers by Tomson'a Novelty Orchestra, Stephen N. Tomson, pianist and director; Vocal numbers by George Seegitz, baritone.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:30 p. m., Original Indiana Five, John Sylvester, leader; 4:30-5:00, Versatile Trio from the Sharlee Restaurant; 5:15-5:45, Jack Fox'a Melody Belles; 9:30-9:45, Lisa Bickman, soprano; 9:45-10:15, "The Harmonians," J. W. Green, leader; 10:30-11:00, Whitehouse Review.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Ethel Manning, soprano; Helen Hawk, pianist; Helen Greim, pianist; J. Henry Welton, tenor; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:45 p. m., Concert, Brooklyn Edison Chorus; 8:15, "The Work of the New York State Assembly," Julius Berg; 8:30, Concert, Brooklyn Edison Chorus; 9:00, "Negro Plantation Songs and Melodies," Marshall Bartholomew; 9:15, "Robin Hood'a Forest," a radio travelogue, Wirt Barnitz; 9:45, Marshall Bartholomew; 9:45, "How to Cook Fish," Mrs. Evelyn Spence.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Leo Riggs, organist; 4:00, Maxine Wilson, mezzo-soprano, of the Greenwich Village Follies; 7:30, Burr McIntosh, the cheerful philosopher; 7:45, Looseleaf Current Topics; 8:30, Royal Male Quartette Concert; 9:00, "Keeping Fit at Sea," Frank Wheelton, physical director of the S. S. "Majestic"; 10:30, Paul Specht and his Alamac Hotel Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Woman's Club, "Child Behavior," Dr. Lawrence G. Lowrey; 2:35, Daylight concert; 4:00, Short story; 5:30, Children's hour, Alpha Stalson, story teller; 6:00, Sport program; 7:30, Farm lectures; 9:30, Musicale.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Half-hour lecture-recital.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Bush Conservatory; 7:00, Weekly Wide Awake Club; 7:30, First of series of Music Memory Contest; 9:15, Musical program.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Marie G. Worden, director; 11:00, Midnight Frolic.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Ackerman's Orchestra; 9:00, Musical program; Ruth Lytie, mezzo-soprano; W. M. Weibler, violinist; piano duet, Dorothy Eden and Hester Peters; Telephone Topics, Cecil Hitchen; Dorothy Stewart, whistler; Selection, Blue Bell Girls' Quartet; Meyer Johnson, tenor; L. W. Metzger, banjoist; Betty Nielson, soprano; Carolyn Mattson, pianist; Vocal solo, Fenelia Legge; Reading, Frances Olson; Selection, Blue Bell Saxophone Orchestra; Vocal duet, Helen Murray and Betty Nielson.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., C. A. Russell, lecturer; 5:45, Chimes; 6:30, Sandman's visit; "The Nature and Uses of the X-Ray," C. A. Russell; 7:20, International lesson for next Sunday, Dr. Frank Willard Court, pastor; 8:00, Musical program, Erwin Swindell; E. H. Hass, reader; Mrs. John Malloy, soprano; Howard Snyder, pianist; Mrs. Frank W. Elliott, pianist; Erwin Swindell, organist.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00 p. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 5:15 p. m., Organ recital, Mary E. Vogt; 7:30, Dinner music, Adelphia Hotel Orchestra; 8:30, Erno Rapee and his orchestra broadcast fro mFox Theater; 9:30, Organ recital, Mary E. Vogt; 10:30, Dance music, Adelphia Hotel Orchestra.

WOR, Newark, N. J. (Eastern, 405), 2:30-1:50 p. m., Lulu Vollner, authoress & playwright, "Difficulties of a Playwright"; 2:50-3:00, Lucille La Verne, star of "Sun Up"; 3:00-4:00, Murray Wocksman Entertainers; 6:30-6:45, Man in the Moon Stories; 7:00-7:30, Francis Stoddart, tenor soloist, Christ Church, Newark, N. J.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., Emorson's Orchestra; 8:30, Address, John F. Case.

Saturday, January 12

CKAC, Montreal, Que. Can. (Eastern, 430), 7:00 p. m., Kiddies' stories in French and English; 7:30, Rex Battle and His Mt. Royal Hotel Concert Orchestra; Prize winners announcements to Radio weekly showers.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Concert, Westinghouse Band; 7:30, "Bringing the World to America." "Our World;" 7:45, Children's period; 8:15, "The Federal Reserve System," Montfort Jones; 8:30, Westinghouse Band, Marie Sybert, soprano; Harry Wirtz, bass; Walter Pyntz, accompanist.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal and instrumental program; 8:00-9:00, Special dance program; 10:00-11:00, Vocal and instrumental concert.

KFKX, Hastings, Nebraska (Central, 283), Rebroadcasts program of KDKA.

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

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program arranged by Maude Fenlon Bollman, soprano; 2:30-3:30, Matinee Musicalo arranged by Maude Fenlon Bollman, soprano; 6:45-7:30, Children's program presenting Helen Pirie, Silver-sheet juvenile, age 7 years; 8:00-10:00, Concert program presenting band of 160th Infantry, C. N. G.; H. C. Bradley, reader; Hatch Graham, banjoist and singer.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-12:00 midnight, Art Weidner and his Fairmont Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 3:00 p. m., Program, group of children under 14 years of age; 7:15, Orchestra concert, organ recital, vocal and instrumental specialties, Missouri Theater.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 6:50 p. m., Children's bedtime story.

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

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Dinner concert, Hotel Kimball Trio; Jan Geerts, violinist; Angela G. Lonergan, cellist; Paul Lawrence, pianist; 7:30, Twilight tales for the kiddies; "Bringing the World to America," World Magazine; 8:00, Mrs. McCoy, pianist; Mrs. John R. Fausey, soprano; Mrs. Harry C. Fletcher, accompanist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Regular popular music program and another Radio Prize Contest; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Orchestra; 4:30, Bobbie Lee and his Cotton Pickers; 7:30, Dream Daddy with boys and girls.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m. "Modern History Comment," George S. Thomas; 8:30-9:30, McFall's Merry-Makers; 11:00-12:00, MacDowell Sisters in Hawaiian Song and instrumental recital.

WGI, Medford Hillside, Mass. (Eastern, 360), 7:30 p. m., New England Business problems, Arthur R. Curnick; Arthur Murray's course in Ball Room Dancing, Lesson No. 6; Music.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m., Dance music, Jack Symonds' Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks;" Strand Theater Orchestra; 7:30-9:00, Sylvian Trio; Fannie Elizabeth Stoll, violinist; Myrl Chrisman, flutist; Evelyn Kaiser, pianist; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:00 p. m., Whitehouse Review; 3:45-4:30, Ideal Novelty Orchestra; 4:45-5:00, Ayy La Skere, double voiced singer; 7:30-8:15, Dixie Devil Demons from the Cinderella; 8:15-8:30, James Flynn, tenor; 9:00-9:30, Jimmy Clarke's White Way Entertainers; 9:45-10:00, Hettie Tillett, contralto.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Irma Moschel, soprano; Marion Leonard, violinist; Joseph Brinkman, pianist; Oriole Orchestra.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Recital, Emily Harford Avery; 4:00, Tea Concert, Hotel Belmont Stringed Ensemble; 5:00, Warner Hawkins, pianist; 7:00, "Uncle Wiggily Stories," Howard Garis; 7:30, Sydney Brakow, violinist; 7:45, Harper Brothers Literary Talk; 8:15, Hampton Institute Quartette Concert; 10:30, Harold Stern and his Hotel Majestic Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, "The Postcard Club;" 2:00 p. m., "Personality," O. V. Simon; 2:30, Daylight concert; 4:00, Short story; 5:30, Children's hour; 6:00, Sport program; 7:30, Business lectures; 8:00, Radio lecture, Ray R. Sweet; 9:17, Anniversary program of the Children's Radio Health and Toothbrush Club of America; 10:30, Dance program, St. Paul Athletio Club Orchestra.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Missouri Pacific Booster Club.

WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m., Lyon & Healy program; 9:00, Chicago Theater Revue.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Blackstonian Orchestra; 9:00, Program uuder auspices of Omaha Printing Co., Mrs. Ernest A. Reese; Frida Paustian; Mable Donlon; Anne Coughlan; Theo. Rud. Reese; Earnest A. Reese; Mrs. Leo A. Hoffman; Chas. Suber; Chas. R. Docherty.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "The Manufacture of Silk," C. C. Hall; 5:45, Chimes; 6:30, Sandman's visit; 7:00, "Just Dad," Mrs. E. Mildred Light; 9:00, P. S. C. Orchestra; V. B. Rochte, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m., Program especially arranged for children under direction of Harry A. Schulman, Pres. of the National Stage Children's Assn. & Dr. Winifred Sackville Stoner, director of the "kiddies' Theatre"; 6:15-7:15, "Music While You Dine," Joseph Adoff and His Orchestra; 7:15-7:30, Fred J. Bendel, Sporting Editor of Newark Morning Ledger; 8:00-8:45, Gene Ingraham's Hotel Benwick Club Orchestra; 9:00-9:15, Humorous talk by Jesse Lynch Williams, author and playwright; 9:35-9:50, Mr. Dougherty (Music Trades); 9:50-10:05, May Barron, contralto, assisted by Maestro Line; 10:05-10:15, Arline Foster in a talk on "Interviews with Men of Achievement"; 10:25-10:45, May Barron, contralto; 10:45-11:00, Gertrude Bronenkant, soprano.

WTAM, Cleveland, Ohio (Eastern, 390), 9:00 p. m., The regular Saturday evening dance program by the WTAM Orchestra; Vocal numbers by favorite artists.

Sunday, January 13

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., L. A. Church Federation Service; 4:00-5:00 p. m., Church musicians; 6:45-7:30, Opera story and Coral Atkins; 10:00-11:00, Theron Bennett, Packard Six.

KHJ, Los Angeles, Calif. (Pacific, 305), 10:00 a. m. Sermon; 10:30-12:30 p. m., Organ recital and entire religious service from First M. E. Church, Rev. E. E. Helms, pastor; Arthur Blakeley, organist; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, oganist; 8:00-10:00, De Luxe program.

KPO, San Francisco, Calif. (Pacific, 423), 11:00-12:15 p. m., Church services, Dr. R. J. Craig, director, C. B. Cannon, tenor; 8:30-10:00, Rudy Seiger and his Orchestra

KYW, Chicago, Ill. (Central, 536), 11:00 a. m., Central Church Service, Orchestra Hall, Dr. F. F. Shannon, pastor; 6:30 p. m., Excerpts from the New Testament—An American Translation, Prof. E. J. Goodspeed, William Ziegler Nourse; 7:00, Chicago Sunday Evening Club.

WBAP, Fort Worth, Texas (Central, 476), 11:00 a. m., -12:15 p. m., Church services, First Christian Church, Rev. L. D. Anderson; 4:00-5:00, Concert, Rialto Theater; 5:00-6:00, Vesper concert.

WDAP, Chicago, Ill. (Central, 360), 9:15 p. m., Drake concert ensemble and artists.

WFAA, Dallas, Texas (Central, 470), 6:00-7:00 p. m., Radio Bible Class, Dr. William M. Anderson, Jr.; 9:30, Five-minute talk on Safety, the beginning of Safety Week; 9:25-10:05, Choriwsters fro mEast Dallas Christian Church, Mrs. Mary V. Culp, director; 10:05-11:00, Jack Gardner's Orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m., Vosper service, the Rev. Samuel Russell, D. D., First Baptist Church of Buffalo; 4:00-5:00, Robert Munn, organist.

WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., Church services, Emmanuel Baptist Church, Rev. A. W. Rogers, pastor; 8:30 p. m., WGY Symphony Orchestra, Leo Kliwon, conductor; Grace E. Simmons, soprano; 7:30, Services, Emmanuel Baptist Church.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Church services, Broadway Baptist Church, Rev. Dr. Russell J. Pirkey, pastor; 4:00-5:00 p. m., Concert, Bel Canto Quartette.

WHK, Cleveland, Ohio (Eastern, 283), 8:00 p. m., Concert program, the WHK Trio: Ben Silverberg, violinist; Ben Burtt, pianist; Max Schmitt, cellist and director; Miss Luana Van Camp, sololst; 9:30 p. m., Chapel services from the Glenville Presbyterian Church, Rev. A. H. Limouze, pastor.

WJAZ, Chicago, Ill. (Central, 447.7), 6:00-9:00 p. m., Eduarde DuFresne, tenor, Chicago Civic Opera Company; Marion Roberts, pianist; Stella Roberts, violinist.

WHN, New York, N. Y. (Eastern, 360), 2:45-4:30 p. m., Christian Endeavor Program; 5:00-5:15, John D. Flynn of the National Security League; 5:30-6:00, W. H. N. Radio Five; 9:45-11:00, Operatic Program by L. Crigg, tenor, L. Merracapa, baritone, R. Fenwick, soprano, C. Psompoulo, soprano, M. Patrono, soprano, M. Jaia, concert pianist.

WDAR, Philadelphia, Pa. (Eastern, 395), 2:00-4:00 p. m., Concert, Arcadia Cafe Concert Orchestra.

WLW, Cincinnati, Ohio (Central, 309), 9:30 a. m., Sunday School services, Editorial Staff of Sunday School Publications, Methodist Book Concert; 11:00, Church Services, Church of the Covenant, Rev. Frank Stevenson, minister; 8:00, Church of the Covenant.

WOAW, Omaha, Nebr. (Central, 526), 9:00 a. m., Radio Chapel service; Rev. R. R. Brown of Omaha Gospel Tabernacle of the Christian Missionary Alliance; 9:00 p. m., Musical Chapel Service, First Congregational Church; Rev. F. G. Gonzales, pastor.

WOC, Davenport, Iowa (Central, 484), 9:00 a. m., Chimes; 1:30 p. m., Orchestra; 7:00, Pipe organ recital; 8:00, Church service; 9:00, Musical program.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., Church services, Central Evangelical Church, Rev. E. W. Berlekampf, pastor.

WWJ, Detroit, Mich. (Eastern, 517), 7:30 p. m., Services, St. Paul's Episcopal Cathedral; 2:00, Detroit News Orchestra.

Monday, January 14

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "Value of Physical Training and Athletics," Dr. J. Fred Bohler; Bailey's Campus Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-9:00 p. m., Harold M. Schulteis, organist; 9:00-10:00, Jessie S. Moore, director; 10:00-11:00, Palace Hotel Dance Orchestra.

WBAP, Fort worth, Tex. (Central, 476), 7:30-8:30 p. m., Concert, pupils of Guy Pitner, pianist; Brooks Morris, violinist; 9:30-10:45, Concert, John Tarleton Agricultural College.

WDAR, Philadelphia, Pa. (Eastern, 3955), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy with boys and girls.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30-7:30, Vinceut Lopez Hotel Statler Dance Orchestra; dinner music; 7:30, Digest of the day's news; 9:00, Concert, Ambroskos' Orchestra, direction of Glen Schulnerster, director.

WGY, Schenectady, N. Y. (Eastern, 380), 7:45 p. m., Program, Alco Male Quartet, Frank Hopwood, violinist; Address, "Relays," O. C. Traver.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; "The Largest Aspect of World Affairs," Frederick Dixon.

WHAZ, Troy, N. Y. (Eastern, 380), 9:00 p. m., Concert of operatio numbers, Captain and Mrs. Albert Geiser, director; "Telephone Courtesy," Harry F. Carroll; 12:00 m., Late program: Rensselaer Polytechnic Institute Students' Symphony Orchestra and Glee Club.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:30 p. m., Colonial Inn Orchestra, Tom Banks, leader; 7:30-8:15, Lannin's Roseland Dance Orchestra; 8:45-9:00, Dorothy Wallace Portingall, saxophone and vocal solos.

WIP, Philadelphia, Pa. (Eastern, 509), 6:05 p. m., Dinner music, Frank Winegar and his Pennsylvanian Orchestra; 7:00, Uncle Wip's bedtime stories and roll call.

WLW, Cincinnati, Ohio (Central, 309) 8:00 p. m., Justin Huber Orchestra; A Demonstration of Telephone Switch Board Connections, N. E. Westlake, assisted by eight regular Operators, with Marie Miller, lecturer; Philip Dreifus, violinist; Marjory Garrigus, pianist.

WMC, Memphis, Tenn. (Central, 500), 8:00 p. m., Lecture, Edward H. Griggs.

WOAW, Omaha, Neb. (Central, 526), 6:30 p. m., Dinner program, Randall's Royal Orchestra; 9:00, Musical program; Hotel Fontenelle Concert Orchestra.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 5:45 p. m., Chimes; 6:30, Sandman's visit; 7:00, Lecture; 8:00, Musical program, Erwin Swindell, director.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 5:15 p. m., Organ recital, Mary E. Vogt; 7:30, Dinner music, Hotel Adelphia Orchestra; 8:00, Ralph Bingham; 9:15, Erno Rapee and his orchestra; 10:30, Dance music, Hotel Adelphia orchestra.

WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m., Landau Serenaders of New York; 6:15-7:30, Harry Cox and his Hotel Robert Treat Orchestra; 8:00-8:15, Mr. McCosker on "Current Motion Pictures;" 8:45-9:00, Bill Steinke, "Radio Cartooning;" 9:00-10:00, Phonograph Trio; 10:00-11:00, Manhattan Serenaders.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., Program, Missouri State Farmers' Week, Address, Pres. Stratton S. Brooks; "Farm Homes Across the Water," Mrs. Izetta Jewel Brown.

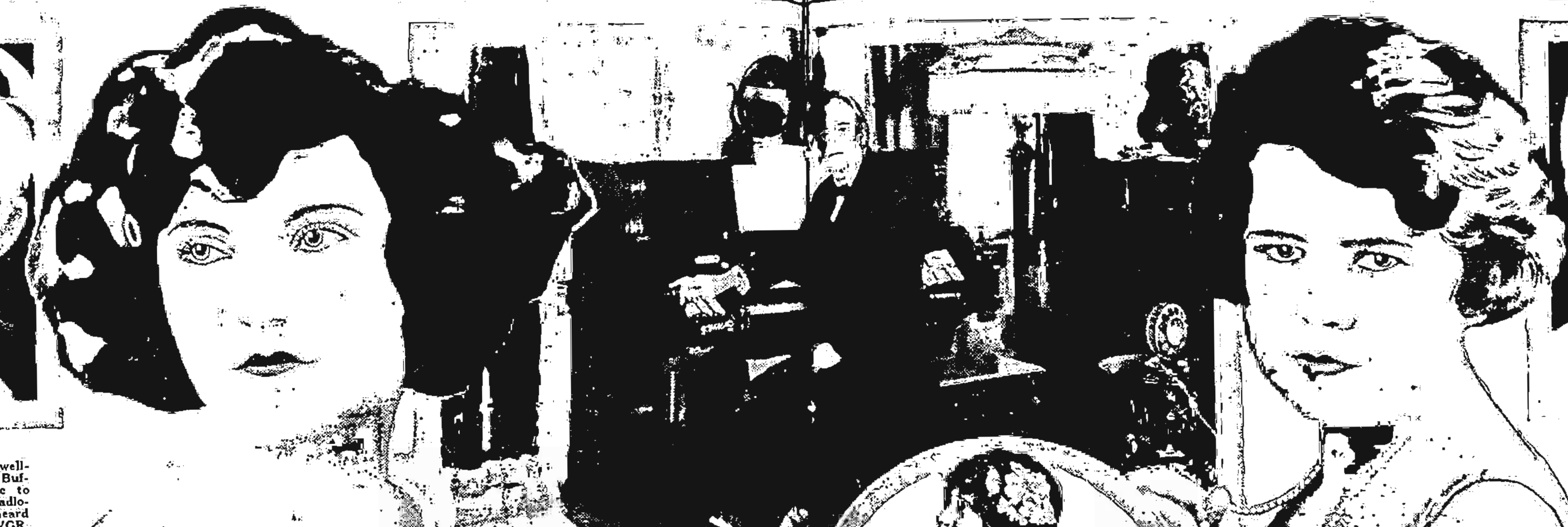
GALAXY OF ATTRACTIONS MARKS CURRENT WEEK'S PROGRAMS

The Week's Headliners on the Air

MOVIE fans can hear Charles Ray Tuesday night at WEAF. Wednesday all Rotarians are promised a treat from WLAG when the Minneapolis Rotary Club will give the feature of the year. Thursday if you like Russian music listen in to David Yaroslavsky at WJZ.

Let me attract you to two WJY features Friday, the Radio travelogue by Wirt Barnitz, and Negro Plantation Songs and Melodies by Marshal Bartholomew. For those who do not dance, the lecture Saturday night on "Modern History Comments," by George S. Thomas from WFAA may be interesting. Sunday WJAZ is giving some particularly fine programs of operatic music, and Monday WHAZ will give a midnight show with the Rensselaer Polytechnic Institute Students' Symphony Orchestra and Glee Clubs.

—THE PROGRAM LADY.



Above is presented John D. Wells, well-known author and conductor of the Buffalo Times' column "From Grave to Gay." He is not unfamiliar to Radiophans and those who have not heard him may do so by tuning in WGR. Judith Roth, at the right, is featured weekly by WHN in popular numbers.

Station WOC, Davenport, Iowa, "Where the West Begins," boasts a splendid pipe organ installed expressly for broadcasting. The gentleman seated at the console (the pipes are concealed overhead) is the famous concert organist, Mr. Clarence, whose performances are real treats. Hear him in recital at 8:00 p. m., Sunday, January 13. In the circle is Mme. Louise Homer as "Delilah" in the opera "Samson and Delilah," to be broadcast from one of the Chicago stations this week.

Gail Sherwood (left) is the vivacious director of "The Singing Sherwoods," and she sang recently from WJAX on a program arranged by the Cleveland News-Leader. Above, Mrs. Frances Ford, director of the Wide Awake Club program, featured by WMAQ.

Tuesday, January 8

CKAC, Montreal, Que., Canada (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel Concert Orchestra; 4:00, Musical tea; 7:00, Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Concert Orchestra; 8:30-9:15, Studio entertainment; 10:30-11:30, Joseph C. Smith and his Mt. Royal Hotel Dance Orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Fort Pitt Hotel Orchestra; 7:45, Children's period; 8:15, Address, Dr. John R. Ewers, pastor; 8:30, Allegro Mandolin Sextet, Percy Lichtenfels, conductor; William Keltman, tenor; Ira Keefer, reader; 11:30, Special Late Evening Concert, Queen City Orchestra.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., California Federation of Music Clubs concert; 10:00-11:00, Special moving picture talent program.

KFKX, Hastings, Nebraska (Central, 283), See program for KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Talk by Jeannette P. Cramer, Home Economics Editor of the Oregonian; 8:30 Talk for Farmers from Extension service, Oregon Agricultural College, 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's Hour, presenting Dorothy Bartosch, reader, 10 years, Helen Rockwell, pianist; Doris Green, pianist; 8:00-10:00, De Luxe program; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-10:00 p. m., Glee Club of the Olympic Club; 10:00-11:00, Palace Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Studio recital, Marion Niedringhaus, baritone; Mrs. Alden Kimball, pianist; Address, H. G. Bristow; 11:30, program.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 2:35 p. m., Studio program; 6:50, Children's bedtime story.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert; 9:30-10:45, Concert, Virginia Jackson, director.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., "Making Better Farm Homes," Prof. Lucile W. Reynolds; 7:30, Twilight tales for the kiddies; "What Education and Training Can Do for Better Homes," Agnes H. Craig; 8:00, Concert, Harold Corbett, baritone; Miss Rogers, pianist; Mrs. Horwick, violinist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Erma Blaine McKendry, reader; Rosemary Hughes, soprano; Frederick W. Agard and Bob Cougle; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Orchestra; 2:00-3:00 p. m., Arcadia Cafe Orchestra; 7:30, Dream Daddy with boys and girls; 7:45, Dramatic review, Arnold Abbott.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Address, DeWitt McMurray; 8:30-9:30, Musical recital, Mozart Choral Club, Earle D. Behrends, director; 11:00-12:00, Reuben Davies Club.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The American Hostess—Her Dinners," Mrs. C. H. Pearce; 7:45, Operetta, "The Bo's'n's Bride," WGY Light Opera Company; "A Few Moments with New Books," L. L. Hopkins; WGY Augmented Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra, "Just Among Home Folks;" Strand Theater Orchestra; Alamo Theater organ; 7:30-9:00, Al Gorman's Novelty Orchestra; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:30 p. m., Will Tyler's Orchestra; 4:45-5:15, Cosmopolitan Singers; 9:30-10:00, Ben Lo Vitz and His Orchestra; 10:15-10:30, Hon. Milton W. Sutton of Natl. Security League; 10:30-10:45, Ary La Skere, double voiced singer; 10:45-11:15, Shapiro Bernstein Music Co.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Concert program arranged by the Cleveland News-Leader; Bedtime story by E. G. Johnson; Popular dance program, Joe Smith-Martha Lee Club Orchestra; Vocal solos, Miss Irene Stanley.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Signe Anderson, soprano; Leona Jordan, guitarist; John Logan, pianist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., Charles Wold, musical glass player; 7:45, "Etiquette," a Doubleday Page talk; 8:16, Charles Wold; 8:45, Samuel S. Aronson, pianist; 9:00, "Opera," Isabel Foste; 9:15, Samuel S. Aronson, pianist.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Afternoon Auditorium Concert; Wanamaker Auditorium; 4:00, Harper's Bazar Fashions; 4:15, Harriet Youngs, soprano; Madeline Marshall, pianist; 7:00, Supper music, Paul Specht and his Alamac Hotel Orchestra; 8:00, "Alexander Hamilton," William E. Martin; 8:15, Fourth American Orchestral Society Concert; 10:30, Dance program, Hotel Astor Grill Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Florence Burton of the League of Women Voters; 2:35, Musical program; 4:00, Short story; 5:30, Children's hour, Antoinette Zwinggi, story teller; 6:00, Sport review, George Barton; 7:30, Farm lecture program; 10:16, Test concert with the New York Evening World.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Current topics for women; 10:00, Indra Consistory Choir, J. Lincoln Newhall, conductor; Carl Hugo Grimm, pianist; 11:00, Special popular program.

WMAQ, Chicago, Ill. (Central, 447.5), 7:45 p. m., Opera.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Charlie McCauley, director; 11:00, Special midnight frolic.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Jaffy's Music Masters; 9:00, Program, by Woodmen of the World.

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

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Marguerite Cortwright, soprano; 2:45-3:00, Dorothy Drumon, pianist; 3:00-3:15, Mrs. Mary Austin, lecturer—"The Indian Question;" 3:30-3:45, Marguerite Cortwright; 3:45-4:00, Dorothy Drumon, pianist; 6:15-6:30, Halsey Miller and His Orchestra; 6:30-6:45, Man in the Moon Stories; 7:00-7:15, Halsey Miller and His Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 9:45, "Ironing Day" special program, Fred Shaw; 3:00 p. m., Detroit News Orchestra; 7:00, Detroit News Orchestra; Charlotte Myers, soprano; Program, Chamber Music Society.

Wednesday, January 9

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel concert orchestra, 4:30, Musical tea.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:30, Pittsburgh Athletic Association Orchestra; 7:45, Children's period; 8:15, Address; 8:30, Concert, artists from studio of Chester C. Humphreys, Irene Jones, soprano; Mrs. Harold Tonor, contralto; Walter Stroud, tenor; J. Herbert Pearson, baritone; Margaret Gunderman, accompanist; Ralph Lowmiller, trombonist.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "How to Prepare for One's Vocation," Dr. D. W. Hamilton; Guitar solos, Ray Kromer; Frederica Kershaw, pianist; "Danger of Untested Seeds," by Dr. Hanna Asoo; "Marketing," E. F. Dummeier.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Nick Harris detective stories and concert; 10:00-11:00, Hollywoodland Community Orchestra dance music.

KFKX, Hastings, Nebraska (Central, 283), Re-broadcasts program of KDKA.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Program, Abergh's concert ensemble, Arno Arnesen, violinist; 11:00, Hotel Statler dance music, Rodemich's orchestra.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Children's programme, music and story; 8:00 p. m., Orchestra concert; 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra, Isabella Needham Kidd, mezzo-soprano.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Hazel Hoffmon, soprano; 8:00-10:00, Program presented by Pasadena, Calif., Lodge of B. P. O. Elks; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-8:00 p. m., Verne Kelsey, pianist; Mrs. Samuel F. Reed, violinist; Melva Farwell, flutist; Frank Miller, baritone; 5:30, Children's hall hour; 9:00-10:00, Palace Hotel Dance Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:58, Adalla Nomar, soprano; Edna Cunningham, soprano; Sallie Menkes, accompanist; Horace Gray, baritone; The Mariners (orchestra); 9:05, Reviews of the latest books, Llewellyn Jones; 10:00-12:30 a. m., Midnight Revue; Wendell W. Hall, KYW's music maker; Herbie Mintz; "Our Sallie" Menkes, accompanist; 11:00, Program, McVicker's Theater, W. Remington Welch, organist; 12:00, Clyde Doerr's orchestra.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Mrs. Pearl C. Davis, director; 9:30-10:45, Concert, George Freeman's Texas Hotel Orchestra.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, Humorous program; 7:30, Twilight tales for the kiddies; "The Importance of Cleanliness in Caring for Chicks," Joseph H. Bodwell; Story for grown-ups, WBZ Quintette, Mrs. Antha Munsell Root, soprano.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Program, John Loring Cook; Jack Chapman's orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Orchestra; piano solos, Edna Finestone; 2:00-3:00 p. m., Concert, Arcadia Cafe Orchestra; 4:30, "Care of Children," Mrs. Louis Love; 5:15, Versatile Serenaders; 7:30, Dream Daddy with boys and girls; 7:45, Dramatic review, Arnold Abbott.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "Self Help in Education," J. O. Mahoney.

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

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; "Just Among Home Folks;" Walnut Theater Orchestra; Dancing lesson No. 6, especially prepared for WHAS by Arthur Murray, Marguerita A. King, pianist; 7:30-9:00, Concert, auspices of Mr. John E. Harmon, Jr.; Berney Rapps Orchestra.

WHN, New York, N. Y. (Eastern, 360), 2:30-3:15 p. m., Sam Wooding's Creole Syncopators; 3:45-4:30, Jimmy Clarke's White Way Entertainers; 7:30-8:00, Clover Gardens Orchestra; 8:15-8:45, Music Students League; 9:30-10:00, Kew Gardens Society Orchestra; 11:30-12:00, S. Jay Kaufman and His Celebrities.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Jerry Kutak, pianist; 3:15, John Marshall, baritone; 4:30, Tea concert, Hotel Commodore Orchestra; 7:00, "When the Land Ran Away," Shadowland Story, Florence S. Vincent; 7:30, Irving Selzer and his Cafe Boulevard Orchestra dance program; 7:45, "The Progress of the World," a Review of Reviews talk; 8:00, Irving Selzer and his Cafe Boulevard Orchestra; 8:30, "City Official Series of Talks," Honorable Alfred A. Taylor, Commissioner of the Dept. of Street Cleaning of the City of New York; 6:45, The Phoenix Male Quartette; 9:00, "Olives and Oils, the Health and Pleasure of Them," Anne Lewis Pierce; 9:15, United States Army Night program, Speech, Brigadier General Amos Fries, Chief of the Chemical Warfare Service; Music, 16th Infantry Band.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Esther Whittington, soprano; Banjo James, banjoist; Fred Langley, cellist; Oriole Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Women's Club; 2:35, Daylight concert; 4:00, Short story; 5:30, Children's hour, Mrs. Robert Cargill, story teller; 8:00, Sport hour; 8:15, Osborn's Minneapolis Athletic Club Orchestra; 9:30, Minneapolis Rotary Club program.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Program for shut-ins, Wurlitzer Concert Company, Macdowell and American composers; William Afspring, reader; Mrs. William Duning, pianist, Mrs. O. B. Kaiser, Mrs. C. A. Hehbun; 8:00, 10th Infantry Band, Ernest Fischer, director; Beatrice W. Chipman, singer; Schimo Kaufman, violinist; Edwin Woldinger, singer.

WMAQ, Chicago, Ill. (Central, 447.5), 1:30 p. m., Chicago Association of Commerce Luncheon; 4:30, Cosmopolitan School of Music; 7:00, George Faulkner, story lady; 7:30, Weekly talk, Northwestern University; 9:15, Program, Thomas McBurney, director.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., Clyde G. Kern, lecturer; 6:30, Sandman's visit; 7:00, "The Value of the Pure Bred Sire," Adolph P. Arp; 8:00, Erwin Swindell, organist; Marguerite M. Kraemer, contralto; 10:00, Program, Howlette Sisters.

WOR, Newark, N. J. (Eastern, 405), 2:30-3:00 p. m., Margaret Lyman, cellist assisted by Ella Drews, contralto; 3:10-3:16, Etta V. Leighton, Secy. of Natl. Security League; 3:45-4:00, Fritzie Leighton & Co. popular songs; 6:15-6:30, Wm. Royal, tenor, formerly with Manhattan Opera Co.; 8:30-6:45, Albert E. Sonn; 6:45-7:00, Wm. Royal, tenor; 8:00-8:15, Gustao Ludenthal, M. E., builder of Hell Gate Bridge over East River will speak on "Fifty-ninth Street Bridge to New Jersey;" 8:30-9:15, Arthur Murray Dance Lessons; 9:15-9:30, Dramma Walters, prima donna, soprano of N. Y. Opera Guild; 8:45-10:00, Drama Walters, prima donna; 10:00-11:00, Dancing to Williams Orchestra of New York.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., Dance program, S. C. Stancill's Novelty Six Orchestra.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Concert program by the WTAM Orchestra; Special numbers, Dorothy MacIntosh, soprano; Frank Hruby, saxophonist; Leigh Hunt, baritone; Ben Silverberg, violinist; Max Schmitt, cellist; A. Hruby, trumpeter; Marimba duet by Mr. and Mrs. A. D. Jagl, Miss Clara Sharp, pianist.

Thursday, January 10

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and his Mt. Royal Hotel concert orchestra; 4:00, Musical tea; 7:00, Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Orchestra; 8:30-9:15, Studio entertainment; 10:30-11:30, Joseph C. Smith and His Mt. Royal Hotel dance orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Fort Pitt orchestra; 7:30, Weekly Chat with Farmers, Frank E. Mullen; 7:45, Children's period; 8:15, Farm feature; 8:30, KDKA Little Symphony Orchestra; Mrs. Mobie S. King, soprano; Mrs. Patti R. Bladridge, contralto; Bertram Webber, accompanist; 11:30, Special late evening concert.

KFI, Los Angeles, Calif. (Pacific, 409), 6:45-7:30 p. m., Opera story and Y. M. C. A. program; 10:00-11:00, Vocal and instrumental program.

KFKX, Hastings, Nebraska (Central, 283), Re-broadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Woman's programme. Story reading; 8:00 p. m., Dramatic programme; 10:00 p. m., Dance music, George Olsen's Metropolitan orchestra under direction of Herman Kenin; solos.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Doras Caulkins, pianist; Lilla Bone, pianist; 8:00-10:00, De Luxe Program; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-9:00 p. m., Harold Montague Schulteis, organist; 9:00-11:00, Max Bradfield's Band.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., St. Louis Symphony Orchestra, Rudolph Ganz, conductor; Michel Gusikoff, violinist.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 2:35 p. m., Studio program; 6:50, Children's bedtime story; 8:00-8:28, Twenty Minutes of Good Reading, Rev. C. J. Pernin; 8:30-9:30, Musical program, Bush Conservatory of Music.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert; 9:30-10:45, Concert, Fort Worth Euterpean Club.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., "Preparation of Federal Income Tax Returns," Thomas McCarry; 7:30, Twilight tales for the kiddies; Letter from the New England Homestead; 8:00, Charles H. Young, tenor; Mrs. Miriam M. Thomson, accompanist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Chicago Conservatory of Music; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Concert; 7:30, Dream Daddy with Boys and Girls.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Music, Red Head Girl; Talk on Lincoln, Judge J. C. Muse; 8:30-9:30, Gibson Mandolin and Guitar Club, Tom D. Collins, manager.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "Women as Jurors," Mrs. Edward E. Hale; 7:45, Paula E. Smith, pianist; Beatrice Zollinger, soprano; Paula E. Smith, pianist; Thomas F. O'Neill, violinist; Lorena A. Kehoe, contralto; Address, Leo M. Doody.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks;" Strand Theater Orchestra; 7:30-9:00, Concert, auspices, Carolin Chrisman; Four-minute digest of International Sunday School lesson; Four-minute Radio Forum Talk.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:00 p. m., Shapiro Bernstein Music Co.; 9:30-10:15, Leo Gold's Wigwam Orchestra; 10:15-10:45, Joremo H. Remick.

WJAX, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Phil Barker, "The Harry Lauder of Cleveland" in Scotch songs and ballads; "The Singing Sherwoods," Gale Sherwood, director; F. C. Lake, baritone; The Cleveland Music School Settlement Trio: Violin, piano, and cello, in popular selections.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Laura K. Elberg, pianist; Florence K. White, soprano; Richard Guderyahn, violinist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., Brooklyn Mark Strand Theater program.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Afternoon Auditorium concert, Wanamaker Auditorium; 4:00, Helen Eastman, soprano; Creighton Allen, accompanist; 4:45, Ary La Skere, double voice entertainer; 7:00, "Jack Rabbit Stories," David Cory; 7:30, David Yaroslavsky, operatic singer; 7:45, The World's Work; 8:00, David Yaroslavsky; 8:16, Organ recital, J. Thurston Noe; 9:00, Dinner of the Society of Automotive Engineers; 10:30, Dance program, Hotel Commodore Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Woman's Club, dancing lesson, Tess Cooperman; 2:35, Renning's Leamington Orchestra; 4:00, Short story; 5:30, Children's hour, Tess Cooperman, story teller; 6:00, Sport hour, Dr. J. S. Dick, Jr., "Dogs;" 6:15, Osborn's Minneapolis Athletic Club Orchestra; 7:30, Farm lecture program.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Piano solos, Adelaide Apfel; 10:00, Concert program, Crosley Radarians, Kathryn Reece, soprano; Garner Rowell, violinist; Jack Paton, cellist; Prewitt Williams, pianist; Leah Fred, soprano; Radario comedy in one act: "Between the Soup and the Savory;" Conservatory Trio; 11:00, Justin Huber dance orchestra.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., First of series of programs, Illinois Federation of Women's Clubs; 7:00, Weekly talk to Boy Scouts; Talk by Automobile Editor; "Rockford College," Katherine W. McCullough; 8:00, Opera.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Concert, Chisca Hotel Philharmonic Orchestra, Clara Ahern, director.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, "Song without Words," Mrs. Fritz Hanson, pianist; Orchestra, O Sol Mio, Melody in F, One Fleeting Hour, Romona Judson, pianist; Grayce Miller, clarinet; Edythe Miller, saxophonist; Chester Robertson, mandolin; Vocal Duets, A Restless Sea; Roses of Picardy, Edythe Miller, soprano; Glen Weldon, tenor; Male Quartet selections; A. R. Nieman, first tenor; N. S. Lawrence, second tenor; W. B. Glikerson, baritone; R. W. Richardson, bass; vocal duet, Viola Cress and Opal Swalley; Piano duet; Reading, "The Duel," Violet Farres; Talk on Magnolia, James C. Arnold; 9:00, Operatic program, Omaha Concert Mixed Quartet; Mr. Hobbs; Dodds; Mrs. Miller; Mrs. Wylie.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Cirrhosis of the Liver," Karl G. Stephan; 5:45, Chimes; 6:30, Sandman's visit; 8:00, P. S. C. Orchestra; V. B. Rochte, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Louise Machine, soprano; 2:45-3:00 Francis Mayer, violinist; 3:00-3:15 Louise Machine; 3:15-3:30, Francis Mayer, violinist; 3:30-3:45, Mrs. Henry Meskowitz of the U. S. Housing Committee, "Housing Conditions in the U. S."; 6:30-7:30, Tom Cooper's Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 3:00 p. m., Detroit News Orchestra; 7:00 p. m., Detroit News Orchestra; Elsie Bond, soprano; 10:00, Dance music, Jean Goldkette's orchestra.

HINTS FOR THE LADIES WHO TUNE

I EXPECT you are a model housekeeper by this time with the help of Radio. However, if you are not, keep on listening to Mrs. A. J. Peterson at KYW and to the Woman's Editor of WWJ, cooking. WGY will help you serve, "The American Hostess—Her Dinners," Mrs. C. H. Peace.

WWJ will make the Ironing Day less tedious on Tuesday mornings. WLAG will give you all sorts of Household hints each morning at 10:45.

You can get all the latest fashion notes from WJZ, join WGY'S American Woman's Club, and that of WLAG which meets every afternoon at 2:00. Tuesday WLW will discuss current topics with you.

Listen in to WFAA at noon Thursday to the music of the Red Headed Girl. WOC gives a chime concert twice during the day. WDAR, WOO, WIP, WDAR all do their best to keep you in the best of spirits, not to speak of the Detroit News Orchestra at WWJ. Get your mending and tune in.

—THE PROGRAM LADY.

Friday, January 11

CKAC, Montreal, Que. Can. (Eastern, 430), 1:30-2:30 p. m., Rex Battle and His Mt. Royal Hotel Concert Orchestra; 4:00, Musical tea.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 6:15, Organ recital, Lucile Hale; 7:15, Radio Boy Scout meeting, Richard Victor, Scoutmaster Troop No. 1; 7:45, Children's period; 8:15, Sunday School lesson for January 13, Dr. R. L. Lanning; 8:30, Girls' Glee Club.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Mrs. Ruth Bradley-Keiser, pianist; "Taxation," Dr. H. W. Cordell; Verle Keiser, tenor; "New Novels," Alice Lindsey Webb.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Wa-Wan Juniors concert; 10:00-11:00, Vocal and instrumental concert.

KFKX, Hastings, Nebraska (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Lecture by Margery Smith, Oregon Agricultural college extension service; 8:15, George Olsen's Metropolitan orchestra in studio programme; 9:00, Lecture, "Development of Oregon Resources," E. E. Farille, subject, "Marketing Agricultural Product"; 10:30, Hoot Owls with Pantages frolic.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Richard Headrich, screen juvenile; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, Program presenting Chorus of Broadway Department Store, Ruth Annette Sabel, director; 10:00-12:00, Art Hickman's Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 12:30 p. m., "The Progress of the World," Review of Reviews; 6:50, Children's bedtime story; 10:00-12:30 a. m., Midnight Revue; Wendell W. Hall, KYW's Music Maker; Walter Wilson, Harry Davis, songsters; Herbie Mintz, pianist; R. D. Hinkle, singer; "Sen" Kaney, specialty act.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert Orchestra of the North Texas State Teachers' College; 9:30-10:45, Concert, College of Industrial Arts.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintette; 7:00, "By Flashlight," Youth's Companion; 7:30, Twilight tales for the kiddies; Current Book Review, R. A. MacDonald; 7:50, Farmers' Period; 11:00, WBZ Quintette; Mrs. Cecelia Cox Denton, contralto.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Ebba Sundstrom, violinist; George R. Hill, Jr., Cambridge Sisters, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Concert Orchestra; piano solos, Edna Finestone; 10:00, Howard Lanin's Arcadia Cafe Dance Orchestra.

WFAA, Dallas, Texas (Central, 476), 12:00-1:00 p. m., Address, Dr. Robert Stuart Hyer; 8:30-9:30, Faculty recital, North Texas State Teachers' College.

WGY, Schenectady, N. Y. (Eastern, 360), 2:00 p. m., "The Woman Who Paints," Modern Priscilla; 6:30, Children's program; 7:45, Selections, "Carmen"; 10:30, Radio drama, "Arms and the Man," WGY Players; WGY Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; "Just Among Home Folks;" Walnut Theater Orchestra; 7:30-9:00, Delta Omicron Sorority, Mrs. Carl D. Jones, soprano; Reading: An Interesting Historical Episode.

WHK, Cleveland, Ohio (Eastern, 283), 9:00 p. m., Concert program arranged by the Cleveland Radio Dealers' Association; Orchestral numbers by Tomson's Novelty Orchestra, Stephen N. Tomson, pianist and director; Vocal numbers by George Seegitz, baritone.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:30 p. m., Original Indiana Five, John Sylvester, leader; 4:30-5:00, Versatile Trio from the Sharlco Restaurant; 5:15-5:45, Jack Fox's Melody Belles; 9:30-9:45, Lisa Dickman, soprano; 9:45-10:15, "The Harmonians," J. W. Green, leader; 10:30-11:00, Whitehouse Review.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Ethel Manning, soprano; Helen Hawk, pianist; Helen Grmm, pianist; J. Henry Welton, tenor; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:45 p. m., Concert, Brooklyn Edison Chorus; 8:15, "The Work of the New York State Assembly," Julius Berg; 8:30, Concert, Brooklyn Edison Chorus; 9:00, "Negro Plantation Songs and Melodies," Marshall Bartholomew; 9:15, "Robin Hood's Forest," a radio travelogue, Wirt Barnitz; 9:45, Marshall Bartholomew; 9:45, "How to Cook Fish," Mrs. Evelyn Spence.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Leo Riggs, organist; 4:00, Maxine Wilson, mezzo-soprano, of the Greenwich Village Follies; 7:30, Burr McIntosh, the cheerful philosopher; 7:45, Looseleaf Current Topics; 8:30, Royal Male Quartette Concert; 9:00, "Keeping Fit at Sea," Frank Wheelton, physical director of the S. S. "Majestic"; 10:30, Paul Specht and his Alamac Hotel Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, Surprise program; 2:00 p. m., Woman's Club, "Child Behavior," Dr. Lawrence O. Lowrey; 2:35, Daylight concert; 4:00, Short story; 6:30, Children's hour, Alpha Stalson, story teller; 6:00, Sport program; 7:30, Farm lectures; 9:30, Musicale.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Half-hour lecture-recital.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Bush Conservatory; 7:00, Weekly Wide Awake Club; 7:30, First of series of Music Memory Contest; 9:15, Musical program.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Mario G. Worden, director; 11:00, Midnight Frolic.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Ackerman's Orchestra; 9:00, Musical program; Ruth Lytle, mezzo-soprano; W. M. Welbier, violinist; piano duet, Dorothy Eden and Hester Peters; Telephone Topics, Cecil Hitchen; Dorothy Stewart, whistler; Selection, Blue Bell Girls' Quartet; Meyer Johnson, tenor; L. W. Metzger, banjoist; Betty Nielson, soprano; Carolyn Matison, pianist; Vocal solo, Fenella Loggo; Reading, Frances Olson; Selection, Blue Bell Saxophone Orchestra; Vocal duet, Helen Murray and Betty Nielson.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., C. A. Russell, lecturer; 5:45, Chimes; 6:30, Sandman's visit; "The Nature and Uses of the X-Ray," C. A. Russell; 7:20, International lesson for next Sunday, Dr. Frank Willard Court, pastor; 8:00, Musical program, Erwin Swindell; E. H. Hass, reader; Mrs. John Malloy, soprano; Howard Snyder, pianist; Mrs. Frank W. Elliott, pianist; Erwin Swindell, organist.

WDO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 5:15 p. m., Organ recital, Mary E. Vogt; 7:30, Dinner music, Adelphia Hotel Orchestra; 8:30, Erno Rapee and his orchestra broadcast from Fox Theater; 9:30, Organ recital, Mary E. Vogt; 10:30, Dance music, Adelphia Hotel Orchestra.

WOR, Newark, N. J. (Eastern, 405), 2:30-1:50 p. m., Lulu Vollner, authoress & playwright, "Difficulties of a Playwright"; 2:50-3:00, Lucille La Verne, star of "Sun Up"; 3:00-4:00, Murray Wocksman Entertainers; 6:30-6:45, Man in the Moon Stories; 7:00-7:30, Francis Stoddart, tenor soloist, Christ Church, Newark, N. J.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., Emerson's Orchestra; 8:30, Address, John F. Case.

Saturday, January 12

CKAC, Montreal, Que. Can. (Eastern, 430), 7:00 p. m., Kiddies' stories in French and English; 7:30, Rex Battle and His Mt. Royal Hotel Concert Orchestra; Prize winners announcements to Radio weekly showers.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noon-day concert; 8:15, Concert, Westinghouse Band; 7:30, "Bringing the World to America," "Our World;" 7:45, Children's period; 8:15, "The Federal Reserve System," Montfort Jones; 8:30, Westinghouse Band, Marie Sybert, soprano; Harry Wirts, bass; Walter Pyntz, accompanist.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal and instrumental program; 8:00-9:00, Special dance program; 10:00-11:00, Vocal and instrumental concert.

KFKX, Hastings, Nebraska (Central, 283), Rebroadcasts program of KDKA.

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

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program arranged by Maude Fenlon Bollman, soprano; 2:30-3:30, Matinee Musicale arranged by Maude Fenlon Bollman, soprano; 6:45-7:30, Children's program presenting Helen Pirie, Silver-sheet juvenile, age 7 years; 8:00-10:00, Concert program presenting band of 160th Infantry, C. N. G.; H. C. Bradley, reader; Hatch Graham, banjoist and singer.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-12:00 midnight, Art Weidner and his Fairmont Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 3:00 p. m., Program, group of children under 14 years of age; 7:15, Orchestra concert, organ recital, vocal and instrumental specialties, Missouri Theater.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 6:50 p. m., Children's bedtime story.

WBAP, Fort Worth, Texas (Central, 470), 7:00-7:30 p. m., Review of the Interdenominational Sunday School Lesson and Radio Bible Class, Mrs. W. F. Barnum.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Dinner concert, Hotel Kimball Trio; Jan Geerts, violinist; Angela G. Lonergan, cellist; Paul Lawrence, pianist; 7:30, Twilight tales for the kiddies; "Bringing the World to America," World Magazine; 6:00, Mrs. McCoy, pianist; Mrs. John R. Fausey, soprano; Mrs. Harry C. Fletcher, accompanist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Regular popular music program and another Radio Prize Contest; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Orchestra; 2:00-3:00 p. m., Concert, Arcadia Cafe Orchestra; 4:30, Bobbie Lee and his Cotton Pickers; 7:30, Dream Daddy with boys and girls.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "Modern History Comment," George S. Thomas; 8:30-9:30, McFall's Merry-Makers; 11:00-12:00, MacDowell Sisters in Hawaiian Song and Instrumental recital.

WGI, Medford Hillside, Mass. (Eastern, 360), 7:30 p. m., New England Business problems, Arthur B. Cornish; Arthur Murray's course in Ball Room Dancing, Lesson No. 6; Music.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m., Dance music, Jack Symonds' Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks;" Strand Theater Orchestra; 7:30-9:00, Sylvian Trio; Fannie Elizabeth Stoll, violinist; Myrl Chrisman, flutist; Evelyn Kaiser, pianist; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:00 p. m., Whitehouse Review; 3:45-4:30, Ideal Novelty Orchestra; 4:45-6:00, Ary La Skere, double voiced singer; 7:30-8:15, Dixie Devil Demons from the Cinderella; 8:15-8:30, James Flynn, tenor; 9:00-9:30, Jimmy Clarke's White Way Entertainers; 9:45-10:00, Bettie Tillett, contralto.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2 a. m., Irma Moschel, soprano; Marion Leonard, violinist; Joseph Brinkman, pianist; Oriole Orchestra.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Recital, Emily Harford Avery; 4:00, Tea Concert, Hotel Belmont Stringed Ensemble; 5:00, Warner Hawkins, pianist; 7:00, "Uncle Wiggily Stories," Howard Garis; 7:30, Sydney Brakow, violinist; 7:45, Harper Brothers Literary Talk; 8:15, Hampton Institute Quartette Concert; 10:30, Harold Stern and his Hotel Majestic Orchestra.

WLAG, Minneapolis and St. Paul, Minn. (Central, 417), 10:45 a. m., Household hints; 11:35, "The Postcard Club;" 2:00 p. m., "Personality," G. V. Simon; 2:30, Daylight concert; 4:00, Short story; 5:30, Children's hour; 6:00, Sport program; 7:30, Business lectures; 8:00, Radio lecture, Ray R. Sweet; 9:17, Anniversary program of the Children's Radio Health and Toothbrush Club of America; 10:30, Dance program, St. Paul Athletic Club Orchestra.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Missouri Pacific Booster Club.

WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m., Lyon & Healy program; 9:00, Chicago Theater Revue.

WOAW, Omaha, Nebr. (Central, 526), 6:30 p. m., Dinner program, Blackstonian Orchestra; 9:00, Program under auspices of Omaha Printing Co., Mrs. Ernest A. Reese; Frida Paustian; Mable Doolan; Anne Coughlan; Theo. Rud. Reese; Earnest A. Reese; Mrs. Leo A. Hoffman; Chas. Suber; Chas. R. Docherty.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "The Manufacture of Silk," C. C. Hall; 5:45, Chimes; 6:30, Sandman's visit; 7:00, "Just Dad," Mrs. E. Mildred Light; 0:00, P. S. C. Orchestra; V. B. Rochte, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m., Program especially arranged for children under direction of Harry A. Schulman, Pres. of the National Stage Children's Assn. & Dr. Winifred Sackville Stoner, director of the "Kiddies' Theatre"; 6:15-7:15, "Music While You Dine," Joseph Adoff and His Orchestra; 7:15-7:30, Fred J. Bendel, Sporting Editor of Newark Morning Ledger; 8:00-8:45, Gene Ingraham's Hotel Renwick Club Orchestra; 9:00-9:15, Humorous talk by Jesse Lynch Williams, author and playwright; 9:35-9:50, Mr. Dougherty (Music Trades); 9:50-10:05, May Barron, contralto, assisted by Marstro Line; 10:05-10:15, Arline Foster in a talk on "Interviews with Men of Achievement"; 10:25-10:45, May Barron, contralto; 10:45-11:00, Gertrude Bronenkant, soprano.

WTAM, Cleveland, Ohio (Eastern, 390), 9:00 p. m., The regular Saturday evening dance program by the WTAM Orchestra; Vocal numbers by favorite artists.

Sunday, January 13

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., L. A. Church Federation Service; 4:00-5:00 p. m., Church musicians; 6:45-7:30, Opera story and Coral Atkins; 10:00-11:00, Theron Seonell, Packard Six.

KHJ, Los Angeles, Calif. (Pacific, 395), 10:00 a. m. Sermon, 10:30-12:30 p. m., Organ recital and entire religious service from First M. E. Church, Rev. E. E. Helms, pastor, Arthur Blakeley, organist; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, De Luxe program.

KPO, San Francisco, Calif. (Pacific, 423), 11:00-12:15 p. m., Church services, Dr. R. J. Craig, director; C. H. Cannon, tenor; 8:30-10:00, Rudy Seiger and his Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:00 a. m., Central Church Service, Orchestra Hall, Dr. F. F. Shannon, pastor; 8:30 p. m., Excerpts from the New Testament—An American Translation, Prof. E. J. Goodspeed, William Ziegler Nourse; 7:00, Chicago Sunday Evening Club.

WBAP, Fort Worth, Texas (Central, 476), 11:00 a. m.-12:15 p. m., Church services, First Christian Church, Rev. L. D. Anderson; 4:00-5:00, Concert, Rialto Theater; 5:00-6:00, Vesper concert.

WDAP, Chicago, Ill. (Central, 360), 9:15 p. m., Drake concert ensemble and artists.

WFAA, Dallas, Texas (Central, 470), 6:00-7:00 p. m., Radio Bible Class, Dr. William M. Anderson, Jr.; 9:30, Five-minute talk on Safety, the beginning of Safety Week; 9:25-10:05, Choristers from East Dallas Christian Church, Mrs. Mary V. Cutp, director; 10:05-11:00, Jack Gardner's Orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m., Vesper service, the Rev. Samuel Russell, D. D., First Baptist Church of Buffalo, 4:00-5:00, Robert Munn, organist.

WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., Church services, Emmanuel Baptist Church, Rev. A. W. Rogers, pastor; 8:30 p. m., WGY Symphony Orchestra, Leo Kliwen, conductor; Grace E. Simmons, soprano; 7:30, Services, Emmanuel Baptist Church.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Church services, Broadway Baptist Church, Rev. Dr. Russell J. Pirkey, pastor; 4:00-5:00 p. m., Concert, Bel Canto Quartette.

WHK, Cleveland, Ohio (Eastern, 283), 8:00 p. m., Concert program, the WHK Trio; Ben Silverberg, violinist; Ben Burtt, pianist; Max Schmitt, cellist and director; Miss Luana Van Camp, soloist; 9:30 p. m., Chapel services from the Glenville Presbyterian Church, Rev. A. H. Limouze, pastor.

WJAZ, Chicago, Ill. (Central, 447.7), 6:00-9:00 p. m., Eduardo DuFresne, tenor, Chicago Civic Opera Company; Marion Roberts, pianist; Stella Roberts, violinist.

WHN, New York, N. Y. (Eastern, 360), 2:45-4:30 p. m., Christian Endeavor Program; 5:00-6:15, John D. Flynn of the National Security League, 6:30-0:00, W. H. N. Radio Five; 9:45-11:00, Operatic Program by L. Ortiz, tenor, L. Morracape, baritone, R. Fenwick, soprano, C. Pagnopoulo, soprano, M. Patrollo, soprano, M. Jala, concert pianist.

WDAR, Philadelphia, Pa. (Eastern, 395), 2:00-4:00 p. m., Concert, Arcadia Cafe Concert Orchestra.

WLW, Cincinnati, Ohio (Central, 309), 9:30 a. m., Sunday School services, Editorial Staff of Sunday School Publications, Methodist Book Concert; 11:00, Church Services, Church of the Covenant, Rev. Frank Stevenson, minister; 8:00, Church of the Covenant.

WDAW, Omaha, Nebr. (Central, 526), 9:00 a. m., Radio Chapel service; Rev. R. R. Brown of Omaha Gospel Tabernacle of the Christian Missionary Alliance; 0:00 p. m., Musical Chapel Service, First Congregational Church; Rev. F. G. Gonzales, pastor.

WOC, Davenport, Iowa (Central, 484), 9:00 a. m., Chimes; 1:30 p. m., Orchestra; 7:00, Pipe organ recital; 8:00, Church service; 0:00, Musical program.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., Church services, Central Evangelical Church, Rev. R. W. Herlchampf, pastor.

WWJ, Detroit, Mich. (Eastern, 517), 7:30 p. m., Services, St. Paul's Episcopal Cathedral; 2:00, Detroit News Orchestra.

Monday, January 14

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., "Value of Physical Training and Athletics," Dr. J. Fred Bohler; Bailey's Campus Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 6:00-0:00 p. m., Harold M. Schulteis, organist; 9:00-10:00, Jessie S. Moore, director; 10:00-11:00, Palace Hotel Dance Orchestra.

WBAP, Fort Worth, Tex. (Central, 476), 7:30-8:30 p. m., Concert, pupils of Ola Pitner, pianist; Brooks Morris, violinist; 9:30-10:45, Concert, John Tarleton Agricultural College.

WDAR, Philadelphia, Pa. (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy with boys and girls.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gumph, harpist; Katherine Stang, violinist; 6:30-7:30, Vincent Lopez Hotel Statler Dance Orchestra; dinner music; 7:30, Digest of the day's news; 9:00, Concert, Ambroskos' Orchestra, direction of Glen Schulmeister, director.

WGY, Schenectady, N. Y. (Eastern, 380), 7:45 p. m., Program, Alco Male Quartet, Frank Hopwood, violinist; Address, "Bridges," O. C. Traver.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; "The Largest Aspect of World Affairs," Frederick Dixon.

WHAZ, Troy, N. Y. (Eastern, 380), 9:00 p. m., Concert of operatic numbers, Captain and Mrs. Albert Geiser, director; "Telephone Courtesy," Harry F. Carroll; 12:00 m., Late program; Rensselaer Polytechnic Institute Students' Symphony Orchestra and Glee Club.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:30 p. m., Colonial Inn Orchestra, Tom Hanks, leader; 7:30-8:15, Lannin's Roseland Dance Orchestra; 8:45-9:00, Dorothy Wallace Fortingall, saxophone and vocal solos.

WIP, Philadelphia, Pa. (Eastern, 509), 6:05 p. m., Dinner music, Frank Winegar and his Pennsylvanian Orchestra, 7:00, Uncle Wip's bedtime stories and roll call.

WLW, Cincinnati, Ohio (Central, 309), 8:00 p. m., Justin Huber Orchestra; A Demonstration of Telephone Switch Board Connections, N. E. Westlake, assisted by eight regular operators, with Marie Miller, lecturer; Philip Drolfus, violinist; Marjory Garrigus, pianist.

WMC, Memphis, Tenn. (Central, 500), 8:00 p. m., Lecture, Edward H. Griggs.

WOAW, Omaha, Neb. (Central, 526), 6:30 p. m., Dinner program, Randall's Royal Orchestra; 9:00, Musical program; Hotel Fontenelle Concert Orchestra.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 5:45 p. m., Chimes; 6:30, Sandman's visit; 7:00, Lecture; 8:00, Musical program, Erwin Swindell, director.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 5:15 p. m., Organ recital, Mary E. Vogt; 7:30, Dinner music, Hotel Adelphia Orchestra; 8:00, Ralph Bingham; 9:15, Erno Rapee and his orchestra; 10:30, Dance music, Hotel Adelphia orchestra.

WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m., Landau Serenaders of New York; 6:15-7:30, Harry Cox and his Hotel Robert Treat Orchestra; 8:00-8:15, Mr. McCaker on "Current Motion Pictures"; 8:45, Mr. McCaker on "Radio Cartooning"; 9:00-10:00, 0:00, Hill Stelnks, 10:00-11:00, Manhattan Serenaders, Phonograph Trio; 10:00-11:00, Manhattan Serenaders.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., Program, Missouri State Farmers' Week, Address; Pres. Stratton B. Brooks; "Farm Homes Across the Water," Mrs. Izolta Jewel Brown.

INTERNATIONAL CODE

(Continued from page 11)

over again in a sense, and learning to receive words and phrases instead of letters. The word habit will cause many mistakes at first, but after some practice it will not only be simpler but far more accurate. Copying with a typewriter, commonly known among telegraphers as "the mill," is much faster and I recommend its use after the student attains a speed of from 15 to 18 words per minute.

Learning to send is much easier than learning to receive at first because the fingers always know just what to do. Place your fingers lightly on the key and make the movements with your wrist, never attempt what is known as "nerve" sending with the fingers, because after a few minutes your hand will become cramped and you are unable to make a perfect letter. Progress with the wrist movement will be much slower at first, but in the end the wrist movement is the speedier. A perfect wrist movement will enable the operator to send for hours without fatigue.

After about two months' practice, the hand is learning to send words instead of letters and is busy learning the trains of action which form common words. A most common train of action noted in our everyday life is when we dress and undress. The victim of such absent-mindedness has formed a train of action in dressing and undressing. He has followed this train in the same way for years and when he once starts his mind on his train of action he will continue without conscious effort to dress or undress.

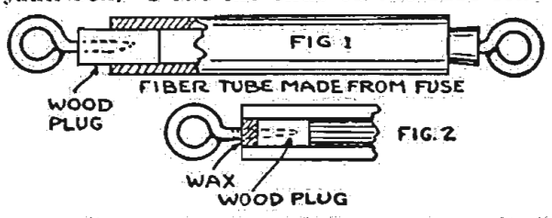
Muscles in Hand Learn Words

In the same way, the muscles of the hand learn to send common words in code; the operator has only to think the word and his hand ticks it out. Short common words, such as the, what, in, and when, are learned practically from the beginning. Words ending in "ing" "ion" become automatic. After long training the hand has acquired an extensive vocabulary of words it sends in trains. After a certain point is reached in training, sending is learned much slower than receiving, because the mind can be trained to work much faster than the fingers.

It's a young man's game. Young men between the ages of 16 and 21 usually learn much quicker than those older. Our best operators today are men who began learning when they were 12 to 15 years old. I, myself, learned the Morse alphabet at the age of 10 years. Men, after they pass the age of 30 before learning the code, seldom if ever make any progress to speak of. However, there are a few exceptions.

Aerial Insulator

In repairing my antenna the other day after a storm I found that one of my insulators had broken and there were no extras on hand. I found a telephone fuse having two screweyes in the ever-ready junk box. I cut the ends of the fuse leaving a fiber tube about 3 inches long, then drove two wooden plugs into the ends to hold the screweyes as shown. This proved quite satisfactory in holding its share of an antenna 100 feet in length. An improvement would be to drive in the plugs for about ¼ inch and pour in some battery sealing wax to make the insulator waterproof.—Lee Duncan, Berrien Springs, Mich.



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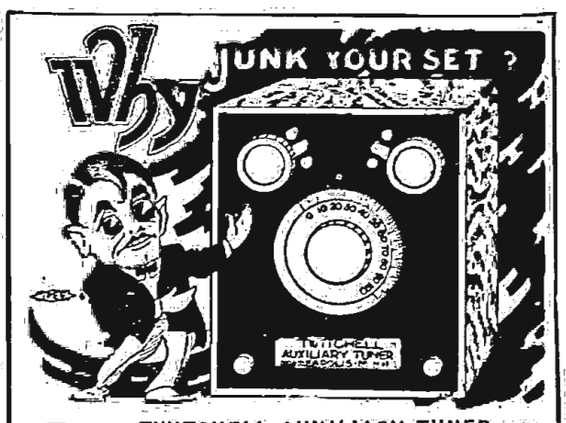

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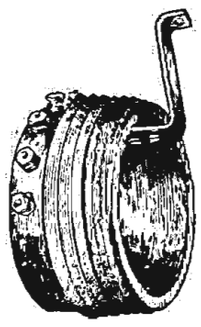

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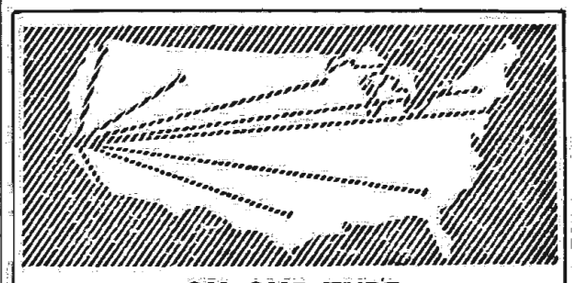

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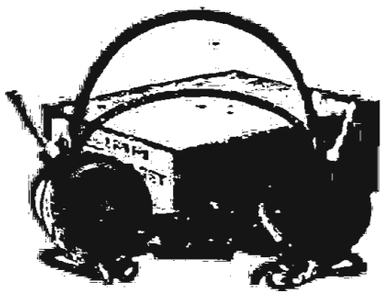

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Simple Explanation of Radio for Everybody

Chapter VIII, Part II—Regeneration

By M. W. Thompson

THE following article is the sixteenth of a series for Radio beginners, written by Marvin W. Thompson, well known in airphone circles for his understandable style of approaching his subject. The remaining chapters will be:

Chapter IX—Audio Frequency Amplification.

Chapter X—Loud Speakers.

TO get the benefits of regeneration a compromise must be effected. The circuit consisting of S, C, GC, GL, G, and F has a certain resistance which tends to prevent high frequency current flowing through it. Our regenerated energy, W plus X, just offsets this resistance, and there being no more resistance to oppose the components Y plus Z, they oscillate (swing back and forth) in the circuit at an undesirable frequency and create the undesirable squeal. Our compromise consists in so adjusting the relationship between the coils T and S that not quite enough energy is brought back into the grid circuit to offset the resistance mentioned above; in other words, we want to keep the energy W and add only part of Z. Thus our current in the secondary is stronger than originally passed into it from the primary of the variocoupler, but is not quite strong enough to get beyond control and cause a squeal.

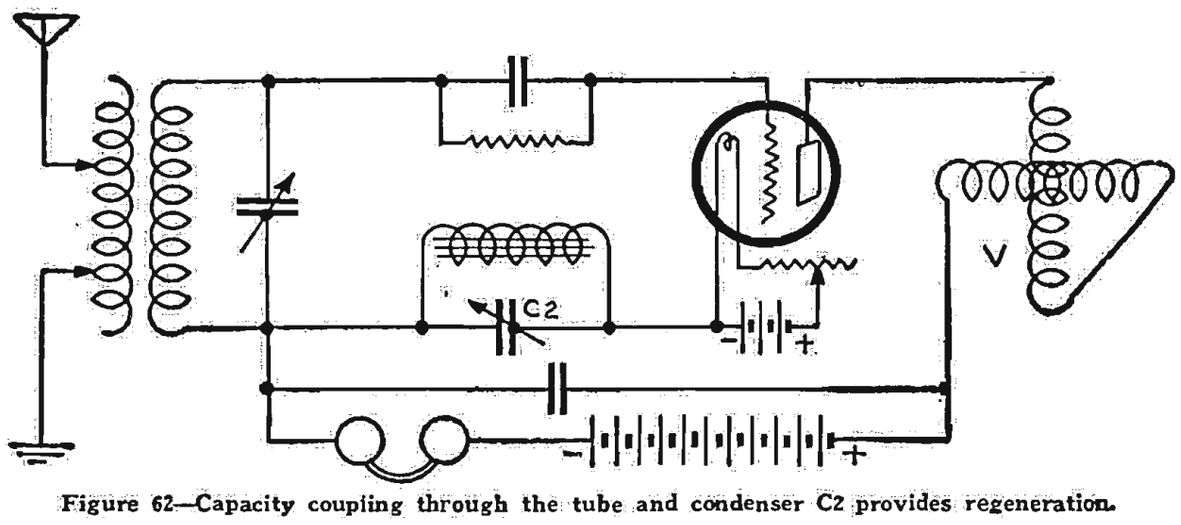

Figure 62—Capacity coupling through the tube and condenser C2 provides regeneration.

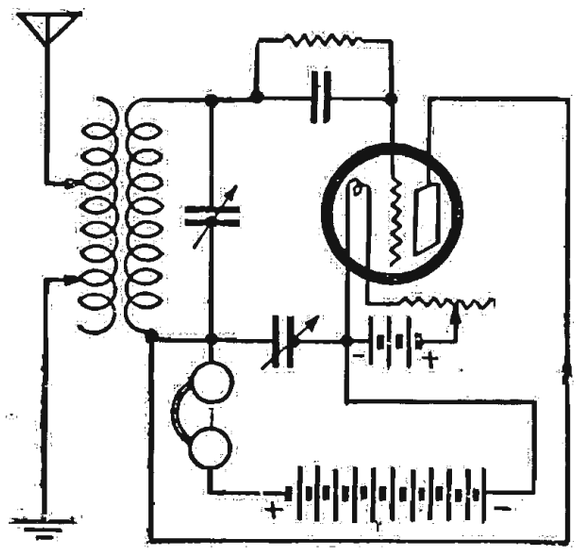

Figure 63—Regeneration by capacity coupling without using capacity between plate and grid.

Capacity Coupling

Regeneration is gained in the circuit shown in Figure 61 by coupling the plate circuit back to the grid circuit by electromagnetic coupling. Regeneration can also be secured by coupling these two circuits electrostatically (by capacity). Such a circuit might appear as in Figure 62. Here we have the plate circuit tuned to resonance with the grid circuit by means of the variometer V, and when this is done, the Radio frequency component of the plate current will pass back into the grid circuit through two capacities, the condenser C2 and the capacity existing in the tube between the plate and the grid. Regeneration, in this case, is controlled by the variometer and the variable condenser C2.

A variation of the ultraudion circuit, as shown in Figure 63, presents another method of capacity feedback. In this case, the capacity of the tube is almost negligible and the variable condenser across the phones and B battery, and also in the grid circuit, plays the prominent part. The tuned plate circuit shown in Figure 64 is an example of capacity coupling which is the reverse of the method shown in Figure 63. Here no external condenser is provided to couple the circuits, but when the plate circuit is brought into resonance with the grid circuit, the Radio frequency component of its current passes back through the condenser formed by the plate and the grid within the tube and strengthens the incoming signals exactly as though electromagnetic coupling were used, as in Figure 61.

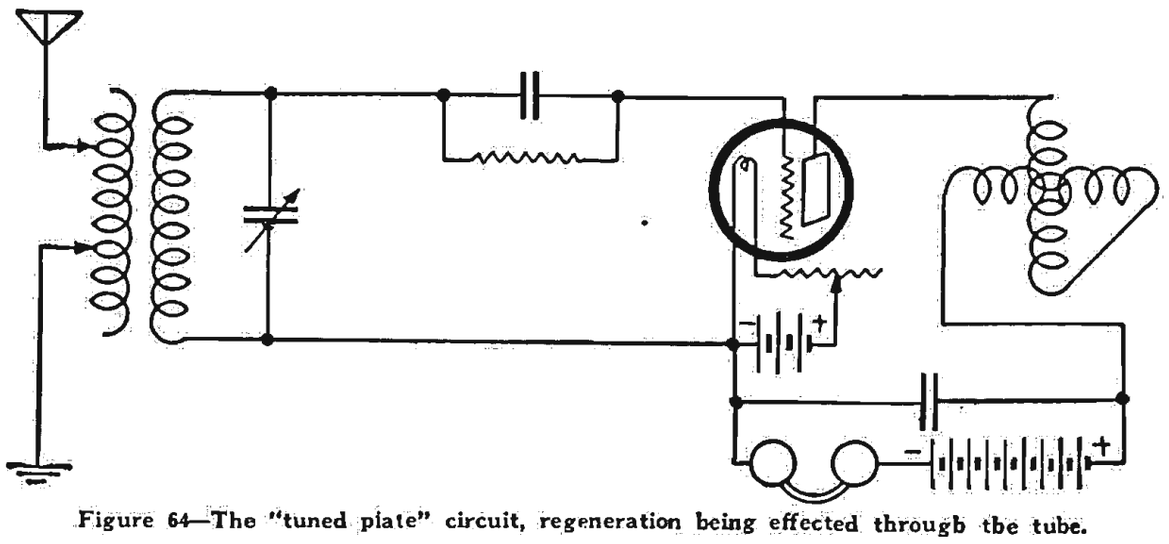

Figure 64—The "tuned plate" circuit, regeneration being effected through the tube.

Combining the Two

Electromagnetic coupling and electrostatic coupling can be combined and both made effective, as shown in Figure 65. This circuit is much the same as that shown in Figure 61, but a condenser has been shunted across the third or feedback coil. It acts to tune the plate circuit so that the circuits are brought into resonance, and capacity coupling through the tube becomes effective in addition to the regeneration obtained through the coils.

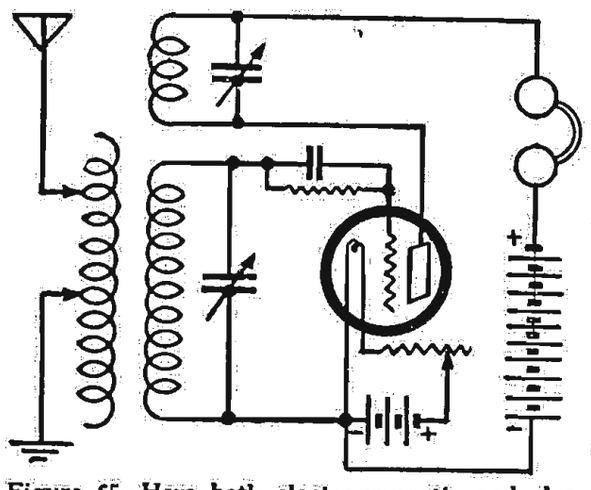

Figure 65—Here both electromagnetic and electrostatic coupling are used to get regeneration.

A variation of the tuned plate circuit shown in Figure 64, and used in many receiving sets, is shown in Figure 66. Here the variable condenser across the secondary coil has been replaced by a variometer connected between the grid

(Continued on page 20)

RADIO "B" BATTERIES

At Factory Prices

Greatest Radio "B" battery on market. Full number voltage taps; QUALITY GUARANTEED; LOWEST PRICES; brings in concerts LOUDER AND STRONGER; will work on any tube or loud speaker. Order by number TODAY with check, money order or pay postman C. O. D.

No. 322B—22½ volt, variable, regularly $2.25 ..... $1.52
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No. 345A—45 volt, 8 taps, regularly $5.50 ..... $3.25

AYRES BATTERY CORPORATION, Cincinnati, Ohio

2-LO, LONDON, ENGLAND

ON ONE TUBE

Another Record for the

ELGIN SUPER-REINARTZ

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

ELGIN RADIO SUPPLY CO.

207 Chicago St. ELGIN, ILL.

Good News for Set-Builders!

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11 Plate Vernier Condenser with 4" bakelite dial and knob $4.95
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4" Bakelite Dials 95c
Bakelite Sockets 55c
Grid Condensers 55c
Double Mountings 60c
Transformers (high or low ratio) $2.95

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Our new catalog illustrates and describes 10 complete receivers and lists the parts to build them. It contains over a thousand radio bargains which, because of our enormous buying power, have not and can not be duplicated elsewhere.

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Vol. VIII Chicago, Saturday, January 12, 1924 No. 1

Courtesy of the Air

Broadcasting Has Developed in Usefulness

THERE seems to be a great similarity between certain stages of development in the history of the automobile and the present conditions of Radio broadcasting. When the automobile was first introduced there were no special rules governing its operation on the public highway. So long as these new vehicles were comparatively few in number there was little need for legislation.

Radio broadcasting has developed in usefulness and popularity much more rapidly than did the automobile, but the same stages of development may be seen.

With only a few broadcasting stations and a comparatively few listeners, there was little need for new legislation or changes in the methods of regulation. The air was practically free and its use unrestricted.

The rapid increase in the number of broadcasting stations and the phenomenal popularity of Radio broadcasting have brought us serious problems, which, like those of the automobile industry, originate in thoughtlessness and selfishness.

No one will deny that there is interference in abundance, nor that rights of others are frequently ignored, both by broadcasters and by those who listen in. Some of these spring from sheer selfishness—much of it from pure thoughtlessness.

Whether from one or the other of these sources, the situation can be greatly improved by an educational campaign, emphasizing the necessity of observing the courtesy of the air.

Keep the Good Work Going

Bureau of Standards Needs Money for Advancement

THE Bureau of Standards is putting forth every effort to advance the cause of both commercial Radio and broadcasting, but because Congress has repeatedly refused to increase the appropriation for this work it has been compelled to slow down, and a compulsory cessation of its endeavors is rapidly approaching. The Government desires to continue this work, which is so beneficial to all of us who are interested in the manufacture, sale and use of Radio receiving and broadcasting apparatus, but its hands are tied for the lack of funds.

Your representatives in Congress have it within their power to supply these funds, and are certain to abide by the will of their constituents. Let these men, or women, know you appreciate your Government's efforts to foster Radio, and point out to them the vital need of additional funds for this work.

Radio broadcasting in this country has reached a point far in advance of that in any other country, a condition brought about to a great extent by the broad and far-reaching policies adopted by our Government. Our Navy was the first agency to grasp the great importance of Radio communication, and, during the first stages of Radio, allotments of both money and talent were set aside for its development. Soon afterward the war department formed an organization in the Army service for the development of portable Radio transmitting and receiving equipment adapted for field operations. While this development progressed, several commercial interests established engineering and operating organizations, applying this new art to merchant marine requirements.

International Radio conventions have been called by various foreign nations, and our Government has sent delegates, who have guarded carefully American Radio interests to such an extent that our progress has not been hampered. As a matter of fact, America has been able to establish itself in a position far in advance of any country in the world.

At the close of the War a new Radio power came into existence, the broadcasting of concerts, and the phenomenal progress of this particular class of communication is appreciated by millions of citizens. The commercial branches of the Government have attempted to keep up with the growth of this new development by bringing into effect proper legislation and inspection to permit the listening public to enjoy the concerts to the fullest extent. The constantly increasing demand for scientific investigation, for inspection and legislation has completely swamped the limited personnel available, a condition that quickly will result in America's loss of her position as a leader in the Radio art.

RADIO INDI-GEST

For Henpecked Husbands Only

I HAVEN'T HAD A CHANCE TO TELL YOU MUCH LATELY SINCE STARTING TO BUILD A MULTINUT DEJECTION SET. BUT THE OTHER DAY A SOCIETY CLIMBING FRIEND OF MINE TOLD ME THAT HE WAS GOING TO GET A DIVORCE SOON AND BEING CURIOUS I ASKED HIM HOWCUM HE WAS GETTING A TRANSFER FROM MATRIMONY TO THE HORRORS OF ALIMONY. THEN HE UNFOLDED HIS PLAN WHICH WAS HE WOULD FALL IN LOVE WITH HIS RADIO SO MUCH THAT HIS WIFE WOULD GET JEALOUS AND DEMAND A RELEASE FROM HIM, THE SET OF COURSE BEING NAMED AS CORESPONDENT. THANKS FOR THE IDEA? WHY, YOU'RE ENTIRELY WELCOME, HELP YOURSELF.

GOO GOO.

Easy, That's Station BVD Calling You

dere indigest—i mad me a supper degenerativ radeo & hiched ut 2 the tub & got wash d c rite awa but thar izza rubbin soun in ut izzut becoz the wash bord izzin the tub? wen i tak the wash hord awa ut hollers (i meen the radeo hollers not the wash bord) wat izzut hollerin fur? & than i tid the radeo 2 the close lin but ut want wurk gud excep on munday wil u all ples 2 let me no wat izzut the trubl & ohlig urs trule

WILL KANOT WASHOUT ARK.

Why I Built a Loud-Speaker

Ever since I was sixteen
I've had a One-Tube Reflex Queen
With which, like every B. C. L.,
I'd get New York, and DX as well,
Until one Wednesday night last June
The Browning King jazz got in tune
And I called in my pretty Jean
To hear a band she'd never seen.
I put the ear-phones on her head,
She listened some, and then she said,
"Oh my, I'll say that this is grand!"
Quoth I, "Well yes, it is some band!"
And then she mentioned how romantic
'Twould be to trip the light fantastic
In time to music from the air
But not with ear-phones in her hair!
Well, I saw the point all right,
And started building a horn that night.

J. L. RIFKIN.

The Tale of a Bird with a Wail, Help! Help!

Indi-Gest: I beseech you to tell me what to do with my wife's parrot, Lucifer, which has become a confirmed Radiophan. We had him confirmed when he was young, but I don't think it took, on account of his name.

It was like this. Recently we were sitting at home and I had just tuned in my Stebbins Model k for BLAH, when I heard what I took to be someone rapping on the back door, and was not surprised to find no one there. I traced the knocking to Tige, the collie, who had treed a flea just back of the front shoulder blade, and was bumping the floor with his hind elbow (or knee), and having about as much success as the federal officers do in dislodging the bootleggers. Well, believe you me, or call me a liar (I won't hear it), that Lucifer bird was sitting on the horn of my loud speaker patting his foot to a south sea lullaby from BLAH when I got back, and I quickly whirled the knobs chopping BLAH off, with a long wailing shriek. Lucifer has never forgotten that selection, and reproduces it ceaselessly, even to the dying wail where I threw it out of clutch. I am sending the dollar by express, as I want a receipt for it knowing you will give me as much or more than its value in advice.

VERR NEAR OUTTE.

Did You Ever Try Maggie's Pies?

Dear Indi: I realized at once upon seeing the picture of the Mystery Man of the Miloplex that he must have criminal instincts, but I never would have believed he would have been featured in the Chicago Daily Tribune thusly:

"MYSTERY MAN" GETS BLAME FOR LABOR MURDERS

Perhaps it was a result of indigestion caused by some of Maggie's pies.

STEW BAD.

But Our Ground Hog Beats All

Dear Indi: I picked up a Digest the other day in which it mentions an air-dale, also a dial-pointer (both dogs). I would like to say that I also have a set-ter. S'orful ain't it?

MIKE ROFARADS.

Try This on Your Bucket Brigade

Dear Indi-Gest: Bill Sparks of Pumpkin Center bought a Radio set and the first thing he did was to tune in the Sweeney Automobile School and the fire siren came in so loud that the bucket brigade run all over town looking for the fire.

DRY CELL.

Condensed

By DIELECTRIC

Good news comes from Belgium. King Albert has laid the cornerstone of a Radio station at Ruysselede that will have sufficient power to communicate with all the big stations of the world. Evidently Poland is not to have all the eyes of Radiodom focused upon her indefinitely, if the Belgians can help it. In addition to the station mentioned, a relay station is to be built on the outskirts of Brussels able to receive three stations at once. When the recent trans-Atlantic test was held, we in this country strained every nerve to catch any sounds coming from the British Isles. Next year our broadcasting may be received at this new station in Belgium and we may be holding our breath while trying to pick up music from the Ruysselede station. Yes, before long each civilized nation will be observing "silent periods" at regular intervals to allow broadcasting from other countries to be heard at home. Today will then seem a long way back.

Many a story has been written about shrewd men with more cunning than honesty who have succeeded in swindling a certain portion of the unsuspecting public out of much of their hard-earned savings. These exposés have perhaps done some good in directing attention to a nefarious practice, cautioning against hasty acceptance of what may seem at first glance a perfectly safe investment. Now comes Radio to lend its valuable aid in further warning on the subject, and here we have concrete evidence of its being heeded and used by an increasing number of listeners in to stations which broadcast information on stock swindling schemes. WJAX, the Union Trust Company of Cleveland, Ohio, has been making rapid strides in this.

There probably is no man whose name is more closely associated with Radio than Senator Guglielmo Marconi, noted scientist and inventor. His associations with prominent men on this side of the water have been most cordial, and he has been a frequent visitor, getting from them ideas which have been specially considered by our leading Radiotricians. From latest reports it is evident that the Senator has been developing a means of transmitting Radio messages so as to conserve power at its source and increase it at the receiving end. This is to be done by sending the electromagnetic waves in a given direction instead of in all directions, as is now the case. It has been a common practice to laugh at the announcements of long distance records said to have been made by owners of crystal sets. Let them beware! It is likely in the mind of this inventor, to be a possibility for crystal sets to glory in competing with their newer rivals, the tube sets, for picking up British broadcasting stations. Think of it! The set with a fifteen-mile radius bringing to the ears of their owners strains of music and speech from merry old England. What of the monopoly on tubes?

Not long ago, I was tuned in to a church service where the minister was directing his remarks to the necessity of directing the attention of the world toward some means of establishing permanent peace on earth. The gist of his conclusions was that to do this would require a "league of religions"; wiping out creedal differences and working from a common acceptable statement of belief. Just how difficult such a procedure would be is easy to imagine. However, some step in that direction appears to be looming up at the present time. It is reported that the Vatican will shortly be "on the air" with words that may carry to most of the civilized nations. Many Protestant churches in this country have for some time broadcast entire services, which men on ships and in the far isolated sections of the land have heard. A concerted effort to reach all listeners has been considered by the representative Protestant body, the Federal Council of Churches. Hence, there may be now under way the means to attempt a "league of religions."

Selective Three Tube Single Circuit Receiver

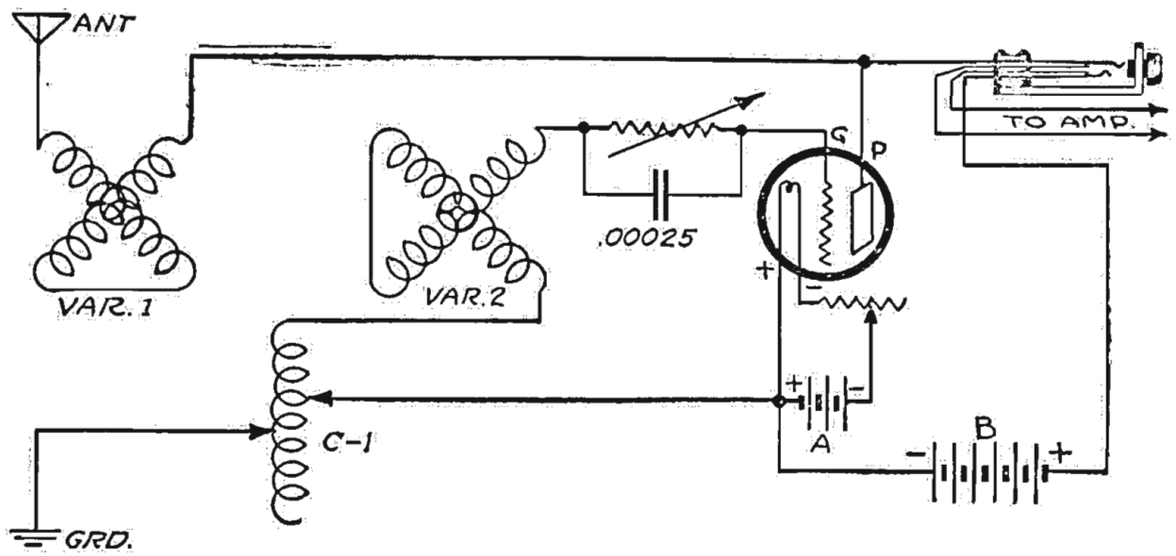
Part II—Construction of the Circuit

By Fred Grill

THIS second article of the series will deal with the construction of the Grill circuit, with the addition of a two step amplifier.

LIST OF PARTS

2 Variometers and dials.
1 Inductance.
2 Switch arms, 14 contacts, 2 switch stops and 8 binding posts.
3 Rheostats, 1 vernier, used for the detector tube.
2 Audio transformers.
3 Sockets.
3 Jacks, 2 double circuit and 1 single.
1 Grid leak condenser, 1/5 megohms, .0025 condenser.
1 .001 Fixed condenser.
1 C battery, 3 to 6 volts.
1 Cabinet and panel, 7 by 24 inches.
2 Shields, size depending upon variometers used.



Let me say at this time that you should take extreme care in selecting your apparatus and be sure that you get only reliable makes. Do not allow the Radio clerk to persuade you to take this instead of what you ask for, nor accept his explanation that "It's just as good," or "I found this to work better," etc. I do not want to be misunderstood. I am not saying that because a part is not manufactured by the best Radio companies it is no good. Many parts of excellent merit are being made and sold by small independent concerns, but the average Radiophan is not able to distinguish between the good and bad makes of apparatus. His only proof is in the appearance, and surely in Radio appearance will fool the wisest of experts.

Arrangement Essential

Follow as near as possible the plan of arrangement shown in the pictures that appeared in Part I. The writer found that the spacing and the general arrangement shown there is the best. That is, to the extreme left is placed the grid variometer, the inductance next and the plate variometer is separated from the inductance by about 1 inch. Following the plate variometer is the detector tube and then the two steps of audio amplification. In constructing the amplifier one should be careful that all leads are as short as possible, and care should be taken also to sec that the C battery that is placed in the last stage is enclosed inside of the cabinet in order to get a minimum of wire in the grid circuit. The negative of this battery should be placed on the grid binding of the tube, while the positive is connected directly to the secondary of the transformer. The .001 fixed condenser should be placed across the last jack. These two accessories tend to give increased volume and clearer signals.

Sockets to Be Used

The sockets are optional, but the author recommends gang sockets made of a good grade of bakelite. These sockets require a minimum of space and also aid in making short connections. The inductance is a tapped coil of 60 turns of wire. It is wound on a tube 3½ inches in diameter. Taps are taken at the 1st, 10th, 20th, 30th, 40th, 50th and 60th turns. These taps are run to two switch arms. One of these switch arms is grounded, while the other completes the grid circuit.

Procedure in Construction

The builder should first take a panel made of wood, and lay off all of his apparatus correctly. Next he should take this panel and lay it directly over the bakelite one and mark all of the holes that are to be drilled. After all the apparatus is mounted, start to hook up the set. Wire from the left to the right, finishing at the last audio stage. After all connections are in place the set should be given a trial. If satisfactory results are obtained, solder all connections. Do not flood each connection with solder, but use just enough to hold the parts together. If acid is used in soldering, care should be taken so that none is spilled on the inductance, because should this happen the coil would be short-circuited and then you might wonder why the set will not work.

Tubes

If a UV-200 be used for detector the grid leak will be very critical. This tube should be used for those interested in the distance possibilities of this circuit. For all-around use the writer found the VT-1 to work the best. The UV-200, 201, 201-A, 301-A and Morehead tubes have been tried, but the best for detector, as said before, is the VT-1, which is at present almost extinct except in some localities. For the amplifier VT-2's have been found to work best, although the 201-A has been used with very satisfactory results.

Characteristics of Circuit

This set, while I make no extravagant claims, such as London on the loud speaker, Los Angeles on one tube, etc., is

(Continued on page 18)

Don't Waste Your Time

Looking for stations you already had. When you get a station simply copy the readings in a KASPER RADIO RECORD BOOK, then when you want it—IT'S THERE. This book can be used with any set and it is so arranged and printed that each day's broadcastings are kept separate; also contains full illustrations and instructions HOW TO RECORD STATIONS. 25 cents—or 6 for $1.00, postage paid—don't send stamps.

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SPECIAL SILICON — B-METAL

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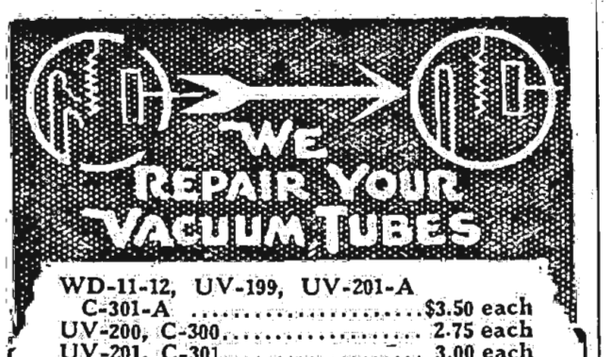

WD-11-12, UV-199, UV-201-A C-301-A ..... $3.50 each
UV-200, C-300 ..... 2.75 each
UV-201, C-301 ..... 3.00 each
DV-6, DV-6-A ..... 3.50 each

All Work Fully Guaranteed

Quick Service—Repaired Tubes shipped C. O. D. unless accompanied by remittance plus postage.

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A-401-A (Type UV-201-A)
A-12 (Type DW-12)
$4.10 EACH

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CARTER "TU-WAY" PLUG

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Tipped or plain cord ends can quickly be connected to the Carter *"TU-WAY"* plug. Can be used with any standard radio Jack. No short circuits, as plug is properly insulated, sturdily built, and will stand constant use. Insulation between tip and sleeve is undercut, preventing particles of brass from collecting on insulation and causing short circuiting.

Carter *"TU-WAY"* plug has become standard equipment with the leading manufacturers after severe competitive tests under all conditions.

Price $1.00

Ask your dealer. Catalog of other Carter high-grade radio products on request.

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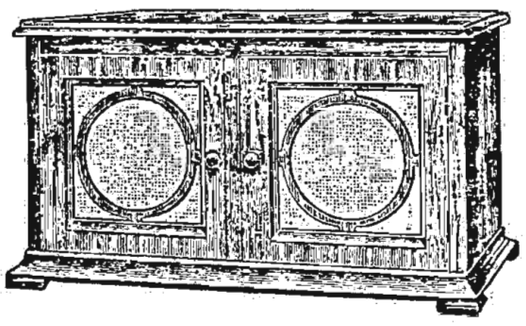


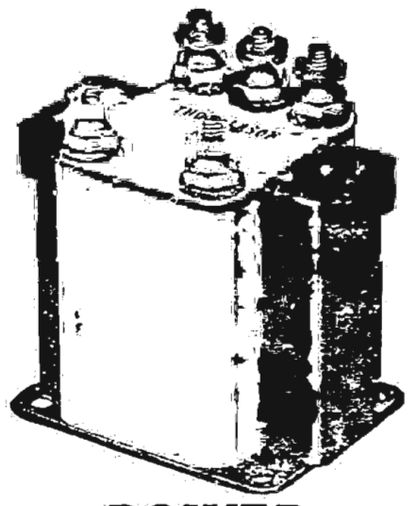
ACE Type 3C Consolette

The Most Satisfactory Radio Set For Real Entertainment

THIS is the last addition to the Ace Family. Has beautiful solid mahogany, wax finished cabinet. Set consists of a regenerative tuner, detector and two stages of amplification with built in loud speaker. Due to the particular method of winding Crosley coils it is exceptionally selective. Has sufficient room inside cabinet for dry batteries making a complete self contained long range receiving outfit. Licensed under Armstrong U. S. Patent No. 1,113,149. Phone jack for tuning with head phones; Crosley multistat; filament switch; engraved Formica panel. Uses all kinds of tubes. An efficient set at a remarkable price, $125.00—without tubes or batteries.

The Precision Equipment Co.
Powel Crosley, Jr., President
127 Vandalia Ave., Cincinnati, Ohio

THORDARSON



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Price per pair, $13.00

The new Thordarson Power Amplifying Transformers (push pull) are designed for use as third stage audio frequency amplifiers, to provide high power amplification for operating loud speaking devices.

With power amplification, not only is it possible to increase volume, but, since two tubes replace the usual one, the distortion and howling which usually accompany the overloading of a single tube on the third stage is done away with entirely.

The Thordarson Power Amplifying Transformers are well constructed electrically and are capable of indefinitely carrying the additional load without breaking down.

In tonal purity these transformers equal the Thordarson Super Audio Frequency transformer whose rich quality and even amplification has made it the popular transformer of the day.

THORDARSON ELECT. MFG. CO.
500 W. Huron St. CHICAGO

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Tube for Tube—the Most Powerful Circuits Ever Built. Write for free Bulletin No. 16.
Electrical Research Laboratories
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Worksman Radio Service
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3.00 Mills 180° Silk Wound 1.95
3.50 Fisher, Large, 90° 2.25
2.75 Fisher, 180° 1.75

VARIOMETERS
$3.50 Workrite $2.95
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CONDENSERS
$2.00 R. C. 11 plate $1.05
2.35 R. C 23 plate 1.35
2.75 R. C. 43 plate 1.65

VERNIER CONDENSERS
$4.00 R. C. 23 pl $2.25
5.00 R. C. 43 pl 2.95

PHONES
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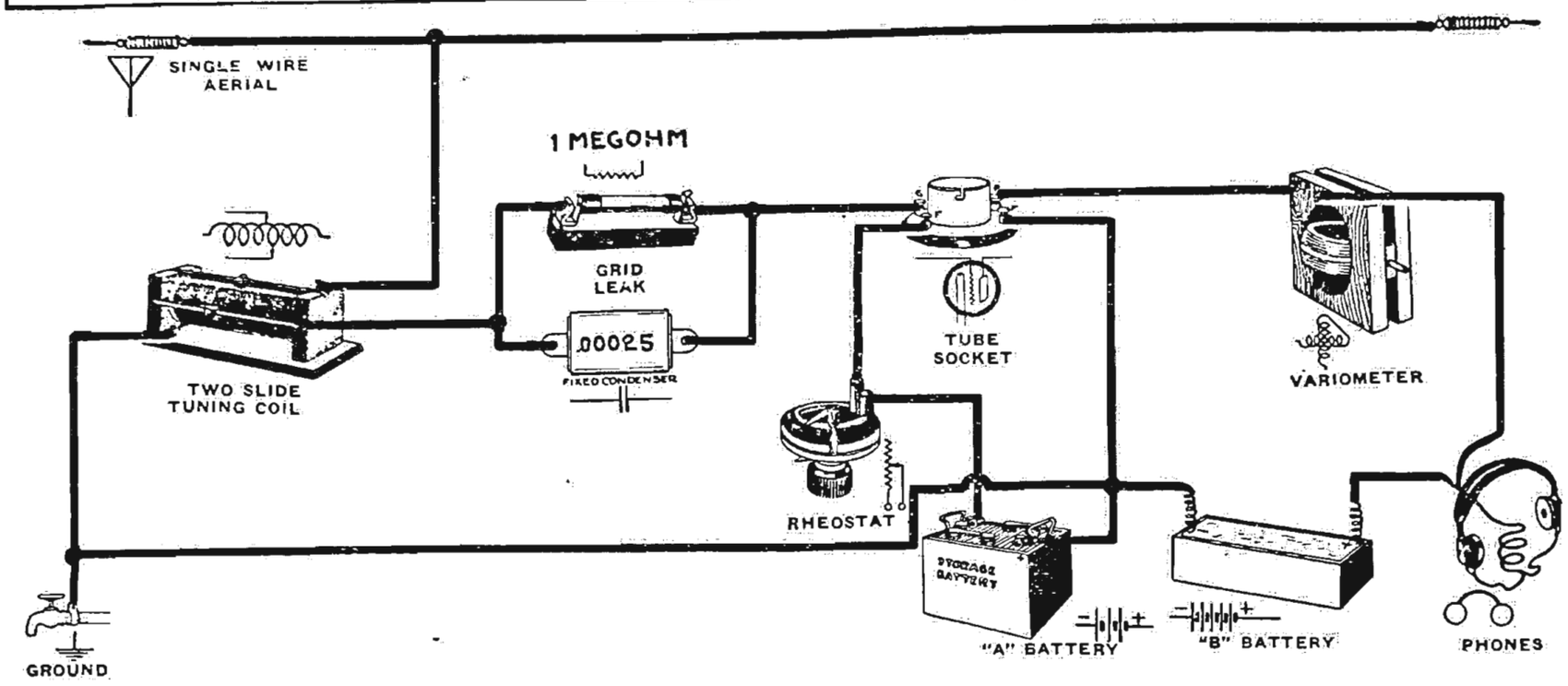
$6.00 Brandes Superior $4.90
12.00 N. & K., Imported 5.50
5.00 Nerco 2.50
Ambassador 3.69
6.00 Potter Precision Headset 4.25
5.00 Diamond De Luxe Phones 3.50

Mail orders promptly attended to. All orders amounting to $5.00 or more will be shipped prepaid. Will ship C. O. D. unless remittance accompanies order.

The above items are just a few of our numerous attractive priced articles, which are contained in our BULLETIN OF RADIO PARTS. Gladly sent to you upon request.

SIMPLEX HOOK-UP WITH A TWO SLIDE TUNING COIL



HERE'S a real simple Simplex hook-up. Just a two slide tuning coil and a variometer with the usual accessories for a detector tube, that is, a 1-megohm grid leak, a .00025 grid condenser, socket, rheostat, battery and a 22½-volt B battery. This, with the phones, makes up your outfit. An 80-ft. single wire aerial, a good ground connection and you're all set to listen in for some real good results. No pretense is made on long distance work, but it is a good reliable hook-up for the fan just starting in, provided he doesn't expect to get 2LO, London, on a single tube.

THREE TUBE RECEIVER

(Continued from page 17)

equal to any audio frequency set of today. That is, it embodies characteristics of many circuits. Selectivity, volume and extreme sensitivity are a combination hard to beat. (See last week's issue for further data in this connection.) I have had quite a few reports and all but one are favorable. This fellow expressed his appreciation of the circuit, but he claims to have been unable to receive the stations using the higher waves. A mere loading of the circuit with two small honeycomb coils should have secured for him the expected results. To this writing an answer has not been received, therefore I am not able to give you his further comment.

Range of Circuit

This set has been used by the author in New York and no difficulty has been experienced in tuning in and out all of the metropolitan stations at will. Such stations as Cincinnati, Buffalo, Cleveland, Washington, Boston, Detroit, Chicago, Indianapolis and Louisville have been heard in the last three weeks. These stations are tuned in during the middle of the evening. After an operator has had some experience he will be able to obtain the same results, and under more favorable conditions much better results will be secured. During a few cool nights many of the above stations were heard on the loud speaker and R-3 Magnavox, and the music and speech sometimes audible for some 30 feet.

Also, this set will appeal to the class of Radiophans that come under the heading of "DX hounds." Not far off are the days when the DX reception will once again be at its height. This year we are looking forward to more remarkable records than were made durir ; last winter. The fan that stays awake until the morning hours will probably feel rewarded when he will find himself able each night to tune in on the "nighthawks" or Denver or Havana.

In the next installment of this series I will give operating instructions and let you know what should be expected from this set when properly built.

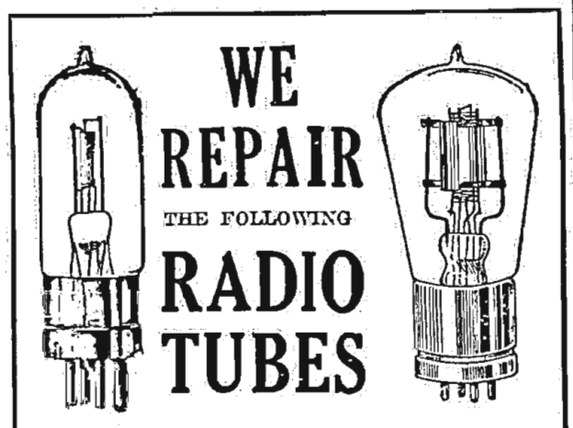
Don't fail to read next week's article which is the third in this series.

(TO BE CONTINUED.)

Spacing Wires

The set builder should always remember that space is the best insulator for the high frequency currents used in Radio. Especially in a multitube reflex set the wires must be kept as far apart as possible. The success of a reflex set depends very largely on well-spaced wiring, for the balance between the circuits is very delicate and interference from one part may completely upset another.

Most people simply open the window, bring the lead-in across the sill and close the window. A short piece of porcelain tubing should be used so as to prevent leakage.



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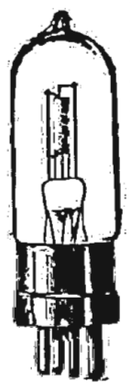

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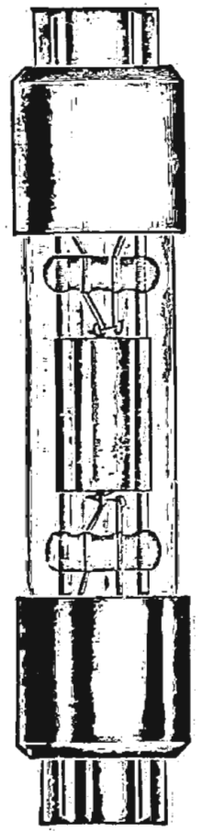

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LET US SAVE YOU TIME AND MONEY

Simple and Efficient Honeycomb Coil Circuits

Part III—Theoretical Efficiency of Coil Windings

By H. J. Marx

IN the previous articles the high inductance value obtained with the low internal capacity effects was considerably emphasized. These facts can be more readily understood by reference to the table of data shown on this page. The question of the gauge of wire used in winding the inductance of any form is more important than may be apparent on the surface. Resistance in any of the apparatus making up the tuning unit of a receiving set is detrimental to the selectivity and therefore to the distance range of that set. Obviously, then, we attempt to use the largest size wire possible in order to reduce the resistance to a minimum. In using the largest size wire the question of the size of the finished article must also receive consideration. For this reason inductance windings require that wire gauge which is as large as possible consistent with a compact, yet not bulky, unit. As the number of turns in the inductance increases, the wire of necessity becomes smaller in size. The special inductance is decidedly more advantageous for the smaller size used for covering the wave length range running to about 1,500 meters. As an illustration, a 25-turn honeycomb coil has a winding cross-section similar to a single layer inductance, but with a lower capacity value. The cross-section has a measurement of about $\frac{1}{16}$ by ¾ inch. The special inductances resemble the bank winding type with a decidedly lower internal capacity value. A cross-section would measure about ¼ by ¼ inch. This form of cross-section gives a much higher inductance value and has the advantage of low internal capacity.

INDUCTANCE DATA

Gauge of Wire Used	Number of Turns	Inductance Millihenrys	Minimum Wave Length With .0005-mfd. Var. Cond.	Maximum Wave Length With .0005-mfd. Var. Cond.	Direct Current Resistance
24	25	.060	105	334	.48
24	35	.120	135	462	.69
24	50	.236	165	645	1.0
24	75	.532	255	972	1.67
25	100	.940	365	1,300	2.9
26	150	2,019	497	1,975	5.95

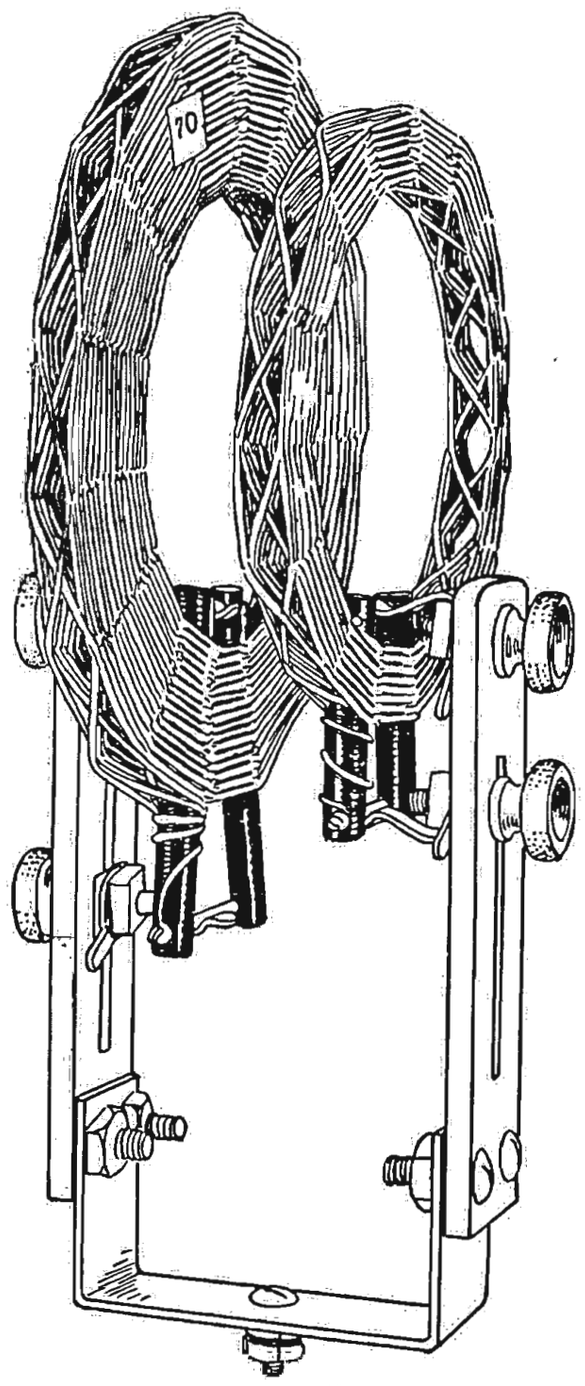

Figure 1.

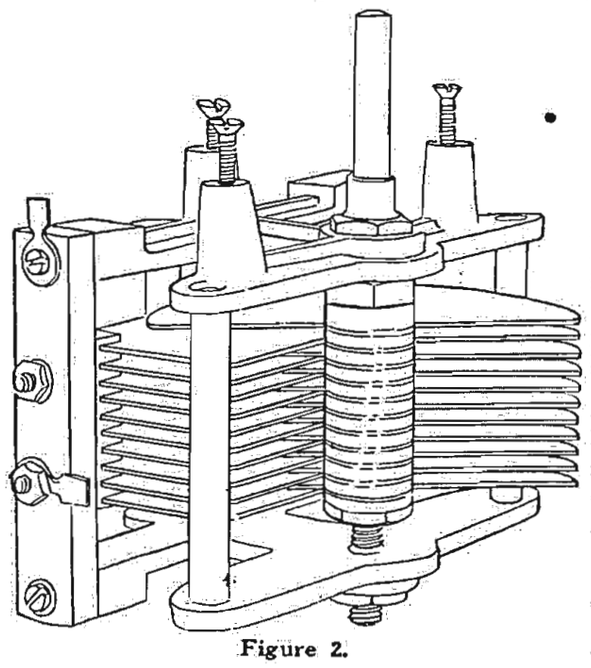

Figure 2.

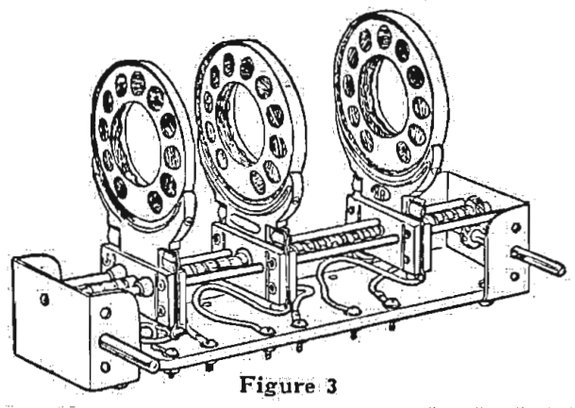

Figure 3

For the higher wave lengths, taking as an illustration a 500-turn coil, the winding cross-section would measure about ¾ by ¾ inch, while in the special inductance it would measure approximately ¼ by 1½ inches. In the larger units, then, these inductances have not the efficiency unless another procedure is followed. That is, for a 500-turn coil, five of the 100-turn coils can be placed alongside of each other, with approximately $\frac{1}{32}$ or $\frac{1}{16}$-inch spacing, and the resultant inductance will be even higher than that of the corresponding honeycomb coils, owing to the fact that its value will not merely be the sum of the inductances, but will be increased by an additional intercoil coupling inductance.

If, then, the same number of turns for smaller units gives better inductance values with a lower internal capacity, their efficiency is higher because in any specified wave length range due to the smaller number of turns required the resistance will be lower.

(Continued on page 20)

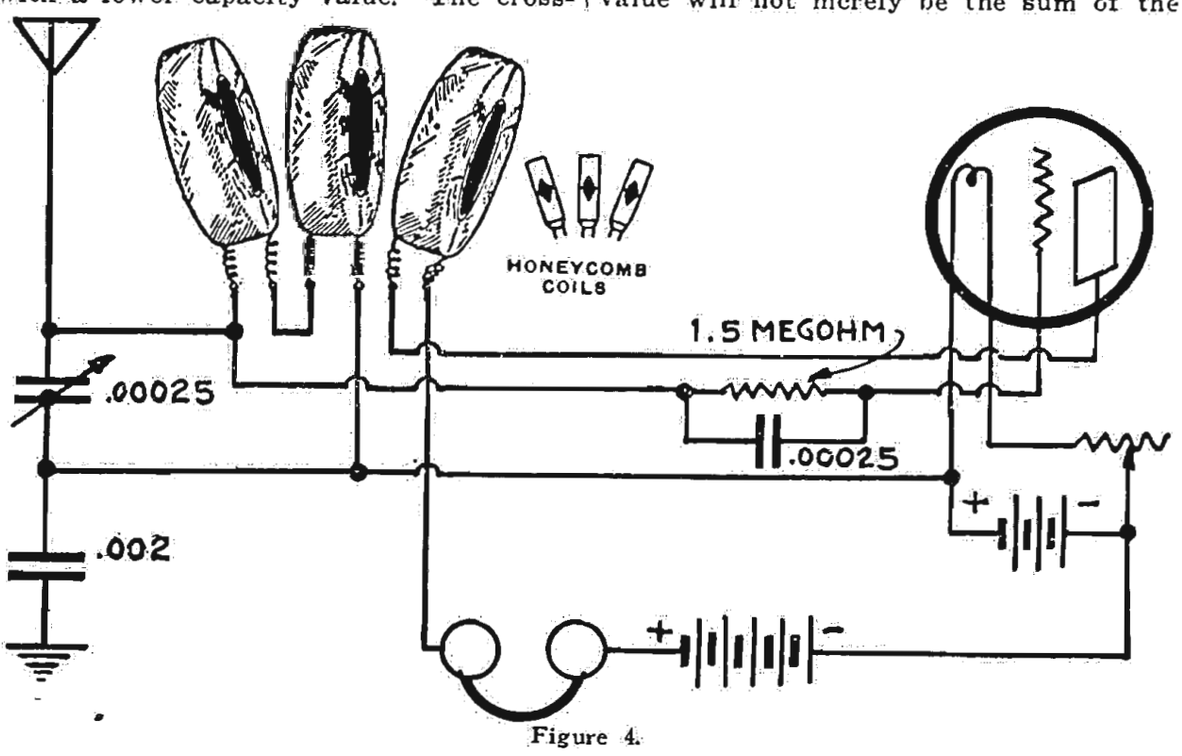

Figure 4.

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(Continued from page 15)

condenser and the end of the secondary coil. Such a method of connecting the apparatus is an excellent one, as the pri-

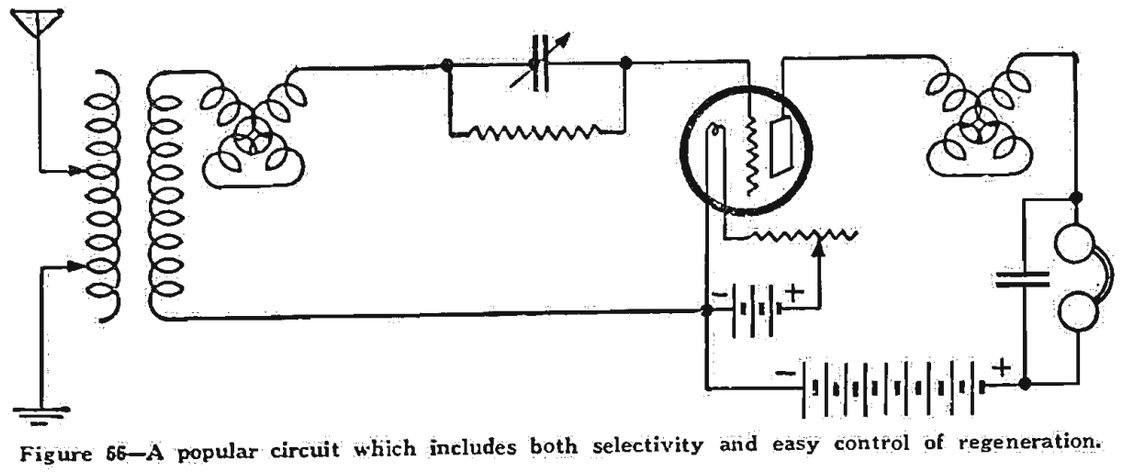

Figure 56—A popular circuit which includes both selectivity and easy control of regeneration.

mary and secondary circuits may be loosely coupled for selectivity, the grid circuit may be tuned to resonance with the antenna circuit and regeneration is easily under control by means of the plate variometer.

There are at least thirty methods generally in use of connecting various units to obtain and control regeneration, but they are all based on the three methods here described—electromagnetic coupling, capacity coupling or a combination of both.

(TO BE CONTINUED.)

H. C. COIL CIRCUITS

(Continued from page 19)

Inductance Comparisons

The inductance data furnished in the table result from some tests on a few of

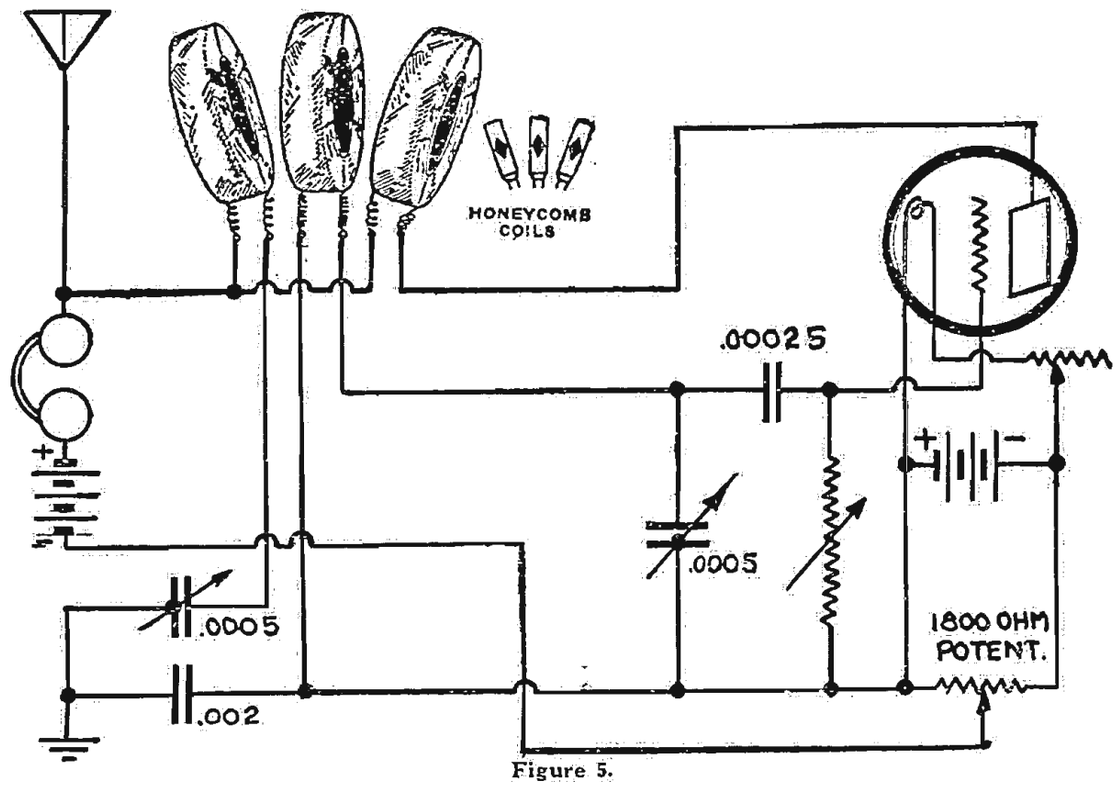

Figure 5.

these units. The values will be found to be correct within a very close margin. In comparison, then, a 25-turn coil will have an inductance of .06 millihenry or 60 microhenrys. A honeycomb coil of the same number of turns has an inductance of 14 microhenrys. A 50-turn coil is probably a better example of a more often used type; an inductance of this size in the special type is 236 microhenrys, compared to 150 microhenrys in the honeycomb coil type. Due to the lower internal capacity, the wave length range will have a much lower minimum value, while the maximum will vary but slightly.

Another interesting feature is the fact that if two 75-turn coils wound with number 24 gauge wire are coupled together, their inductance is as high or even higher, due to the coupling effect, than the 150-turn coil, while the resistance of the two coils will be only two-thirds that of the single coil, which has smaller wire.

The wave length range measurements are based on tests made with an .0005-mfd. variable condenser across the coils.

Radio Frequency Transformer

Radio fans will readily appreciate the distinct advantages possible in using these inductances for air core R. F. transformers. The low internal capacity and low resistance value are two distinct features that do much towards insuring their efficiency far beyond the average. An illustration of the application to this purpose is shown in Figure 1. By varying the length of the clip used for mounting the coupling, the distance between the coils can be varied at will. The mounting is such that different size coils can be conveniently interchanged; consequently the circuit will operate over a wide band of wave lengths using values that give the best of efficiency at the desired point. Not merely can this unit be used for Radio frequency transformers, but also for fixed couplers and similar units.

Efficient Condensers

Much has been said of coil efficiency, but all of this becomes valueless unless the same care and selection is followed for condensers. Their resistance and low minimum capacity values must be carefully taken into consideration. Space is not available for elaboration on condensers in this series, but let it be said that Figure 2 presents a form of variable condenser that is universally known for efficiency. Losses have been reduced to a minimum, due to its design and construction, and the minimum capacity value has been decidedly reduced.

Three Coil Unit

A three coil unit at present on the market, using a very similar form of winding, is shown in Figure 3. This unit is equivalent to a triple honeycomb coil mounting with a better coupling arrangement and using coils that are much better than honeycombs. When mounted in the rear of a panel, two rotating dials vary the coupling distance between the outer and inner coils by means of the geared shafting. Although possibly a little more expensive, the efficiency of the coils and advantages of the units make it well worth the difference in cost.

Two Three Coil Circuits

Two three coil circuits are shown in Figures 4 and 5. In Figure 4 the coils on the left are both 35-turn coils, while the one on the right is a 75-turn coil. A soft tube is used in conjunction with a 22½-volt B battery. In the second circuit the coils should be 35, 50 and 50 turns, respectively. An 1,800-ohm potentiometer permits a more uniform adjustment of the plate potential, while the variable grid leak insures maximum efficiency of tube operation. Here likewise a soft tube with 22½-volt B battery is recommended.

(THE END.)

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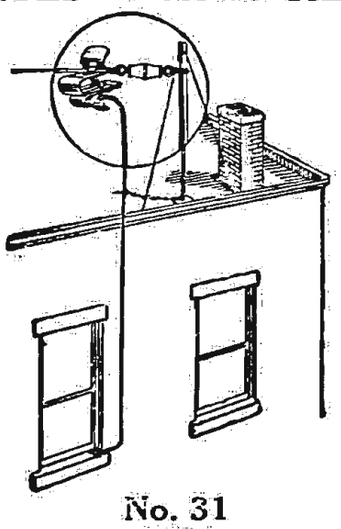

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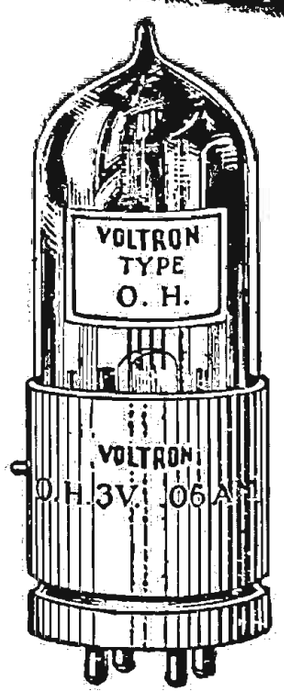

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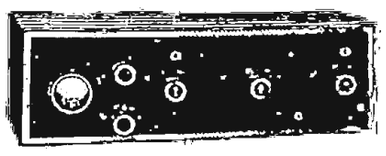

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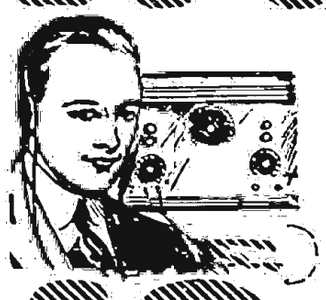

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Three Tube Set Does the Work of Five

Special Tuner Reduces Number of Tubes in Set

In the endeavor to find the best hook-up we forget some things that are facts about Radio. There are very few known circuits, and many hook-ups are really one or the other of the well-known circuits differently arranged. If we would give the hook-ups a little careful study before plunging into them, we perhaps would know much about them from the circuit they originated from and know what to expect. Almost all circuits in use at present are based on the three fundamental principles for increasing the signal strength, that is regeneration, Radio frequency and super-heterodyne. At present one of the popular circuits is tuned Radio frequency.

In keeping abreast of the advance of Radio we are forgetting the proved reliable regenerative circuit that in itself possesses Radio frequency and regeneration and has fewer controls to operate as well as parts in the construction. The writer is a neutrodyne and heterodyne fan, but from the view point of the advantages mentioned, a regenerative circuit with a special tuner is described herein that has tapped secondary as a special means of increasing the signal strength and selectivity, and a tickler coil in the plate circuit inductively related to the secondary. Much has been said about doing away with taps and tuning with a condenser. This is all right for a limited wave length, but for extreme variations of wave lengths considerable signal strength as well as selectivity is sacrificed; therefore we will still use taps to balance the inductance. The regenerative circuit, with the tuner herein described, is equal to any two-stage Radio frequency receiver that I have tried for both selectivity and range. It brings in KHJ of Los Angeles on the loud speaker; so, let your own judgment be your guide. The absence of the additional tubes and transformers for Radio frequency and the less number of controls are the appealing features, and for those desiring to construct such a tuner and receiver the hook-up is herewith given with a description of the tuner.

Obtain a 4-inch diameter tube, 7 inches long, of bakelite or formica and wind both primary and secondary on it, using number 24 dcc. wire. Wind the secondary first by starting ⅜-inch from one end of the tube. This allows space for bolting a base or support for the tuner. Tap this first turn for a lead to the switch. Wind 20 turns and take off another tap, then 15 more turns and leave a ¾-inch space on the tube, and start winding in the same direction. Take off another tap at the beginning of the winding, then wind 15 more turns and take off another tap; then continue and wind 20 more turns, completing the secondary, which now has 70 turns of wire, or 35 turns on each side of the ¾-inch space, and is tapped at the first, 20th, 36th, 50th and 70th turns.

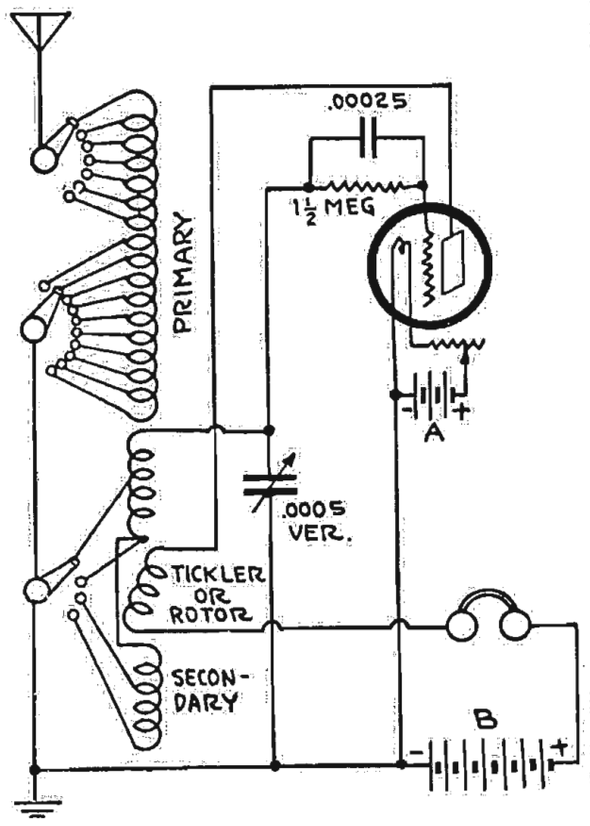
In leaving space on a tube it is advisable to cut the wire, pass it through a small hole in the tube and solder it on the inside where it crosses the space to the beginning or continuing of the winding. Next, start winding the primary, spaced one inch from the secondary just completed. Wind 7 turns, tapping each turn, then wind 70 more turns, tapping each seventh turn. Drill a ¾-inch hole through the tube in the center of the ¾-inch space between the secondary windings and bolt a thin plate over each hole. The plate is to be drilled for the rotor shaft. Drill a ¾-inch hole through the exact center of a piece of tube that is 3½ inches in diameter and 1½ inches long. Wind 16 turns of number 26 dcc. wire on each side of the holes (connected across the space), beginning as close to the outside edge as possible. You will have 32 turns on the rotor. This rotor is placed inside of the tube where it revolves. For shafts use ¾-inch brass rod or tubing, one short piece and one long for the dial. Thread these shafts on one end, pass them through the plates on the outside of the 4-inch tube and lock into the rotor with two nuts and washers. Drill a small hole in each rotor shaft for a retaining pin and use a washer and compression coil spring between these pins and the bearing plates on the tube. Solder the outside or end wires of the rotor on the shafts. This may look like a big job, but if description is followed it will not take long to finish it and you will find it worth while. A better tuner cannot be made. The controls should all have vernier adjustments.

The audio frequency for this circuit is standard. It can be made in a separate cabinet.—W. L. Friday, Chicago, Ill.

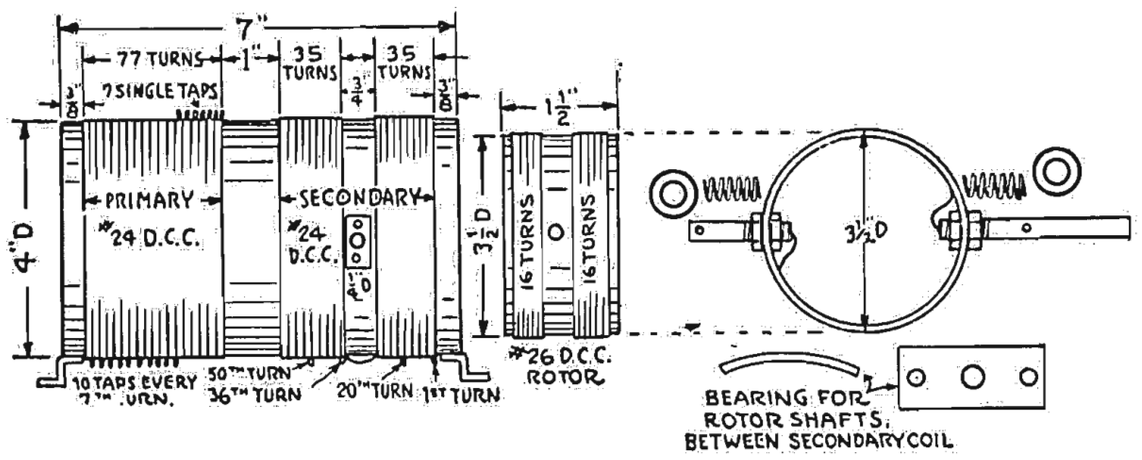
WORKSHOP KINKS? EARN A DOLLAR—

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

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



HOW TO WIND AND ASSEMBLE COILS



Grounding Transformer Cores

If adjusting the filaments of an amplifier does not stop it from howling, try attaching a wire from the negative terminal of the battery used for lighting the filaments of the tubes to the ground post of the set. Should the howling continue, try grounding the iron cores of the amplifying transformers by attaching a wire to the cores and bringing it to the ground terminal.

Tuner Essential with Crystal Receiving Set

The simplest form of receiving circuit is a crystal detector in series with the antenna and ground with the phones shunted around the detector. This hook-up, however, is not satisfactory, because it does not permit the operator to tune out undesired signals, and therefore interference is at a maximum. Either a single or a double circuit tuner is preferable. The latter allows more selective tuning.

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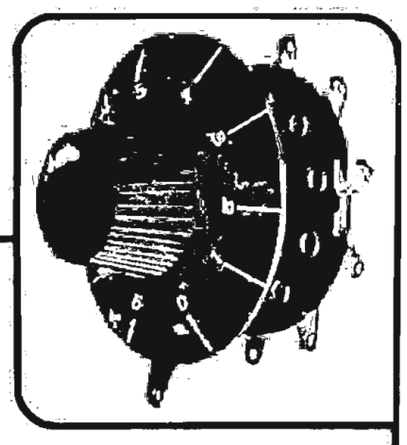

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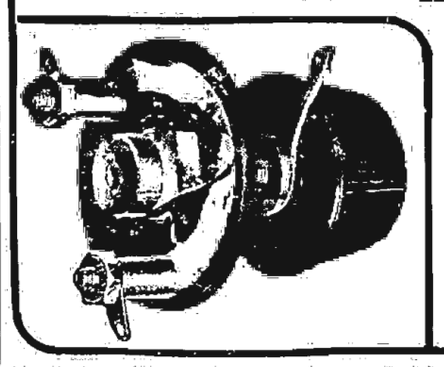

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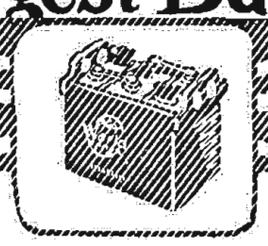

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Questions and Answers

Super Heterodyne

(06177) JFO, St. Lament, Que., Can.

With a three-circuit selective tuner, one detector, two amplifiers, using Northern Electric peanut lamp, would I get better results and more volume by changing to WD-11 or WD-12 lamp with grid leak complete for same? I have built this set and would greatly appreciate your opinion as to change or improvements. I might add I am getting 1,700 miles to date. Please give your advice on a long distance set; is the super heterodyne, and which type, the best for distance? Also, where can I apply for drawings of same?

A.—The substitution of the WD for your present tubes would be so slight an improvement as to be unwarranted. We would recommend the employment of six-volt tubes with storage battery for increasing sensitivity and amplification.

Undoubtedly the super heterodyne circuit is a superior type of receiver, although requiring more than the average skill in operating. Detailed discussion of this circuit is in course of preparation to appear in January issues of Radio Digest.

Best Tubes to Use

(5155) RSH, Uniontown, Pa.

This summer, I constructed from your blueprints the Flewelling, adding to it a series-parallel switch, the whole enclosed in a 7 by 12-inch cabinet, together with a 90-volt B battery and a 1½-volt A battery. This I have carried as a portable set in my machine, and we have had some results. No use listing stations, we got the whole list within reach of a "one-lunger," WD-12 tube.

I have a phonograph cabinet, in which last winter I had a two-stage audio frequency set, with horn. I have torn that out, and will proceed to construct the three-tube reflex, per your recent article. One question—what will be the best tubes, operating on dry cell, to use in this set? Of course, as I understand, there is no result like the 6-volt storage battery tubes, but I wish to do away with the storage battery proposition, as, judging from my experience with the Flewelling, the dry cell tubes must be quite satisfactory in that respect.

Thank you in advance for this "tip," as well as all the interesting and helpful information in your numbers.

A.—In the matter of dry cell tube, the UV-201A, using three, will be very effective, affording several times greater volume than the WD tubes. Ninety volts' plate potential can be employed. For a three-tube circuit, two sets of dry cells connected in parallel are recommended to prolong service.

Interference

(06242) WB, Krakow, Wis.

I have a 32-volt light plant, which I run every evening, and while running this plant, it is impossible to get a thing on Radio, as it makes too much noise.

This plant is about 100 feet from the Radio receiving outfit, the aerial is hooked on the building the plant is in. Changing aerial, or using loop does not help. Even if the aerial and ground wires are disconnected the commutator noises come on the receiver.

Now I would like to know if there is any way of cutting this interference out.

A.—The interference with which you are troubled is practically impossible to eliminate. The only remedial measure we can suggest is the use of a highly selective, three-circuit tuner, the construction of an antenna system in a position to run away from the generator housing, and using a counterpoise in place of the usual ground.

Colpitts Receiver

(06012) FMC, Grasselli, N. J.

I am using a Colpitts receiver with a two step audio amplifier, using a C-300 for detector and 201-A's for amplifiers. The set works fine in the daytime, but as soon as the street lights are turned on at night I get an A. C. hum so lound that it practically drowns out speech or music. The lights in my home do not seem to affect it at all. A street light is located about 30 feet from the house. These lights run on 2,300 volts.

I have watched, and the second the street lights go on the hum starts. It is at least one and one-half or two miles to the nearest factory or power plant. There are several sets about 300 or 400 feet from my set that are not bothered at all. I have tried an inside aerial and it helps some but not enough to be of much use. I will appreciate any information you may give in regard to the elimination of this hum.

A.—A peculiarity of the ultra-audion (Colpitts) circuit is its sensitivity to low frequency excitation. In fact, it is a principal objection.

This is the nature and reason of interference encountered, and we would recommend a three-circuit regenerative type of receiver as not subject to such a condition.

A counterpoise instead of the usual ground will also serve to eliminate the interference from service lines in the proximity.

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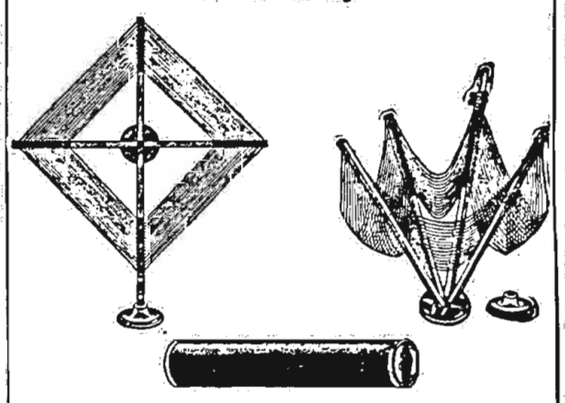

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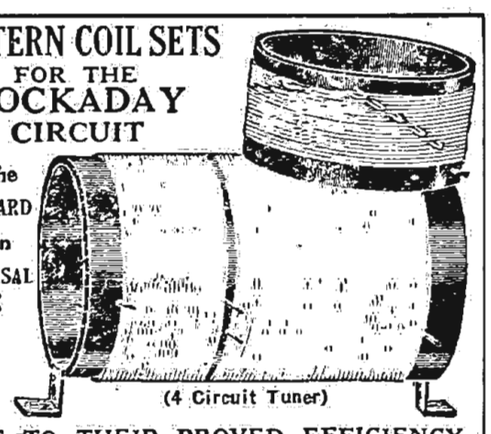

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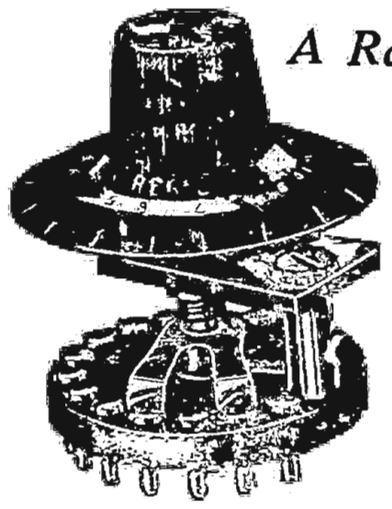

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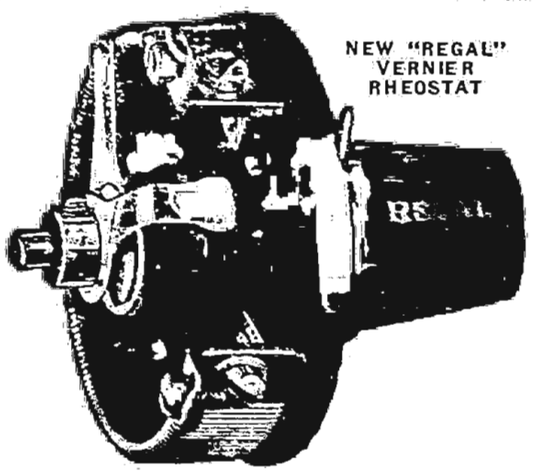

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CFAC, Calgary, Alta., Can. 420 meters. 500 watts. Calgary Herald. Daily ex Sun, 1 pm, 3:30-4:30, 7:45-8:45; Fri, 11 pm, music, entertainment, news, market, weather. Dance orchestra Sun, 9 pm; Military Band. Mountain.
CFCA, Toronto, Ont., Can. 400 meters, 1,000 ml. Toronto Star. Daily ex Sun, 12 m, weather, news, stock; 5:30-6 pm, news; 8-9 pm, music. Sun, 7 pm, church services. Eastern.
CFCF, Montreal, P. Q., Can. 440 meters. Marconi Wireless Telg. Co. Daily 1-1:45 pm; Monday, Wed, Fri, 7:30-9 pm, music, entertainment, reports, Eastern.
CFCH, Iroquois Falls, Ont., Can. 400 meters. Abitibi Power & Paper Co., Ltd. Daily, 9 pm, reports, music, entertainment. Experimental station. Eastern.
CFCJ, Quebec, Que., Can. 410 meters. La Cie de L'Evenement.
CFCK, Edmonton, Alta., Can. 410 meters. Radio Supply Co. Daily ex Sun, 8-8:45 pm, music. Sun, 3:30-4:30 pm. Concert. Mountain.
CFCL, Victoria, B. C., Can. 400 meters. 500 watts. Centennial Methodist Church. Slogan, "Where Religion Cheers." Tues, Fri, 8:30-10:30 pm, concerts, lectures. Sun, 11 am, 7:30 pm, church services. Pacific.
CFCN, Calgary, Alta., Can. 440 meters. 500 watts. W. W. Grant Radio Ltd. Slogan, "Voice of the Prairies." Mon, 11 pm, music. Wed, 10-1 am, dance music. Sat, 10-12 pm, dance music. Test program, Sat, after midnight. Mountain.
CFCO, Bellevue, P. Q. 450 meters. Semmelhaack-Dickson, Ltd. Daily ex Sat, Sun, 9:45-10:30 pm, news, markets, reports, sports, time, music. Sat, 9:30-11 pm, music. Sun, 9:15-10:45 pm, sacred music. Eastern.
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CFCR, Sudbury, Ont., Can. 410 meters. Laurentide Air Service, Ltd.
CFRC, Kingston, Ont., Can. 450 meters. Queen's University.
CFUC, Montreal, P. Q., Can. 400 meters. 1,000 ml. Univ. of Moutreal.
CHBC, Calgary, Alta., Can. 410 meters. 1,000 mi. The Alberta Pub. Co. Daily ex. Sat, 8:45-9:45 pm., news, stock quotations, music. Mountain.
CHCD, Quebec, Que., Can. 410 meters. Canadian Wireless and Electric Co. Mon, 7:30-9 pm; Wed, 8-9; Sat, 8-10, music. Eastern.
CHCE, Victoria, B. C., Can. 310 and 400 meters. Western Canada Radio Suppl, Ltd. Slogan: "The Voice of the Island." Daily ex Sun, 7-8 pm, music, stock reports, entertainment. Sun, 9-10 pm, music, entertainment. Pacific.
CHYC, Montreal, Que., Can. 410 meters. 2,000 watts. Northern Elec. Co. No regular schedule.
CJCA, Edmonton, Alta., Can. 450 meters. 500 watts. Edmonton Journal, Ltd. Slogan, "The Sunniest Spot in Sunny Alberta." Club, "Igloo Hut." Daily ex Sun, 12:30 pm, weather, markets, 7:30-8 pm, Children's half hour. 8:30-9:30 pm, concert, reports. Thurs, 11:15 pm, Igloo Hut meetings. Mountain.
CJCD, Toronto, Ont., Canada. 410 meters. T. Eaton Co. Daily ex Sat, Sun, 4-4:30 pm, music. Eastern.
CJCE, Vancouver, B. C., Can. 420 meters. Sprout-Shaw Radio Co. Daily ex Sun, 12:30-1:30 pm. 3:30-5 8-10, music, news. Pacific.
CJCI, St. John, N. B., Can. 400 meters. Maritime Radio Corp., Ltd. Mon, Wed, Fri, 7:30-9 pm, music. Sat, 9-11 pm, music. Eastern.
CJCN, Toronto, Ont., Can. 410 meters. Simons, Agnew & Co. Signals.
CJCX, Olds, Alta., Can. 400 meters. 200 watts. Percival W. Shackleton. Slogan, "The Best Town in the West." Tues, Thurs, 9:45-11 pm, music. Sat, 8:45-10 pm, music. Mountain.
CJGC, London, Ont., Can. 430 meters. London Free Press. Daily ex Sun. 9:30-10 am, 12-1 pm, 9:30-6, news, market and weather, 8-9, music, entertainment. Eastern.
CJSC, Toronto, Ont., Can. 430 meters. The Evening Telegram.
CKAC, Montreal, Que., Can. 430 meters. 1,200 watts. La Presse. Daily ex Sat, Sun, 4 pm, music; 4:30, weather, markets, stocks. Tues, Thurs, Sat, 7 pm, children's hour; 7:30, concert; 10:30, specials. Sun, 4:30 pm, sacred concert. Eastern.
CKCD, Vancouver, B. C., Can. 410 meters. Vancouver Daily Province. Daily ex Sun, 8:30-9:30 pm, music, news, entertainment. Pacific.
CKCE, Toronto, Ont., Can. 450 meters. 750 watts. Can. Ind. Telephone Co. Occasional programs.
CKCK, Regina, Sask., Can. 420 meters. 500 watts. Leader Pub. Co. "The Queen City of the West." Daily ex Sat, Sun, 9:54, time; 10-10:30 am, 1:15-2 pm, 7:30-8:15. Tues, 7:30-9 pm, music, entertainment, news, market, weather. Sat, silent night. Sun, 9, service. Mountain.
CKOC, Hamilton, Ont., Can. 410 meters. 20 watts. Wentworth Radio Supply Co., Ltd. Slogan, "In the Garden of Canada." Mon, Wed, Fri, 8-9 pm, music, entertainment. Sun, 7-8 pm, church services. Eastern.
CKY, Winnipeg, Man., Can. 450 meters. 2,000 watts. Manitoba Tel. System. Daily ex Sun, 12:30-1:30 pm. lectures, etc. Sun, 7 pm, church services; 9, sacred concert. Central.
CYB, Mexico City, Mex. 425 meters. 500 watts. El Buen, Tono. Wed, Sat, 7:30-9 pm. Thurs, 8-10 pm, concert. Mexican time.
CYL, Mexico City, Mex. 440 meters. 500 watts. Tues, Fri, 9-10:30 pm. Mexican.
KDKA, E. Pittsburgh, Pa. 326 meters. 1,000 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 9:45-10 am. 12-1 pm, market reports, music; 6-10 pm, news, features, markets, concert; 9:55-10, time. Sun, 10-45 am, church service; 2:30 pm, Bible story; 2 pm, concert; 4:45 pm, 7:30, church service. Eastern.
KDPM, Cleveland, O. 270 meters. Westinghouse Elec. & Mfg. Co.
KDPT, San Diego, Calif. 244 meters. 50 watts. Southern Elec. Co. Daily ex Sun, 7-7:30 pm, news, weather, concerts, lecture. Tues, Sat, 8-10 pm. Sun, 11:30-12:30 pm, sermon. Pacific.
KDYL, Salt Lake City, Utah. 360 meters. 50 watts. Newhouse Hotel. Daily ex Sun, 6:30-8 pm, news, music, entertainment. Mountain.
KDYM, San Diego, Calif. 280 meters. 100 watts. Savoy Theater. Mon, Wed, Fri, 8-10 pm, music, entertainment. Pacific.
KDYQ, Portland, Ore. 360 meters. 100 watts. Oregon Institute of Technology. Slogan, "The Radio School." Educational programs.
KDYW, Phoenix, Ariz. 360 meters. 20 watts. Smith Hughes & Co. Temporarily discontinued.
KDYX, Honolulu, T. H., Hawaii. 360 meters. 100 watts. Honolulu Star-Bulletin Co., Ltd. Daily ex Sun, 12:15-1:15 pm, reports; 6:30-7:30 pm, entertainment, music, talks. Mon, Wed, Sat, 9:15-10:15 pm, dance music. Sun, 11 am-12:15 pm, church services. 120th Meridian.
KDZB, Bakersfield, Calif. 240 meters. 100 watts. Frank Siefert. Daily ex Sun, 8-9 pm, reports, music. Sun, sacred program, irregular. Pacific.
KDZE, Seattle, Wash. 455 meters. 500 watts. The Rhodes Co. Mon, Wed, Fri, 8:30-10:30 pm, music; Fri, 12:30-1:30 pm, meeting; Sat, 2-3 pm, music. Pacific.
KDZF, Los Angeles, Calif. 278 meters. 500 watts. Automobile Club of Southern California. Not operating now.
KDZI, Wenatchee, Wash. 360 meters. 50 watts. Elec. Supply Co. Temporarily discontinued.
KDZK, Reno, Nev. 360 meters. 25 watts. Nevada Machine & Elec. Co. (Nevada State Journal). Sun, 7-8 pm. Pacific.
KDZQ, Denver, Colo. 360 meters. Nicholas Academy of Dancing.
KDZR, Bellingham, Wash. 261 meters. 50 watts. The Bellingham Pub. Co. Daily and Thurs, 7-8 pm. Pacific.
KDZT, Seattle, Wash. 360 meters. 10 watts. Seattle Radio Assn.
KFAD, Phoenix, Ariz. 300 meters. 100 watts. McArthur Brothers. Daily ex Sun, 7:30-8:30 pm, news, weather, stock reports, music. Mountain.
KFAE, Pullman, Wash. 330 meters, 500 watts. State College of Washington. Mon, Wed, Fri, 7:30-9 pm, lectures, music, readings. Pacific.
KEAF, Denver, Colo. 360 meters. 500watts. Western Radio Corp. Slogan, "Voice from the Rockies—Out Where the West Is." Mon, Tues, Fri, Sat, 8-9 pm; Thurs, 7:30-8, music, reports, news. Wed, silent. Mountain.
KFAJ, Boulder, Colo. 360 meters. 100 watts. Univ. of Colo. Tues, Thurs, Sat, 9 pm, time, music, addresses by faculty. Sat, 2:30-5 pm, football. Mountain.
KFAN, Moscow, Ida. 360 meters. 50 watts. The Electric Shop.
KFAP, Butte, Mont. 360 meters. 100 watts. Standard Pub. Co.
KFAR, Hollywood, Calif. 280 meters. 200 watts. Studio Lighting Service Co.
KFAU, Boise, Ida. 270 meters. 150 watts. Boise H. S. Daily ex Sun, 4-4:30 pm, markets, weather, news. Wed, Fri, 8-9 pm, concert. Mountain.
KFAV, Venice, Calif. 258 meters. 5 watts. Abbot-Kinney Co. Mon, Tues, Wed, Fri, 8:30-9:30 pm, music. Pacific.
KFAW, Santa Ana, Calif. 280 meters. 10 watts. Radio Den. Daily ex Sun, 4:30-5 pm, news, reports, music. Mon, Thurs, 6:30-7:30 pm, concert. Pacific.
KFAY, Medford, Ore. 283 meters. 50 watts. W. J. Virgin. Temporarily discontinued.
KFBB, Havre, Mont. 360 meters. 50 watts. F. A. Buttrey Co. Daily ex Sun, 12:30 pm, agriograms, weather, news. Tues, Fri, 8-9:30 pm, music. Mountain.
KFBC, San Diego, Calif. 278 meters. 20 watts. W. K. Azbill. Thurs, Sun, 8-9 pm, Bible lesson, sermon. Pacific.
KFBE, San Luis Obispo, Calif. 360 meters. 50 mi. R. H. Horn. Mon, Wed, Fri, 4:30-5:30 pm. Pacific.
KFBG, Tacoma, Wash. 360 meters. 50 watts. First Presbyterian Church. Sun, 11 am-12:15 pm, 7:30-9. Pacific.
KFBK, Sacramento, Calif. 283 meters. 100 watts. Kimball-Upson Co. Slogan, "Heart of California." Daily ex. Sun, 6-6:45 pm, concert, news, codes. Wed. 8-9:30 pm, concert. Pacific.
KFBL, Everett, Wash. 224 meters. 10 watts. Lesse Bros. Daily ex Sun. 7:15-8:15 pm. Sun, 2-3 pm. Pacific.
KFBS, Trinidad, Colo. 360 meters. 15 watts. Chronicle News & Gas & Elec. Supply Co.
KFBU, Laramie, Wyo. 283 meters. 50 watts. Bishop N. S. Thomas.
KFCB, Phoenix, Ariz. 278 meters. 78 watts. Nielson Radio Supply Co. Daily, 7-7:30 pm, bedtime stories. Mountain.
KFCD, Salem, Ore. 360 meters. 5 watts. Salem Elec. Co. Tues, Wed, Fri, 7-8 pm. Pacific.
KFCF, Walla Walla, Wash. 360 meters. 50 Watts, Frank A.
KFCF, Billings, Mont. 360 meters. 10 watts. Electric Service Station, Inc. Wed, Fri, Sun, 7:30-9 pm, music. Mountain.
KFCK, Colorado Springs, Colo. 258 meters. 10 watts. Colorado Springs Radio Co. Club, "Lion Tamers." Daily ex Sun, 12-1 pm, 5:15-6:15, music. Special concerts, 10-11 pm. Sun, 11-12:15 pm, 7:30-9:30, church. Mountain.
KFCM, Richmond, Calif. 244 meters. 100 watts. Richmond Radio Shop. Slogan, "Out Where the West Ends." Daily ex Sun, 1-2 pm, music. Tues, Fri, 8-9 pm. music. Pacific.
KFCP, Ogden, Utah. 360 meters. 25 watts. Ralph W. Flygars.
KFCV, Houston, Tex. 360 meters. 10 watts. Fred Mahaffey, Jr. Daily ex Sun, 7:30-8 pm, markets, entertainment. Sun, 2-3 pm, entertainment. Central.
KFCY, Le Mars, Ia. 252 meters. 50 watts. Western Union College, Wed; 10-11 pm, music, educational. Central.
KFCZ, Omaha, Neb. 258 meters. 100 watts. Central H. S., Mon, Tues, Wed, Thurs, Fri, 3-4 pm. Mon, Tues, Thurs, 7-8 pm. Central.
KFDA, Baker, Ore. 360 meters. 5 watts. Adler's Music Store. Daily ex Sun, 5-6 pm, 7:30-8, music. Sun, 6-8 pm. Pacific.
KFDD, Boise, Idaho. 252 meters. 10 watts. St. Michael's Cathedral. Sun, 11:15-12:30 pm, 8-9:15 church services. Mountain.
KFDH, Tucson, Ariz. 360 meters. 150 watts. Univ. of Ariz. Temporarily discontinued. Mountain.
KFDJ, Corvallis, Ore. 360 meters. 50 watts. Oregon Agri. College. Mon, 8-9 pm. Thurs, 8-9 pm. Pacific.
KFDO, Bozeman, Mont. 218 meters. 40 watts. H. Everett Cutting. Mon, Wed, Sat, 8-9 pm. Mountain.
KFDR, York, Neb. 360 meters. 10 watts. Bullock's. Slogan, "The Little Station with the Big Kick." Club, "Radio Bats." Daily, 4-4:30 pm, children's hour; Wed, 8:30-10 pm, music; Sun, special afternoon program. Central.
KFDS, San Francisco, Calif. 360 meters. John D. McKee.
KFDU, Lincoln, Neb. 240 meters. 20 watts. Neb. Radio Elec. Co.
KFDV, Fayetteville, Ark. 360 meters. 200 watts. Gilbreth & Stinson. Slogan, "Southern Gateway to the Ozarks." No regular schedule. Central.
KFDX, Shreveport, La. 360 meters. 100 watts. First Baptist Church.
KFDY, Brookings, S. D. 360 meters, 50 watts S. D. State College of Agri. & Mech. Arts. Mon, Sat, 8:30 pm, music. Tues, Thurs, 11 am, music lectures, news, Central.
KFDZ, Minneapolis, Minn. 231 meters. 5 watts, Harry O. Iverson.
KFEC, Portland, Ore. 360 meters. 50 watts. Meier & Frank Co. Inc. Daily ex Sun, 12 m, weather, reports; 4-5 pm, music; 6:30 pm, weather, crop, markets, reports. Thurs, 9-10 pm, concert. Sat, 11 am 12 m, children's hour. Pacific.
KFEL, Denver, Colo. 360 meters. 50 watts. Winner Radio Corp. Daily ex Sun, 9 am, 10, 11, 11:45, stock reports; 2-4 pm, music. Mon, Fri, 9-10 pm, concerts. Sun, 9-10 am, church services. Mountain.
KFEQ, Osk, Neb. 360 meters. 100 watts. J. L. Scroggin. No regular schedule.
KFER, Fort Dodge, Ia. 231 meters. 20 watts. Auto Electric Service Co.
KFEV, Douglas, Wyo. 263 meters. 100 watts. Felix Thompson Radio Elec. Shop. Slogan, "You Tell 'Em." Weather reports and special warnings. Mountain.
KFEX, Minneapolis, Minn. 261 meters. 100 watts. Augsburg Seminary. Tues evening, music. Central. Coeur d'Alenes." Mon, Wed, Sat, Sun, 7:30-8:30 pm.
KFEY, Kellogg, Ida. 360 meters. 10 watts. Bunker Hill & Sullivan Mining Co. Slogan, "Voice of the Coeur D'Alene." Mon, Wed, Sat, Sun, 7:30-8:30 pm.
KFEZ, St. Louis, Mo. 360 meters. 100 watts. American Society of Mech. Engrs. Wed, 8:30-9:30, Engineering program. Central.
KFFB, Boise, Ida. 273 meters. 10 watts. Jenkins Furn. Co. (Owyhee Hotel). Daily, 8-9 pm, concert. Mountain.
KFFE, Pendleton, Ore. 360 meters. 10 watts. Eastern Ore. Radio Co. Daily ex Sun. 8:30-9:30 pm, music. Pacific.
KFFO, Hillsboro, Ore. 229 meters. Dr. E. H. Smith. Daily, 6-7 pm, music, sports, news. Fri, 9-10 pm, Chamber of Commerce Community Program. Pacific.
KFFQ, Colorado Springs, Colo. 360 meters. 100 watts. The Marksheffel Motor Co. Daily, 8:45 am, weather, road reports, time. Mon, Fri, 8-9:30 pm, special program. Tues, 4-5 pm. Mountain.
KFFR, Sparks, Nev. 226 meters. 100 watts. Jim Kirk. Thurs, 7-8 pm, "Sagebrush Canaries." Pacific.
KFFV, Lamoni, Iowa. 360 meters. 100 watts. Graceland College. Thurs, 7-8 pm, music. Sun, 6:30 pm, church service. Central.
KFFX, Omaha, Nebr. 278 meters. 100 watts. The McGraw Co. Daily, 2:30-3:50 pm. Central.
KFFY, Alexandria, La. 360 meters. Pincus & Murphy, Inc.
KFFZ, Dallas, Tex. 360 meters. Al. G. Barnes Amusement Co. (Portable Set). Moving soon to Los Angeles.
KFGC, Baton Rouge, La. 254 meters. 100 watts. Louisiana State University. Fri, 8-9 pm. Central.
KFGD, Chickasha, Okla. 248 meters. 100 watts. Okla. College for Women, Chickasha Radio & Elec. Co. Slogan, "Queen of the Washita." Tues, Thurs, 7:30 pm, music, lectures, etc. Wed, 10 am, chapel Sat, services from college. Central.
KFGH, Stanford Univ., Calif. 222 and 286 meters. 500 watts. Leland Stanford Junior University. No regular schedule.
KFGJ, St. Louis, Mo. 266 meters. 250 watts. National Guards Missouri 138th Inf. Mon, 7:30-10:30 pm, Fri, 10:30 pm-1 am, Sun, 2-4 pm. Central.
KFGL, Arlington, Ore. 234 meters. 5 watts. Arlington Garage.
KFGQ, Boone, Ia. 226 meters. 10 watts. Crary Hardware Co.
KFGV, Utica, Nebr. 224 meters. 10 watts. Hidbreder Radio Supply Co. No regular schedule.
KFGX, Orange, Tex. 250 meters. 500 watts. First Presbyterian Church. Sun, 11 am, 7:30 pm, church services. Central.
KFGZ, Berrien Springs, Mich. 268 meters. 10 watts. Emanuel Missionary College. Temporarily discontinued.
KFHA, Gunnison, Colo. 252 meters. 50 watts. Western State College of Colorado. "Where the Sun Shines Every Day." Daily ex Sun, 8:30 am, weather, markets. Tues, Fri, 7:30 pm, entertainment. Mountain.
KFHB, Hood River, Ore. 280 meters. 5 watts. Rialto Theatre. Daily ex Mon, 6:20-6:35 pm, sports, news. Sun, 1-1:45 pm, music. Special programs 11 pm, Pacific.
KFHD, St. Joseph, Mo. 226 meters. 125 watts. Utz Electric Co. Daily ex Sun, 5:30-6 pm; Tues, Thurs, Sat, 8-9:30 pm, concert. Central.
KFHF, Shreveport, La. 266 meters. 150 watts. Central Christian Church.
KFHH, Neah Bay, Wash. 261 meters. 50 watts. Ambrose A. McCue. Tues, Thurs, 9-10 pm; Sat, 9-11 pm, dance. Pacific.
KFHJ, Santa Barbara, Calif. 360 meters. 100 watts. Fallon & Co. Wed, Thurs, Fri, Sat, 6-6:45 pm; Wed, Fri, 9-10 pm; Sun, 10 am, church services. Pacific.
KFHQ, Los Gatos, Calif. 242 meters. 5 watts. Curtis Bros. Hdwe. Store.
KFHR, Seattle, Wash. 270 meters. 100 watts. Star Elec. & Radio Co.
KFHS, Lihue, Hawaii. 275 meters. 30 watts. Clifford J. Dow.
KFHU, Mayville, N. D. 261 meters. M. G. Sateren.
KFHX, Hutchinson, Kans. 229 meters. 200 watts. Robert Nelson.
KFI, Los Angeles, Calif. 469 meters. 2,000 ml. Earle C. Anthony, Inc. Daily ex Sun, 5-6 pm, 6:45-7:30 pm. 8-11 pm, Wed, Fri, Sat, 8-12 pm. Sun, 10:30-11:30 am, 4-5 pm, 6:45-7:30, 8-11. Pacific.
KFIB, St. Louis, Mo. 244 meters. 10 watts. Franklin W. Jenkens.
KFID, Iola, Kans. 246 meters. 20 watts. Ross Arbuckles Garage. Daily, 5:15-5:45 pm. Tues, 9-10 pm. Central.
KFIF, Portland, Ore. 360 meters. 200 watts. Benson Tech Student Body.
KFIK, Gladbrook, Iowa. 234 meters 20 watts. Gladbrook Elec. Co.
KFIL, Louisburg, Kans. 234 meters. 30 watts. Windisch Elec. Farm Equip. Co. Wed., Sat., 8-10.30 pm. Sun., 11-12 m, church services. Central.
KFIO, Spokane, Wash. 252 meters. 50 watts. North Central High School.
KFIQ, Yakima, Wash. 224 meters. 50 watts. Yakima Valley Broadcasting Assn. Slogan, "The Station That Will Make 224 Famous." Mon, Wed, Fri, 7:30-8:30 pm, concert. Sat, 7:30-8 pm, S. S. lesson. Sun, 4-5 pm, music. Pacific.
KFIU, Juneau, Alaska. 226 meters. 10 watts. Alaska Elec. Light & Power Co. Mon, Wed, Fri, 7.30-9 pm. Pacific.
KFIX, Independence, Mo. 240 meters. 250 watts. Reorganized Church of Jesus Christ of Latter Day Saints.
KFIY, Seattle, Wash. 231 meters. Brott Laboratories.
KFIZ, Fond du Lac, Wis. 273 meters. Daily Commonwealth and Oscar H. Hueisman.
KFJA, Grand Island, Nebr. 244 meters. 100 watts. Central Power Co.
KFJB, Marshalltown, Iowa. 248 meters. 10 watts. Marshall Elect. Co. Tues, Fri, 8:30 pm. Central.
KFJC, Seattle, Wash. 270 meters. 100 watts. Post Intelligencer. Slogan, "Hello Folks." Daily ex Sat, 3:30-4:30 pm, music; 8:30-10 programs, dance music. Tues, Thurs, 7-7:30 pm, code. Sat, 8:30-12 m, dance. Pacific.
KFJD, Greeley, Colo. 236 meters. 50 watts. Weld County Printing & Pub. Co. Temporarily discontinued.
KFJF, Oklahoma City, Okla. 252 meters. 40 watts. National Radio Mfg. Co. Slogan, "Radio Headquarters." Daily ex Sun, 3 pm, concert; 6:30, police, announcements. Tues, Fri, 8:30 pm, concert. Sun 3 pm, concert. Central.
KFJI, Astoria, Ore. 252 meters. 10 watts. E. E. Marsh and Liberty Theater. Daily ex Sun, 7-8 pm. Sun, 9:30-10:30 pm. Pacific.
KFJJ, Carrollton, Mo. 236 meters. 10 watts. Carrollton Radio Shop.
KFJK, Bristow, Okla. 233 meters. 100 watts. Delano Radio & Elec. Co. Daily ex Sun, 3-4 pm, music. Thurs. 8-9:30 pm, music. Sun, 7:30 pm, church services. Central.
KFJL, Ottumwa, Ia. 242 meters. 10 watts. Hardsocg Mfg. Co. Club, "Boiled Bugs." Mon, Wed, Fri, 7:30-8:30 pm. Central.
KFJM, Grand Forks, N. D. 280 meters. 100 watts. University of North Dakota.
KFJR, Stevensville, Mont. 258 meters. 6 watts. Ashley. C. Dixon & Son. Slogan, "The Bitter Root Valley Broadcasting Station." Fri, Sun, 8-9 pm, music, readings. Mountain.
KFJU, Kearney, Neb. 234 meters. 10 watts. Central Power Co. Occasional concert.
KFJV, Dexter, Ia. 224 meters. 10 watts. Thomas H. Warren. Daily ex Sun 9:15 am, 10:25, 1:45 pm, weather, markets. Tues, Fri, 8:30 entertainment. Central.
KFJW, Towanda, Kans. 226 meters. 10 watts. La Grande Radio Co. Mon, Wed, Thurs, 7-8 pm. Tues, 8:45-11:45 pm, concert. Fri, 8:45-11:45 pm, orchestra. Central.
KFJX, Cedar Falls, Iowa. 229 meters. 50 watts. Iowa State Teachers College. Educational programs.
KFJY, Fort Dodge, Iowa. 246 meters. 50 watts. Tunwall Radio Co. Slogan, "Ft. Dodge, Iowa, Where Corn Is King." Daily ex Sun, 8 am, 8:30, 9:30, 10:30, 11:30, 12:20 pm, weather, markets. Sun, 11-12:20 pm, church services. Special evening programs. Central.
KFJZ, Fort Worth, Texas. 254 meters. 20 watts. Texas National Guard, 112th Cavalry. Wed, 8:30-9:30 pm. Sat, 8:30-10 pm, program. Central.
KFKA, Greeley, Colo. 248 meters. 50 watts. Colorado State Teachers College.
KFKB, Milford, Kans. 286 meters. 500 watts. Brinkley-Jones Hospital Assn. Slogan, "Watch Out, Here Comes Brinkley." Daily ex Sun, 10-12 midnight, music, lectures. Central.
KFKH, Lakeside, Colo. 226 meters. 10 watts. Denver Park Amusement Co. Closed for winter.
KFKQ, Conway, Ark. 224 meters. 100 watts. Conway Radio Lab. Daily ex Sun, 12 m, weather, market reports. Tues, Fri, 8 pm, music. Sunday evening, church services. Central.
KFKV, Butte, Mont. 283 meters. 50 watts. F. F. Gray.
KFKX, Hastings, Neb. 286 meters. 500 watts. Westinghouse Elec. & Mfg. Co.
KFKZ, Colorado Springs, Colo. 234 meters. 10 watts. Nassour Bros. Radio Co. Daily ex Sun, 12-1 pm, 5-6, matinee musicale. Mountain.
KFLA, Butte, Mont. 283 meters. 5 watts. Abner R. Willson.
KFLB, Menominee, Mich. 248 meters. 20 watts. Signal Elec. Mfg. Co.
KFLD, Franklinton, La. 234 meters. 20 watts. Paul E. Greenlaw.
KFLE, Denver, Colo. 268 meters. 25 watts. National Educational Service. Daily, 7-7:30 pm. Broadcasts for schools on request. Mountain.
KFLH, Salt Lake City, Utah. 261 meters. 50 watts. Erickson Radio Co., Inc.
KFLP, Cedar Rapids, Iowa. 240 meters. 20 watts. Everett M. Foster.
KFLQ, Little Rock, Ark. 261 meters. 20 watts. Bizzell Radio Shop. Mon, 8-9 pm, music. Tues, Thurs, 8-9:30 pm, revival services. Sun, 11:00-12:00 m., 8-9:30 pm., church services. Central.
KFLR, Albuquerque, N. M. 254 meters. 100 watts. University of New Mexico. Fri, 8 pm, educational program. Mountain.
KFLU, San Benito, Texas. 236 meters. 20 watts. Rio Grande Radio Supply House.
KFLV, Rockford, Ill. 229 meters. 10 watts. Rev. A T. Frykman.
KFLW, Missoula, Mont. 234 meters. 10 watts. Mis-
KFLX, Galveston, Tex. 240 meters. 10 watts. George B. Clough.
KFLY, Fargo, N. D. 231 meters. 20 watts. Fargo, Radio Supply Co.
KFLZ, Atlantic, Ia. 273 meters. 10 watts. Atlantic Automobile Co.
KFMQ, Fayetteville, Ark. 263 meters. 100 watts. U. of Arkansas.
KFMR, Sioux City, Ia. 261 meters. 10 watts. Morningside College.
KFMS, Duluth, Minn. 275 meters. 100 watts. Freimuth Dept. Store.
KFMT, Minneapolis, Minn. 231 meters. 5 watts. Dr. George W. Young.
KFMU, San Marcos, Tex. 240 meters. 20 watts.
KGB, Tacoma, Wash. 252 meters. 50 watts. Tacoma Daily Ledger. "This is KGB in Tacoma, Washington, the Lumber Capital of America." Mon, Wed, Fri, 7-9 pm. Pacific.
KGG, Portland, Ore. 360 meters. 50 watts. Hallock & Daily ex Sun, 5:30-6 pm, music, entertainment 7.30-8 pm, reports. Sat, 8-8:30 pm, answers to Radio questions. Sun, Wed, 9-10 pm, music. Pacific.

(NOTE—The second part of the station data list will appear next week.)

CHALLENGE!

ONE DOLLAR will be paid to the Radiophan submitting the most errors in any one station's listing. Letters must reach Radio Digest office not later than one week from date of issue corrected. Readers are not limited to correcting one station. Turn in corrections for as many stations as you can find—If you can find errors! Use separate sheet of paper for each station submitted and place name and address on each sheet.

That's just how sure Radio Digest is that this Radiophone station directory is correct! To make the challenge fair for everyone, broadcasting stations and their employees are barred from this offer. Why? Because the broadcasters are the source of all the data given herein. They are (or should be) interested enough to answer the inquiry sent them every time data on their station appears. This inquiry contains a proof of their last listing and must either be corrected or oked as correct and returned to the Digest. Nevertheless, sometimes the stations are careless and mistakes are made. But Radio Digest is so sure of the exactness of this directory that this challenge is made unconditionally.

With reference to the directory: It appears in four parts, serially continuously; the first three parts are station data listings, arranged alphabetically; the fourth part is a state, city index of stations. The information contained in each station data listing is given in the following order: Call letters, city, state, wave length used, watts antenna input, owner's name, slogan used, if any, name of listener in "club," schedule of operating hours, and kind of time used.

Four successive issues of Radio Digest will give one the most complete and accurate list of broadcasting stations obtainable. This service is original with this publication, and has been maintained from the start. Right of reproduction without permission of any or all of the data contained herein is denied.

Radio Illustrated

Forty-nine stations in one night is the record of William Delaney of Brooklyn, N. Y., here shown with the homemade outfit that did it. He heard Canada, Texas, Nebraska and Cuba among others. Photonews Photo

Clara Bow, eighteen-year-old actress and movie artist, is an ardent Radiophan, and, they say, is trying to remember just where she first heard, "Yes, we have no bananas," over the air at the moment she was snapped in this charming pose. She has made a name for herself, both on the stage and the screen.

Alfredo Sever, noted Italian artist and caricaturist, gets his inspiration while at work from his Radio set. He says his hand works to the rhythm of the music he hears.
Fotograms Photo

Above are shown Evan Evans and Commodore Sheldon Clark of the Chicago Yacht Club on the occasion of the dedication of the new clubhouse, replying to a message from Captain MacMillan, the Arctic explorer.
P. & A. Photo