©CIB610770

1000-Mile Crystal Set, 27; Neutrodyne, 25

Radio Digest

EVERY WEEK **Illustrated** PROGRAMS TEN CENTS

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

Vol. VIII | Copyright 1924 By Radio Digest Publishing Co. | SATURDAY, MARCH 1, 1924 | No. 8

LABOR UNIONS TO RADIO

PLANS AIR TALKS TO HOLD WORKERS

WANTS SET IN HOME OF EVERY EMPLOYE

Canadian Rail Chief Has New Method of Keeping in Personal Touch

NEW YORK.—After declaring that he did not believe the amalgamation of the larger railroads in the United States would be productive of good, Sir Henry Thornton, chairman and president of the Canadian National Railways, announced recently his plans for obtaining the loyalty and enthusiastic support of the employes on his own 22,000-mile system through Radio, in a speech made here.

Sir Henry proposes that his railroad shall be the first in the world on which every employe will have a Radio receiver in his home, so that over it he will be able to hear the hopes, ambitions and plans of the president at least once a week. In order to give this personal touch, the Canadian National Railways will establish broadcasting stations at certain points on the lines, and provision will be made to sell to the 100,000 employes Radio receiving outfits at cost.

Establish Chain of Stations

"We are establishing a chain of broadcasting stations from the Atlantic to the Pacific at such intervals as will enable headquarters to keep in constant touch with the whole of the property.

"We propose to place at the disposal of our employes Radio sets for a moderate price. The sets can be bought either by paying for the whole thing at once or at the rate of $1 or $2 a month. The result of that will be that in a comparatively short time most of our men will have equipped themselves with receiving sets, and we propose, as fast as circumstances may require, to talk to our men in the evenings at their own homes."

For a dancer, whose twinkling toes are her stock in trade, to become a Radio favorite, seems unthinkable, but Mlle. Gambarelli, prima ballerina of the Capitol theater, New York, has done it with her Italian "patter" songs from WEAF, the theater's studio, every Sunday night.

TAKE STEPS TO PURCHASE BROADCASTER

Workers' Heads See Unions at Disadvantage Without Ether Propaganda Medium

To Unionize Station Help

Federations Approve Plan to Get on Air to Counteract "Garbled Interpretations of Employers"

CHICAGO.—Union labor of the United States, numbering more than 5,000,000 men and women, is likely soon, it was indicated here recently, to take definite steps toward the purchase and operation of Radio broadcasting plants at "strategic points", that is, in large cities and other industrial centers. It may thus incur under certain conditions, it was declared, the ban of the federal government.

The contemplated movement of union labor has been forced on it, it was contended by those speeding it in Illinois especially, by the tactics of "the employing class in alliance with owners of broadcastiug stations now in operation who, like the owners and editors of most newspapers

(Continued on page 2)

Station WOR recently presented a most unusual program when a number of scholarship winners, all under the age of sixteen, entertained with song, dance and speech making. The juvenile prodigies are, from left to right, Lillian Kay, Florence Hynes, who performed in songs and recitals; Harold Polk, boy tenor, and Marion Stickel, songstress, all displaying themselves in happy mood on top of the grand piano, and nearest "mike" Elizabeth Mazalkowics. President Coolidge was among the listeners in, it is said. K. & H. Photo

GOTHAM'S SCHOOLS "TUNE IN" LESSONS

RADIO NOW SCHOOLMA'M IN NEW YORK

Board of Education Broadcast Series of Lectures; on Air Half Hour Daily

NEW YORK.—For the first time in the history of education active use of Radio broadcasting on an extensive and permanent basis as an educational aid was inaugurated here recently when the Board of Education of this city, acting in co-operation with Station WJZ, broadcast the first of a series of daily educational Radio programs which have just been scheduled.

The programs, arranged by the newly created Radio Committee of the Board of Education, will be broadcast from 2 to 2 30 p. m. every school day. A special and permanent microphone line has been installed in the office of Dr. William L. Ettinger, superintendent of schools, and the programs every Tuesday afternoon will be broadcast by WJZ direct from there. On all other school days the programs will be given at the studio of Station WJZ.

Purpose to Educate People

The programs are designed primarily to acquaint the people with the work of the schools, to educate the public as to education. Superintendents of each department of the Board of Education will, in turn, explain exactly what is done in his department, and to what purpose. In addition, the pupils of each school will take part in the later programs with regular recitations, music lessons, glee club and school orchestra concerts, spelling bees, and special exercises for holidays.

New York City is thus the first city in the world to recognize and utilize the extreme value of broadcasting in education, and arrangements already consummated call for the largest municipal broadcasting program ever scheduled.

It is believed the boards of education of other large cities will follow the lead of New York in utilization Radio in educational service by municipal co-operation with local broadcasting stations.

It is believed the boards of education of other large cities will follow the lead of New York in utilizing Radio in educational work, creating what may possibly become a nation-wide Radio educational service by municipal co-operation with local broadcasting stations.

LABOR UNION RADIO

(Continued from page 1)

and news services, exclude, ban or garble the transmission of organized labor's interpretation of economic problems."

Chicago Labor Favors Radio

During the last six months, as an instance of the growth of the demand for Radio as an agent of propaganda for labor, the Chicago Federation of Labor, the second largest organization of its kind in the United States, has thoroughly considered the feasibility of buying and running a broadcasting station here.

The proposal was recently unanimously approved by the local federation, members of which supported a resolution introduced by a delegate from the Commercial Portrait Artists' union that "one of the greatest problems confronting organized labor is that of reaching the working people with the story of its struggles and battles for uplifting toilers to a higher plane of civilization."

Unions at Disadvantage Without Radio

According to the resolution "Radio has become universal; it is so rapidly being converted into an instrument of propaganda in the interest of the powers that be that unless organized labor is able to use this wonderful means of communication in presenting its message to the working people it will be placed at a disadvantage."

The resolution, which concluded by urging the establishment and control of a Radio broadcasting station by the Chicago Federation of Labor was said to have been the second of its kind within a short time. It was referred to the executive board, composed of officers of the federation. Discussion of the resolution was featured by the enthusiastic opinions of delegates from the postoffice clerks', lathers', sheet metal workers', cigarmakers', pressmen's, machinists', painters' and other unions.

Labor to Unionize Broadcasters

A member of the executive board afterward declared that efforts would be made to "unionize" all electricians, telegraphers, engineers and other mechanical employees of broadcasting stations throughout the country.

Reports current here recently showed, it was said, that almost every labor council in the United States had considered, within the last few months, the purchase and operation of broadcasting plants. It is considered probable that the Central Trades and Labor Council of New York City, whose membership numbers hundreds of thousands, will soon determine ways and means to acquire a station. "When I was in New York city a few days ago," said Victor J. Olander, of Chicago, secretary of the Illinois State Federation of Labor (600,000 members), "I heard Radio discussed as an instrument of information very favorably by labor officials."

Question of Stations Hinges on Money

The Illinois labor body, Olander said, is "in a receptive state of mind" as to the use of Radio in the form of a broadcasting plant. "The question has often been discussed," he declared. "It is merely a matter of money." Finances of the Illinois federation of labor are said to be in good condition.

"Labor unions in Illinois," continued Olander, "await the action of the Chicago Federation in relation to the conclusion of its Radio investigating committee. The state labor convention in Peoria in September may make Radio an order of business."

Labor Radio May Be National

Although the advisability of employing Radio as a means of disseminating "its side of the question" has not as yet been considered officially or formally by the American Federation of Labor (headquarters Washington, D. C.), it was deemed probable by high labor executives here recently that the national organization will soon be compelled to consider the use of Radio broadcasting stations either under its ownership and direction or by various large labor bodies throughout the United States.

Organized labor anticipates and is prepared to meet, it was said, the opposition not only of "the employing class" but that of the United States' government. The latter prohibits propaganda only when "the majority of the people seem to be against it," according to E. A. Beane, supervisor of Radio, ninth district, Chicago. "When letters or other forms of communication to directors of broadcasting stations show that the majority of the people oppose certain propaganda it is barred from the air," Mr. Beane said. The government would not interfere with the broadcasting of union labor views, Beane asserted, unless the reaction of such propaganda were bad.

N. Y. Symphony Debut Goes on Ether at WJY

Famous Former Conductor of Berlin Orchestra Leads Musicians

NEW YORK.—The first concert of the season by the New York Symphony Orchestra with Bruno Walters conducting was broadcast by station WJY of the Radio Corporation of America directly from Carnegie Hall Friday, February 15, through the courtesy of George Engles.

Bruno Walters, internationally famous conductor of the former Berlin Symphony Orchestra, has been touring this country as guest conductor of the greatest symphony orchestras here since last season. His appearance with the renowned New York Symphony was his first New York concert since his arrival in America. Last season he conducted the same orchestra on two occasions, but has since then never appeared with them or with any other New York organization.

The program was broadcast in entirety, and included Schubert's "Symphony No. 9 in C," Tschaikowsky's "Fantasy-Overture, Romeo and Juliet," and "Till Eulenspiegel's Merry Pranks," by Richard Strauss.

CONTENTS

Radio Digest, Illustrated, Volume VIII, Number 8, published Chicago, Illinois, March 1, 1924. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign Postage One Dollar additional; single copies Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

"All the Live News of Radio"....1 to 8
Manufactured Wave Traps Now on the Market.... 6
Government Complaint against R. C. A.... 9
Operating and Trouble Shooting for Owners of Standard Receivers....11, 12, 13
An Evening at Home with the Listener In.... 14
Advance Programs for the Current Week....15, 16, 17
Meditations by the Inventor of King Miloplex, by the Mystery Man.... 19
Editorials; Indi-Gest; Condensed by Dielectric.... 20
How to Make a Lighthouse Keeper's Set, Part IV, by S. R. Winters.... 21
Simple Explanation of Radio for Everybody, Chapter XII—Radio Frequency Amplification, by M. W. Thompson.... 23
Construction of a Four Tube Reflex Neutrodyne, Part II—Panel Layouts, by H. J. Marx.... 25
Crystal Hook-Up with Split Variometer.... 27
Florida Special Hook-Up, R. D.-114.... 28
First Aid and Helpful Hints for Listeners In, Chapter I—Operating the Regenerative Receiver, by Peter J. M. Clute.... 29
Questions and Answers.... 30
Radiophone Broadcasting Station Dictionary.... 31
Radio Illustrated, a Page of Pictures.... 32

Looking Ahead

Wave Traps and Their Use—Another article of much interest to the listener in. This is a continuation of the article this week. It is written by the Mystery Man who knows the mystery of the elements.

Every Week Programs—Advance programs for more stations than most sets can tune in. When you want complete advance programs turn to page 15 of Radio Digest, the National Broadcast Authority.

Four-Tube Reflex Neutrodyne—H. J. Marx tells more about this set next issue. Following the circuit and building this set are well worth your time and expenditures for the parts.

A New A-B-C Series—These articles will start March 22 and the title of them will be "15 Minute A-B-C Lessons for Radio Beginners." This series will be in simplified language for the new fan in Radio. It will be written by P. E. Edelman.

Regenerative Receivers—Peter J. M. Clute will next tell the "Peculiarities of Regenerative Receivers." Learn all about regeneration and then you can't possibly interfere with your neighbor.

R. D.-115—This is an old circuit but it is a good single tube outfit.

Simplex Diagram—This hook-up is for a single tube reflex. Those who have used this hook-up have had excellent results.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest,
123 West Madison St.,
Chicago, Illinois.

Please find enclosed check M. O. for Five Dollars (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated.

Name .....

Address .....

City..... State.....

THE "FORD" OF LOUD SPEAKERS

Fultone

Loud Speaker

Special Built Unit

Standard Cord Ready To Use on Your Set

$9.50

BRINGS IN CLEARLY ALL MUSICAL TONES

THE Fultone Loud Speaker is full throated and brings in, in volume, both music and voice in their natural, full, rich tones, with no distortion or metallic noises. Its performance is matchless and unequaled at any price. Dark black in color with a full rounded symmetry, it is worthy a place in the finest home.

Fultone is constructed of a non-metallic composition, in one piece, and is equipped with a special built unit, together with standard cord all ready for attachment to the finest Radio set. It is fully guaranteed and will match the performance of any loud speaker on the market at any price. It represents

Quality Low at a Price

Facilities for immense production have enabled us to quote you this moderate low price on the quality Fultone loud speaker. No longer need your family miss the concert or speech because you need a good loud speaker. Fultone enables every set owner to make his set talk or sing out loud for the enjoyment of all. Everyone can enjoy the luxury of a completed set by attaching Fultone, the quality speaker at a low price. Fultone can be found at

All good dealers or

SENT POSTPAID on Receipt of Price

HALL & WELLS

Manufacturers' Representatives and Exclusive Distributors of FULTONE Loud Speakers

508 South Dearborn Street

CHICAGO, ILL.

JOBBERS DEALERS We have a money-making proposition on FULTONE for you. This loud speaker, because of its quality at such a low price, is destined to be the biggest seller in Radio. Better wire today. Prompt and immediate delivery assured.

Fultone

RADIO INSPECTORS NEED MORE FUNDS

HOPES FOR MONEY TO BUY EFFICIENT TOOLS

Present Appropriations Fail to Provide Receiving Sets for Policing Force

WASHINGTON.—The lives of government Radio supervisors and inspectors in the nine districts of the country are strenuous, exhausting and expensive. Most of these officials, who strive to make ships, land stations, amateurs and broadcasters live up to regulations have, of necessity, become "night owls."

They must be a cross between detectives and mind readers. The varied problems coming up for solution every day, and the medley of technical questions they are asked by amateurs and fans, require the combined wisdom of Sherlock Holmes and Guglielmo Marconi.

Not alone do they inspect all transmitting stations, and examine commercial and amateur operators; they see to it that stations remain on assigned wave lengths, power and time schedules; they try to locate interference from every source to keep the ether clear for commerce and the listeners in.

Work Calls for Late Hours

This requires late hours, since most interference is reported to occur at night, and they are usually on watch until midnight in most districts. First hand information is of the greatest value to them, enabling them to act immediately and not spend time running down rumors and incorrect or inadequate interference reports, which they receive by the hundreds.

Present government appropriations, strange as it may seem, do not provide receiving sets for the governmental Radio policing force; consequently all of the men have to purchase or build their own sets. Good sets are, of course, necessary, and one supervisor is known to have spent seven hundred dollars in equipment for his main office out of his own pocket, but believed necessary for efficient and effective service in his district.

Can't Listen In on Hydrometer

Many other supervisors and inspectors have spent between four and five hundred dollars each in Radio equipment. The Government can only provide its field force with testing and measuring instruments, such as decremeters, wattmeters, ammeters, voltmeters and hydrometers. They cannot listen in with these instruments.

In Baltimore, the Supervisor maintains his own automobile, found essential in running down or locating unidentified stations and radiating receiving sets in the outskirts of his district. Some of the inspectors find Radio compasses, or direction-finding coils, necessary, in locating offending transmitting sets, or amateurs operating without giving their calls or using "fake" calls. It is a "hard life," they all admit and yet they find it fascinating and developing.

With the advent of the new appropriation bill, it is hoped that increased funds will be forthcoming so that the field force of the Radio section of the Bureau of Navigation can be provided with sufficient apparatus of the latest type to cope with the increased traffic in both code and voice.

WAAW Picks Its Slogan

OMAHA.—WAAW—"Where Agriculture Accumulates Wealth." that's the new call-letter slogan of the Omaha grain exchange's Radio station here. It was selected from approximately 1,000 suggestions telegraphed to the station the night the program was broadcast commemorating the 20th anniversary of the founding of the exchange. Harvey C. Kendall, Lincoln, Neb., the author, won $10 in cash.

1,000,000 In Congregation

BIRMINGHAM, ALA.—The First Baptist church of Birmingham is said to have the largest Radio congregation. It consists approximately of 1,000,000 persons. Radio services are conducted in connection with WSY, Birmingham's station which broadcasts the Sunday services of the church.

MIKE'S EAR CATCHES ODD FELLOW RITUAL

CINCINNATI. — The Independent Order of Odd Fellows held the center of the microphonic stage at WLW, Crosley Radio Corporation, here recently, when for the first time in the history of Radio the installation of officers and other work of the Order was broadcast. Officers of one of the Cincinnati lodges did the ritualistic work in the studio and Radio carried it to the listening world.

DODY HAS A CHIP ON HER SHOULDER

MINNEAPOLIS.—A challenge to all the "jazz" piano players in the world and other nearby points is being broadcast regularly by WLAG, Twin City Radio central, following the announcement that Dody Reimer has won the piano championship of that station. Her rendition of "The Rosary" and other sacred numbers with her own arrangement is one of the persistent requests of fans.

ETHER WAVE MAKES MARCEL WAVE

Milady can now have her hair waved by Radio. This machine produces a Radio frequency current of about 3800 meters wave length, it is claimed. The high frequency current is concentrated upon the subject's hair and used to produce heat. The current is circulated through strands of wire wound on a heating spool. The hair is wound for curling on a tube which is inserted into the spool. There is no heat until this tube is placed within the spool. The apparatus eliminates all possibilities of burning the subject or her hair, it is said. Int. Newsreel Photo

OBREGON'S SECRET CODE OVER WBAP

USES RADIO TO KEEP IN TOUCH WITH CONSULS

Calls on Fort Worth Station to Broadcast Rush Confidential Messages

FORT WORTH, TEX.—President Obregon of Mexico utilized the Star-Telegram station, WBAP, this morning from 2 to 5 o'clock, to convey a group of rush confidential messages to Mexican consuls located in different parts of the United States.

WBAP has for weeks handled news messages in code on a wave length of 1,250 and 4,000 meters from the chief Mexican air station, XDA, located in Chapultepec Castle at Mexico City. These have been from correspondents of the Associated Press, Chicago Tribune and New York Times.

At the conclusion of the news filings at an early hour Saturday morning, Colonel Romirez, chief of the Mexican Army Air Service, requested WBAP to establish connection if possible with President Obregon's private train, saying the president had some rush messages he wished to get to his American consuls immediately. The location of the train was not disclosed, and while the wave length of the apparatus on the president's train had to be given, secrecy was requested.

Use Secret Code

Connection was quickly made and in a few minutes the dispatches from the train station were being received. The transcript was in Spanish and in secret code. They were relayed promptly by telegraph to destination points. All were signed: "Tren Presidencial, Alvaro Obregon, Presidente Republica."

At the conclusion, Obregon sent a message of "thanks, congratulations and felicitations to the people of Fort Worth and Station WBAP."

During the transmission of many thousands of words of news dispatches, there has been each night a campaign of deliberate interference by the rebel faction. It has not, however, been able to block WBAP and XDA carrier waves, and only on one occasion was communication impossible.

HE COULDN'T PLACE THAT EMELINE GAL

Dusky Tenor Gets Her Praise but Not Her Identity

CLEVELAND.—The musical numbers of a program broadcast recently from a local station were provided by a group of tuneful colored folk and a considerable amount of applause was received by telegraph and telephone. Most of the telegrams were addressed to the station but one came addressed to the tenor of the group and read:

"I am sure pleased to hear your voice again. (Signed) Emeline."

It was from Birmingham, Alabama. The members of the group crowded around to read the message over the tenor's shoulder, and expressed their admiration of the tribute. The tenor scratched his head. "I certainly can't place that Emeline gal; nowhere, nohow. Most doubtless I knowed her, but I just can't recall her personality, a-tall." "Never mind," said a friend, "you can take the message home and frame it; I sure would."

"Who? Me? Me take that message home?" The tenor's voice trembled. "Man, you-all don't understand; if I was to take that there message to my home I wouldn't have no such!"

Something New in Hats

CINCINNATI.—A recent millinery exhibition here had a Radio receiving set fastened to a hat. Next they will be equipping them with transmitters and talking through them.

THE ANTENNA BROTHERS — Spir L. and Lew P. — A Mere Child in Fact

UNIVERSITY TEAMS HOLD AIR DEBATE

JUDGES LISTEN-IN FROM THIRD STATION

Oregon and California "U's" Engage in First Contest of Kind on Record

(See Pictures on Page 15)

PORTLAND, ORE.—A Radio debate between teams representing the University of California and the University of Oregon, with the two teams over 700 miles apart, and the judges probably in a third place equidistant, or with the Radio public judging, is the latest innovation in broadcasting.

Such an event is scheduled to take place on the night of February 29, with Station KGW, the Morning Oregonian, Portland, Ore., and Station KLX, the Oakland Tribune, as the two mediums through which the arguments will be given. So far as is known, this will be the first Radio debate on record to be held in such a manner.

The subject to be debated is the Bok Peace Plan, a topic of much interest over the entire country.

Will Continue Two Hours

Harold Cherniss and Raymond Sanders have been chosen in open competition to represent the University of California, and Joe A. Frazier and Walter D. Malcolm are the debaters of the University of Oregon. Cherniss and Sanders are being coached by Arnold Perstein, coach for California, and the two Oregon men are being prepared by H. E. Rosson.

According to the plans thus far announced, debating will begin at 8 o'clock Pacific time on Friday night, February 29, and will continue for about two hours. The station through which the affirmative will be upheld will make the first announcement and will then close down while the second station makes a similar announcement. The first speaker for the affirmative will then be introduced through his station and he will be allowed 15 minutes in which to present his arguments. The second station will then come on the air and the first negative speaker will be introduced and will present his arguments. In this manner the debate will be conducted just as though the four debaters were facing an audience from a single platform. Each team will be equipped with a receiving set in order to listen to the other's arguments for rebuttal.

Judges May Listen In

No definite plan for deciding the debate has been announced. The committee of arrangements is considering two plans: one to have the judges at a third point and to listen by Radio, and the other is to have the public at large cast votes, all votes to be in within ten days after the debate.

Both Stations KLX and KGW are of 500-watt power capacity with a minimum normal range of at least three times the distance between the two cities in which they are located and the audience will consist of all persons having access to receiving sets capable of picking up both stations. The two wave lengths in use are the highest in the Pacific Coast chain of Class B stations. KLX broadcasts on 509 meters and KGW on 492 meters.

Code "Hams" Bid for Memory Prize

One Got Some Message from Two Points Simultaneously—and Paid Twice

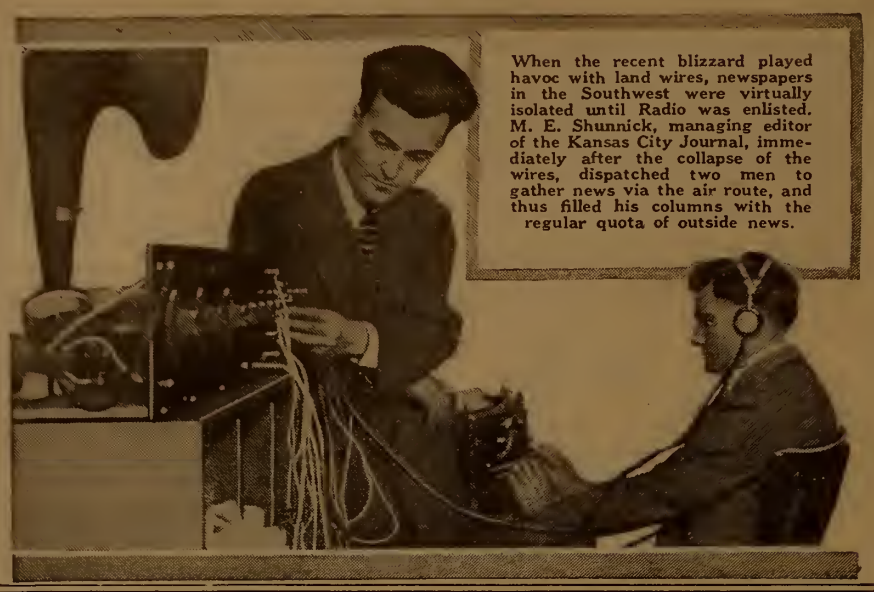
WASHINGTON.—Many old code operators defend the belief that experienced operators can copy or memorize more than one English message at a time, citing one expert in San Francisco, credited with having taken three dispatches at once—all proving to be correct when written out.

There is a former naval operator, now in a high governmental Radio position, who claims that while copying one message, he has often been able to note mentally other messages interfering with the reception of the first, and later write them out. Whenever he was copying some dull and uninteresting report, he says, he always was able to note with accuracy messages pertaining to shore leave, pay or other features in which he was especially interested.

But He Also Paid Twice

Another government official says he once got the same message while aboard ship from two shore stations. An important message for his ship was routed via San Francisco and also via Los Angeles. Both KPH and KPJ called him at the same time, and when he told San Francisco to go ahead, both began to send simultaneously. He tried to take them both, which proved very easy when he discovered they were identical. The only trouble arose later, when both shore stations billed his ship for the message, each claiming credit.

RADIO VANQUISHES ELEMENTS



When the recent blizzard played havoc with land wires, newspapers in the Southwest were virtually isolated until Radio was enlisted. M. E. Shunnick, managing editor of the Kansas City Journal, immediately after the collapse of the wires, dispatched two men to gather news via the air route, and thus filled his columns with the regular quota of outside news.

New Orleans Operator Dies in Honduras Plane Crash

NEW ORLEANS.—Word has been received here that O. Endsley, Radio operator for the United Fruit Company, was killed in Honduras in an airplane wreck. The operator was on his way from New Orleans to Tegucigalpa. As the machine was crossing the mountains it was forced to land. A wing was ripped off, Endsley was killed and the pilot injured.

DREAM DADDY OUT ON STATION TOUR

WDAR Bedtime Story Teller Takes "Vacation" by Working All the Harder

PHILADELPHIA.—Everyone knows the answer to the question, "Where does a ball player go when he has a day off?" Yes, that's it, he goes to a ball game.

This same funny spectacle presents itself in the announcement that Harry E. Ehrhart, famous as "Dream Daddy," the bedtime story teller at WDAR, Lit Brothers' station here, is spending his midwinter vacation this year in a tour of the principal broadcasting stations of the middle west and east. "H. E. E.," as he is known when he announces, will be accompanied by Carl Zoehrns, co-author of the song "Dream Daddy," who will entertain from the stations they visit.

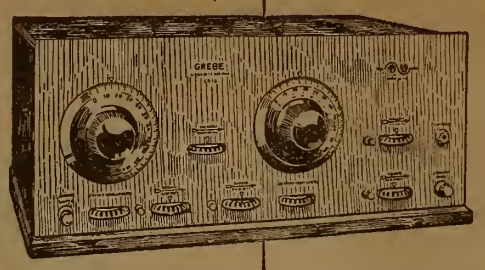
The trip began with the first stop at KDKA, Pittsburgh. From there the following towns were to be visited: Louisville, Cincinnati, Chicago, Detroit, Cleveland, Buffalo, Schenectady, Springfield, Mass., Boston, Medford Hillside, Mass., New York, and Newark, N. J.

Buenos Aires Has 9,000 Sets

WASHINGTON, D. C.—Vice Consul Heulahan estimates that there are about 9,000 amateur Radio sets in use in the city of Buenos Aires. He states that practically all well-known American apparatus have been introduced there.

"Music and beauty make life pleasant."—Yang Chu. The Grebe Broadcast Receiver delights both ear and eye.

Doctor Yen



Type CR-12—4 tubes Combines Regeneration and Tuned R.F. $175.00 (Accessories extra)

The Ideal Radio Instrument for Your Home

THERE'S an ever-fresh program in the air to bring joy to your leisure hours. Tune in on this world of delightful entertainment with a dependable

GREBE Broadcast Receiver

Built in two types, each an easily operated Instrument that adds charm to the most tastefully arranged room.

The rich walnut cabinets conceal all necessary dry batteries.

Each detail of craftsmanship bespeaks real efficiency. Even a casual inspection reveals the reason why Grebe Receivers are the choice of those wise in the ways of radio, as well as of those who desire a thoroughly dependable Instrument that will harmonize with their surroundings.

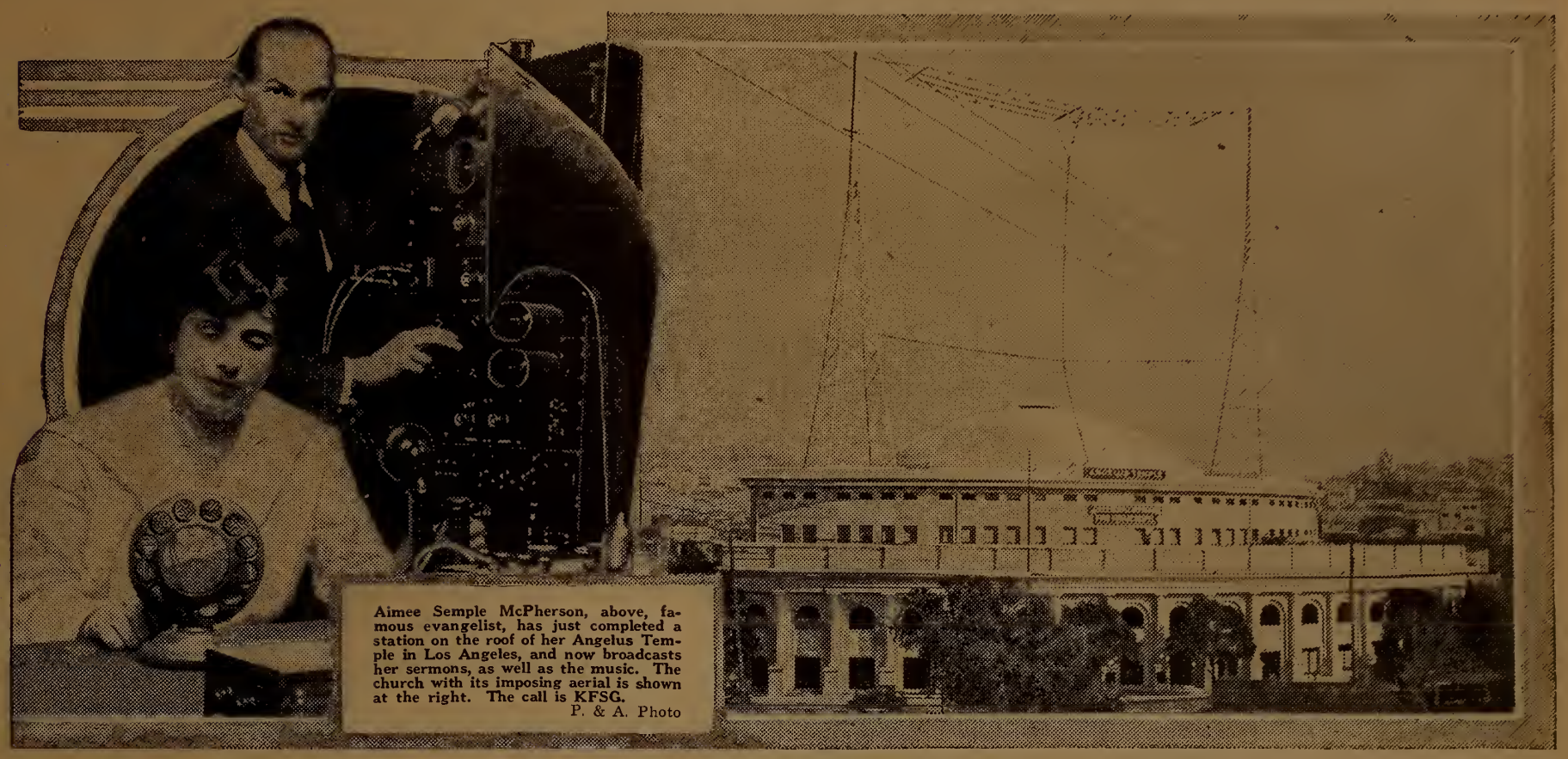
Ask your dealer to demonstrate

A. H. GREBE & CO., Inc.
RICHMOND HILL, N.Y.
WESTERN BRANCH: 451 East 3rd St.
Los Angeles, Calif.

Type CR-14—A 3-tube dry cell Regenerative Receiver . . . $110.00 (Accessories extra)

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

WOMAN EVANGELIST BUILDS STATION



Aimee Semple McPherson, above, famous evangelist, has just completed a station on the roof of her Angelus Temple in Los Angeles, and now broadcasts her sermons, as well as the music. The church with its imposing aerial is shown at the right. The call is KFSG.
P. & A. Photo

U. S. LINKS CHICAGO PLANTS TO AID RAILS

CHICAGO.—E. A. Beane, federal Radio supervisor for the ninth district, headquarters here, has organized local broadcasters to keep communication open and trains moving during blizzards such as that which recently snarled wires and tied up the midwest. The broadcasters will cooperate with the railroads by transmitting dispatchers' orders.

BRYAN BROADCASTS ELECTION MESSAGE

The "Great Commoner" for the first time confronted "Mike." when recently he delivered an address on "The Election of 1924" from the Hotel Commodore, New York, where Station WJZ had installed an instrument specially for the occasion. K. & H. Photo

Walter Camp Talks About Young Men and Athletics

NEW YORK.—Walter Camp, world famed athlete, sport writer, and coach of Yale's most famous football teams, recently talked to WEAF's listeners.

He dealt with the value of athletic training in the development of young men. His address was under the auspices of the Boy Scout Foundation.

LEGIONARY BRANDS WGY BIASED CRITIC

CUTS ATTACK ON MELLON, CHARGE

Former New York State Chief and Charity Officer Call General Election "Unfair"

SCHENECTADY, N. Y.—WGY, the station of the General Electric company here, is being severely criticised, it is reported, for its policy of censoring broadcasts.

One of the most specific criticisms is by Samuel E. Aronowitz, formerly state commander of the American Legion, who charges that the address of John R. Quinn, national commander of the Legion, had been so censored by General Electric company officials that important parts of the talk had been deleted. Quinn spoke at a banquet of world war veterans who are at present members of the state legislature. The dinner was in the Ten Eyck hotel in Albany, whence the speech was broadcast by WGY.

Speech for Bonus Hit Mellon

The national commander's address made a strong plea for a soldier's bonus and attacked Secretary of the Treasury Mellon for his negative stand on the question. Mr. Aronowitz, who listened in, charged, on the day following the broadcast, that the electrical censorial shears had been employed by the General Electric officials.

First, Station WGY declared that Mr. Aronowitz' charge was not true.

Then a statement was issued by the great electrical corporation "to clear up the misunderstanding." The second statement "explained" that the station had established a policy of censoring all speeches, that no attacks on the government were permitted, but that Commander Quinn's address had not been received in time to censor it.

Maintains Speech Was Censored

Aronowitz replied to the General Electric "explanation" by declaring that the speech had been censored. His attack on WGY was seconded later by Commissioner of Charities Leo A. Doody of Albany who also scored the General Electric company.

Commissioner Doody is very pointed in his criticism of WGY officials for attempting to dictate what speakers should or should not say, and is quoted with having said:

"It is a very strange thing for a company which is supposed to be rendering an economic service to demand that the views of speakers representing a society agree with the views of the officials of that company."

Manchester, Eng., broadcasting has now been heard in a Wigan coal mine at a depth of 260 yards. This beats the previous record at Lanark, when a Glasgow program was heard 300 feet below the surface.

Engineers Give Talks

NEW YORK.—A special program as to transportation was the subject of a recent series of talks in Philadelphia before the Institute of Electrical Engineers. Several addresses of the program were broadcast by Stations WEAF of New York, WCAP of Washington, D. C., WIP of Philadelphia, Pa.; KDKA of Pittsburgh, Pa., and WGY of Schenectady, N. Y.

WAAM Talks of Salesmanship

NEWARK, N. J.—Station WAAM has a strong feature in the weekly talks on salesmanship delivered by Joseph G. Wood. His rapid-fire delivery and the humorous business stories he uses to point his addresses have won a large and appreciative audience, according to the number of commendatory telegrams and letters.

De Forest DV3 Dry Cell Tube $6.50

De Forest DV2 Storage Battery Tube $6.50

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 agents 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. 7 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.

MANUFACTURED TRAPS NOW ON THE MARKET

THE number 247W Wavemeter and filter, shown in the illustration, is manufactured by the General Radio Company of Cambridge, Mass. It consists of a wavemeter inductance connected to a .0005-mfd. variable condenser with a vernier control. In order that it may be used as a filter, a coupling coil is placed beneath the wavemeter winding. The number of active turns of this coil may be varied by means of a switch, which also serves to either disconnect or short-circuit the coupling coil.

How to Use the Filter

The filter can be used with any receiving set to improve selectivity; the improvement being more noticeable when used with a single-circuit type than with the inductively coupled type of receiver. When used with a crystal receiver, the operation of the filter is quite simple, but some practice is necessary to get best results when using it with a regenerative tube set, especially when the parallel filter is used.

The Series Filter

When troubled by interference from a nearby broadcasting station, break the antenna lead to your receiver and insert the coupling coil, by connecting it in series in the antenna lead.

Set the switch on tap 8 (8 turns in the coupling coil) and slowly rotate the condenser knob until the desired signal decreases, vanishes and again increases. Using the small knob, pass slowly back and forth over this point until the position for minimum interfering signal is located. The filter is now set for this one interfering station, whose wave length in meters can be read from the condenser scale. Both the interference and the filter may now be forgotten and the receiving set tuned to distant station in the usual manner.

Use of the Switch

Place switch on 0 to entirely cut the filter out of the circuit, on 3 or 5 for moderate interference, and on 8 for strong interference. Do not try to use a series filter to cut out spark stations. The parallel filter is used for this purpose.

The Parallel Filter

The parallel filter is used to reduce interference caused by spark transmitters, static, A.C. hum and similar sources. It will also allow you to tune out several local stations broadcasting simultaneously, and receive from a broadcasting station on a wave length differing by only a few meters from the nearest interfering wave.

Connecting the Parallel Filter

Set the switch on "open," and tune your receiver to the desired station. Then move the filter switch to contact 8 and all signals will disappear until the filter condenser is adjusted to exactly the wave length of the desired station. The wave length markings on the dial are a help if the desired wave length is known. Listen closely for your station while slowly moving filter condenser back and forth over the approximate wave length of the station. Use the small knot and tune carefully, because one-half degree on the condenser dial is enough to tune the desired station in or out. Most people are not accustomed to the highly desirable sharp tuning which is obtained from this Radio filter, and therefore pass over the proper setting without noticing the signal. Practice first on tuning in a loud broadcasting station. After the filter has been carefully adjusted for maximum signal strength, slightly retune the receiver, making a change in the amount of regeneration, if necessary. Place switch on "open" to entirely disconnect filter from receiver, on 8 or 5 for moderate interference and on 3 for strong interference.

Measuring Wave Lengths

Wave lengths from 150 to 500 meters may be measured within 2 per cent of precision. To measure the wave length of an incoming signal, connect the coupling coil in series with the antenna; set the switch on 3 or 5 and carefully rotate the wavemeter condenser until the signal is filtered out. The wave length is then read from the condenser dial.

Setting for Known Wave Lengths

It is often desirable when listening for a certain broadcasting station to adjust your receiver to the proper wave length before transmission begins. Many experimenters also find it convenient to have their tuning controls calibrated in wave lengths. The wavemeter can be used for this purpose only with regenerative receivers. With the usual single-circuit tuner, the operator should make the detector tube oscillate at approximately the desired wave length. The wavemeter is then brought near the antenna tuning inductance and the condenser slowly rotated until the double click is heard in the telephone receivers. This click is due to a sudden change in current through the telephones.

When the wavemeter is tuned to the wave length of the oscillating tube it withdraws sufficient energy from the tube to momentarily stop its oscillations, and a click in the telephones results; another click is heard when the tube again begins to oscillate. If the two clicks occur 30 or 40 meters apart, the coupling between the wavemeter and the receiver should be lessened by moving the wavemeter coil

farther away until the two clicks merge into one. After a little practice in noting the indication of resonance by the double click method, you are ready to set your receiver to the desired wave length, say 410 meters. Set the wavemeter at 410 meters and slowly vary the wave length of your receiving set while it is oscillating. Listen for the double click when the receiver is in tune with the wavemeter. Move the wavemeter far enough away so that the two clicks occur very closely together. The receiver is now tuned to 410 meters. If the means for controlling regeneration on the receiver is altered, the wave length will vary slightly, but this variation is usually less than three meters.

Inductively Coupled Receiver

With an inductively coupled receiver, disconnect the antenna and proceed as mentioned in the foregoing paragraph, coupling the wavemeter to the secondary circuit of the receiver. After this circuit is tuned to the proper wave length, the operator should reconnect the aerial and retune the antenna circuit to the secondary circuit by means of the double click method, using only sufficient coupling in the variocoupler to make the double clicks come close together. Incidentally, this easy and accurate method of tuning the primary or secondary wave length is not as widely known, or used, as it should be.

Measuring Wave Length of Transmitter

To measure the wave length of a C.W. transmitter with a 247W wavemeter, the operator makes use of the reaction method to indicate resonance. With the C.W. transmitter in operation, the wavemeter is brought near the antenna tuning inductance (about 6 inches away) and the condenser dial is slowly rotated until the wavemeter is brought into resonance with the transmitter, which is indicated by a sharp reaction on both the plate and antenna ammeters. The plate ammeter, if used, is ordinarily the better indicator to watch, because it is quick-acting. After a downward kick is noted on the indicating meter, the wavemeter condenser is then slowly rotated back and forth by means of the small knob, until the reading of the indicating meter is a minimum. The wave length of the transmitter is then obtained by reading the wavemeter scale. The coupling between the wavemeter and the antenna tuning inductance should be only sufficient to cause the least reaction which can be easily observed on the indicating meter.

Idle Hours No Longer Dreary for Ranch Men

Texas Ranch Picks Up Joy from Far and Wide

SANDERSON, TEX.—Radio is revolutionizing ranch life in Texas. The long evenings which once were a major argument in inducing youths to desert the cattle industry, have been converted into periods of joy and interest.

An example is the Downie ranch of more than 100 sections of land, 10 miles northwest of Sanderson. One of the largest Radio receiving sets in Texas has been installed on the ranch by Charles Downie, son of the owner. During the last few weeks the ranch house has been headquarters for ranchers in the district who hear programs from all parts of the United States.

You wouldn't think it was the same set since I've added All-American Power Amplification

For an astounding roundness, richness, depth and clarity of tone—plus maximum volume wholly without distortion!—just hook up a pair of All-American Power Amplifying Transformers in a "push pull" circuit and add it to your present audio frequency amplifiers.

Use any good loud speaker—you'll be delighted beyond words. "Absolutely the most efficient, most satisfactory 'push-pull' transformers ever put on the market"—this is the verdict of radio enthusiasts everywhere.

All-American Power Amplifiers are as popular as All-American Audio and Radio Frequency Transformers—which is the highest compliment that could be paid them because the latter are the best-liked, most widely used transformers in the world.

Special Offer

Have you the new "All-American" diagram and circular describing Power Amplification; also Book of 22 Tested Hook-ups for getting new thrills out of your radio equipment? Send 4c in stamps to Rauland Mfg. Co., 2650 Coyne St., Chicago.

ALL-AMERICAN
AMPLIFYING TRANSFORMERS
Largest Selling Transformers in the World

ALL THE BETTER
Dealers recommend
THE "ALL-AMERICAN"

All-American Audio Frequency Transformers lead in the sales: 3:1, 5:1, 10:1, $4.50 to $4.75. The best—no need to pay more.

All-American Socket
One-piece molded Bakelite—for panel or base mounting. Finest socket money can buy. Only 75c.

For "Push-Pull" Circuits: The All-American Power Amplifying Transformers, Input and Output Types, $6.00 each.

And NOW! the new All-American Long Wave Radio Frequency Transformer Suitable for Super-Heterodyne circuits

AIRWAVE GUIDES FOR MAILPLANES

WARN FLYERS OF DANGERS ON THEIR ROUTES

Signals by Etherwave Give Up-to-Minute Reports on Weather Conditions

FAIRFIELD, O.—Tests of new Radio equipment at the Army Air Service Radio station at Wilbur Wright Field here show the practicability of co-operating with Air Mail and Air Service planes, especially in disseminating meteorological information and in keeping track of transcontinental flights over distances up to 1,000 miles.

Station WYD, part of the Army Radio net for some time, has also aided airplane flights, but a complete central weather forecasting and broadcasting station has now been incorporated for the transcontinental airways.

The major duty of this station will be to receive, co-ordinate and broadcast meteorological information to and from various Air Service airdromes via the Model Airways. At present a regular flying schedule is maintained over the Airways between Mitchell Field, N. Y.; Bolling Field, Washington, D. C.; Langley Field, Va.; Langin Field, West Va.; Wilbur Wright Field, Ohio; McCook Field, Ohio; Chanute Field, Ill.; Selfridge Field, Mich., and Scott Field, Ill.

Tell Flyers Weather

Weather reports from each of these stations are received daily at 7:50 a. m. and every two hours thereafter until late in the afternoon. These reports are consolidated and the summary immediately broadcast to all airdromes, where the information is posted on bulletin boards, so that all pilots may have first hand information as to weather conditions over all the routes.

In addition, special items as to local storms and conditions will be relayed to the central station. Arrival and departure of all pilots is broadcast to Airways Headquarters at Bolling Field, together with such information as may be pertinent, thus the location of all pilots can be plotted and their arrival anticipated.

Broadcasting from this station will ordinarily be in code on a 1,500-meter wave length. As the equipment permits of Radiophone broadcasting, it is possible that programs of various kinds may be broadcast later. An emergency set, having a range of 3,000 miles and similar to that now in use by the Shipping Board for communication with its fleet, will also be installed as a precautionary measure.

ARGENTINE PRESIDENT RADIOPHAN

Argentina's president is the latest famous person to get the Radio habit. President Marcelino Alvear (cane over arm) bought the miniature Radio set he is holding at a recent Buenos Aires exhibition. Photo by United

Famous Detective Tells Some Thrills from WOR

Val O'Farrell, Active in Prominent Cases, Reminisces for Fans

NEWARK, N. J.—Val O'Farrell, who enjoys the distinction of being one of the best beloved and at the same time thoroughly feared men in the annals of crime detection, talked recently from WOR here. His talk included reminiscences gleaned from an unusually active experience which covers close to a quarter of a century and extends to every corner of the civilized world.

Among the famous cases he worked on were: the Schoelkopf robbery, the Ward murder case, the Carmen murder case, the famous Burnet $50,000 jewelry robbery, and the Garnet robbery.

NO RECEIVER TAX, HOOVER'S POLICY

Secretary of Commerce Opposes Suggestion That Listeners Pay Licenses

WASHINGTON, D. C.—Secretary of Commerce Hoover recently took the definite stand that he would oppose any suggestion that the government collect taxes from Radio fans owning receiving sets.

The question came up at a recent news conference with the secretary when his attention was called to the fact that many foreign governments are collecting license fees as to Radio receivers. He said he was not in favor of such fees in the United States and pointed out how much more advanced the United States is as to Radio. This is due in part, he said, to the fact that no licenses are required.

Hoover said that he was not of the opinion that charges would be made for broadcasting, at least at the present time.

DOCTOR PRESCRIBES HEADPHONE SET

AND NOW HIS PATIENT IS STEADILY IMPROVING

Two Elderly Sisters on Lonely Farm Forget Their Complaints to Enjoy Radio

NEW YORK—The use of Radio receiving sets in hospitals has become fairly common, but it remained for a Massachusetts doctor to prescribe a set for a patient he was treating in her own home.

For some time he had been physician to two middle-aged women, sisters, living on a lonely farm. One of the sisters had been under his care constantly for an obscure condition which seemed to be growing chronic. A consultation of physicians ended with the opinion that the patient's ailment was more mental than physical.

Doctor Suggests Radio Set

It happened that the doctor was a Radiophan. The thought of a Radio set for the patient suggested itself; he promptly prescribed one.

The price of a complete set seemed prohibitive; so he advised the sisters to build one. They couldn't have been more surprised if he had asked them to build an aeroplane. But the doctor loaned them his own set until he could go to town to buy parts for them.

With a little help from the doctor, they built the set, received excellent results and rapidly became ardent Radiophans. Meanwhile the sick sister forgot to be sick.

WBAP's Hourly Reports on Wilson Win Thanks

FORT WORTH, TEX.—Hundreds of telegrams and letters of appreciation were received by the Star-Telegram for its hourly bulletins on the condition of the late ex-President Woodrow Wilson broadcast over WBAP.

The Star-Telegram broadcast concise bulletins for fifty-five consecutive hours prior to the death of Mr. Wilson at 10:15 (Central Standard time) Sunday. Following his death WBAP was on the air hourly with the information. A leased wire from Washington furnished WBAP with a running story on the illness and death of the wartime president.

"Yes,—But Jim's set has an—!"

The competition between radio enthusiasts! You can't have helped notice it. Each man is proud of the attainments of his set—eager for its further development.

It is this same, healthy spirit of competition that has contributed largely to the success and leadership which establishes, as positive in its performance, every radio set and every radio part made guaranteed by Federal.

Federal Head Sets are but one of 130 Radio Parts, designed, made and guaranteed by Federal.

Federal Telephone and Telegraph Company
FACTORY: BUFFALO, N. Y.

Boston New York Philadelphia Chicago San Francisco
Pittsburgh Bridgeburg, Canada London, England

Federal
Standard RADIO Products

(The Sign of Reliable Radio Dealers)

RADIO SPILLS SOME N'ORLEANS SYRUP

TAKES POST AS EMISSARY OF GOOD EATS

Somebody Broadcast Something About Pancakes and 'Lasses and That Started It

NEW ORLEANS.—Enter Radio as an empire builder and emissary of good things to eat. Empire building sounds big and magnificent, and all that, but those who have visited or lived in Louisiana know the vanity of empire building when compared with good things to eat. However, it is the good things to eat that Louisiana sells that make for empire building, so far as this commonwealth is concerned, and Radio is given credit for a part in helping Louisiana expand. In this manner:

Walter K. Bush, station agent for the Missouri Pacific railroad at Clarks, La., was listening in when the announcer at a broadcasting station at Jefferson City, Mo., expressed a desire for some good old homemade syrup and pancakes. Mr. Bush couldn't send the pancakes, but he sent a can of good old homemade syrup by the next train headed for Missouri.

Illinois and Dakota Mouths Water

The announcer, upon receipt of the syrup, thanked Mr. Bush by Radio. It so happened that Mrs. H. S. Bowen, of Wilmette, Ill., and A. E. Marshall, of Del Rapides, S. D., overheard all that, and it came to pass that their mouths watered at the discussion set up between Missouri and Louisiana upon the subject of eating—a subject that anyone who has ever lived in the pancake and hot biscuit belt will admit being among the most important subjects conceivable.

So Illinois and South Dakota became interested and wrote for prices, and rushed—not merely sent—but rushed checks forward for supplies of good old homemade syrup. Later Wisconsin, Ohio and Minnesota stepped forward with orders, all within a few days.

Thus do good things to eat, empire building and education go hand in hand, even through the ether.

Denmark now has officially licensed 3,109 private Radio receiving sets. School pupils rank first with 473 sets while commerce, shipping, and industry come second with 448.

'BABY' PRIMA DONNA IN REQUEST RECITAL

Though called the "baby" of the Chicago Civic Opera Company, Mary Fahian is that only in size and years. Recently she sang from WJAZ. Previous to her singing at the Zenith-Edgewater Beach hotel station, listeners were asked to express their wishes as to what she should sing. Responses came in by the thousand and a very enjoyable evening program was the result.

"Bridge" Expert Tells His Tricks by Station WEAF

NEW YORK.—Raymond F. Rode, said to be one of the foremost authorities as to auction bridge, recently gave a lesson by Radio through WEAF. It was one of a series acceptable to those who play the game. Rode explained the fine technique of the game in simple terms.

RADIO TALKS

Do you know that an up to date low loss tuning condenser means no body capacity effects, sharper tuning, no shielding, more long distance work? A real good variable condenser is a safe investment at any reasonable price, because the entire action of your set depends so much upon this item.

E. J. Flewelling

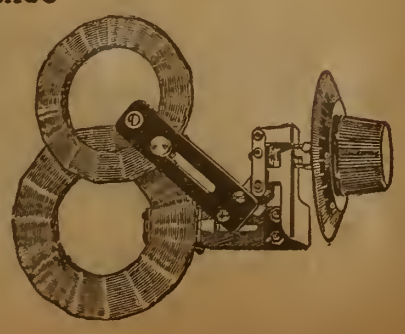
Genuine-
E. J. Flewelling
Radio Apparatus
De Luxe

Satisfaction comes only with results. And there are loads of both in the Flewelling Tuner. By results we mean "first class" reception; we mean strictly high performance; we mean ability to do everything a good tuner should do—and a lot more. What we mean by satisfaction can only be experienced by the user of the Flewelling Tuner. It is "genuine" if it is manufactured by

BUELL MANUFACTURING COMPANY
2977 Cottage Grove Ave.
CHICAGO

Flewelling TUNERS $8.00

Flewelling SOCKETS $1.00



BRISTOL SINGLE CONTROL RADIO RECEIVER

(NON REGENERATIVE)

Using Grimes Inverse Duplex System

ONE CONTROL ONLY Makes It Most Simple to Operate.

SIMPLICITY OF OPERATION is the outstanding feature of this Receiving Set. One Control Dial includes every adjustment. To tune in, turn this Dial. A station once located can always be brought in again at the same setting.

NOT CONFINED TO LOCAL BROADCASTING—this four-tube set has power equal to six. Because the Grimes Inverse Duplex System utilizes the first two tubes for both Radio and Audio Amplification.

ANTENNA OR LOOP—either may be used to suit conditions.

SOLID MAHOGANY CASE with walnut finish encloses the complete Receiving Set. It is a beautiful piece of furniture fully in keeping with the most luxurious room.

The Price

Bristol Single Control Radio Receiver

$190.00

Ask for copy of Bulletin AY-3013 describing this set.

THE BRISTOL CO.
Waterbury, Connecticut

FEDERAL COMPLAINT AGAINST R.C.A.

How R.C.A. Ties up with Postal Telegraph, A. T. & T., Japan and South America

R.C.A. Conspired; Claim

Commission Names Seven Means Used to Create Monopoly and Restrain Competition

(Believing that Radiophans in general are interested in the recent complaint against the Radio Corporation of America filed by the Federal Trade Commission, Radio Digest has undertaken the complete reprinting of the material contained in the report of the commission. While the complaint is in true legal form and is not easily read by Radiophans other than lawyers, the direct reprint is undertaken because it is believed no other publication will give the information in so complete a form.—Editor's Note.)

Part III (Conclusion)

PARAGRAPH TWENTY-TWO: On or about September, 1922, the Radio Corporation of America entered into an agreement with the Federal Telegraph Company of California to incorporate the Federal Telegraph Company of Delaware for the purpose of carrying out certalu agreements between the Federal Telegraph Company of California and the Government of China, executed on or about January 8 and September 20, 1921, for the construction, installing and operation in China of a Radio system for communication between this couutry and China; said agreement between the Radio Corporation of America and the Federal Telegraph Company of California was for the term of ten years and provided for the taking over by the Federal Telegraph Company of Delaware of said contracts of January 8 and September 20, 1921, and the participation of the Radio Corporation of America in the carrying out of the agreement with the Federal Telegraph Company of California with the Chinese Government on the basis of an equal share of the profits.

The Radio Corporation was to name the chairman of the board of directors, on which the Radio Corporation of America and the Federal Telegraph Company of California were to have equal representations in number; the president of the Federal Telegraph Company of California to be president of the Delaware corporation. By said agreement of September, 1922, the Radio Corporation granted to the Delaware corporation, for the purpose of construction and communication under the Federal company-China contracts, a non-exclusive licenae under all its patents in the United States to use in China for Radio telegraphing purposes, but not to make or sell, and the Federal Telegraph Company of California granted to the Delaware corporation a similar license under its patents, all of which more fully appears from said agreements.

R.C.A. Ties Up with Land Telegraph

PARAGRAPH TWENTY-THREE: On or about July 10, 1922, the Radio Corporation of America and the Postal Telegraph Company, a New York corporation, entered into an agreement by which the Postal Company agreed to accept for and receive from the Radio Corporation messages, each to pay the other for its respective service tolls; the Radio Corporation agreed to tender the Postal Company, to be forwarded over its lines, all trans-Atlantic Radio messages received by it or its connections destined to points in the United States reached by the Postal Company, except where the Radio Corporation has its own facilities; it being provided that no traffic arrangement should be made with any other company where the Postal Company has facilities except for ship-to-shore and ship-to-ship traffic, the Postal Company agreeing to receive Radiograms only of and from the Radio Corporation and not otherwise to be the forwarder of trans-Atlantic radio messages under any agreement for through Radiotelegraph service, all of which more fully appears from said agreement.

A.T.& T. Lends R.C.A. Land Lines

PARAGRAPH TWENTY-FOUR: On or about September 25, 1920, the Radio Corporation of America and the American Telephone and Telegraph Company entered into an agreement for extra-continental Radio traffic, which recites that the latter company in connection with its telephone system maintains some telegraph terminals and that the Radio Corporation purposes to establish transfer offices for the transfer of extra-continental Radiotelegrams between land lines and its Radio stations; said agreement provides that the Radio Corporation may attach wires connecting its transfer offices with Radio stations to poles of the American Telephone and Telegraph Company at the same rates as commercial telegraph companies for use only for the transmission of the Radio Corporation'a extra-continental Radiotelegraph messages, and transmission of its telegraph service and other messages at the Radio Corporation's expense, on the condition that the Radio Corporation shall not direct elsewhere a material part of its extra-continental traffic, all of which more fully appears from said agreement.

How R.C.A. Gets All Jap Business

PARAGRAPH TWENTY-FIVE: Among the assets of the Marconi Wireless Telegraph Company of America, acquired as hereinbefore alleged by the Radio Corporation of America, by an assignment dated on or about March 27, 1920, was an agreement entered into on or about August 22, 1916, between the Marconi Company and the Imperial Japanese Government, which provided for a mutual exclusive contract for the handling of traffic unless specially ordered otherwise by senders, and provided that rates are as cheap as elsewhere, and subject to the terms of the International Telegraph Convention of St. Petersburgh so far as compatible with said agreement, all of which more fully appears from said agreement.

PARAGRAPH TWENTY-SIX: By various agreements by assignment from the Marconi Wireless Telegraph Company of America, or directly with the governments and/or companies having exclusive rights for the operation of Radio communication from said governments, respectively, of Germany, France, Sweden, Norway and Poland, the Radio Corporation of America has acquired in the year 1920, and thereafter, exclusive and/or preferential traffic arrangements and/or exclusive or preferential arrangements for the exchange of patents and patent rights, relating to Radio communication and the operation of same, respectively, as more fully appears from said agreements.

South American Trust Created

PARAGRAPH TWENTY-SEVEN: By an agreement entered into on or about October 14, 1921, between the Radio Corporation of America and representatives of British, French and German interests owning or controlling rights for the operation of Radio communication in and with various territories of Central and South America a trust was created of which the chairman was to be named by the Radio Corporation with power of veto, by which the parties agreed to communicate exclusively with the stations of the other parties and their affiliated companies in their respective territories and for traffic in the territory of the other parties with the consent of the respective parties, as more fully appears from said agreement.

Four Companies Sit on R.C.A. Board

PARAGRAPH TWENTY-EIGHT: Since the organization of the Radio Corporation of America, the following respondents have been represented on the board of directors:

General Electric Company
Westinghouse Electric and Manufacturing Company
American Telephone and Telegraph Company and
United Fruit Company

and on December 31, 1922, the respondents named, with the exception of the American Telephone & Telegraph Company, were so represented.

R.C.A. Puts "Obstacles" in Front of "Non-Licensees"

PARAGRAPH TWENTY-NINE: The Radio Corporation of America has, by appropriate action of its board of directors, caused to be published in connection with its Radio apparatus offered for sale a so-called "patent license" containing restrictions as to the use thereof by purchasers, viz., to amateur and experimental purposes only and not for commercial purposes or sale, and not for use in circuits or sets made or assembled for commercial purposes; and has also provided that transmitting apparatus, not exceeding two kilowatts antenna input, and receiving apparatus may be leased to competing companies and others for communication only between ship and shore and vice versa, also for private use and not for tolls and not to resell, on condition that, other things being equal, the Radio Corporation should

(Continued on page 10)

MARLE

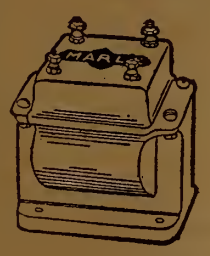
Radio & Audio Frequency
TRANSFORMERS

"The Heart of a Good Receiver"

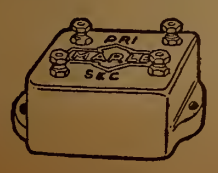
PERFECT amplification is the boon you secure when you buy a Marle Transformer. Radio impulses are magnified to the uttermost limit without a sign of distortion. True over the widest range of frequencies. Special folders, showing the hookups for standard circuits, sent upon request.

Write for Hookups and Illustrated Folder TODAY!

Your Dealer Sells Marle Transformers, or Write to Us for the Names of the Nearest Marle Dealers.



MARLE Engineering Company
ORANGE
New Jersey



Audio F Type A7 Ratio of 3¾ to 1

Radio F Types R1 and R2

A *Freed-Eisemann* KNOCKDOWN NEUTRODYNE RECEIVER

Unassembled Model KD-50, Freed-Eisemann Neutrodyne Receiver

NOW the opportunity is presented to obtain a complete set of parts, recommended by the manufacturer, to work with each other in building your Neutrodyne set. An illustrated 32-page book on how to build the Neutrodyne with full-sized diagrams and templates included.

Complete with Full Instructions

$80

Dealers Write for Name of Nearest Distributer

NEUTRODYNE has taken the country by storm. It is the remarkable distance getting, powerful, non-oscillating and non-whistling receiver.

A 32-page book answers every question. The panel is accurately drilled. A baseboard is furnished; in fact, everything down to the very last screw and nut, including all necessary parts excepting the cabinet.

Besides the book there is furnished schematic blueprints and template for drilling the baseboard, also full-size pictorial perspective wiring diagram, so that it will hardly be possible for the amateur with ordinary care and skill to make an error.

Remember that here are licensed parts—not a collection of apparatus trusting to luck that they will assemble properly. Each part is designed and fitted to work with each other part in this particular set. The instructions are so complete and the parts so accurately matched that you will be grateful for the manner in which we have eliminated guesswork in the amateur construction of this receiver.

For sale by dealers of the better class throughout the country, for amateur and experimental building. Builders are cautioned against attempting to build a Neutrodyne Set with parts which are not recommended and designed by the manufacturer to work with each other.

Front View KD-50, Neutrodyne Being Assembled

FREED-EISEMANN RADIO CORPORATION
LICENSED BY INDEPENDENT RADIO MANUFACTURERS, INC.
NEUTRODYNE
UNDER MAZELTINE PATENT NO. 1450080 DATED MAR. 27, 1923 AND PATENTS PENDING

32-page illustrated book of instructions on "How to Build the Neutrodyne" with full size pictorial wiring diagram and full-size panel and baseboard templates, $1. At your Radio Dealers.

Freed-Eisemann Radio Corporation

SPERRY BUILDING MANHATTAN BRIDGE PLAZA BROOKLYN, N. Y.

COMPLAINT ON R.C.A.

(Continued from page 9)

be given preference in routing business transmitted by such apparatus also that apparatus not for external international communication purposes may be sold or leased, provided transmitting apparatus shall not exceed two kilowatts per antenna input, also that whenever possible, an agreement should be secured giving exclusive traffic connections to stations of the corporation and its affiliated companies; and that no licenses of whatsoever nature are to be granted for the manufacture and sale of vacuum tubes, also, its policy, as recommended by its board of directors, has been that apparatus sold for amateur, entertainment and experimental purposes differ as widely as practicable from the designs of the apparatus sold or leased for other purposes, as "the best way in which to protect our licensees and enforce our restrictions" and to offer "just one more obstacle that non-licensees will have to overcome."

"R.C.A. Combined, Conspired and Created Monopoly"

PARAGRAPH THIRTY: By reason of the facts and acts of the respondents set forth in the preceding paragraphs numbered 8 to 29, inclusive, the respondents have combined and conspired for the purpose and with the effect of restraining competition and creating a monopoly in the manufacture, purchase and sale, in interstate commerce, of Radio devices and apparatus, and other electrical devices and apparatus, and in domestic and trans-oceanic Radio communication and broadcasting by the following means:

(1) Acquiring collectively, directly and indirectly, patents and patent rights covering all devices and apparatus known to and used in any and all branches of the practice of the art of Radio, and combining and pooling, by assignment and licensing, rights thereunder to manufacture and use and/or sell such devices and apparatus, competing and non-competing, and allotting certain of such rights exclusively to certain respondents;

Restricted Competition, Claim

(2) Granting to the Radio Corporation of America the exclusive right to sell such devices and apparatus manufactured under said patents and patent rights and restricting purchases by the Radio Corporation of America of devices and apparatus useful in the art of Radio to certain respondents and apportioning such purchases among them;

(3) Restricting the competition of certain respondents in the respective fields of manufacture and commerce of other respondents;

(4) Attempting to restrict and restricting the use of Radio communication and/or broadcasting of articles manufactured and sold under said patents and patent rights;

(5) Acquiring the equipment heretofore existing in this country essential for trans-oceanic Radio communication and perpetuating the monopoly thereof by refusing to supply to others apparatus and devices necessary for the equipment and operation of such service;

(6) Entering into exclusive contracts and preferential agreements for the handling of trans-oceanic Radio traffic, and the transmission of Radio messages in this country, thereby excluding others from the necessary facilities for the transmission of Radio traffic.

(7) Agreeing and contracting among themselves to co-operate in the development of new inventions relating to Radio and to exchange patents covering the results of the research and experiment of their employees in the art of Radio, including patents on inventions and devices which they may obtain in the future, seeking thereby to perpetuate their control and monopoly of the various means of Radio communication and broadcasting beyond the time covered by existing patents owned by them or under which they are licensed.

Acts Are to Prejudice of Public

PARAGRAPH THIRTY-ONE: The above alleged acts and practices of respondents are all to the prejudice of the public and of respondents' competitors and constitute unfair methods of competition in commerce within the intent and meaning of Section 5 of an Act of Congress, entitled, "An Act to create a Federal Trade Commission, to define its powers and duties, and for other purposes," approved September 26, 1914.

WHEREFORE, THE PREMISES CONSIDERED, the Federal Trade Commission, on this 24th day of January, A. D., 1924, now here issues this its complaint against said respondents.

Must Answer by March 14

NOTICE: Notice is hereby given you, and each of you, General Electric Company, American Telephone & Telegraph Company, Western Electric Company, Inc., Westinghouse Electric & Manufacturing Company, The International Radio Telegraph Company, United Fruit Company, Wireless Specialty Apparatus Company and the Radio Corporation of America, respondents herein, that the 14th day of March, 1924, at 10:30 o'clock in the forenoon, is hereby fixed as the time, and the office of the Federal Trade Commission, in the City of Washington, D. C., as the place, when and where a hearing will be had on the charges set forth in this complaint, at which time and place you shall have the right, under said Act, to appear and show why an order should not be entered by said commission requiring you to cease and desist from the violation of the law charged in this complaint.

IN WITNESS WHEREOF, The Federal Trade Commission has caused this complaint to be signed by its secretary, and its official seal to be hereto affixed at Washington, D. C., this 26th day of January, 1924.

By the Commission; Commissioner Vernon W. Van Fleet, dissenting. OTIS B. JOHNSON, Secretary.

Fannie Hurst Greets Her Readers via Station WOR

NEWARK, N. J.—Fannie Hurst, beloved American authoress, whose latest book, "Lummox," has proved one of the most popular of the year, made a return appearance at WOR last Saturday afternoon. Her reappearance provided an opportunity for thousands of her readers and admirers to see her personally; Miss Hurst broadcast from the improvised studio on the sixth floor of the Bamberger building as a feature of a Radio show.

THORDARSON

POWER AMPLIFYING TRANSFORMERS

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

MAKE PERFECTION YOUR SELECTION

PERFECTION

New York City's Greatest Radio Outlet

119 West 23rd Street — 78 Cortlandt Street — 59 Cortlandt Street
368 Livingston, Flatbush, Bklyn. — 118 Nassau Street — 128 Chambers Street

MAIL ORDER DEPT., 24 MURRAY ST., NEW YORK, N. Y.

HISTORY MAKING PRICE REDUCTIONS!

NEUTRODYNE
5 TUBE SET

The Neutrodyne Circuit is the last word in Radio and is the best set made today. Works without aerial or ground. Will receive any American station.

- 1 Formica Panel 7x24
- 5 Bakelite Sockets
- 3 Neutroformers
- 2 Neutrodons
- 2 Franco Audio Transformers
- 1 "A" Battery Switch
- 3 Dials, 4-inch
- 1 Amsco Rheostat
- 1 Amsco Power Rheostat
- 8 Binding Posts with Names
- 3 Jacks, 12 ft. Spaghetti
- 22 ft. No. 14 Gold Plated Wire
- 1 Condenser
- 1 Grid Leak and Condenser, Freshman
- 1 Dubilier Condenser, .002

Special price for complete licensed parts for 5-tube Neutrodyne set. **$32.50**

COCKADAY
3 TUBE SET

- 1 Cockaday Coil
- 2 17-Plate Plain Condensers
- 2 Switch Arms
- 10 Switch Points
- 4 Switch Stops
- 3 Sockets, Bakelite
- 3 Rheostats, Bakelite
- 1 Grid Leak
- 1 Grid Cond., .00025
- 2 Double Jacks
- 1 Single Jack
- 12 ft. Bus Bar, gold plated
- 1 7x18 Panel, Formica
- 8 Binding Posts, initialed
- 2 Audio Transformers, Jefferson
- 1 .001 Condenser Free Diagram

VALUE $30.00 — Our Price **$19.75**

ERLA
ONE TUBE SET

- 1 Pioneer Bakelite Coupler
- 1 23-Plate Vernier Condenser
- 1 Socket, Erla
- 1 Erla Audio Transformer
- 1 Erla Fixed Detector
- 1 Erla Reflex No. 1 Transformer
- 1 Jack
- 1 Rheostat
- 1 .001 Mica Condenser, Erla
- 1 .002 Mica Condenser, Erla
- 1 .00025 Mica Condenser, Erla
- 1 7x14 Panel, Formica
- 1 Erla Bezel
- 6 Binding Posts, initialed
- Erla Blueprint
- Buss Wire, gold plated

VALUE $30.00 — Our Price **$19.45**

REINARTZ
3 TUBE SET

- 1 Reinartz Coil (John L. Reinartz signature on each coil)
- 1 23-Plate Condenser
- 1 11-Plate Condenser
- 3 Rheostats, Bakelite
- 3 Sockets, Bakelite
- 1 7x21 Panel, Formica
- 1 Grid Leak
- 8 Binding Posts, initialed
- 12 ft. Bus Bar, gold plated
- 3 Switch Arms
- 1 doz. Switch Points
- 6 Stops
- 2 Double Jacks
- 1 Single Jack
- 2 Audio Transformers, Jefferson

VALUE $25.00 — Our Price **$18.90**

COCKADAY
ONE TUBE SET

- 1 Cockaday Coil
- 2 17-Plate Condensers
- 1 Switch Arm
- 7 Switch Points
- 2 Switch Stops
- 1 Socket, Bakelite
- 1 Rheostat, Bakelite
- 1 Grid Leak
- 1 .00025 Condenser
- 1 Jack
- 8 ft. Bus Bar, gold plated
- 1 7x14 Panel, Formica
- 8 Binding Posts, initialed
- Free Diagram

VALUE $14.00 — Our Price **$9.95**

NEW REINARTZ
ONE TUBE SET

- 1 Reinartz Coil (Genuine John L. Reinartz signature on each coil)
- 1 23-Plate Condenser
- 1 11-Plate Condenser
- 1 Rheostat, Bakelite
- 1 Socket, Bakelite
- 1 7x12 Panel, Formica
- 1 Grid Leak
- 8 Binding Posts
- 8 ft. Bus Bar
- 3 Switch Arms
- 1 doz. Points
- 6 Stops

VALUE $14.00 — Our Price **$9.90**

ULTRA AUDION SET

- 1 Variometer, PATHE
- 1 23-Plate Condenser
- 1 Grid Leak and Condenser
- 1 7x12 Panel, Formica
- 1 Socket, Bakelite
- 1 Rheostat, Bakelite
- 8 Binding Posts, Initialed
- 8 ft. Bus Bar, gold plated
- 1 .001 Condenser

VALUE $14.00 — Our Price **$8.90**

2-STEP AMPLIFIER

Convert your one-tube set to a distance getter on a loud speaker with

- 1 7x10 Panel, Formica
- 2 Double Jacks
- 1 Single Jack
- 2 Jefferson Audio Transformers
- 6 Binding Posts
- 2 Rheostats, Bakelite
- 2 Sockets, Bakelite
- 8 ft. Bus Bar, gold plated

VALUE $15.00 — Our Price **$9.90**

FROST FONES

A nationally known quality product. SPECIAL

$4.00 2000 Ohms $2.95
5.00 3000 Ohms 3.75

PHONES

$12.00 Nathaniel BALDWIN $7.95
18.00 Dr. SEIBT, imported 6.50
$18.00 N. & K. Model D, imported... $6.50
3.98 AMBASSADOR, 3000 Ohms.. 3.25
2.95 SCIENTIFIC 2.45
8.00 POTTER PRECISION 3.95
4.50 MURDOCK 3.45
6.00 BRANDES Superior 4.75
6.00 Baldwin Single Corrugated Metal Diaphragm 4.75

LOUD SPEAKERS

$10.00 BRANDES Table Talker.... $ 8.95
8.50 WOODEHORN, Genuine .. 6.45
18.00 WESTINGHOUSE Unit 9.50
25.00 TRINITY 18.50

PIONEER

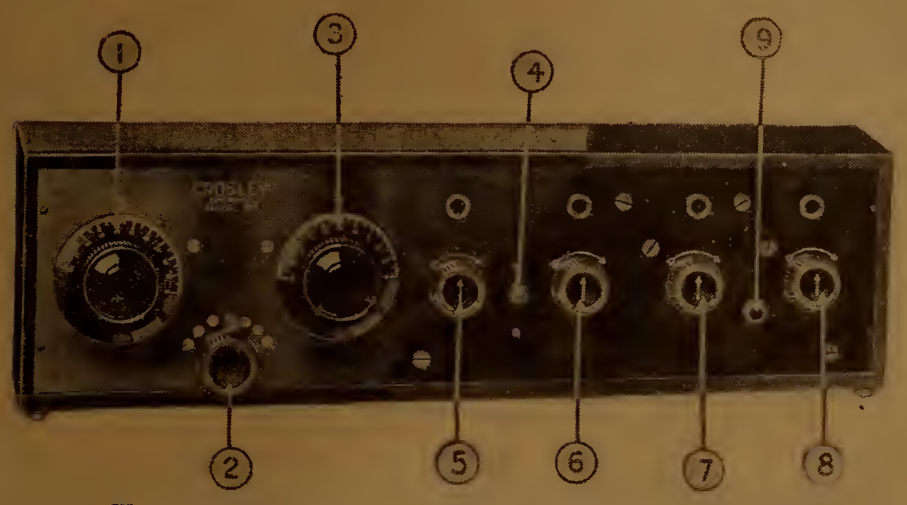
$6.50 Variometer, Bakelite $3.95
9.00 Variocoupler, Bakelite 4.25

OPERATING AND TROUBLE SHOOTING

For the Owner of a CROSLEY Model XJ Receiver

"OPERATING and Trouble Shooting" is a Radio Digest feature whose purpose is to study the late models of various standard receiving sets and to show the newly initiated broadcast listener, who has purchased such a set, how he can operate it to get the best there is in it and how he can overcome minor difficulties which may be causing some trouble. On pages 11, 12 and 13 this week the Crosley Model XJ Receiver is described. Radiophans with other sets will also find these articles worth reading, particularly the notes on trouble finding.

THE Crosley model XJ receiver combines one-stage of tuned Radio frequency amplification, detector and two stages of audio frequency amplification. The tuning is quite simple and is done by means of the knobs 1, 2 and 3. The first is the antenna condenser, the second is the tap switch, while the third is the tuned Radio frequency amplification.



Wave Length Range

The wave length in this receiver is between 200 and 600 meters. Sharp tuning to any wave length between 200 and 600 meters is possible with this set and as all popular broadcasting falls within this band, the set will cover the full range.

Amplification

In addition to Radio frequency amplification, a two-stage audio frequency amplifier is incorporated in the receiver. The filament circuits of the amplifying tubes are controlled by the knobs 7 and 8. The former controls the first stage and the latter the second stage. When headphones are plugged into the jack 9, only the first stage of amplification is used. When the phones are removed, the loud speaker, connected to the binding posts marked 27 and 28, is automatically connected, utilizing both stages of amplification.

Antenna

Any type of antenna may be used with the Crosley receiver, but the best is of the outdoor variety. In erecting an antenna, it is important that the ends of the wires be insulated with a standard porcelain or other insulator. All splices or joining of wires, unless made with clamps, should be soldered. The antenna should be erected according to the National Electric Code, 1923 edition, Rule Number 86.

The Lead-In

The lead-in should be of copper or copper-clad steel, which will not corrode excessively and should not be smaller than number 14, except that number 17 copper-clad may be used. Do not allow the lead-in wire to come nearer than 4 inches to electric light or power wires. Where the wire passes through the building, the simplest arrangement is to have made a small board equal in length to the width of the window and about 2 inches wide. One or more holes may be drilled in this board to accommodate porcelain tubes through which the wire is passed.

Protective Device

It is necessary to equip the lead-in with some sort of approved protective device properly connected and located as near as possible to the point where the wire enters the building. It may be either inside or outside of the building. One terminal (the insulated one) is connected to the lead-in 18, and the other terminal to the protective ground. Follow the directions given with the protective device and you may rest assured that there is no danger whatever connected with the installation.

Protective Ground Wire

This may be either a bare or insulated copper, number 14 B. & S. gauge, or a number 17 copper-clad steel wire. It must be run in as straight a line as possible to a good ground, preferably water piping. There are other grounds, such as grounded steel frames of buildings, or other grounded metal work in the building; artificial grounds, such as pipes driven into moist earth, or buried metal, or a wire in a well, and the like.

Ground Wire for Receiving Equipment

The same ground as mentioned above may be used for receiving equipment. It is also possible to use steam radiators, hot water heating systems or water piping.

Poor grounds and poor ground connections probably cause more trouble to the operators of Radio sets than any other one factor. A large Radio service company in New York City recently made an investigation and found that, in over nine-tenths of all the cases in which trouble was experienced, the difficulty was due to a poor ground. A careful study of grounds was made throughout the state of Ohio in connection with electrical power transmission. It was found that the average good ground was 90 feet below the surface.

To insure proper operation, the Radio set must first be grounded to an object of the proper type, and second, the ground connection must be made in the proper manner. In city installation, perhaps the best object to use for a ground is a water

(Continued on page 12)

The Herald Loud Speaker *is* CLEAR!

DINE out—at home! A famous restaurant, a great orchestra playing, and you there—in the life, the thrill, the glorious music—because the clear Herald brings it all right into your own dining room.

So real because it's so clear! No blast, no blurr, no blare. But every tone of every program—pure, strong and satisfying.

THE Herald, like other good musical instruments, improves with age because of its laminated core, mica diaphragm and permanent magnet. It stands up under power without rattling. The adjustable diaphragm makes it possible to get the most out of a weak set. Height, 30 inches. 6-foot cord. Price, $30. Slightly more on Pacific Coast and in Canada. Write for folder and enclose your dealer's name.

Herald Electric Co., Inc., 113 Fourth Ave., N. Y.

PACIFIC COAST BRANCH:
329 Union League Bldg.
LOS ANGELES

The Superlative Inductance

Four years of careful attention to the details of manufacture of this type of inductance unit has yielded a product of unquestioned superiority. And with increased efficiency in manufacturing methods, moderate prices prevail for all sizes

Ask Your Dealer

Cotoco

"Built First to Last"

COTO-COIL CO. PROVIDENCE

OPERATING AND TROUBLE SHOOTING

(Continued from page 11)

pipe. Make your connection, however, as near as possible to the point where the water piping enters the building. If the water meter is located in the building, make the connection on the far side of the water meter. A steam or water heating system is usually connected to the water supply, and in this case may serve as a ground. However, it is better to go direct to the water system as just mentioned. The gas piping may also be used for a ground. In this case make your connection as near as possible to the point where the pipe enters the building. If several systems are available try out one after another, and use the one giving the best results. Also try using two or more systems connected in at the same time.

Where a piping system is not available, a ground may be obtained by dropping a copper plate to the bottom of a well, letting the plate rest in the clay bottom. Do not attempt to use a cistern, for in ordinary cases the water is too free from salt to make a good conductor. A rod may be driven into moist soil, or a plate buried in moist earth. However, a ground of this type is usually very unsatisfactory, because you do not penetrate the earth far enough and sufficient contact is not made with the ground water. Very frequently such grounds become absolutely worthless in dry weather. Do not attempt to use a lightning rod ground or a telephone ground. In practically all cases, such grounds will be found to be worthless. In case you have not a good piping system on which to make your ground connection, probably the best results will be obtained from a counterpoise system. This is really a copper or wire ground, and it is constructed underneath the aerial. Stretch wires parallel to your aerial either on the ground or a few feet above the ground or buried in a trench. A wire stretched a few feet above the ground may give the best results, and if it can be erected in this position without being in the way, it is highly recommended. Connecting your ground wire to a wire fence serves very much the same purpose, and in practically all cases is found to be greatly superior to telephone or lightning grounds, or pipes driven in the ground.

After a proper ground has been obtained be sure that a good connection is made to the wire running to the Radio set. If the ground is a pipe, the pipe must be scraped absolutely clean. If possible empty the water from the pipe and solder it. If this cannot be done, use a ground clamp, and fasten it tightly to the brightened metal. If a plate is dropped in a well, solder the wire to the plate first. If a counterpoise or fence is used, the connection may be soldered very easily, or in the case of the counterpoise, a continuous wire may be run into the house without break.

Additional Equipment Required

A grid leak, if desired; C battery (required only with certain tubes using very high B battery voltage); four vacuum tubes; A battery; B battery of at least 45 volts; loud speaker, if desired.

Grid Leak

Some manufacturers of vacuum tubes recommend the use of a grid leak. In some cases better results are obtained with a grid leak, but its use is not essential and at times is even detrimental. Spring clips between the first and second sockets from the left are provided to hold a tubular or cartridge leak.

C Battery

The manufacturers of vacuum tubes state that the efficiency of a tube as an amplifier may be increased by the introduction of a C or grid bias battery, particularly when plate or B batteries of 67 or 90 volts are used. To take advantage of this, an extra binding post marked C— is provided on the subpanel of the model XJ. As a C battery is not often necessary, this binding post is connected to the A— binding post when the receiver is shipped from the factory. Before a C battery can be used, this connection must be broken. Connect the C battery, if used, as shown in the sketches, using about 3 volts for 45-volt B battery and higher C battery voltages for higher B battery voltages. Always test out C battery voltages for best operation.

Vacuum Tubes

The model XJ is equipped with universal rheostats known as Multistats, 5, 6, 7 and 8. This type of rheostat makes it possible to use any of the vacuum tubes now available. The following combinations of tubes may be successfully used (12, 13, 14 and 15 are the sockets): *One UV-200 as detector with three UV-201A

(Continued on page 13)

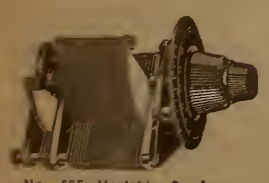
Ask Your Dealer for Kellogg Radio Parts

No. 501

Transformers
Built and designed correctly, delivering maximum amplification with minimum distortion. Connections clearly marked. Properly designed brass shield permits close mounting.
No. 501 Ratio 4½ to 1..... $4.50
No. 502 Ratio 3 to 1..... 4.50

No. 501 with 502 Tuner Coil

Variocouplers
Furnishes efficient coupling. No sliding contacts. Bakelite shells. High induction, low distributed capacity.
No. 501 Variocoupler $9.00
No. 502 Tuner Coil 3.00



No. 505 Variable Condenser with Vernier

Variable Condensers
Decremeter type, 11, 23 and 43 plate with and without 3 plate vernier. Arranged for panel mounting.
No. 605, 43 plate with vernier $8.75

No. 69A Head Set

Head Sets
Extremely sensitive. Small in size. Easily adjusted. Thoroughly efficient.
No. 69A Head Set, 2400 ohms $10.00
No. 74A Head Set, 1000 ohms 5.00

KELLOGG SWITCHBOARD & SUPPLY COMPANY
1066 W. Adams St. CHICAGO, ILL.

RADIO At New York Prices

Via Daily Parcel Post

The Prices Quoted Below Deliver Goods to Your Door

REFERENCES:
R. G. Dun's, Bradstreet, Corn Exchange Bank, N. Y. City. No salvaged goods handled. Only standard brands in original packing, which bears our and the manufacturers' guarantee. Due to our tremendous output we can undersell any of our competitors. Send your order in today and insure prompt delivery.

HOW TO ORDER—Write your order plainly; state number, description and price of items wanted. Send Post Office or express Money Order, personal check or bank draft.

VACUUM TUBES

Standard brand Radio Corp. tubes. Guaranteed brand new.
D50 Det., UV-200, ea...$4.79
D51 Amp., UV-201A, ea. 4.79
D52 1½ volt WD-11, ea. 4.79
D53 WD-12, each..... 4.79
D54 UV-199, each..... 4.79
D55 UV-199 Adapter for UV-199 tube, fits any socket, each... .50
D56 WD-11 Adapter fits WD-11 tube and standard socket, each..... .50

AUDIO FREQ'CY TRANSFORMERS

The following transformers are guaranteed standard makes, and will produce very efficient results.
D63 Dietzen 3-1 Ratio..$3.95
D64 Dietzen 5-1 Ratio.. 3.95
D65 Dietzen 10-1 Ratio. 3.95
D66 Acme Audio 3.95
D67 Amertran 5.95
D68 General Radio 4.65
D69 Modern Audio 4-1..... 4.65
D216 Modern Audio 10-1..... 4.95

INDOOR LOOP AERIAL

D76 Can be assembled by anyone in five minutes, all wood parts, wire and binding posts included, complete while quantity lasts. 79c

MOULDED BAKELITE VARIOMETER OR VARIOCDUPLER

D79 Ea., $4.65; List $8.00
A high grade instrument. Takes in the wave lengths from 250 meters to 800 meters. Table or Panel Mtg.

FRESHMAN VARIABLE GRID LEAK AND GRID CONDENSER

Lowest filament current increases battery life; eliminate howling; zero to 5 megohms.
D102 Freshman Variable Grid Leak alone.....$0.65
D103 Freshman Variable Grid Leak and Condenser combined $0.85

FILAMENT CONTROLLED RHEOSTATS

Highest grade of bakelite used tapered knob.
D104—6 ohm $0.49
D105 30 ohm ..... .49
D106 200 ohm Potentiometer 79
D107—400 ohm Potentiometer 79

HONEYCOMB COILS UNMOUNTED

Turns	Cat. No.	Price
25	D200	$0.40
35	D201	.40
50	D202	.45
75	D203	.50
100	D204	.55
150	D205	.70
200	D206	.80
250	D207	.85
300	D208	.95
400	D209	1.05
500	D210	1.15
600	D211	1.35
750	D212	1.50
1000	D213	1.70
1250	D214	1.95
1500	D215	2.20

HONEYCOMB COIL MOUNTINGS

D140 2-coil mounting $2.85
D141 3-coil mounting 3.79
D142 Single coil mounting .... .40
D143 Receptacle for single coil mounting .... .50

MISCELLANEDUS

D163 Spaghetti Tuhing, per yd....$0.09
D164 Synthetic Crystal ..... .30
D165 Ground Clamps ..... .17
D166 Black Rubber Binding Posts .05
D167 Nickel Pl. Binding Posts 2 for .05
D168 No. 18 Annunciated Wire, half pound coil..... .39
D169 6 ft. Phone Cord with tips. .79
D170 20 ft. Exten. Cord with tips 1.95
D171 Wall Insulators, Porcelain.. .05
D172 Tubular Porcelain Lead-in Insulators, 6 in..... .10
D173 Reinartz Coil 1.45
D174 Cockaday Coil 2.45
D175 2 in. Dial and knob..... .25
D176 3 in. Dial and knob..... .35
D177 Switch Arm—tapered knob... .19

BUILD YOUR OWN SETS

COCKADAY 4 CIRCUIT TUNER

Consisting of
1 Cockaday 4 circuit tuner and 7 pigtail connections
2 .0005 Variable Condensers
1 Socket
1 Panel 7x12
2 Dials, 3 in.
1 Grid Leak and Condenser
1 Rheostat
1 Switch Lever
1 Base Board
12 Ft. Bus Bar
7 Switch Points
8 Marked Binding Posts
1 Jack
Wiring Diagram and Instructions
D-178 - - Our Price $9.85

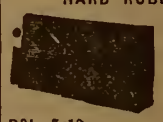
REINARTZ CIRCUIT COMPLETE

Consisting of
1 Reinartz Coil & 16 pigtail connections
2 3 in. Dials
2 .0005 Variable Condenser
1 Socket
1 Vernier Rheostat
3 Switch Levers
1 7x12 Panel
1 Base Board
8 Marked Binding Posts
12 Ft. Bus Bar
1 Grid Condenser
2 Doz. Switch Points and Stops
Wiring Diagram and Instructions
D-179 - - Our Price $10.85

DIETZEN SUPER HEAD SET

D181 2200 ohms $2.95
Reg. Price $5 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.
D134 Brandes Superior $5.25
D135 Dictograph 6.75
D136 Baldwin Type "C" Double.... 9.85
D137 Baldwin Type "C" Single..... 4.95
D138 Western Electric 10.50
D139 Dietzen Navy Type, 3000 ohms 4.95
List price 8.00

HARD RUBBER PANELS



The highest grade panel on the market. Highly polished finish; cut in the following sizes:
D88—7x10 ....$0.95
D89—7x12 .... 1.15
D90—7x14 .... 1.25
D91—7x18 ..... 1.65
D92—7x21 ..... 1.95
D93—7x24 ..... 2.20

FISHER WOODEN VARIOMETERS

D97 Price $3.45
A real high grade job at extremely low price. Takes in all wave lengths.

AMPLITONE LOUD SPEAKERS

Make a loud speaker of your headphones. This speaker will give efficient results when used with any pair of headphones; highly nickel plated; 18 in. high.
D117 .....$3.95

MAGNET WIRE (8 Oz.)

Double Cotton Covered Size	Price	Green-Silk Size	Price
D144 18...	$0.43	D145 18...	$0.73
D146 20...	.53	D147 20...	.85
D148 22...	.68	D149 22...	1.00
D150 24...	.78	D151 24...	1.13
D152 26...	.88	D153 26...	1.65
D154 28...	1.07	D155 28...	1.95
D156 30...	1.58	D157 30...	2.65

DOUBLE PHONOGRAPH ATTACHMENT

This attachment fits all phonographs, will take any headset. It converts your phonograph into a loud speaker.
D132 Double attachment $0.85
D180 Single attachment fits any single phone unit to be used on phonographs .49

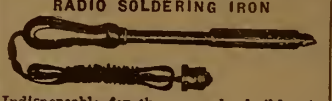
WAVE TRAP

Simplifies tuning. Eliminates interfering stations, thereby improving the selectivity of your set. Selects between conflicting stations. Special while quantity lasts.
D95 Each....$4.95

BAKELITE TUBE SOCKETS

Moulded of brown bakelite; Binding Post Connections.
D99 Standard Type for 201A, 301A, WD-12....49c
D100 For UV-199, UV-299 Socket 49c
D101 For WD-11, C11.49c

RADIO SOLDERING IRON



Indispensable for the man who builds his own sets.
D109 .....$2.25

VARIABLE AIR CONDENSERS

These condensers are made of heavy aluminum plates, high grade bakelite ends.
D110—21 Plate .0005 Mfd....$1.75
D111—11 Plate .00025 Mfd... 1.25
D112—3 Plate .00005 Mfd. ..... .95
D113—43 Plate .001 Mfd. 2.25

VERNIER VARIABLE CONDENSERS

Specifications the same as above.
D 114—14 Plate Vernier with knob and dial $2.95
D115—26 Plate Vernier with knob and dial 3.45
D116—43 Plate Vernier with knob and dial 3.95

RADIO CABINETS

Highest grade Mahogany piano finish Cabinets. Hindged top. These cabinets are being sold at less than one-half regular value.
D57 Cabinet; panel size 7x10". Ea.$2.95
D58 Cabinet; panel size 7x12". Ea. 3.45
D59 Cabinet; panel size 7x14". Ea. 3.95
D60 Cabinet; panel size 7x18". Ea. 4.45
D61 Cabinet; panel size 7x21". Ea. 4.95
D62 Cabinet; panel size 7x24". Ea. 5.75
D217—7x26" 6.50

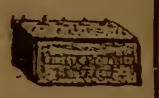
RADIO FREQUENCY TRANSFORMERS

D70 Tri-coil for 201A or 301A tubes $1.95
D71 For 199, 299 or WD-11 and 12 tubes . 1.95
D72 Erla AB1 ..... 3.75
D73 Erla AB2 ..... 3.75
D74 Erla AB3 ..... 3.75
D75 Erla Reflex 4.65
D218 Rasla Reflex ... 3.95

VARIOCOUPLER

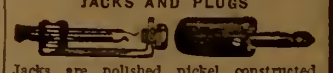
D77 High grade 180 Degree Coupler, made of Bakelite tubing wound with green silk wire. Special....$2.45
D78 Variometer, same specifications 2.45

PLATE CIRCUIT "B" BATTERIES



D80—22½ Volt small $1.15
D81—22½ Volt medium 1.45
D82—22½ Volt large..... 1.95
D83—45 Volt medium..... 1.95
D84—45 Volt large..... 2.50
D85—45 Volt extra large..... 3.50
D86—360 hr. 1½ Volt twin double duty "A" Battery..... .75

JACKS AND PLUGS



Jacks are polished nickel constructed with pure silver contacts.
D118 One Spring open circuit.....$0.39
D119 Two Spring closed circuit.... .49
D120 Round plug as illustrated.... .49

AERIAL WIRE

D121 100 ft. Solid Copperweld Wire Coil $0.49
D122 7 Strand, 100 ft..... .69
Ground Wire Rubber Covered No. 14
D123 25 ft. Coil..... .49
D124 50 ft. Coil..... .85

INSULATORS

These are very strong strain type insulators.
D158 Moulded Insulator, shown above ..... Ea. $0.10 Doz. $1.10

LOUD SPEAKERS

D125—Dictograph Loud Speaker. Reproduces the voice naturally. Formerly $28.50. Now $16.95.
D126 Magnavox, new type..... $29.85
D127 Music Master 28.50
D128 Atlas Speaker 22.50
D129 Pathe Speaker 21.95
D130 Dietzen Speaker 18.95
D131 Herald Loud Speaker..Now 30.00
The above prices delivered to your door

Modells ESTABLISHED 1889 — 71 Cortlandt St. New York, N. Y.

America's Greatest Radio Mail Order House

ELEVEN NEW YORK STORES

Send 10c for our big catalog containing hundreds of Radio bargains. We will send, FREE with every catalog, a 62-page book, the A B C of Radio, written in clear simple terms, by a nationally known radio expert.

OPERATING AND TROUBLE SHOOTING

(Continued from page 12)

as amplifiers; *one C-300 as detector with three C-301A as amplifiers; *one UV-200 as detector with three UV-201 as amplifiers; four C-301A; four UV-201A; four DV-6 (De Forest); *four WD-12; *four C-12; four WD-11; four UV-199; four C-299. Combinations marked with (*) are recommended. There are also other combinations that may be used.

A and B Batteries

For economical service an 80 ampere-hour storage battery is required as A battery (20 and 23) for tubes, except where loud speaker requiring exciting current from the A battery is used. In this case we advise the use of a 120 ampere-hour battery. The A tubes use low filament current. For this reason the rheostats controlling these tubes should be operated at the halfway position and should never be turned on full when using the 6-volt A battery. A B battery of at least 45 volts is required, and for maximum volume use 90 volts. If only 45 volts of B battery is used, connect the binding post (26) marked B 40-100 to the same B battery terminal as the binding post marked B 45. Some UV-200 and C-300 detector tubes operate best on less than 22½ volts. Make the B 22½ connection to various terminals of the first block of B battery, that is, between 16½ to 22½ volts, to determine the voltage for best operation. No grid leak is required. No C battery is required.

Headphones and Plug

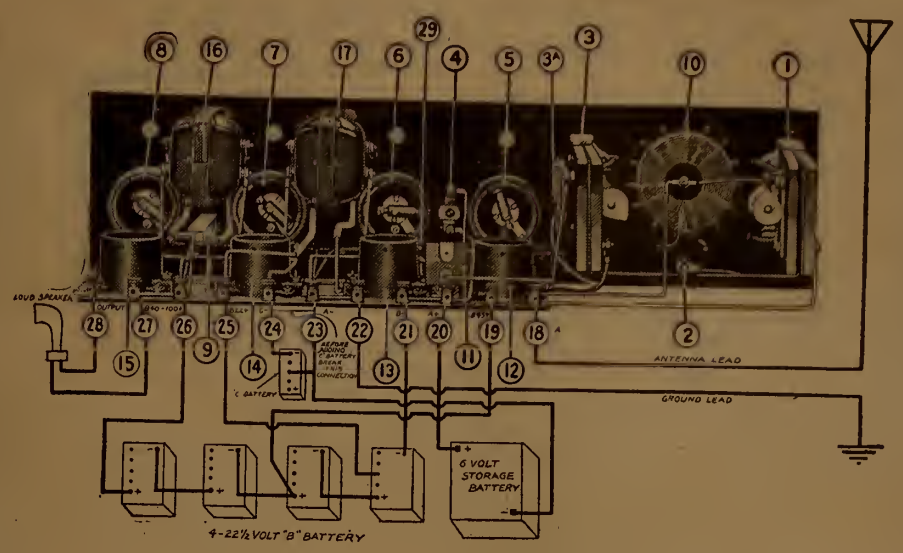
A pair of sensitive headphones are necessary. A phone plug is required in order to make use of the jack.

Loud Speaker

A loud speaker should be used where it is desired to furnish entertainment for a large number of persons.

Controls

Antenna condenser: This unit is controlled by the large knob and dial 1 on the left-hand side of the panel. Antenna inductance: This is varied by the tap switch 2 at the bottom of the panel at the right of the first knob and dial. Radio frequency tuner: This unit is controlled by the large knob and dial 3 to the right of the tap switch. Radio frequency amplifier tube: The knob marked with the white arrow nearest the Radio frequency



tuner 5 operates the rheostat controlling the filament of the Radio frequency amplifier tube. Detector tube: The second rheostat knob from the left (6) controls the detector tube filament. First audio frequency amplifier tube: The third knob from the left (7) controls the filament of this tube. Second audio frequency amplifier tube: The fourth knob or the one on the extreme right (8) controls the filament of the second stage audio frequency amplifier tube. Filament switch: The small knob located between the first and second rheostat (4) controls, operates a line battery switch which turns on and off the filament current of all the tubes in the receiver. When this switch is pulled out, the tubes are lighted. This switch makes it possible to turn off the tubes and leave the set tuned. Phone jack: The phone jack 9 is located between the third and fourth rheostat knobs. When the phones are connected to the phone plug and the plug inserted in the jack, only the first stage of audio frequency amplification is used. The second amplifier tube may then be tuned out. The phones may be connected to the binding posts on the subpanel marked "Output," but the signals are usually too loud for comfort with the headphones when the two stages of amplification are used. When the loud speaker is connected to the output binding posts with all the tubes burning, the phones may be plugged in the jack for tuning. This cuts out the loud speaker. When tuning is accomplished, pull out the phone plug and the loud speaker will be automatically connected. It may then be necessary to retune very slightly.

Operation

Check all connections carefully; turn off rheostats by rotating the knobs 5, 6, 7 and 8 toward the left until the contact arm is not touching the resistance winding; place tubes in sockets; the amplifier tubes must be placed in the first (12), third (14), and fourth (15) sockets from the left and the detector tube in the second socket (13); pull out the filament switch 4; turn on the rheostats one at a time, being careful not to turn them too high. Follow the directions given for the various types of tubes; connect headphones either by means of the plug or in the binding posts marked "Output" (27 and 28); place the tap switch 2 on the sixth tap from the left; take the two large knobs in the left and right hands (1 and 3), then turn the dial on the left slowly through the range from 0 to 100, at the same time turning the dial on the right through the entire range for every few points moved by the dial on the left. The dial on the left together with the tap switch controls the wave length of the antenna circuit, while the dial on the right controls the tuning of the Radio frequency unit. This makes it necessary to tune these two units to the same wave length before signals will be heard.

The signal is indicated by a swishing or whistling sound. Tune more carefully and bring in this sound as loud as possible. You will now undoubtedly hear the station more clearly. Adjust the filaments of the first and second tubes on the left. This should clear up and increase the volume of the signal being received (12 and 13). Adjust the filaments of the two tubes on the right until amplifier is operating at the most efficient point (14 and 15). Use other taps and retune for different wave lengths. The taps on the left are for the lower wave lengths.

In Case of Failure to Operate

Be sure a broadcasting station is operating within the range of the receiver.

Break the B-45 connection once or twice; if no click is heard in the headphones, check the B battery connections very carefully. Also check your B battery for voltage if possible.

Be sure the right A battery is being used and that it is in good electrical condition.

Check antenna and ground connections carefully; the antenna must be carefully insulated from any grounded object.

Test headphones by using them on a set known to be operating properly; if this is not possible, place phone tips on the terminals of the A battery, one on the negative and one on the positive. A decided click should be heard when this is done. Connect only momentarily.

Test vacuum tubes in a properly operating set if possible.

Remember that it requires no little skill to tune a set with which you are not acquainted.

(ANOTHER SET NEXT WEEK.)

1c SALE

One of Six Large New York Stores

The RADIO-SHACK

58 Dey Street - New York City
Goods shipped C.O.D.
Just pay the postman
EVERY ARTICLE SOLD ON WRITTEN MONEY-BACK GUARANTEE

Send No Money. We'll Ship Anything C. O. D.

1c SALE

They Won't Let Us Stop

Letters are pouring in from all over the United States asking us for more 1c sale items. Many requests have been made for more time in which to buy. We feel obligated to our many friends and are happy to announce that the prices in the Feb. 9th issue of the RADIO DIGEST will be good for one more week.

SUPERTRON TUBES

Just received a new shipment. Oh boy, what an amplifier! Better than ever. At this price they'll go fast. The 201 A's are 6 volt, dry cell or storage battery operated, and the W. D. 12 type uses 1½ volt dry cell. Better get your order in now. Both types, 1 for $6.49.

2 FOR $6.50

VARIABLE CONDENSERS

Just get these points! 1. Heavy moulded end plates. 2. Phosphor-bronze contacts to heavy binding posts. 3. Processed aluminum plates that retain their aligament. 4. And the list price is double what we ask.

11 plate ..... 1 for $1.99
23 plate ..... 1 for $2.49
43 plate ..... 1 for $2.99
VERNIER CONDENSER with dial. Same as above.
11 plate vernier $4.99
23 plate vernier 5.69
43 plate vernier 5.99

2 FOR 1c MORE

VARIOMETER

Let's tell you about the new variometer! First of all, it's moulded. Of course, it has pigtail connections for efficiency. And a positive stop. Split? Oh, yes. Can be split for any circuit. Green silk windings and takes 600 meters. 1 for $5.49.

2 FOR $5.50

SOCKETS

A new process enables us to offer an unheard of value. By this new method a nickel tube is forced into a moulded base under heavy pressure. This assures perfect contact with the phosphor bronze springs. Easily worth 75c each. 1 for 69c.

2 FOR 70c

PHONES

For this sale we are going to let you have TURNEY 3,000 ohms phones for a very low figure. 1 pair for $5.89.

2 FOR $5.90

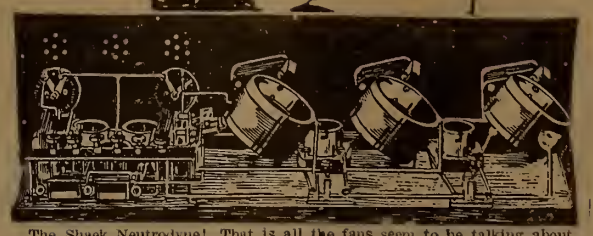
DIALS

Mahogany colored dials with exceptionally heavy brass bushing. Will dress up your set. Change your dials and make your friends think you have a new set. List $1.00. 1 for 69c.

2 FOR 70c

The following "hard to get" apparatus in stock at special prices.
Erla Transformers, Hlico Couplers, Erla Crystals, Rathbun Condensers, Premier Jacks, Erla Blueprints, Erla Sockets, Lavite resistances 48,000 ohm, Amplex Gridensers, All-American Push-Pull Trans., Amsco Condensers and rheostats.

LICENSED BY INDEPENDENT RADIO MANUFACTURERS INC.
NEUTRODYNE
UNDER HAZELTINE PATENT NO. 1450080 OTHER PATENTS PENDING
REG. U.S. PAT. OFF.



The Shack Neutrodyne! That is all the fans seem to be talking about. The wonderful distance-getting power of the Neutrodyne and the low price of the genuine Neutrodyne parts at the Radio Shack. Licensed under the original Hazeltine patents. Licensed parts are your protection. They always work.
Complete list of parts for building five tube set. **$25.97**

A Special Dial Screwdriver Free With Every $2.00 Purchase

D. L. COILS 35—50—75—100 Just the size for Three Circuit. 1 FOR 69c.	2 For 70c	GOLO BUS BAR Most Efficient. Allows high frequency currents least resistance. Used in finest sets. Reg. 15c. 1 FOR 15c.	2 For 16c
VERNIER CONTROL For any Dial. Makes a Vernier out of any make condenser. Very efficient. Reg. 75c. 1 FOR 49c.	2 For 50c	TRANSFORMERS Audio Frequency well known standard make. Ratio 4-1. Reg. $5.50. 1 FOR $5.49.	2 For 5.50
DIALS DeForest Type Remarkable value. Knurled knob with heavy brass bushing. ¼ and 5/16 shafts. 2 inch.....39c 2½ inch.....44c 3 inch.....54c 4 inch.....74c	2 FOR 1c MORE	LITZ WIRE Most Efficient A double silk covered wire with 37 strands of No. 38 wire, each strand enameled. Wonderful for Coils, Loops, etc. 1 FT. FOR 4c.	2 For 5c
AERIAL WIRE 7 Strand Tinned copper wire gives excellent results on OX work. Reg. $1.00. 100 ft. 99c.	200 For 1.00	VERNIER RHEOSTATS The famous TECO. Needed for your detector tube. 1 FOR 89c	2 For 90c
HYOROMETERS Very Accurate. Packed in wooden moisture proof box. Reg. 75c. 1 FOR 59c.	2 For 60c	VARIOCOUPLERS 180 Degree Wound on Genuine Bakelite tubing with green silk wire. Reaches 600 meters. Reg. $5.00. 1 FOR $3.89.	2 For 3.90
JACKS Single or Double Heavy Springs—German Silver Contacts. Nickel finish. Reg. 90c. 1 FOR 59c.	2 For 60c	TUBE PROTECTORS Impossible to blow your tubes if you attach these to end of socket for ¼ or 1 amp. tubes. 1 FOR 49c.	2 For 50c

AN EVENING AT HOME WITH THE LISTENER IN
(SEE INSTRUCTIONS FOR USE BELOW)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	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.	425	Silent	6:00-10:30	Silent	6:00-10:30	Silent	6:00-10:30	3:30- 4:30
CYB, Mexico City, Mex.	425	Silent	8:00- 9:30	Silent	8:30-10:30	Silent	8:00- 9:30	Silent
CYL, Mexico City, Mex.	500	Silent	9:30-11:00	Silent	Silent	9:30-11:00	Silent	Silent
KDKA, E. Pittsburgh, Pa.	326	5:00- 9:00	5:00-11:30	5:00- 9:00	5:00-11:30	5:00- 9:00	5:00- 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	9:30-10:30	Silent	9:30-10:30	Silent	9:30-10:30	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	12:00- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	8:45- 1:00
KGO, Oakland, Calif.	312	Silent	10:00-11:00	Silent	10:00-11:00	10:00-11:00	10:00-11:00	Silent
KGU, Honolulu, Hawaii	360	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30
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- 2:00	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	10:00-11:00	10:00- 2:00	10:30-12:00
KSD, St. Louis, Mo.	546	8:30- 9:30	8:00- 9:00	7:00- 9:00	8:00-10:30	Silent	9:00-10:00	Silent
KYW, Chicago, Ill.	536	Silent	7:00- 9:30	7:00- 2:00	7:00- 9:30	7:00- 2:00	7:00-12:00	6:30- 8:00
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.	426	5:30- 8:30	5:30- 8:30	5:30- 8:30	5:30- 8:30	5:30- 8:30	5:30- 8:30	5:30- 8:00
WCAP, Washington, D. C	469	Silent	6:30- 9:00	Silent	6:15-11:00	Silent	6:15-11:00	6:20- 9:00
WCBD, Zion, Ill.	345	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	1:00- 3:00
WEAF, New York, N. Y.	492	6:30- 9:00	6:30- 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	8:30-12:00	6:00-11:00
WFI, Philadelphia, Pa.	395	5:30- 6:00	5:30- 8:00	5:30- 6:30	5:30- 8:00	5:30- 6:30	5:30- 8:00	6:30- 7:30
WGI, Medford Mass.	360	Silent	6:30- 7:30	6:00- 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- 4:00
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	5:00-10:00	5:00- 5:30	7:00- 9:00
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	7:00-10:00
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- 9:30	Silent	6:30- 9:15	6:30-11:00	Silent	7:15-10:00
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	Silent	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	8:30- 9:30	Silent
WNAC, Boston, Mass.	278	5:00- 9:00	7:00- 9:00	5:00- 9:00	7:00- 9:00	5:00- 9:00	8:00- 9:00	6:30- 8:30
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- 9:00	8:00- 9:00	8:00- 9:00	9:00-10:00	7:00-11:00
WOO, Philadelphia, Pa.	509	6:30-10:00	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	7:30- 8:30
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	Silent	8:00-12:00	8:00-12:00	8:00-12:00	7:30- 9:15
WSY, Birmingham, Ala.	360	Silent	8:00- 9:00	Silent	Silent	8:00- 9:00	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.

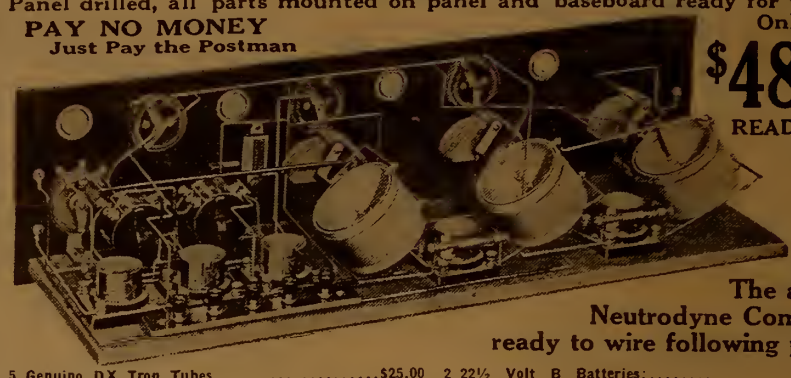
BRINGS IN EVERYTHING

BEAUTIFUL MAHOGANY NEUTRODYNE

WHEN you get this magnificent looking set wired and hooked up, you will be able to hear all stations without interference. All parts are same as illustrated in Radio Digest, Feb. 2nd. Panel is mahogany with beautiful mahogany dials—a set fitted for the most exclusive home.

Panel drilled, all parts mounted on panel and baseboard ready for wiring

PAY NO MONEY
Just Pay the Postman



Only **$48.50** READY TO WIRE

FREE BLUE PRINT

The above Neutrodyne Complete ready to wire following parts:

5 Genuine DX Tron Tubes	$25.00	2 22½ Volt B Batteries	$ 6.00
1 110 Ampere Storage Battery	18.00		
1 DeLuxe Homecharger	18.00		$86.00
1 Genuine Baldwin Headset	12.00	1 Fultone Loud Speaker	9.50
1 Complete Aerial Equipment	1.50		
1 45 Volt B Battery	5.50	TOTAL	$95.50

The above parts and equipment complete would cost you $144.00! **Our Price $125.00**

It Works—NEUTRODYNE—All Standard Parts

3 Rheostats, 30 ohms	$ 2.00	2 Transformers	$ 9.50
1 Rheostat, 6 ohms	.90	9 Readem Binding Posts	.85
3 Air Core R. F. Transformers, mounted on condensers, and 2 balancing condensers	20.00	1 8x26 Mahogany Panel	3.64
1 Potentiometer, 600 ohms	1.85	4 Bezels	.80
3 Jacks	2.70	3 Dials	4.50
1 Condenser	.40	1 Baseboard	.50
1 Grid Leak	.65	24 ft. Square Brass Bus Wire	.60
5 Sockets	5.00	Total	$53.89

Only $45.50 with blue prints FREE.

Complete Parts—MILOPLEX—2-Step Amplifier

Mounted on baseboard and panel. **LIST $21.06 OUR PRICE ONLY $16.50**

1 Panel 7x9x3/16"	$1.26	2 Sockets	$2.80	1 Baseboard	$0.25
2 Webster's 4-1 Transformers	9.50	2 Double Circuit Jacks	1.80	1 Cabinet Mahogany Finish	3.50
2 30 Ohm Rheostats	2.00	1 Set Readem Engraved Binding Posts	.75		

The above mentioned parts will include any Ohm Rheostat and All-American Transformers if desired.

Complete Parts—MILOPLEX—Cabinet FREE

1 .0005 Variable Condenser, Vernier	$6.00	1 Socket Bakelite Base	$0.90
1 Estru Variometer	5.00	1 Bakelite Panel, 9x14x3/16	2.50
1 .00025 Variable Condenser	2.00	1 WD-12 Tube	6.50
1 Variable Grid Leak	.75	1 B Battery, large, 22½ volt	3.00
1 .00025 Mica Fixed Condenser	.40	3 Dry Cells	1.35
2 .002 Phone Condensers	.80	12 ft. sq. brass Bus wire	.30
3 3½-inch Dials, each 75c	2.25	1 Set Readem Binding Posts	.75
1 Potentiometer, 1850 ohms	2.20		
1 Rheostat	1.00	TOTAL	$35.70

ONLY **$28.50**

Blue print FREE only with order for complete parts

We Are Responsible Folks, Money Promptly and Cheerfully Refunded If You Are Not Satisfied

All Orders Mailed Promptly. Parcel Post Prepaid on $5.00 or Over. No Stamps Accepted.

Everything in Radio Write Us

Quality Merchandise at Low Prices

Economical Radio House
4600 LINCOLN AVENUE, CHICAGO

We Personally Guarantee All Goods

READ WHAT EXPERTS SAY
AND INSIST ON

COMSCO COMSCO

COMSCO CONDENSERS

The most ingenious variable air condenser ever conceived
No outside Spring Connections—True Capacities.

and Remember the Bronze Bushings!

Bronze Bushings for Permanent Contact—A Comsco Feature

11 plate plain	$2.00	16 plate vernier	$4.00
17 plate plain	2.25	26 plate vernier	4.50
23 plate plain	2.75	46 plate vernier	5.50
43 plate plain	3.50	All Tested Instruments	

YOU CAN DEPEND ON A COMSCO CONDENSER
IT'S MADE BY THE MAKERS OF
THE ORIGINAL AUTOMATIC
BULL DOG GRIP TELEPHONE PLUG

For One Pair Phones $1.00

For Two Pair Phones $1.50

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

GENERAL INSTRUMENT CORP.
123 Liberty Street
NEW YORK CITY

SUPER VALUES

NEW COCKADAY FOUR CIRCUIT RECEIVER
ALL PARTS As specified by Mr. COCKADAY LIST PRICE, $75.00 OUR PRICE **$59.00**

Mahogany Cabinet for above set, $7.50 Extra

GENUINE **Fada-Hazeltine Neutrodyne Parts** FOR 5 TUBE SET
List Price $65.60
Our Price $50.15
You Save $15.45 by Buying Through Us

FREED-EISEMANN
LIST PRICE $80.00 — Knocked Down Neutrodyne Receiver — OUR PRICE $65.00

NAZELEYS-PORTENA
FOLDING LOOP
List Price $7.00 Our Price $5.35
LIMITED SUPPLY WHILE THEY LAST

REINARTZ CIRCUIT Complete

	List Price	OUR Price		List Price	OUR Price
Reinartz Coil	$2.50	$2.00	3 Switch Levers with Knobs	$ .75	$ .35
One 7x10x3/16 Radion Panel	1.25	1.00	One Baseboard for Mounting	.75	.40
National Bakelite Socket	1.00	.40	One Fixed Phone Condenser	.40	.25
Vernier Rheostat	1.50	1.00	One Single Jack	1.00	.25
Two 23 Pl. Var. Condensers at $3 each	6.00	3.00	Blue Prints with complete Instructions for assembly and mounting	.50	.50
Switch Points and Nuts	.80	.40			
Six Switch Stop Points and Nuts	.40	.20			
Freshman Grid Leak and Condenser	1.00	.65	Regular Price	$19.05	
Seven Binding Posts	.70	.35	OUR PRICE $11.05		
25 Ft. Tinned Bus Bar	.50	.30			

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

RESISTANCES—Genuine P. L. Original Lavite
48,000 OHMS $1.00 100,000 OHMS $1.00
We Are Prepared to Supply Dealers. Write for Our Proposition.

We Have Just Received a New Shipment of
THE NEW MODEL D. N. K. & K. PHONES
MADE IN GERMANY
Our Price **$6.50**

WE GIVE A 20% DISCOUNT On All Standard Radio Apparatus Not Listed Above
ALL MAIL ORDERS SHIPPED PROMPTLY. SEND MONEY ORDER, INCLUDING POSTAGE.
The RADIO MAIL ORDER HOUSE—Known for Low Prices. Write for Our Catalog B

HANES-ZENER
1480 Broadway, Corner 42nd St., New York City

U DEBATE BY AIR FEATURES WEEK

Tuesday, February 26

CKAC, Montreal, Que., Can. (Eastern, 425), 4:30 p. m., Talks; 7:00, Kiddies' stories in French and English; 7:30, Mount Royal Concert Orchestra; 8:30, Studio entertainment; 10:30, Dance program, Mount Royal Hotel, Ted Brown, xylophonist.

KDKA, East Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Dinner concert; 7:45, Children's period; 8:15, "Sincerity," Dr. John Ray Ewers; 8:30, Concert, quartet of the First Lutheran Church; 11:30, Concert.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert, preseuted by Emma M. Bartlett; 10:00-11:00, Concert numbers by the Henry Ilobinson Trio.

KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-4:30 p. m., Special music and readings for "shut-ins"; 7:00-7:30, Children's Bible story; 8:00-9:30, Musical program and sermon by Aimes Semple McPherson.

KGO, Oakland, Calif. (Pacific, 312), 8:00-10:00 p. m., Concert program.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert, Civic Music Club of Portland; 3:30, Talk, Jeannstts P. Cramer; 7:45, Talk for farmers, Oregon Agri. College extension service.

KHJ, Los Angsiss, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale presentiug Louise Gude, contralto; 6:45-7:30,. The weekly visit of the Sandman and Queen Titania; Lois Forrest, soprano; Ethel Wilson, accompanist; Bedtime story by "Uncle John"; 8:00-10:00, Program presenting Floryane Thompson, soprano; Dr. Thomas Lutman, lecturer, will speak on "Forces That Win"; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Ssiger's Fairmont Hotel Orchestra; 2:30-3:30, Harriet Jacoby, soprano; Dorothy Labowitch, pianist; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour, stories for children by "Big Brother" of KPO, from Book of Knowledge; 7:00-8:00, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-10:00, Program, Walter Frank Wenzel, pianist; 10:00-11:00, E. Max Bradfield's Palace Hotel Dance Orchestra.

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

KYW, Chicago, Ill. (Central, 536), 6:50 p. m., Children's bedtime story; 7:00-7:30, Dinner concert, Joska DeBabary and his orchestra; Clyde Doerr and his orchestra; 8:20-8:48, American Farm Bureau Federation, "The Bankers' Relation to the Farmer," S. E. Bradt, chairman, Illinois Bankers' Association; "Agricultural Editing on the Metropolitan Paper," Frank Ridgway; 8:48-9:30, Sarah Chez Freidman, soprano; James D. Westbrook, tenor; James Rotas, violinist; Earling Wettland, pianist; Hortense Adrian Peters, accompanist; Helen A. Westbrook, accompanist; Wilfred Caven, accompanist.

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

WAAM, Newark, N. J. (Eastern, 263), 8:00-8:30 p. m., "Star Spangled Banner," Carolina Ramblers' Orchestra of Jersey City, under direction of Arthur Richter, Robert Binner, saxophons solo1st; 8:45-9:00, Broadway Mslody Entertainers, under direction of Jimmy Clark; 9:00-9:15, Lucills Wilson, society entertainer, in a series of humorous readings; 9:15-9:30, Jimmy Clark, pianist, and Joseph Sherman, tenor; 9:30-9:45, "How to Set the Table Correctly," talk by Capt. Gsorge E. Fahys of the Alvin Silver Co.; 9:45-10:00, Al Novins, tenor, and Clinton Sommer, pianist, in popular numbers; 10:00-10:15, Lucills Wilson, society entertainer, in humorous readings; 10:15-10:30, Gloria Marshall, soprano; 10:30-10:45, Dixieland Serenaders' Jazz Band with Harry Romains and Dorothy Mack.

WBAP, Fort Worth, Tsx. (Central, 476), 7:30-8:30 p. m., Concert, Fraternal Aid Union, Mrs. John L. Rogers, director; 9:30-10:45, Concert, Fort Worth Harmony Club.

WBZ, Springfisld, Mass. (Eastern, 337), 7:30 p. m., Bedtims story for ths kiddies; "The Art of Investment," Donald McClench; 8:00, Piano recital, William Ryan, Everett Kellogg, Libbis C. Levin, Madalens Davison, Stanley Fletcher, Margaret McConville; Daniel Alexander, violinist; Mrs. Myrtls C. Atchinson Walmer, accompanist; 9:00, Bedtims story for grown-ups, Orison S. Marden.

WCAE, Pittsburgh, Pa. (Eastern, 462), 4:30 p. m., The Sunshine Girl; 6:30, Dinner concert, William Penn Hotel; 7:30, "Uncls Kaybee"; 7:45, Popular numbers, Lew Kennedy; Irens Setzler, accompanist; 8:30, Musical program, Maurice Novelty Orchestra.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Eddie Kuhn's Kansas City Athletic Club Orchestra; 6:00-7:00, "School of the Air," address, E. O. Moffatt; Address, J. Frank Smith; Children's story and information period; Fritz Hanlein's Trianon Ensembls; 11:45-1:00, Nighthawk Frolic. "Ths Merry Old Chief" and ths Coon-Sander Novslty-Singing Orchestra.

WDAP, Chicago (Central, 360), 7:00-8:00 p. m., Drake Concert Ensembls and Blackstons String Quintett; 8:00-8:30, Barton Organ played by Ralph Emerson; 10:00, Ruth Fowler, soprano; Pearl Nelson, piano; Irma Stafford, whistler; Rosemary Hughes, soprano; Fred W. Agard, tenor; Bob Cougle, piano; Jack Chapman's Orchestra.

WDAR, Philadelphia (Eastern, 395), 11:45 a. m., Dally Almanac; 12:02 p. m., Organ recital, Stanley Theater; Dinner musle, Arcadia Cafe Concert Orchestra; 2:00-3:00, Arcadia Cafe Concert Orchestra; studio features; 7:30, Dream Daddy's bedtime stories; 7:50, Dramatio revisw, Arnold Abbott.

WEAF, New York (Eastern, 492), 10:00-11:15 a. m., Gertrude Casrial, pianist; 11:15-11:25, Y. W. C. A.; 11:25-11:45, Adels F. Woodwards' talk; 11:45-12:00 m., U. S. Dept. of Agriculture; 4:00-4:15 p. m., Ethsl Pyne, soprano; 4:15-4:45 Edna Bockstsln, pianist; 4:45-5:15, Adele M. Roncs, contralto; 5:15-5:30, Louise Blamonte, flutist; 7:30-7:40, Thornton Fisher; 7:50-8:20, Program by Nat'l Carbon Co.; 8:30-9:00, Brooklyn Eagle News Review; 9:00-9:30, Vernon Archibald, baritone; 9:30-9:45, Program by Columbia Phonograph Co.; 9:45-10:30, Coney Island Chamber of Commerce; 10:30-11:00, Ruth Bodell, lyric soprano.

WFI, Philadslphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellsvus Stratford Concert Orchestra; 3:00, Loretta Kerk, planist; 6:00, Bedtime stories; 6:30, Meyer Davis Bellsvus Stratford Orchestra; 10:10, Charlis Kerr's Hotel Majestic Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360), 3:00 p. m., Amrad Women's Club Program, talk, Dr. A. K. DeBlois; Descriptive musicals; 3:45, "Tuesday Tea Talk," David McGregor Cheney; 6:30, Meeting of the Big Brother Amrad Club; 7:00, Evening program, "Africa from Cape Town to ths Congo," as seen by a commercial traveler, A. S. Flint; Program, arranged by Judge Thomas P. Riley.

WGR, Buffalo, N. Y. (Eastern, 319) 12:30-1:00 p. m., Georgs Albert Bouchard, organist; 2:30-4:00, The Radio Dealers' Orchestra; 4:00, Tea time music, Martha Gomph, harpist; Katherins Stang, violinist; 6:30-7:30, Vincant Lopez Hotel Statler Orchestra; 7:30, Digest of ths day's news.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "City Government," Mrs. Campbell Macmillan; 6:30, Children's story; 6:45, Youth's Companion story; 7:00, Dinner musle, Albany; 7:40, Health talk, Burt Rickard; 7:45, Anniversary program, third year of ths station; WGY Orchestra; 7:50, Edward Rice, violinist; 7:55, Address, Martin P. Rice; 8:10, American Trio; 8:15, Radio Four; 8:20, Dr. Sigel Roush; 8:30, WGY Instrumental Quartet; 8:35, "The Wolf," WGY Players; 9:35, WGY Orchestra; 9:40, Thom DeStefano, violinist; 9:45, Rice String Quartet; 9:55, "Over the River, Charlie," Georgia Minstrel Boys; 10:10, Ollie Ysttru, planist; 10.15, Ernest Burleigh, cellist; 10:20, WGY Light Opera Company, comic opera selections; 10:35, WGY Orchestra; 10:40, Kitty Meinhold, pianist; 10:45, Peter Schmidt, clarinetist; 10:50, Dance program, Romano's Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Thsater Orchestra; Selections, Walnut Theater Orchestra; Alamo Theater organ; 7:30-9:00, Concert, Henry M. Schilling and his orchestra; Katherine Hannon, reader.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:15 p. m., Bob Schaefer and His Entertainers; 4:45-5:15, Leo Feist Entertaiusrs; 9:30-10:15, "The Ritz Orchestra" from ths Hotel Gramatan; 10:15-10:30, Hon. Milton W. Sutton of National Security League; 10:45-11:15, Buddees Soclsty Dance Orchestra, Mortyn Konigsberg, leader.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Karl Bonawitz, organist; 3:00, Program by "Scranton Sirens" Orchestra; 6:05, Dick Regan and his WIP Symphony Orchestra; 7:00, Uncle Wip's bedtims stories; 8:00, Dramatic review by Elliott Lester; 10:15, Ted Weems and his Cafe L'Aiglon Orchestra.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Bedtime story; E. G. Johnson; 7:45, Special program arranged by the Cleveland News-Leader; Dance numbers and popular selections by Hughie Thow's Syncopaters; Tsnor solo, Peter Glueckman; Soprano solo, Miss Carrabells Johnson; Mouolog, Roy Lewis; Quartette selections, Harmonic Mals Quartetts; Instrumental numbers, Trio from Cleveland Institute of Music; Baritons solo, Francis J. Sadlier; Piano solo, Edward McMullen; Dance and popular selections, Vitalo's Park Thsatre Orchestra; Scene from "Abie's Irish Rose," Martha Lee Mandolin Club; Dance and popular selections, Lombardo Royal Canadian Orchestra; Ten-minuts play: "Finder's Keepers," Martha Lee Club Players; Baritone solos, L. R. Schroedar; Dance and popular selections, Joe Smith-Martha Lee Club Orchestra; Solos and duets with orchestra accompaniment, June Farley and Ruth Spouseller; Quartette numbers, Ths American Harmony Four; Bagpipe selections, James Steveus; Piano solos, Eddie Persell.

WJAZ, Chicago, Ill. (Central, 448), 10:00 p. m.-1:00 a. m., Musical program, Ester Whitington, soprano; M. A. Jacobson, baritone; Marvin Castle, pianist; Fred Meyers, saxophons; Oriols Orchestra.

WJY, New York City (Eastern, 405), 7:30 p. m., Adele Bender, contralto, accompanied by Creighton Allen; 7:45, Etiquette talk by Doubleday Pags Company, 8:15, "Is the Railroad's Problem ths Shippers?" by W. J. L. Banham; 9:00, Ester Klinefelter, soprano, accompanied by Creighton Allen; 7:55, Music Week Contest.

WJZ, New York, N. Y. (Eastern, 455), 2:00 p. m., New York Board of Educatiou; 3:00, Afternoon Auditorium Concert; 4:00, Harper's Bazaar Fashions; 4:15, "Department of English," Prof. Howard R. Driggs; 4:45, Frances Kirsch, soprauo; 7:00, "Human Organization in Industry," Samuel A. Lewisohn; 7:15, Super music, Paul Specht's Alamac Hotel Orchestra; 8:30, Radio Organ Recital, Marcel Dupre, famous French organist; 10:00, William W. Crawford; 10:30, Dance program, Hotel Astor Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35-12:00 m., Surprise program; 2:00-2:30 p. m., Woman's Club, "Party Primaries and Conventions," Miss Gladys Harrison for League of Women Voters; 2:40-4:00, Daylight concert; 4:00-4:30, WLAG players, "The Crimson Cocoanut," Ian Hay; 5:30-6:00,, Children's stories by Antoinette Zwinggi; 6:00-6:15, "Bird Dogs," E. E. Simmons; 6:15-7:00, Dinner concert by Minnsapolis Athletic Club Orchestra; 7:30-8:15; Farm lectures, "Building and Loan Association," A. S. Dean; "Relation of Chemistry to Agriculture and Forestry," Dr. R. A. Gorter, University of Minnesota.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Special program, Wurlitzer Concert Company; 10:00, Richard Pavey, tenor, Howard Fuldner, baritone, Ernest C. Dalton, pianist; 10:30, Special program, Bud Rudd for the Collegians; Gens Logan, tenor; Gene Perazzo, violinist; Sherley Kooler, vocalist; Thomas McCormish.

WMAQ, Chicago, Ill. (Central, 447.5), 2:35 p. m., Lyon & Healy program; 4:00, Olive M. Jones, President National Educational association; 4:20, Items of interest to women; 4:30, Pupils from Glenn Dillard Gunn School of Music; 5:00, Child life talk for children; 7:00, Chemistry talk by LaVerne Spring; Jamie Heron, entertainer; 8:30, Geo. D. Strayer, Teachers' College; 8:50, LaSalle Orchestra, 9:15, Lyon & Healy program.

WMC, Memphis, Tenn. (Central, 500), 3:00 p. m., Britling Orchestra, Frank Bracciante, director; 8:00, "The Healing of Europe," S. K. Ratcliffe, 11:00, Burk's Orchestra.

WOAW, Omaha, Neb. (Central, 526), 6:30 p. m., Dinner program, Carl Lamp'a Orchestra; 9:00, Concert, Seventeenth U. S. Infantry Band; Helen Pourson, pianist; Eldon D'Orio, xylophonist; Caryl Segerstrom, pianist.

WOC, Davenport, Iowa (Central, 484), 3:30 p. m., Educational program, "Gall Stones," A. G. Hinrichs, 5:45, Chimes concert.

WOR, Nswark, N. J. (Eastern, 405), 2:45-4:00 p. m., Program by Howard Pascal, tenor of WOR, and Joseph M. Barnett, baritone of WOR, in a joint recital; 6:15-6:30, Halsey Miller & His Orchestra; 6:30-7:00, Man in Moon Stories; 7:00-7:30, Halsey Miller & His Orchestra.

WSB, Atlanta, Ga. (Central, 429), 12:00-1:00 p. m., Entertainment; 4:00-4:30, Howard theater overture; 5:00-5:30, Entertainment, "Home Gardening message," William B. Deckner; 5:30, Bonnis Barnhardt's songs; Burgess bedtime story; 8:00-9:00, "Ideal Radio Concert," Annis Nolan; 10:45-11:45, Johnnie Meintzer's ds Luxe orchestra; Florence Germany, ballad singer; Tsd Moran, pianist.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 9:45, "Ironing Day," Fred Shaw, pianist; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra; Doris Eber, pianist; H. D. Schubert, tenor.

Headliners of the Week

TWO STATIONS are celebrating special occasions in their Radio lives *Tuesday* night. WJAX of Cleveland is giving a housewarming in a nice new studio, consisting of two plays, dance music, and popular artists. WGY is three years old this same day. This station is quite an antique as Radio stations go.

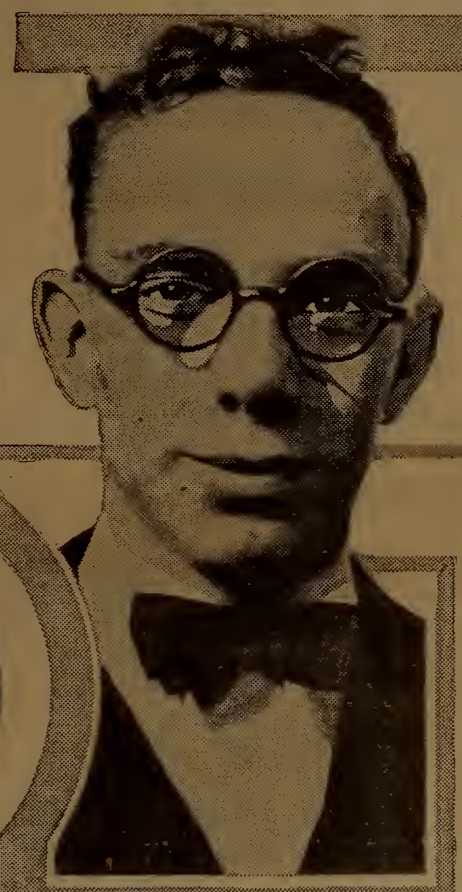
Wednesday WSB will give a midnight frolic presenting the famous colored company from "Shuffle Along." Note the quartet harmony. Hunters of big game will certainly tune in for WWJ to hear S. E. Saugster, big game hunter.

WLW specializes in queer contests. Are you a ham? If you are, win a ham at the Radio Ham's contest on *Thursday* night. You can win as many as $25.00 worth of American Beauty Hams, and fill the larder for the rest of the winter.

The first long distance university debate will be heard over the air *Friday*. The University of California and the University of Oregon will carry on this debate through the two stations KLX and KGW. Notice the contestants below. This is without doubt the most unusual debate thus far in history. Listen in and help be a judge. WGI of the eastern coast is strangely enough scheduling a debate for this same evening, but no doubt the opponents will, at least, see each other. All spinsters should try for WBAP the same night. This station promises a Novelty Leap Year Concert. Let us hope there will be some useful hints on how it is really done.

Monday WEAF promises a thrilling tale of adventure for girls entitled "A Girl's Experience at Stony Wold in the Adirondacks."

WFI, Philadelphia, announces the acquisition of Charlie Kerr and his popular dance orchestra. They will be heard hereafter on *Tuesday*, *Thursday* and *Saturday* evenings. Our Philadelphia correspondent says that the music Charlie's orchestra grinds out sure makes the feet shuffle along.



As told in detail on page 4 of this issue, the first debate ever staged between two universities by Radio will be broadcast from Station KGW, The Morning Oregonian, Portland, Oregon, and Station KLX, The Oakland Tribune, Oakland, California, on Friday night, February 29. The debate will be between the University of California and the University of Oregon. Of the two debaters for the University of California Harold Cherniss is presented at the left.

Above, Walter D. Malcolm, debater for the University of Oregon.

Right, Raymond Sanders, the other member of the California team of debaters.

Above, Joe A. Frazer, Walter D. Malcolm's team-mate for the Oregon University.

Wednesday, February 27

CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m., Classical program, Mt. Royal Hotel Concert Orchestra; 4:30, Joseph C. Smith and his Mount Royal Hotel Dance Orchestra.

KDKA, East Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Dinner concert, Pittsburgh Athletic Association Orchestra; 7:30, "The Mind and its Relation to Health and Disease"; 7:45, Children's period; 8:15, "The Port of Havre," Charles Latus; 8:30, Glee Club, Pennsylvania College for Women.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert program and Detective Stories by Detective Nick Harris; 10:00-11:00, Concert features by the Hollywoodland Community Orchestra.

KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-4:30 p. m., Music and readings for "shut-ins"; 7:00-7:30, Bible stories for children; 8:00-9:00, Sermon with musical numbers by Aimee Sempls McPherson.

KGW, Portland, Ore. (Pacific, 492), 11:15 a. m., Window Shopping; 12:30 p. m., Darby's Orchestra; 3:30, Children's program; 8:00, Columbia Theater All-Artist Orchestra; 9:00, Alexander Hamilton Instituts Business talk, James Albsrt; 10:00, Dance music, George Olsen's Metropolitan Orchestra; Adslaids Rudy, soprano; Mrs. Stanley Juce, pianist.

KHJ, Los Angsles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale presenting L. H. LaLeavitto, tenor; Charles H. Deppe, President, Savings Divisiou of the United States, will speak on "A Review of the Savings Banks of the United States"; 6:45-7:30, Program arranged by Harry James Beardsley, baritons; Prlscilla Moran, screen juvenile; Bedtime story by "Uncle John"; 8:00-10:00, Program presenting Claire Forbes Crane, pianist; Tamisss Freeman, soprano; Dr. Mars F. Baumgardt, lecturer; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Jack Falt's Entella Cafe Orchestra; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour, stories for children by "Big Brother" of KPO, from Book of Knowledge; 7:00-8:00, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-11:00, E. Max Bradfield's Band; "Your Body and Mind," William T. Elzinga; Arnold G. Maguire, tenor; Everett Mason, soloist; Grace Morris, pianist.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Abergh's Concert Ensembls; Arne Arnesen, violinist.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 7:00-7:30, Dinner concert, DeBabary's orchestra; Clyde Doerr's Orchestra; 8:00-8:58, Bethany Bible School, Cora B. Stahley, director; Prof. O. G. Davis, of Public Speaking; 9:05, Book reviews, Llewellyn Jones; 10:00-2:00 a. m., Midnight revue.

WAAM, Newark, N. J. (Eastern, 263), 8:00-8:30 p. m., "Star Spangled Banner," Mulford Bawden's Collegiate Dance Orchestra of Bayonne, in popular selections; 8:45-9:15, Walter Brown's Singing Entertainers with Edward Meeker, Joseph Woodruff and Edward Reese; 9:15-9:30, "Current Book Reviews," by Andrew McRae; 9:30-9:45, Times Square Entertainers

(Continued on page 16)

CODE AND "HAM" CONTESTS, CELE

Where to Hear Concerts

THESE are the stations for music lovers to dial, and you can hear, providing you dial correctly and read the programs carefully, everything from jazz to opera.

Tuesday: KDKA, KFI, KFSG, KGO, KHJ, KPO, KSD, KYW, WBAP, WBZ, WCAE, WDAF, WDAP, WJY, WJZ, WLAG, WEAF, WFAA, WGI, WGY, WHAS, WHN, WJAX, WJAZ, WLW, WMAQ, WMC, WAOW, WOR, WSB, WWJ.

Wednesday: KDKA, KFAE, KFI, KFSG, KGW, KHJ, KPO, KSD, KYW, PWX, WBAP, WBZ, WDAF WDAP, WCAE, WEAF, WFAA, WGI, WHAS, WHN, WJAZ, WJZ WLAG, WLW, WMAQ, WOC, WOR, WOS, WSB, WTAM, WWJ.

Thursday: KDKA, KFI, KFSG, KGO, KGW, KHJ, KPO, KSD, KYW, WBAP, WBZ, WCAE, WCBD, WDAF, WDAP, WEAF, WFAA, WGI, WGY, WHAS, WHN, WJAX, WJAZ, WJY, WJZ, WLAG, WLW, WMAQ, WMC, WAOW, WOC, WOR, WSB, WWJ.

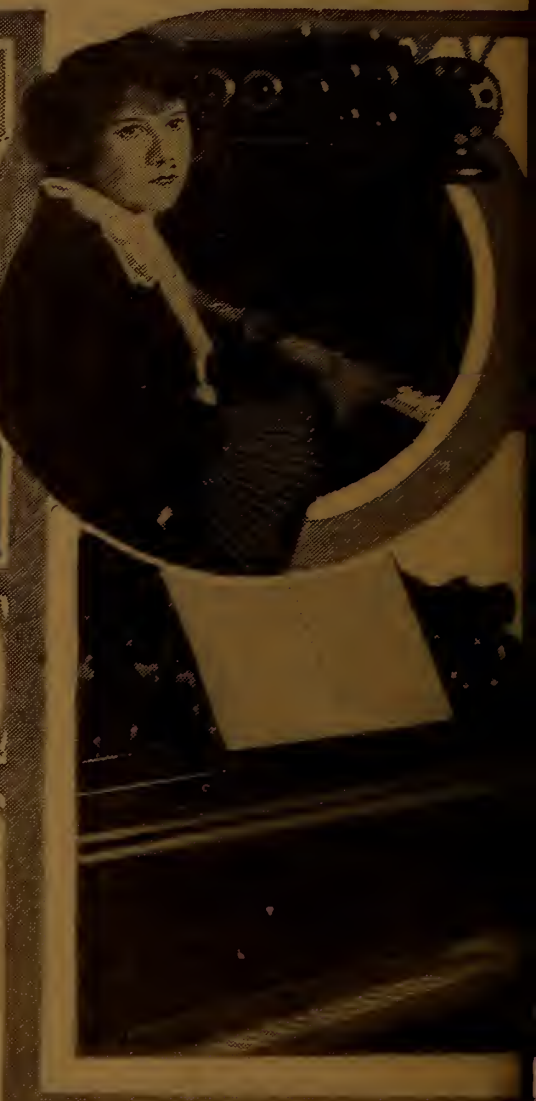
Friday: KDKA, KFAE, KFI, KFSG, KHJ, KGW, KPO, KYW, WHAS, WHK, WHN, WJAZ, WJY, WJZ, WLAG, WMAQ, WMC, WOAW, WOC, WOR, WOS, WSB, WWJ.

Saturday: KDKA, KFI, KFSG, KGO, KHJ, KPO, KSD, KYW, PWX, WBZ, WCAE, WDAF, WDAP, WEAF, WFAA, WGI, WHAS, WHK, WHN, WJZ, WLAG, WMC, WOC, WOR, WSB, WTAM, WWJ.

Sunday: CKAC, KFI, KFSG, KPO, KH,J KYW, WBAP, WDAP, WEAF, WFAA, WGI, WGY, WHAS, WHK, WHN, WOC, WSB, WWJ.

Monday: KDKA, KFAE, KPO, WBAP, WCBD, WEAF, WGY, WHAZ, WHN, WLAG, WLW, WMC, WOC, WOR, WOS, WSB.

Above, Helen Leefelt, pianist, who will be heard from Station WJAZ, Chicago, on March 2. It will be worth your while to tune her in.



Wednesday, February 27

(Continued from page 15)

with Tom Butler Trio, Jack Sheehan and Phillp Ellis; 9:45-10:00, James A. Brennan, song writer and composer, singing "That's a Lot of Bunk," and "Just For To-night"; 10:00-10:15, Judith Roth, singing "Kiss Me with Your Eyes"; 10:15-10:30, Harry A. Wygant, Chautauqua lecturer talking on "Current Achievements in the Drama"; 10:30-10:45, Continuation program by California Rambiers' Orchestra.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Southwestern Baptist Theological Seminary; 9:30-10:45, George Freeman's Sooner Serenaders.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ String Orchestra; 7:30, Bedtime story for the Kiddies; "Infantry Section of the Organized Reserves," Major Charles A. Thuis; 8:00, Chamber music, WBZ String Orchestra; Fred W. Gardner, tenor; Katherine Gravelin, accompanist; 8:00, Bedtime story for Grown-ups, Orison S. Marden.

WCAE, Pittsburgh, Pa. (Eastern, 462), 3:00 p. m., Fred Rosenfeld, pianist; 4:30, Uncle Kaybee; 6:30, Dinner concert, William Penn Hotel; 7:30, Sunshiue Girl; 8:30, Musical program, representative of the leading music publishers, "Song Exploitation Night."

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p m., Johnie Campbell's Kansas City Club Orchestra; 6:00-7:90, School of the Air, Weekly Health talk, Health Conservation Association; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Classical concert, arranged and presented, Harry E. Cooper; 11:45-1:00 a. m., Nighthawk Frolic: "The Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra.

WDAP, Chicago, Ill. (Central, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintett; 10:00, Lillian Rosenthal, soprano, Barton Organ played by Ralph Emerson, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Piano solos, Edna Finestone; concert, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; Stanley Theater Symphony Orchestra, Josef Pasternak, director; 10:10, Howard Lanin's Arcadia Cafe Dance Orchestra.

WEAF, New York, N. Y. (Eastern, 492). 11:00-11:30 a. m., Glen Frank from Town Hall; 11:45-12:00, U. S. Dept. Agriculture, 12:00-12:15 p. m., Chapel Services, Columbia University; 4:00-4:30, Reinhardt Blechschmidt, violinist; 4:30-5:00, Loyd W. Johnson, baritone; 5:00-5:30, Children's hour; 7:00-7:30, United Synagogue of America, 7:30-7:40, Thornton Fisher; 7:40-7:50, American Agriculturist; 7:50-8:20, Charles F. Robinson, baritone; 8:20-10:30, Philharmonic Orchestra Concert, Carnegie Hall.

WFI, Philadelphia, Pa. (Eastern, 395). 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Tenor Solos, Ednyfed Lewis; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevue Stratford Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360). 6:30 p.m., Meeting of the Big Brother Amrad Club; 6:50, Message to Camp Fire Girls, Charles W. Casson, "Big Smoke"; 7:20, "Science Up to Date," Scientific American; 7:30, Evening program, Drama, "The Closed Door," Boston Stage Society.

WGR, Buffalo, N. Y. (Eastern, 319). 12:30-1:00 p. m., George Albert Bouchard, organist; 2:30-4:00, The Radio Dealers' orchestra; 4:00, Tea time music, Martha Gomph, barpist; Katherine Stang, violinist; 6:30 and 11:30, Vincent Lopez Hotel Statler orchestra; 7:30, Digest of the day's news; 8:15, Special concert, Harry E. Ehrhart ("Dream Daddy"—H. E. E. of WDAR) and Carl Zeorhns; 9:00, Concert program, direction of Ralph Dietrich.

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

WHA, Madison, Wis. (Central, 360). 7:30 p. m., "The Romance and Economics of Transportation Development, S. L. Miller.

WHAS, Louisville, Ky. (Central, 400). 4:00-5:00 p. m., Strand Theater Orchestra; Alamo Theater organ; 7:30-9:00, Madam Cara Sapin; Reading, An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360). 2:15-2:45 p. m., Fritzi Leyton and Her Entertainers; 7:30-8:00, Clover Gardens Orchestra; 8:00-8:30, Music Students' League; 8:30-8:40, Agnes Macpeake; 8:45-9:00, Johanna Stern, contralto; 9:00-9:30, Dan Gregory and His Dancing Carnival Orch.; 9:45-10:00, Jack Yellen, songwriter; 10:00-10:30, Jimmy Clarke and His Entertainers, 10:45-11:00, Regina and Broadway Melody Boys; 11:00-11:45, M. Witmark Black & White program; 11:45-12:00, S. Jay Kaufman.

WIP, Philadelphia, Pa. (Eastern, 509). 1:00 p. m., Gimbel's Tea Room Orchestra; 6:05, Jimmy Campbell's Little Club Studio Orchestra; 7:00, Uncle Wip's bedtime stories.

WJAZ, Chicago, Ill. (Central, 448). 10:00 p. m. to 1:00 a. m., Program furnished by Saxophone Band thru courtesy of Gillen School of Instrumental Music; Oriole Orchestra, Popular pieces.

WJZ, New York (Eastern, 455), 2:00 p. m., New York Board of Education; 3:00, Edna Stuyvesant Crowe, pianist; 3:30, Mabel Cranfill, soprano; 3:50, Nolley Coward, baritone; 4:00, League of American Pen Women; 4:15, Nolley Coward; 4:30, Tea concert, Hotel Commodore Orchestra; 5:30, "Department of Philosophy," Dr. Herman H. Harne; 7:00, "Four of a Kind," a Shadowland story, Florence Smith Vincent; 7:35, Dance program, Irving Selzer and his Cafe Boulevard Orchestra; 7:45, "The Progress of the World," a Review of Reviews talk; 8:00, Dance program, Irving Selzer and his Cafe Boulevard Orchestra; 8:30, Talk, William McAdoo, Chief City Magistrate; 8:45, "Irish Songs," Agatha Ireland; 9:00, "What Do You Mean "Meat Substitutes"?; 9:15, Agatha Ireland; 9:30, Bordentown Male Quartet; 10:30, Spanish Dance Orchestra, Federico Velez, director.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417). 9:30-9:45 a. m., Announcements; 10:45-11:15, Household Hints; 11:35-12 m., Surprise Program; 2-2:30 p. m., Woman's Club—"Twentieth Century Housekeeping," Bernice Bell; 2:40-4, Daylight Concert; 4-4:30, Reading "A Lodging House"—Willson, Mildred Simons; 5:30-6 p. m., Children's stories, Alpha Stalson; 6-6:30, "Salesman's Place in Industry," J. S. Taylor; 7:30-8:15, Farm Lectures: "How Farmers Can Make Profit Using Electric Light Plants," J. R. Golden, Sandusky, Ohio; 9:15-9:40, Talk by Herbert P. Sheets, Indianapolis; Musical program by Sarah Bates Franz, reader; A. A. Arnold & Co., Old Fashioned Dances and Reels; Theodore Tausch, zither.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Special programs for "Shut Ins," Wurlitzer Concert Company; 8:00, The Rotary Glee Club, William Smith Goldsnburg, director; "Good Evening, Rotarians," Powel Crosley, Jr.; Dorothy Jacksou, pianist; Nellie Ziegler, vocalist; "A Newsboy in Church," Master David Weber; 8:45, Ohio Military Band; 9:30, Rotary Glee Club; 12:30, "Hams for the Radio Hams," special code contest for the Radio Amateurs.

WMAQ, Chicago, Ill. (Central, 447.5). 1:00 p. m., Speeches—Chicago Ass'n. of Commerce, 4:00, Robinsou G. Jones—Supt. Cleveland Public Schools, 4:20, Items of Interest to Women; 4:30, Pupils of Cosmopolitan School of Music, 7:00, Georgene Faulkner, Story Lady, Stories for Children; 7:30, Weekly lecture—Northwestern University; 8:00, Keith Preston, famous columist of The Daily News; 8:25, John H. Breveridge, Supt. Omaha Public Schools; 8:50, La-Salle Orchestra; 9:00, Talks from various Chicago Charities; 9:15, Program by faculty Glenn Dillard Gunn School.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Steel," C. A. Russell; 6:30, Sandman's visit; 7:00, "The Care of Farm Machinery," Hugo Beckman; 7:20, "The Conservation of Fur Bearing Animals," George W. Paull; 8:00, Musical program, Edwin Swindell, director; Olga Edlen, soprano; Oral Papenthien, contralto; Mildred O. Brecht, soprano; Erwin Swindell, organist.

WOR, Newark, N. J. (Eastsrn, 405). 2:30-3:00 p. m., Original Indiana Three; 3:30-4:00, Original Indiana Three; 6:15-7:00, Music While You Dine—Ernie Krukett and His Orchestra; 8:00-8:15, "Bermuda"—travel talk by James Albert Wales; 8:15-8:25, Cantor Berele Chagy, tenor; 8:25-3:30, Five Minute Talk on Ballroom Etiquette by Arthur Murray; 8:30-8:50, Joint recital by Mary Rose Eaton, violinist, and Margaret Eaton Dernler, soprano; 9:00-9:15, Cantor Berele Chagy; 9:30-10:00, Joint recital by Mary Eaton, violinist, and Margarst Eaton Dernler, soprano; 10:00-11:00, Melody Minstrels of New York.

WOS, Jeffsrson City, Mo. (Csntral, 440.9). 8:00 p. m., Program Band of the Missouri State Prison, Virgil W. Combs, bandmaster.

WSB, Atlanta, Ga. (Central, 429). 12:00-1:00 p. m., Entertainment; 4:00-4:30, Howard theater overture; 5:00-5:30, Vick Meysrs Melody orchestra; 5:30, Bonnle Barnhardt's songs; Burgess bedtime story; 10:45-11:45, Classical Masterpiece Hour, Helen Schaid, pianist; Mrs. Charles Trownselie, violinist; Atlanta Male Quartet, harmony singers; 12:00, Special revue, "Shuffle Along," famous troupe of colored entertainers.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Orchestral numbers by Ths WTAM Symphony Orchestra; Violin solos, Ben Silversbsrg; Miss Clara Sharp, accompanist. Vocal numbers by J. E. Morris, tenor; A. R. Willard, pianist; Harp solos by Miss Virginia Renter; Vocal numbers by Miss Lillie Whitehouse; Miss Gladys Mae Parsons at the piano; Cello solos by Max Schmitt; Clara Sharp, accompanist; Trumpet solos by M. A. Hruby.

WWJ, Detroit, Mich. (Eastern, 517). 9:30 a. m., "To-night's dinner," Woman's Editor; 12:00 m., Jean Goldkette's Orchestra; 3:00 p. m., Detroit News Orchestra; 8:30, Shirley E. Field, baritone; S. E. Sangster, big game hunter; Nina Fox, soprano.

Thursday, February 28

CKAC, Montreal, Can. (Eastern, 425). 7:00 p. m., Kiddies' stories in French and English; 7:30, Special Classic Program, Rex Battle and his Mount Royal Hotel Orchestra; Herbert Spencer, organist; 8:30, Studio entertainment; 10:30, Dance program, Joseph C. Smith and his Mount Royal Hotel Dance Orchestra.

KDKA, East Pittsburgh, Pa. (Eastern, 326). 6:15 p. m., Dinner concert, KDKA Little Symphouy Orchestra; 7:15, "Europe Today, Civilization or Chaos," Stephen P. Duggan; 7:30, Farm program, Frank E. Mullen; 7:45, Children's period; 8:15, Farm program; 8:30, Concert, KDKA Little Symphony Orchestra; Mabel Shoup King, soprano; Robert C. Johnston, tenor; 11:30, Concert.

KFI, Los Angsles, Calif. (Pacific, 469). 6:45-7:30 p. m., Concert presented by Y. M. C. A.; sales lecture and bedtime story; 10:00-11:00, Concert program by the Marion Warde School.

KFSG, Los Angeles, Calif. (Pacific, 278). 3:30-4:30 p. m., Special program of music and readings for "shut-ins"; 7:00-7:30, Children's Bible stories; 8:00-9:30, Sermon by Aimes Semple McPherson, with musical features.

KGO, Oakland, Calif. (Pacific, 312). 8:00-10:00 p. m., Concert.

KGW, Portland, Ore. (Pacific, 492). 11:15 a. m., Window Shopping; 12:30 p. m., Concert, Sherman, Clay & Co.; 3:30, Woman's Story program, "The Midlander, Booth Tarkington; 3:00, One-Act plays, Doris Smith, director; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395). 12:15-1:15 p. m., Concert presenting Jose Arias and his Mexican Orchestra; 2:30-3:30, Matineo Musicale; 6:45-7:30, Program presenting Dickie Brandon, screen juvenile; Muriel Frances Dana, screen juvenile; W. Ernest Feutz, tenor; Bedtime story by "Uncle John"; 8:00-10:00, Program arranged by Harry C. Knox, flutist; Virginia Flohri, soprano; 10:00-12:00, Art Hickman's Orchestra.

KSD, St. Louis, Mo. (Central, 546). 8:00 p. m., St. Louis Symphouy Orchestra; Rudolph Ganz, conductor; Erika Morini, violinist.

KPO, San Francisco, Calif. (Pacific, 423). 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Banjo selections, popular songs; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour, stories for children "Big Brother" of KPO, from Book of Knowledge; 7:00-8:00, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-8:30, Theodore John Irwin, organist; 8:30, Pacific Musical Society.

KYW, Chicago, Ill. (Central, 536). 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 2:35-3:30 p. m., Studio program; 6:50, Children's bedtime story; 7:00-7:30, Dinner concert: Joska DeBabary and his orchestra; Clyde Doerr and his orchestra; 8:00-8:20, "Twenty Minutes of Good Reading," Rev. C. J. Pernin; 9:15, National Live Stock and Meat Board program.

WAAM, Newark, N. J. (Eastern, 263). 8:00-8:15 p. m., "Star Spangled Banner" by Victor Wilbur, tenor and Joseph Macy, piano; 8:15-8:30, Fritzi Leyton, song writer and vaudeville headliner, with Martha Unger, pianist; 8:30-3:45, "Metchnikoff's Bacillus of Long Life," third in a series of talks by Dr. C. A. Lowenstein, expert dietician; 8:45-9:00, Benjamin Friedman, Elsio Blum and Sylvia Goodman, singing popular refrains; 9:00-9:15, Marguerite Soper, coloratura soprano; 9:15-9:30, "The Turn of the Wheel of Events," second in a series of talks by Dr. Arthur W. Brooks, counsellor in personal problems; 9:30-9:45, Alfredo de Snooks, lyric tenor in a program of songs in French; 9:45-10:00, Trianon Melody Four, singing; 10:00-10:30, Continuation program by Collegiate Dance Orchestra of Bayonne.

WAAW, Omaha, Neb. (Central, 360). 7:45 p. m., Educational program, "Radio Chats on Animal Disease Problems," Dr. Van Es.

WBAP, Fort Worth, Texas. (Central, 476). 7:30-8:30 p. m., Conceri, Fort Worth artists, Rev. J. W. Bergin; 9:30-10:45, Texas Christian Universlty, Prof. H. D. Guelick, director.

WBZ, Springfield, Mass. (Eastern, 337). 7:30 p. m., Bedtime story for the Kiddies; Farmers' period—Letter from ths New England Homestead; 8:00, Concert, Helen Beckwith, contralto; William G. Stevens, baritone; Mrs. J. E. Snyder, Jr., accompanist; 9:00, Bedtime story for Grown-ups, Orison S. Marden.

WCAE, Pittsburgh, Pa. (Eastern, 462). 4:30 p. m., The Sunshine Girl; 6:30, Dinner concert, William Penn Hotel; 7:30, "Uncls Kaybee"; 8:00, Address, Rep. Clyde L. Nevins; 3:30, Musical program, WCAE's star artists.

WCBD, Zion, Ill. (Central, 345). 8:00 p. m., Zion Band, P. B. Newcomer, director; Mrs. H. E. Mayfield, soprano; Glenn R. Sparrow, tenor; John D. Thomas, baritone; M. P. Barton, tenor; Mrs. Hulda Klammer, reader.

WDAF, Kansas City, Mo. (Central, 411). 3:30-4:30 p. m., D. Ambert Haley's Dance and Concert Orchestra; 6:00-7:00, School of the Air: Piano tuning in number on the Duo-Art; Address, William Jewel College; Children's story and information period; Fritz Hanleln's Trianon Ensemble; 11:45-1:00 a. m., The "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra; Organ recital, Norma Mannering.

WDAP, Chicago, Ill. (Central Time, 360). 7:00-8:00 p. m., Drake Concert Ensemble and Blackstone String Quintet; 8:00-8:30, Barton Organ played by Ralph Emerson; 10:00, Anna Brune, piano; Johu Stamford, tenor; Grace Nelsou, piano; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395). 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 3:00-3:00, Arcadia Cafe Concert Orchestra; "The Market Basket," Mrs. Anna B. Scott; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, 492). 11:00-11:30 a. m., Eugenie Ferrer, pianist; 11:50-12:00, U. S. Dept. Agriculture; 4:00-4:30 p. m., Jessie Hoaghund Mitchell, pianist; 4:30-4:45, Bernard Frank, harmonic player; 4:45-5:05, Richard Powers, high baritone; 5:05-5:30, Marie Rose Kemiey, dramatic soprano; 7:00-7:30, N. Y. Federation of Churches; 7:30-8:00, Robert Wendell, bass and Marie Davison, contralto; 8:30-9:00, Hunter College Musical Program; 9:00-9:10, Bank of America; 9:10-9:30, Continuation Hunter College Program; 9:30-9:45, Columbia Phonograph Co.; 9:45-10:45, Eveready Minstrels.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Beevue Stratford Concert Orchestra; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 8:00, Radio Boy Scouts Meeting; 10:10, Charlie Kerr and his Hotel Majestic Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360). 6:30 p. m., Meeting of the Big Brother Amrad Club; 7:00, Crescent Quartette.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., Georgo Albert Bouchard, organist; 2:30-4:00, The Radio Dealers' Orchestra; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30-7:30, Vincent Lopez Hoto Statler Orchestra; 7:30, Digest of the day's news; Boy Scout Radiograms, Employment bulletin, story from tho American Boy magazinc.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The Renaissance of tho Hooked Rug," Modern Priscilla; 6:30, Dinner music, Romano's Orchestra; 7:45, WGY Orchestra; Mendelssohn Club, Dr. Frank S. Rogers, conductor; "A Few Moments with New Books," L. L. Hopkins; Frazer Gange, baritone.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; 7:30-9:00, Concert, Illinois Central Railroad Company.

WHN, New York, N. Y. (Eastern, 360), 2:15-2:45 p. m. Shapiro Bernsteln Music Co.; 3:00-3 17, Jack Morisse, tenor; 3:15-3:30, Sam Coslow, song-writer and composer; 9:30-10:00, Lou Golds Wigwam Club Orchestra; 10:30-11:00, Sam Lannin's Roseland Orchestra; 11:15-11:30, Jerome H. Remick; 11:30-12:00, The Louis Fischer Orchestra.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Gimbel's Tea Room Orchestra; 6:05, Frank Winegar's Pennsylvanian Orchestra, 7:00, Uncle Wip's bedtime stories; 10.30, Karl Bonawitz, organist; 11:15, Ted Weems and his Cafe L'Aiglon Orchestra.

WJAX, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Vocal numbers by Prof. Charles Mareau, baritone, and instrumental numbers by Prof. Gabriel Fenyves, pianist; 10:00 p. m., Organ recital from the Cleveland Public Auditorium, Vincent H. Percy, organist.

WJAZ, Chicago, Ill. (Central, 448), 10:00 p. m.-1:00 a. m., Musicale Program, Frances Bealford, Contralto; Joseph Glivadoti, violinist; Ernest Mecler, pianist; Oriole Orchestra.

WJY, New York City (Eastern, 405), 7:30 p. m., Belva Jaeger, violinist; 7:45 p. m., "Golf," by Innis Brown, Editor, American Golfer; 8:00 p. m., Bentley Ford, baritoue, accompanied by Viola Peters, 8:15 p. m. New York String Quartet directly from Aeolian Hall.

WJZ, New York, N. Y. (Eastern, 455), 2:00 p. m., New York Board of Education program; 3:00, Afternoon Auditorium Concert; 4:00, Women's Wear; 5:00, "That Street Called Broadway," Rosalie Armistead Higgins; 5:15, John Fugary, harmonica, soloist; 7:00, Uncle Dave Cory's "Jack Rabbit Stories"; 7:30, Bentley Ford, baritone; 8:00, "Social Economy," Dr. Henry P. Fairchild; 8:30, Margaret Clarkson, soprano; 9:10, Dinner of the Maine Society of New York; 10:00, Harold Stearns, Hotel Majestic Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417). 9:30-9:45 a. m., Announcements; 10:45-11:15, Household Hints; 11:35-12:00 m., Surprise program; 2:00-2:30 p. m., Woman's Club—Weekly Dancing Lesson by Tess Cooperman; 2:40-4:00, Daylight concert; 4:00-4:30, Reading, Mildred Simons; "July, the Female of the Species"—Irwin; 5:30-6:00, Children's Stories by Catherine Westerveld; 6:00-6:15, Sport Talk, "Baseball as I Have Known It"—Perry Werden; 6:15-7:00, Geo. Osborn's Minneapolis Athletic Club Orchestra; 7:30-8:15, Farm Lectures: Program arranged by United National Association of Post Office Clerks. Eleanor Poehler, soprano; Eleanor Freemantel, accompanist; Louise Sorenson, cornet; Egan Gustafson, reader. Talk by W. W. Davis.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Special program, Wurlitzer Concert Company; 10:00, Program, Home offices of the Western & Southern Life Insurance Company; Western & Southern Glee Club; Loretta Dressman. Tom Woll. duets; W. H. Hunter, violinist; Duet, M. Schnitzler, Dorothy Marsh; Address, Pres. W. J. Williams; Benjamin Dillon, pianist; 11:00, Woody Meyer's Cincinnati Orchestra; Feature songs, Viola Luring.

WMAQ, Chicago, Ill. (Central, 447.5), 2:35 p. m., Concert from Lyon & Healy Recital Hall; 4:00, A. E. Winship, Editor, Journal of Education; 4:20, Items of Interest to Women; 4:30, Ill. Federation of Women's Clubs Talk, Mrs. Geo. V. Plummer, 7:00 Boy Scouts Weekly Talk; 8:50, Pres. Dept. of Superintendence; 8:50, LaSalle Hotel Orchestra; 9:15, Western Elec. Night.

WMC, Memphis, Tenn. (Central, 500), 5:30 p. m., Program, Chisca Hotel Orchestra, Clara Ahern, director.

WOAW, Omaha, Neb. (Central, 526), 6:00 p. m., Child's Story Hour, Grace Sorenson; 6:30, Dinner program, Frank Hodek's Orchestra; 8:00, Program, Public School Music Dept. of U. of Omaha, Johanna Anderson, director; University Glee Clubs: Marguerite Foley, vocalist; Fonda Waldorf, pianist; Mixed Quartet; Josephine Drapler, pianist; Althea Stelner, vocalist; Jennie Gillespie, pianist; Dorothea Linsel, soloist.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Bronchitis," Karl G Stephan; 5:45, Chimes; 6:30, Sandman's visit; 7:00, P. S. C Orchestra; V. B. Rochte, baritone soloist.

RATIONS MARK WEEK'S PROGRAMS

ody Reimer of Minneapolis (left) is the winner the jazz piano championship of WLAG. In en competition with thirteen contestants, she n the Cutting and Washington Radio re- ving set offered as first prize, tying with dney Williams of St. Paul. Miss Reimer is e of the favorite artists of WLAG and never ils to receive an extraordinary response every ne she "does her stuff." If you turn to page of this issue, you will see she now challenges the "jazz piano players in the world and arby points" to try to rob her of her laurels. low, Professor Gabriel Fenyves, of the Woos- College Conservatory of Music, Wooster, io, a pianist of rare ability, recently heard from WJAX.

Miss Carrabelle Johnson, often heard on the "Wave from Lake Erie" (WJAX, Cleveland), is the possessor of a perfect Radio voice—a beautiful soprano.

WOR, Newark, N. J. (Eastern, 405), 6:15-6:30 p. m., Albert E. Sonn, Radio Dept. of Newark Sunday Call; 6:30-7:30, Tom Cooper and His Country Club Orchestra.

WSB, Atlanta, Ga. (Central, 429), 12:00-1:00 p. m., Entertainment; 4:00-4:30, Howard theater overture; 5:30, Bonnie Barnhardt's songs; Burgess Bedtime story; 8:00-9:00, DeKalb county concert, Floyd B. Fuller, operatic tenor; Mrs. Ruby Hastings, pianist; Cecil White, Hawaiian guitarist; 10:45, Special symphonic demonstration, "Classics Versus Jazz," Atlanta Rainbow Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's dinner," Woman's Editor; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra; F. Eugene Wilson, baritone; Margaret Foy, soprano; Eugene Jeffers, tenor; Amos H. Gohie, baritone; 10:00, Dance music, Jean Goldkette's Orchestra; 11:00, Detroit News Orchestra.

Friday, February 29

CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m., Mount Royal Hotel Concert Orchestra; 4:30, Joseph C. Smith & his Dance Orchestra.

KDKA, East Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Organ recital, Lucile Hale; 7:15, Radio Boy Scout Meeting; 7:45, Children's period; 8:00, Special feature; 9:00, Program, American Legion.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert program, Jean Smalley, whistler; Lloyd Head, vocalist; 10:00-11:00, Special vocal and instrumental concert.

KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-4:30 p. m., Musical program and readings for "shut-ins"; 7:00-7:30, Special program presenting the international Sunday School lesson; 8:00-9:30, Musical program and sermon presented by Aimee Semple McPherson.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert; 3:30, "Clothes Lines," Esther Cooley; 8:00, Radio Debate. Resolved—"That the Bok Peace Plan Should Be Adopted." University of California, affirmative, through Station KLX. University of Oregon, negative, through KGW; 10:30, Hoot Owls.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:40-7:00, Children's program featuring Richard Headrick, screen juvenile; Bedtime story by "Uncle John"; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, Continuity program, "A Trip to the Moon," arranged by O. G. Pirie; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Organ recital, Theodore J. Irwin; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 7:00-7:35, Dinner concert, Joska DeBabary and his orchestra; Clyde Doerr and his orchestra; 10:00-2:00 a. m., Midnight revue.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Homphill Heights Masonic Lodge; 9:30-10:45, Novelty Leap Year concert.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Orchestra; 7:00, "Three is a Crowd," dramatized story, Youth's Companion; 7:30, Bedtime story for the Kiddies, Original Dream Daddy; Current Book Review, R. A. MacDonald; 11:00, Program of Chamber music, WBZ Orchestra; Harriet Chamberlain, lyric soprano.

WCAE, Pittsburgh, Pa. (Eastern, 462), 4:30 p. m., The Sunshine Girl; Uncle "Kaybee"; 6:30, Dinner concert, William Penn Hotel; 8:30, Eddie's Original Six Orchestra, Eddie Munk, manager.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Regular "request" program, Leo R. Davis "Radio" Orchestra; 6:00-7:00, School of the Air: Piano tuning in number on the Duo-Art; Address, speaker from the Kansas City Children's Bureau; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Novelty Night: Pupils of Alma Nash School of fretted instruments; 11:45-1:00 a. m., Nighthawk Frolic: The "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra.

WDAP, Chicago, Ill. (Central, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintett; 10:00, George R. Hill, Jr., baritone, Cambridge Sisters, Barton Organ played by Ralph Emerson, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 2:00-3:00, Piano solos, Edna Finestone; Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 10:10, Howard Lanin's Arcadia Cafe Concert Orchestra; "Morning Glory Club" features; songs and talks by principals of musical comedies, "Sally, Irene and Mary" and "The Greenwich Village Follies"; songs by Harry Glyn.

WEAF, New York, N. Y. (Eastern, 492), 11:00-11:30, Prof. Marguerite Clement from Town Hall; 11:50-12:00, U. S. Dept. Agriculture; 4:00-4:30 p. m., Wallace Drewes, jazz pianist; 4:30-5:00, Fritzi Letyon, soprano; 5:00-5:30, Children's Hour Stories; 7:30-7:40, Thoruton Fisher; 7:40-7:50, Winifred T. Barr; 8:00-8:30, Billy Jones & Ernest Hare; 8:30-9:00, World Mutual Insurance Co.; 9:00-10:00, Astor Coffee Dance Orchestra.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360), 3:00 p. m., Amrad Women's Club program: "The Sinking of the Titanic," Brita Heurlin; Afternoon Musicale, Brunswick Records; 3:30, Talk, Dorothy Dean, dir. Metropolitan Division Mass. Council of Girl Scouts; 6:30, Meeting of the Big Brother Amrad Club; 7:30, Selected verses, Charles L. H. Wagner, Radio poet; "Under-nourished Children," Henry Copley Green, Red Cross talk; Frederic Joslyn, baritone; Debate by Radio, arranged by Robert W. Kelso.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 2:30-4:00, The Radio Dealers' Orchestra; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30 and 11:30, Vincent Lopez Hotel Statler Orchestra; 7:30, Digest of the day's news; 9:00, Concert, mixed program, The Larkin Co

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The New Spring Millinery," Robert L. Smith; 6:30, Children's program; 7:45, "A Tailor Made Man," WGY Players; WGY Orchestra; 10:30, WGY Orchestra; "Just Boy," reading, American Boy Magazine; Edward Rice, violinist; Leo Kliwen, violinist; Ramon de Bries, tenor.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., Readings from Literature, C. F. Gillen.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; 7:30-9:00, Concert, Louisville Conservatory of Music, Violet M. Code, director; Reading, An Interesting Historical Episode.

WHK, Cleveland, Ohio (Eastern, 283), 8:00 p. m., Dance program arranged by the Cleveland Radio Dealers' Association; Orchestra numbers by Louis Rich's Orchestra; Solo numbers by favorite artists.

WHN, New York, N. Y. (Eastern, 360), 2:15-2:45 p. m., Jimmy Clarke and His Entertainers; 3:00-3:15, Con Conrad, song-writer and composer; 4:30-5:00, "Snappy Trio"; 5:15-5:30, Jack Fox's Melody Belles Orchestra; 9:30-9:45 Lisa Bickman, soprano; 9:45-10:15, Robert C. Kindler and His Orchestra; 10:30-10:45, Fred Whitehouse Review; 11:00-11:05, Richard Douglas, tenor; 11:15-12:00, Harry Spierer and His Orchestra.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Gimbel's Tea Room Orchestra; 6:05, Jordan-Lewis Dance Orchestra; Bob Lewis, director; 7:00, Uncle Wip's bedtime stories.

WJAZ, Chicago, Ill. (Central, 448), 10:00 p. m.-1:00 a. m., Program, Columbia School of Music, Oriole Orchestra, popular music.

WJY, New York City (Eastern, 405), 7:30 p. m., Frank Shevitt, "Income Taxes," 7:45 p. m., Leon Gilbert Simon, baritone, accompanied by Josef Adler, 8:00 p. m. The Honorable Julius Berg, "The Work of the New York Assembly," 8:15, Leon Gilbert Simon, baritone, accompanied by Josef Adler; 10:00, Breau & Tobias.

WJZ, New York, N. Y. (Eastern, 455), 12:15 p. m., Friday Noon Hour, Brick Presbyterian Church; 3:00, Leo Riggs, organist; 4:00, Jimmy Moore's popular songs; 4:15, "Frozen Fish," Evelene Spencer; 4:30, Fashion developments of the Minute, Women's Wear; 4:35, Olga Erika Schotte, famous Danish singer; 5:15, "Systematic Psychology," Dean James Lough; 7:30, Burr McIntosh, the Checrful Philosopher; 7:50, Dorothy MacDonough, soprano; 8:35, Cousins Double Male Quartette; 8:45, "Home Building," William H. Beers; 9:00, New York Music Week Contest Winners Concert; 9:15, Cousins Double Male Quartette; 9:40, "Mistakes Mah Jong Players Make," R. F. Foster; 10:00, Felian Garzia, pianist; 10:30, Dance program, Paul Specht's Alamac Hotel Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35-12:00 m., Surprise program; 2:00-2:30 p. m., Woman's Club Talk arranged by Community Fund; 2:40-4:00, Daylight Concert; 4:00-4:30, Reading, "Miss Jenny"—Dana Burnet; 5:30-6:00, Children's Stories by Ellen Nyo; 6:00-6:30, Sport program, "Bowling Anecdotes," by Dad Hull; 7:30-8:15, Farm Lectures: "Canued Food Week," Carey Emerson; 9:15, "Busiuess Message," Capt. John P. Corby, Chicago, will speak; 9:30-10:45, Musical program by Sam Heiman's Casino Orchestra of St. Paul Hotel; James Miller, tenor.

Where to Hear Talks

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

Tuesday: KDKA, KGW, KHJ, KYW, WBZ, WCAE, WDAF, WEAF, WFAA, WGI, WHN, WJY, WJZ, WLAG, WMAQ, WMC, WOC.

Wednesday: KDKA, KFAE, KGW, KYW, WDAF, WEAF, WGI, WHA, WJZ, WLAG, WMAQ, WOC, WOS, WWJ.

Thursday: KDKA, KYW, WBZ, WCAE, WDAF, WEAF, WFAA, WGI, WGY, WJZ, WMAQ, WOC.

Friday: KFAE, KGW, KHJ, KYW, WBZ, WDAF, WEAF, WFAA, WGI, WGY, WHA, WJY, WJZ, WLAG, WMAQ, WOC.

Saturday: WBAP, WBZ, WDAF, WFAA, WGI, WLAG, WOC.

Monday: KFAE, WEAF, WFAA, WHAZ, WLAG, WOC.

WMAQ, Chicago, Ill. (Central, 447.5), 4:20 p. m., Items of interest from the Woman's Page; 4:30, Pupils of Bush Conservatory; 7:00, Weekly "Wide Awake Club" program by Mrs. Frances M. Ford of The Daily News; 7:30, Music Memory Contest conducted by Mrs. Marx E. Oberndorfer; 9:00, Recreational Talk by Mary McDonell; 9:15, Luther Memorial Choir.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Musical program, Apollo Club of Memphis; 11:00, Frolic, Bob Miller and his new Idlewild Orchestra.

WOAW, Omaha, Neb. (Central, 526), 6:00 p. m., Program, musicians from Fremont, Mrs. Lily Ruegg-Button, director pianist; Mrs. Phillip Lange, soprano; Rev. Phillip Lange, pianist; 9:00, Spelbring's Concert Orchestra, Mrs. Nellie Fickel, readcr; Margaret Spelbring, pianist; Claude E. Wilson, tenor; Mrs. June Fickel, soprano; Mrs. Ward Fickel, alto.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "The Liver as a Transformatiou Plant," R. G. Maybach; 5:45, Chimes; 6:30, Sandman's visit; 8:00, Musical program, Erwin Swindell, director; Program, Choir of St. John's Methodist Episcopal Church, A. W. Barlow, director.

WOR, Newark, N. J. (Eastern, 405), 2:30-3:00 p. m., Ernie Krukett & His Orchestra; 3:30-4:00, Manhattan Serenaders of N. Y.; 6:15-6:30, Lillian Spitzer, pianist; 6:30-7:00, Man in the Moon Stories; 7:00-7:45, Bronx Malo Orchestra.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., Program, Christian College.

WSB, Atlanta, Ga. (Central, 429), 12:00-1:00 p. m., Entertainment; 4:00-4:30, Howard theater overture; 5:00-5:30, Vick Myers' Melody Orchestra, featuring "Mutt and Jeff" blues; 5:30, Bonnie Barnhardt's songs and Burgess Bedtime story; 8:00-9:00, Agnes Scott college girls' glee club; 10:45-11:45, "Campus Days," Suwanee Glee Club, University of the South.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 12:00 m., Dance music, Jean Goldkette's Orchestra; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra; Anne Campbell, Detroit News poet; Mrs. Lillian Selden, soprano; Walter Peglow, baritone.

Saturday, March 1

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 1:30 p. m., Concert, Daugherty's Orchestra; 6:15, Dinner concert, Westinghouse Band; 7:30, "Bringing the World to America," Our World; 7:45, Children's period; 8:15, "The Golden Anniversary of the Woman's Christian Temperance Union," Mrs. R. B. Robinson; 8:30, Concert, Westinghouse Band; Edgar Thomson Male Quartet.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert program and bedtime story; 8:00-9:00, Concert presented by the Woman's Lyric Club; 10:00-11:00, Special instrumental and vocal concert.

KFSG, Los Angeles, Calif. (Pacific, 278), 8:00-9:30 p. m., Special musical program and sermon by Aimee Semple McPherson.

KGO, Oakland, Calif. (Pacific, 312), 8:00-10:00 p. m., Concert.

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

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale, Juanita Ruth Cure, soprano; Mildred Irene Cure, pianist; 6:45-7:30, Children's program featuring Helene Pierie, screen juvenile, Richard Allen White, age 3 years, reader; Bedtime story by "Uncle John," 8:00-10:00, Program, Kathryne Thompson and her Southern California Saxophone Band, 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy's Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Virginia Miller, pianist; Paramount Orchestra; 3:30-5:30, E. Max Bradfield's Orchestra; 8:00-12:00, Art Weidner's Fairmont Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 9:00 p. m., Orchestra concert, organ recital, vocal and iustrumental 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; 7:00-7:35, Dinner concert, Joska DeBabary and his orchestra; Clyde Doerr and his orchestra; 8:00-8:58, Salvatiou Army Staff Band; 9:05, "Safety First" talk, Chicago Motor Club; 8:15, "Under the Eveniug Lamp," Youth's Companion; 10:00-12:00, Late Show.

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

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Dinner concert, Hotel Kimball Trio; 7:30, Bedtime story for the Kiddies; "Bringing the World to America," Our World Magazine; 8:00, Concert, WBZ Trio; 9:00, Bedtimo story for Grown-ups, Orison S. Marden.

WCAE, Pittsburgh, Pa. (Eastern, 462), 3:00 p. m., Special musical program; 6:30, Dluner concert, William Penn Hotel; 7:30, Uncle "Kaybee"; Popular songs, Lew Kenuedy; 8:30, Dr. John M. Hierholzer, flutist; Marie Caveney, pianist; Elcanor Conley, soprano.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Riley Ebrhart Orchestra; 6:00-7:00, School of the Air, Piano tuning-in number on the Duo-Art; Travelogue, Edgar A. Linton; Children's story and information period; Fritz Haulein's Trianon Ensemble; 11:45-1:00 a. m., Nighthawk Frolic, "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra.

WDAP, Chicago, Ill. (Central, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintet; 10:00, Harmony Girls, Betty Holmes, Boh Brown, Frank Nuber, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, 492), 4:00-5:00 p. m., Carolinians Orchestra; 5:00-5:30, Arthur Levassour, tenor; 7:15-8:05, Chiclet Quartette & Trio; 8:00-11:30, Unusual and delightful specially arranged Musical Program to be announced only at that time.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 8:00, WFI Quartet; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevuo Stratford Orchestra; 10:10, Charlie Kerr and his Hotel Majestic Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360), 6:30 p. m., Meeting of the Big Brother Amrad Club; 7:30, New England Business Industry, Arthur R. Curnick; Arthur Murray's course in Ball Room Dancing, lesson No. 13; Musicale.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 2:30-4:00, the Radio Dealers' Orchestra; 6:30, Vincent Lopez Hotel Statler Orchestra; 7:30, Digest of the day's news.

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

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; 7:30-9:00, Instrumental Trio, Sara King, pianist; Vertner Allen, violinist; Aileen Meckback, cellist; Myrtle George Stinger, soprano; D. Harry Daley, pianist; Corida Greer Petrie, reader.

WHN, New York, N. Y. (Eastern, 360), 2:15-2:45 p. m., Fred Whitehouse Review; 7:30-8:00, "The Gregorians"—Clyde Moser, leader; 8:15-8:30, Jimmy Flyn, tenor; 8:30-8:45, Avy La Skere, double voiced singer; 8:45-9:00, Fitzpatrick Bros., old timo songs; 9:00-9:30, Marten's Peerless Orchestra; 9:45-10:00, M. Witmark & Son; 10:00-10:45, Full Moon Dance Orchestra—Vincent Bordini, leader.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Karl Bonawitz, organist; 3:00, A. Paul Whiteman Orchestra; 6:05, Greenwich Village Serenaders; 7:00, Uncle Wip's bedtime stories; 10:15, Ted Weems and his Cafe L'Aiglon Orchestra.

WJAZ, Chicago, Ill. (Central, 448), 10:00 p. m.-1:00 a. m., Program by E. Warren K. Howe, musical director; Florence K. White, soprano; Florence Burfischer, mezzo soprano; Langion Brothers, steel guitar; Cambridge Sisters, vocal trio; Oriole Orchestra, popular music.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Memphis Syncopators; 3:15, Harold Dellon's popular program; 3:30, Memphis Syncopators; 3:45, Harold Dellon's popular program; 4:00, Tea concert, Hotel Belmont Stringed Ensemble, Harry Lerner, leader; 5:00, Lora Green, soprano; 7:30, Erva Lucille Giles, soprano; 7:45, Vincent Desautis, violinist; 8:00, "Sausage," John C. Cutting; 8:15, Vincent Desautis, violinist; 8:30, Elis A. Lundberg, baritone; 8:45, Music Week contest; 9:00, Ellis A. Lundberg, baritone; 9:15, "Employers and Satisfactory Service," K. M. Wehringer; 10:30, Harold Stern and his Hotel Majestic Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35-12:00 m., Weekly meeting of Postcard Club, E. R. Buell, presiding; 2:00-2:30 p. m., Woman's Club—Lester Rees, "Stage and Screen Review"; 2:40-4:00, Daylight concert; 4:00-4:30, Reading, Mildred Simons "In Person"—Saxby; 4:30-5:00, Weekly talk by Ray R. Sweet, "Radio"; 5:30-6:00, Meeting of Children's Radio Health and Toothbrush Club of America, Dr. F. W. Pepper, presiding; 6:00-6:30, Sport Hour—Mrs. C. A. Swetak, "Training and Care of Canarics"; 7:30-8:15, Business lecture; Mrs. W. S. Aull, "The Shriners' Children's Hospital"; 9:15-10:15, Studio program; 10:15-12:30, Dance program.

WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m., Suburban Band of LaGrango; 9:00, Balahan & Katz Chicago Theatre Revue.

WMC, Memphis, Tenn. (Central, 500), 8:00 p. m., "The Place of Women in Modern Society," Dr. Earl Barnes.

WOC, Davenport, Iowa (Central, 484), 12:00 m., "Chemical Constituents of the Human Body," C. C. Hall; 5:45, Chimes; 6:30, Sandman's visit; 7:00, "Some Facts About Balloon Type Tires, J. F. Block; 9:00, P. S. C. Orchestra, Gerald M. Barrow, director; V. B. Rochte, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-4:00 p. m., Halsey Miller and His Orchestra; 7:15-7:30, Fred J. Bendel, sports writer, 8:00-8:50, Gene Ingraham and His Bell Record Orchestra; 8:50-9:00, Belle Bart, astrologist; 9:00-9:15, James MacDonald, baritone, assisted by Allen C. Allbee, pianist; 9:35-9:45, Belle Bart; 9:50-10.05, James MacDonald, baritone; 10:05-11:00, Combined Musical Clubs of Stevens Institute of Technology.

WSB, Atlanta, Ga. (Central, 429), 12:00-1:00 p. m., Entertainment; 4:00-4:30, Howard theater overture; 5:30, Bonnie Barnhardt's songs, Burgess Bedtime story; 8:00-9:00, J. Kell Martin instrumeutal quartet in variety program; 10:45-11:45, Kimo Kalohi's Moonlight Five, Hawaiian serenaders; Radlowl skylark.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Regular Saturday Evening Dance Program by the WHAM Dance Orchestra; Solo numbers by Dick Finnegan, the 11-year-old boy soprano; Mr. E. J. Brisbane, tenor.

Sunday, March 2

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., Service by Church Federation; 4:00-5:00 p. m., Vesper Musical service; 6:17-7:30, Concert; 10:00-11:00, Concert.

KFSG, Los Angeles, Calif. (Pacific, 278), Entire church services broadcasted at 10:30-12:30 m.; 2:30-5:00 p. m., 7:00-9:30.

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

KPO, San Francisco, Calif. (Pacific, 423), 11:00-12:00 m., Radio church services, auspices of the American Bible Society; A. J. Milligen, baritone; Theodore J. Irwin, organist; 8:30-10:00 p. m., Rudy Seiger and his Fairmont Hotel Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:00 a. m., Central Church Service, Dr. F. F. Shannon, pastor; 2:30 p. m., Studio Chapel Service, Rev. Martin Luther Thomas, chairman on Radio evangelism: Dr. Gilbert Wilson, pastor New First Congregational Church, 7:00, Chicago Sunday Evening Club, Dr. Hugh Black.

WBAP, Fort Worth, Texas (Central, 476), 11:00 a. m., Church services, First Methodist Church; 4:00-5:00 p. m., Organ concert; 5:00-6:00, Address, Rev. J. Frank Norris; 11:00-12:00, Fred Cahoon's WBAP Southern Serenaders' Orchestra.

WDAF, Kansas City, Mo. (Central, 411), 4:00-5:00 p. m., Musical program.

WDAP, Chicago, Ill. (Central, 360), 5:00-6:00 p. m., Barton Organ Recital played by Ralph Emerson; 9:15, Drake Concert Ensemble and soloists.

WDAR, Philadelphia, Pa. (Eastern, 395), 2:00-4:00 p.m., Concert of popular selections; by Arcadia Cafe Concert Orchestra, direction Feri Sarkozi.

WEAF, New York, N. Y. (Eastern, 492), 2:45-3:45 p. m., N. Y. Federation of Churches; 3:45-4:45, Dr S. Parkes Cadman; 7:20-9:00, Capitol Theatre Orchestra and staff of artists; 9:00-10:00, Skinner organ recital.

(Continued on page 18)

CODE AND "HAM" CONTESTS, CELEBRATIONS MARK WEEK'S PROGRAMS

Where to Hear Concerts

THESE are the stations for music lovers to dial, and you can hear, providing you dial correctly and read the programs carefully, everything from jazz to opera.

Tuesday: KDKA, KFI, KFSG, KGO, KHJ, KPO, KSD, KYW, WBAP, WBZ, WCAE, WDAF, WDAP, WJY, WJZ, WLAG, WEAF, WFAA, WGI, WGY, WHAS, WHN, WJAX, WJAZ, WLW, WMAQ, WMC, WAOW, WOR, WSB, WWJ.

Wednesday: KDKA, KFAE, KFI, KFSG, KGW, KHJ, KPO, KSD, KYW, PWX, WBAP, WBZ, WDAF, WDAP, WCAE, WEAF, WFAA, WGI, WHAS, WHN, WJAZ, WJZ, WLAG, WLW, WMAQ, WOC, WOR, WOS, WSB, WTAM, WWJ.

Thursday: KDKA, KFI, KFSG, KGO, KGW, KHJ, KPO, KSD, KYW, WBAP, WBZ, WCAE, WCBD, WDAF, WDAP, WEAF, WFAA, WGI, WGY, WHAS, WHN, WJAX, WJAZ, WJY, WJZ, WLAG, WLW, WMAQ, WMC, WAOW, WOC, WOR, WSB, WWJ.

Friday: KDKA, KFAE, KFI, KFSG, KHJ, KGW, KPO, KYW, WHAS, WHK, WHN, WJAZ, WJY, WJZ, WLAG, WMAQ, WMC, WOAW, WOC, WOR, WOS, WSB, WWJ.

Saturday: KDKA, KFI, KFSG, KGO, KHJ, KPO, KSD, KYW, PWX, WBZ, WCAE, WDAF, WDAP, WEAF, WFAA, WGI, WHAS, WHK, WHN, WJZ, WLAG, WMC, WOC, WOR, WSB, WTAM, WWJ.

Sunday: CKAC, KFI, KFSG, KPO, KHJ, KYW, WBAP, WDAP, WEAF, WFAA, WGI, WGY, WHAS, WHK, WHN, WOC, WSB, WWJ.

Monday: KDKA, KFAE, KPO, WBAP, WCBD, WEAF, WGY, WHAZ, WHN, WLAG, WLW, WMC, WOC, WOR, WOS, WSB.

Above, Helen Leefelt, pianist, who will be heard from Station WJAZ, Chicago, on March 2. It will be worth your while to tune her in.

Dody Kenner of Minneapolis (left) is the winner of the jazz piano championship of WLAG. In open competition with thirteen contestants, she won the Cutting and Washington Radio record set offered as first prize, tying with Harry Williams of St. Paul. Miss Renner is one of the favorite artists of WLAG and never fails to receive an extraordinary response every time she "does her stuff." If you turn to page 1 of this issue, you will see she now challenges all the "jazz piano players in the world and nearby points" to try to rob her of her laurels. Professor Gabriel Fenyves, of the Wooster College Conservatory of Music, Wooster, Ohio, a pianist of rare ability, recently heard from WJAX.

Miss Carrabelle Johnson, often heard on the "Wave from Lake Erie" (WJAX, Cleveland), is the possessor of a perfect Radio voice—a beautiful soprano.

Where to Hear Talks

TALKS [illegible] and [illegible] broadcasts, are broadcast daily and below are listed the stations:

Tuesday: KDKA, KGW, KHJ, KYW, WBZ, WCAE, WDAF, WEAF, WFAA, WGI, WHN, WJY, WJZ, WLAG, WMAQ, WMC, WOC.

Wednesday: KDKA, KFAE, KGW, KYW, WDAF, WEAF, WGI, WHN, WJY, WJZ, WMAQ, WOC, WOS, WWJ.

Thursday: KDKA, KYW, WBZ, WCAE, WDAF, WEAF, WFAA, WGI, WGY, WJZ, WMAQ, WOC.

Friday: KFAE, KGW, KHJ, KYW, WBZ, WDAF, WEAF, WFAA, WGI, WGY, WHN, WJY, WJZ, WLAG, WMAQ, WOC.

Saturday: WBAP, WBZ, WDAF, WFAA, WGI, WLAG, WOC.

Monday: KFAE, WEAF, WFAA, WHAZ, WLAG, WOC.

Wednesday, February 27

(Continued from page 15)

with Tom Butler Trio, Jack Sheehan and Phillip Kilty; 9:45-10:00, James A. Dempsey, song writer and composer, singing "That's a Lot of Bunk," and "Just For To-night"; 10:00-10:15, Judith Roth, singing "Kiss Me with Your Eyes"; 10:15-10:30, Harry A. Wygant, Chautauqua lecturer talking on "Current Achievements in the Drama"; 10:30-11:45, Continuation program by California Hoofers' Orchestra.

WDAP, Fort Worth, Texas (Central, 475). 7:30-8:30 P. m., Concert, Southwestern Baptist Theological Seminary; 9:30-10:45, George Freeman's Rector Terrandra.

WOZ, Springfield, Mass. (Eastern, 357). 6:00 p. m., Dinner concert, WOZ String Orchestra. 7:30, Bedtime story for the Kiddies, "Infantry Section of the History for the Kiddies, "Infantry Section of the History for the Kiddies"; 7:45, Chapter Charles A. Towle, 8:00, Unsolicited Receipts," Major Charles A. Towle, 8:00, Unsolicited Receipts," Major Charles A. Towle, 8:00, Thimbles parade, WOZ String Orchestra, Fred W. Gardner, tenor; Katherine Gravelin, accompanist, 9:00, Bedtime story by listeners-in, Urban E. Mandot, 9:00, Bedtime story by listeners-in, Urban E. Mandot.

WCAE, Pittsburgh, Pa. (Eastern, 462). 3:00 p. m., Ewal Rosenfeld, pianist, 4:30, Uncle Ralphe; 6:30, Dinner concert, William Penn Hotel Trio, Semaphore Dinner concert, William Penn Hotel; 7:30, Semaphore Hill; 8:30, Musical program, representative of the leading music publishers, "Song Exploitation Night."

WDAF, Kansas City, Mo. (Central, 411). 8:30-4:30 p. m., Aeolian Company's Kansas City Pipe Orchestra, 6:00-7:00, School of the Air, Weekly Health talk, Dr. Herman B. Mundt, Kansas City Health Association, Children's story and information period, Fritz Haulein's Titanian Ensemble; 8:00-9:15, Classical concert, assisted by Mrs. Ralph Sanborn, Harry T. Cooper; 11:45-1:00 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Loon Bandora Novelty Minstrels, studio.

WOAW, Omaha, Neb. (Central, 526). 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone Radio Quintette, 9:00, Lillian Rosenthal, soprano, accompanied by Phillip Emerson, Jack Chapman's Orchestra.

WEAF, New York, N. Y. (Eastern, 492). 11:00-11:50 a. m., Glen Frank from Town Hall, 11:15-12:00, U. S. Department of Agriculture, 12:00-12:15 p. m., Time Signals, Weather Forecast, 12:15-1:00, Richfield Hour, orchestra, violinist, 3:30-5:00, Loyd W. Johnson, baritone, 5:30-5:45, Children's hour, Uncle Wip, Junior Nurses, Synagogue of America, 7:00-7:15, Thornton Sisters, 7:45-8:00, American Agriculturist, 8:00-8:20, Dr. P. Hoffman, baritone, 8:20-10:30, Philharmonic Orchestra Concert, Carnegie Hall.

WIP, Philadelphia, Pa. (Eastern, 395). 1:30 p. m., Mayor Harry Bellevue Mackey, 2:00-3:00, Concert, Tune Rolls, Delighted Twins; 6:00, Bedtime stories, 6:30, Uncle Wip's Bedtime Stories and Bedtime stories, 6:30, Uncle Wip's Bedtime Stories and Health Talk, 6:45, Musical concert, 7:00, Bedtime story, 7:30, Digest of the day's news; 8:45, Special concert, Harry E. Richter, Clarence Babb, M. F. Small and William Small, Clarence Babb, M. F. Small and William Small, WDAH, East Zeuthen, 9:00, Concert program, direction of Ralph Hedrich.

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

WHA, Madison, Wis. (Central, 535). 1:30 p. m., "The Romance and Economics of Transportation Development, S. L. Mitler.

WHAS, Louisville, Ky. (Central, 400). 4:00-5:00 (Cinderella Matinee, Alamo Theater organ), 7:30, Grand Theater Orchestra, Alamo Theater organ), 7:30, Grand Theater Orchestra, Alamo Theater organ), 7:30, Grand Theater Orchestra

S

are broad-

E, WDAF,
AQ, WMC,

AF, WGI,

F, WFAA,

F, WFAA,

, WOC.

in Ball Room Danc-

), 12:30-1:00 p. m.,
ist; 2:30-4:00, the
Vincent Lopez Hotel
f the day's news.
, 380), 9:30 p. m.,

0), 4:00-5:00 p. m.,
-9:00, Instrumental
er Allen, violinist;
le George Stinger,
ist; Corida Greer

n, 360), 2:15-2:45
; 7:30-8:00, "The
; 8:15-8:30, Jimmy
kere, double voiced
s., old time songs;
hestra; 9:45-10:00,
Full Moon Dance

509), 1:00 p. m.,
. Paul Whiteman
Serenaders; 7:00,
, Ted Weems and

10:00 p. m.-1:00
K. Howe, musical
no; Florence Bur-
others, steel guitar;
le Orchestra, pop-

455), 3:00 p. m.,
i Dellon's popular
ors; 3:45, Harold
ea concert, Hotel
y Lerner, leader;
Erva Lucille Giles,
violinist; 8:00,
:15, Vincent De-
undberg, baritone;
Elis A. Lundberg,
isfactory Service,"
ern and his Hotel

(Central, 417),
):45-11:15, House-
meeting of Post-
2:00-2:30 p. m.,
and Screen Re-
4:00-4:30, Read-
r"—Saxby; 4:30-
"Radio"; 5:30-
alth and Tooth-
pper, presiding;
tak, "Train-
ness lec-
dren's
2:30,

m.,
Katz

"The
rnes.
m.,
C.
ome
:00,
B.

m.,
J.
and
art,
one,
elle
:05-
cute

m.,
re;
me
rtet
on-

m.,
the
in-
is-

:45
n.,
00-

ire
30-

m.,
entre
Helms,
:30 p. m.,
urch, Arthur
program, vo-

bedtime story; 7:00-7:35, Dinner concert, Joska De-Babary and his orchestra; Clyde Doerr and his orchestra; 10:00-2:00 a. m., Midnight revue.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Hemphill Heights Masonic Lodge; 9:30-10:45, Novelty Leap Year concert.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Orchestra; 7:00, "Three Is a Crowd," dramatized story, Youth's Companion; 7:30, Bedtime story for the Kiddies, Original Dream Daddy; Current Book Review, R. A. MacDonald; 11:00, Program of Chamber music, WBZ Orchestra; Harriet Chamberlain, lyric soprano.

WCAE, Pittsburgh, Pa. (Eastern, 462), 4:30 p. m., The Sunshine Girl; Uncle "Kaybee"; 6:30, Dinner concert, William Penn Hotel; 8:30, Eddie's Original Six Orchestra, Eddie Munk, manager.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Regular "request" program, Leo R. Davis "Radio" Orchestra; 6:00-7:00, School of the Air: Piano tuning in number on the Duo-Art; Address, speaker from the Kansas City Children's Bureau; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Novelty Night: Pupils of Alma Nash School of fretted instruments; 11:45-1:00 a. m., Nighthawk Frolic: The "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra.

& Tooths.

WJZ, New York, N. Y. (Eastern, 455), 12:15 p. m., Friday Noon Hour, Brick Presbyterian Church; 3:00, Leo Riggs, organist; 4:00, Jimmy Moore's popular songs; 4:15, "Frozen Fish," Evelene Spencer; 4:30, Fashion developments of the Minute, Women's Wear; 4:35, Olga Erika Schotte, famous Danish singer; 5:15, "Systematic Psychology," Dean James Lough; 7:30, Burr McIntosh, the Cheerful Philosopher; 7:50, Dorothy MacDonough, soprano; 8:35, Cousins Double Male Quartette; 8:45, "Home Building," William H. Beers; 9:00, New York Music Week Contest Winners Concert; 9:15, Cousins Double Male Quartette; 9:40, "Mistakes Mah Jong Players Make," R. F. Foster; 10:00, Fellan Garzia, pianist; 10:30, Dance program, Paul Specht's Alamac Hotel Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35-12:00 m., Surprise program; 2:00-2:30 p. m., Woman's Club Talk arranged by Community Fund; 2:40-4:00, Daylight Concert; 4:00-4:30, Reading, "Miss Jenny"—Dana Burnet; 5:30-6:00, Children's Stories by Ellen Nye; 0:00-6:30, Sport program, "Bowling Anecdotes," by Dad Hull; 7:30-8:15, Farm Lectures: "Canned Food Week," Carey Emerson; 9:15, "Business Message," Capt. John P. Corby, Chicago, will speak; 9:30-10:45, Musical program by Sam Helman's Casino Orchestra of St. Paul Hotel; James Miller, tenor.

p. m., Riley Ebrhart Orchestra; 6:00-7:00, School of the Air, Piano tuning-in number on the Duo-Art; Travelogue, Edgar A. Linton; Children's story and information period; Fritz Haulein's Trianon Ensemble; 11:45-1:00 a. m., Nighthawk Frolic, "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra.

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

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; Arcadia Cafe Concert Orchestra; 2:00-3:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, 492), 4:00-5:00 p. m., Carolinians Orchestra; 5:00-5:30, Arthur Levasseur, tenor; 7:15-8:05, Chiclet Quartette & Trio; 8:00-11:30, Unusual and delightful specially arranged Musical Program to be announced ouly at that time.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, WFI Quartet; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevue Stratford Orchestra; 10:10, Charlie Kerr and his Hotel Majestic Orchestra.

WGI, Medford Hillside, Mass. (Eastern, 360), 6:30 p. m., Meeting of the Big Brother Amrad Club; 7:30, New England Business Industry, Arthur B.

KPO, San Francisco, Calif. (Pacific, 423), 11:00-12:00 m., Radio church services, auspices of the American Bible Society; A. J. Milligen, baritone; Theodore J. Irwin, organist; 8:30-10:00 p. m., Rudy Seiger and his Fairmont Hotel Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:00 a. m., Central Church Service, Dr. F. F. Shannon, pastor; 2:30 p. m., Studio Chapel Service, Rev. Martin Luther Thomas, chairman on Radio evangelism; Dr. Gilbert Wilson, pastor New First Congregational Church; 7:00, Chicago Sunday Evening Club, Dr. Hugh Black.

WBAP, Fort Worth, Texas (Central, 476), 11:00 a. m., Church services, First Methodist Church; 4:00-5:00 p. m., Organ concert; 5:00-6:00, Address, Rev. J. Frank Norris; 11:00-12:00, Fred Calhoon's WBAP Southern Serenaders' Orchestra.

WDAF, Kansas City, Mo. (Central, 411). 4:00-5:00 p. m., Musical program.

WDAP, Chicago, Ill. (Central, 360), 5:00-6:00 p. m., Barton Organ Recital played by Ralph Emerson; 9:15, Drake Concert Ensemble and sololsts.

WDAR, Philadelphia, Pa. (Eastern, 395), 2:00-4:00 p.m., Concert of popular selections; by Arcadia Cafe Concert Orchestra, direction Ferl Sarkozi.

WEAF, New York, N. Y. (Eastern, 492), 2:45-3:45 p. m., N. Y. Federation of Churches; 3:45-4:45, Dr S. Parkes Cadman; 7:20-9:00, Capitol Theatre Orchestra and staff of artists; 9:00-10:00, Skinner organ recital.

(Continued on page 18)

ADVANCE PROGRAMS

(Continued from page 17)

WFI, Philadelphia, Pa. (Eastern, 395), 7:30 p. m., Arch Street Presbyterian Church services.

WGI, Medford Hillside, Mass. (Eastern, 360), 4:00 p. m., Twilight program; "Adventure Hour," Youth's Companion; Musicale; 8:30, "World Unity," Greater Boston Federation of Churches; Musicale.

WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m., Vesper service, the Rev G. A. Leichliter, Prospect Avenue Baptist Church, 4:00-5:00, Robert Munn, organist.

WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., Church service, First Baptist Church. Sermon, Rev. Gordon H. Baker, Pastor; 8:30 p. m., Program by WGY Symphony Orchestra; 7:30 p. m., Church services, First Baptist Church, Sermon, Rev. Gordon H. Baker, Pastor.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Organ music [illegible], Church services, auspices of the Fourth Presbyterian Church, Rev. Dr. Charles W. Welsh, pastor; 4:00-5:00 p. m., Concert, auspices of Sara Lee.

WHK, Cleveland, Ohio (Eastern, 283), 4:30 p. m., Vesper service conducted by Rev. A. H. Limouze, pastor Coltsville Presbyterian Church. Sermon; subject: Fishing For Distance"; Choral singing by the choir of the church; 8:00, Concert program by WHK Orchestra, Vocal numbers by Charlotte Kemper, [illegible].

WHN, New York, N. Y. (Eastern, 360), 3:00-4:30 Queens County Christian Endeavor Program; 4:00-4:40, John D. Flynn, National Security League; 4:40-5:00, Mme. Alberts; 4:50-5:10, WHN Radio Hour; 5:30-6:00, Tempo Club Orchestra, Wm. H. Hoyer Jr., leader.

WIP, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Services from Holy Trinity Church; 4:00 p. m., Germantown Y. M. C. A. meeting; male quartet.

WJAZ, Chicago, Ill. (Central, 448), 6:00-9:00 p. m., Program by E. Warren K. Howe, Musical Director; Helen Icefelt, Pianist; Cora Allen Propps, Contralto; Margaret Heff, Pianist; Oriole Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:30-12:00 m., Morning service, Westminster Presbyterian Church; 3:45-4:45 p. m., Vesper service, House of Hope Church, St. Paul; 7:45-9:15, Evening service, Second Church of Christ, Scientist; 9:30-10:45, Musical concert.

WLW, Cincinnati, Ohio (Central, 309), 9:30 a. m., Sunday School, Editorial Staff of Sunday Publication of the Methodist Book Concern; 11:00, Services of the Church of the Covenant, Dr. Frank Stevenson, minister; 7:45, Services, First Presbyterian Church, Rev. F. N. McMillan.

WSB, Atlanta, Ga. (Central, 429), 11:00 a. m., First Presbyterian church service, Rev. J. Sprole Lyons, pastor; Dr. Charles A. Sheldon, organist; 5:00-6:00 p. m., Sabbath twilight studio broadcast, Gertrude S. Johnson; 7:30-9:00 Wesley Memorial M. E. Church service Rev. Marvin Williams, pastor.

WWJ, Detroit, Mich. (Eastern, 517), 4:00 p. m., Detroit News Orchestra; Cyril Wezemael, baritone; Leo Robitaille, tenor; 11:00 a. m., Services, St. Paul's Episcopal Cathedral.

Monday, March 3

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Peter J. Butti's Humboldt Club Orchestra; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour, stories for children, "Big Brother" of KPO, from Book of Knowledge; 7:00-8:00, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-9:00, Theodore J. Irwin, organist; 9:00-10:00, Program, Sherman Clay and Co.; Carl Lamont, pianist; 10:00-11:00, E. Max Bradfield's Palace Hotel Dance Orchestra.

WAAM, Newark, N. J. (Eastern, 263), 8:00-8:30 p. m., "Star Spangled Banner," Nelson Rogers WAAM Dance Orchestra; 8:35-9:00, "The Best Photoplays of the Year," talk by Alice Belton Evans, secretary, National Committee for Better Films; 9:00-9:15, Martin Mortenson, dancopation exponent de luxe, in a piano potpourri of old and new masters; 9:15-9:30, James V. Moore, tenor, with Hettie Delman, soprano; Overseas Entertainers with A. E. F.; 9:30-9:45, Leo Jacobs, pianist, in songs of the home and fireside; 9:45-10:00, Puritan Trio, in song and syncopation; 10:00-10:15, Hamilton Reid Burns, elocutionist, late of the London Concert stage in the third of his series of "Rambling Readings in Scotch"; 10:15-10:30, Frederick and Viola A. Heuze, in favorite Irish songs; 10:30-10:45, George Blundon and Frederick J. Metzger, singing.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Fred Wagner and his talking guitar; Wagner Brothers; 9:30-10:45, Concert, R. H. Cornelius and his male quartet and mixed quartet.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Musical matinee; 6:00-7:00, School of the Air: Piano tuning-in number on the Duo-Art; Address; Children's story and information period; Fritz Haulein's Trianon Ensemble; 8:00-9:15, Popular program.

WOAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Arcadia Cafe Concert Orchestra; organ recital, Stanley Theater; 2:00-3:00, Piano solos, Edna Fluestone; Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; Motion Picture review, James A. Nassau; 8:00, Opera Talk, Samuel Lacair, Arias from famous operas; Arcadia Cafe Concert Orchestra; 10:10, Howard Lanin's Arcadia Cafe Dance Orchestra.

WEAF, New York, N. Y. (Eastern, 492), 2:30-4:30 p. m., Debate on Coal Question from Government Club meeting at Hotel Astor; 4:30-5:00, Edna May Fay, drama, soprano; 5:00-5:30, Mother's Program; 7:00-7:30, Erna Korn, contralto and Hedy Spellter, pianist; 7:30-7:40, Thornton Fisher; 7:40-7:50, Dora Damon Pardee, cornetist; 7:50-8:00, "A Girl's Experience at Stony Wold in the Adirondacks"; 8:10-8:20, Talk on Clocks by Ansonia Clock Co.; 8:20-9:05, Dan Gregory and His Dancing Carnival Orchestra; 9:05-9:35, Frederick Wheeler, baritone; 9:35-10:35, Mozart String Quartet, with Winifred T. Barr, pianist, assisting artist.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 6:00, Bedtime stories; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 2:30-4:00, The Radio Dealers Orchestra; 4:00, Tea Time music, Martha Gomph; harpist; Katherine Stang, Violinist; 6:30-7:30, Vincent Lopez Hotel Statler Orchestra; 7:30, Digest of the day's news; 9:00, Mixed program, The Lions Club of Buffalo.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., Music and household talk; 6:15 p. m., Review week's sports, Elmer Z. Ollphant, director of athletics, Union College; 7:45, Musical program, piano solos; Reading, "Just Boy" of American Boy Magazine; Band concert, Kaa-Rhea-Vahn Band.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra.

WHN, New York, N. Y. (Eastern, 360), 7:30-8:00 p. m., Moe Hallett's Roseland Dance Orchestra; 8:15-8:30, Antonio Pesci, tenor; 8:30-8:45, Sam Coslow, tenor; 9:00-9:30, "Lorraine Society Dance Orchestra, Arnold Miller; 9:45-10:00, Avy La Skere, double voiced singer; 10:00-10:45, "Original Ideal Novelty Five," Eddie Di Lalla, leader.

WIP, Philadelphia, Pa. (Eastern, 509), 1:00 p. m., Gimbel's Tea Room Orchestra; 6:05, Ches West's Orchestra; 7:00, Uncle Wip's bedtime stories.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15 Household Hints; 11:35-12 m., "Just Among Ourselves"; 2:00-2:30 p. m., Woman's Club—Lesson in Dressmaking by Mme. Myrtle Saperston; 2:40-4:00, Daylight concert—Ruth Helger, violin; Edna Timm Schneidler, soprano; 4:00-4:30, Reading by Mildred Simons; 5:30-6:00, Children's stories by Tess Cooperman; 6:00-6:15, Sport review by Ed Walker; 6:15-7:00, Dinner concert by Minneapolis Athletic Club Orchestra; 7:30-8:15, Farm and business lecture.

WLW, Cincinnati, Ohio (Central, 309), 8:00 p. m., The operetta "Dreams," Paul A. Barns, author-director, opera group of the Highlands High School; 9:00, Woody Meyer's Cincinnati Orchestra.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Concert, Gayoso Hotel Orchestra, Prof. Gasper Poppalardo, director.

WSB, Atlanta, Ga. (Central, 429), 12:00-1:00 p. m., Atlanta Federation of Musicians; 4:00-4:30, Howard theater overture; 5:00-5:30, Vick Meyer's Melody orchestra; "The Bird Lady," Mrs. Smering; 5:30, Bonnie Barnhardt's songs; Burgess bedtime story; 8:00-9:00, Atlanta Federation of Musicians; 10:45-11:45, Atlanta Federation of Musicians.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 3:00 p. m., Detroit Symphony Orchestra; 8:30, Detroit News Orchestra.

WDR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Paula Nodine, pianist; 2:45-3:00, Helen Stone, soprano; 3:30-3:45, Paula Nodine; 3:45-4:00, Helen Stone; 6:15-7:30, Harry Cox and His Hotel Robert Treat Orchestra; 8:00-8:15, Mr. Alfred McCosker; 8:30-8:45, Jolly Bill Steinke; 9:00-9:15, Income Tax talk by John Armstrong, C. P. A.

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.**

WHOLESALE RADIO SERVICE COMPANY

9 Church Street
New York City

Formerly at 39-41 Cortlandt St., New York City.

5 TUBE NEUTRODYNE SET

Consists of:

- 1 7x26 Baseboard
- 3 Neutroformers, Columbia
- 2 Neutrodons
- 5 Nat'l Bakelite Sockets
- 2 Jefferson Transformers
- 2 Filament Control Jacks
- 1 Cut-Hammer Battery Switch
- 1 Bestone Power Rheo and Dial
- 1 30 ohm Bestone Rheo and Dial
- 1 7x20 Drilled Panel
- 1 .00025 Dubiller Condenser
- 1 2 Meg. Leak
- 2 .006 Mica Condensers
- 8 Binding Posts
- Spaghetti, Wire, Blueprint and Booklet.

When this set is hooked up you will be entertained by broadcasting stations thousands of miles away. You will enjoy a revelation of selectivity, volume, distance and clarity. With the dial readings of a station recorded, it can always be tuned in again to the same settings, maintaining at the same time loud-speaking intensity and clarity of natural reproduction.

Included in the set is drilled panel, ready for mounting and wiring. A FADA book FREE. **$32.50**

Complete 5-TUBE NEUTRODYNE, built of genuine FADA parts, in a fine mahogany cabinet, ready to operate and pull in the long distance stations on the loud speaker, only..... **$85.00**

(This does not include tube or batteries)

8 TUBE SUPER-HETERODYNE

The popular 8-tube Super-Heterodyne Receiving Kit, consisting of the following parts:

- 1 Oscillo-Coupler Type S. W. 21
- 1 Tuned Filter Coupler Type No. 34
- 1 ATX Audio Transformer
- 1 AT 3 Audio Transformers
- 2 C 1000 Bypass Condensers
- 3 Radio Frequency No. 1716, 5000 to 25,000 Meter Intermediate Frequency Transformers
- 1 Super-Heterodyne 65-Page Manual—blueprints, panel layout and templates

Complete for only **$65.00**

3-Tube Regenerative Long Distance Receiver Built in a good-looking mahogany cabinet ready to operate..... **$49.50**

Radio Corporation Radiola V1—6-tube set ready to operate. Regular price, $275. Our Price..... **$85.00**

A limited number on hand

The Radio Corporation's NEW RADIOLA III 2 TUBE SET

The Radio Corporation unconditionally guarantees this two-tube set to receive from broadcasting stations 2,000 miles distant on the loud speaker. This receiver complete with 2 W.D.11 Tubes, Phones and "B" Batteries for only..... **$39.75**

These sets are difficult to get, but we have a limited number, so act at once!

- Freed Eisemann 5-Tube Neutrodyne Knock-down $72.50
- Freed Eisemann Neutrodyne Kit—3 Neutroformers and 2 Neutrodons.... 22.50
- Fada Neutrodyne Kit—3 Neutroformers and 2 Neutrodons..... 23.75
- Columbia Neutrodyne Kit—3 Neutroformers and 2 Neutrodons..... 15.50

ORDERS SENT C. O. D.

WE SELL RETAIL AT WHOLESALE PRICES.

STANDARD EQUIPMENT **HILCO** SCIENTIFIC RADIO APPARATUS IN THE BEST RECEIVING SETS

Hilco Variocoupler

Type "E"

$7.00

The HILCO Type E Variocoupler contains a primary and secondary winding of the HILCO Lattice Banked Type and is ideal for use in single, two or three circuits. The primary winding is so tapped as to give very close adjustments to wave lengths of 200 to 600 meters. The position of the secondary winding makes this instrument very selective, sharp tuning and its coupling is variable thru a wide range. **Price $7.00.**

Hilco Variometer

Type "A"

$6.00

The HILCO Type A Variometer contains four sections of HILCO Lattice Banked Winding, assembled so as to give a wide range of inductance thruout the entire movement of the rotor. This instrument is very selective, sharp tuning and can be mounted in any desired position. Note suspension of wires in air with successive turns crossing at right angles, and minimum amount of energy-absorbing material. **Price $6.00.**

Hilco Tuning Inductance

$2.50

The HILCO Type "RI" Tuning Inductance is designed for use in connection with the Reinartz Receiving Circuit. It consists of two HILCO Lattice Banked Windings combined in one unit, tapped so as to conform to the original Reinartz Tuning System. This Inductance will tune to wave lengths of from 200 to 575 meters.

The HILCO Variocoupler's success in the ERLA Reflex Circuit has brought it unprecedented popularity. The lattice-banked winding (which is an exclusive feature of all HILCO equipment, and should not be confused with honeycomb winding), suspends the coils in air, preventing the accumulation of moisture, and insures clear, distinct reception of distant stations.

If your dealer can't supply you, send his name with order and we will see you are supplied.

Dealers and Jobbers—HILCO Radio Products are profitable, satisfactory merchandise, with quick turnover. Write for literature and discounts.

A. E. HILL MANUFACTURING CO.
ATLANTA, GEORGIA

Meditations by the Inventor of King Miloplex

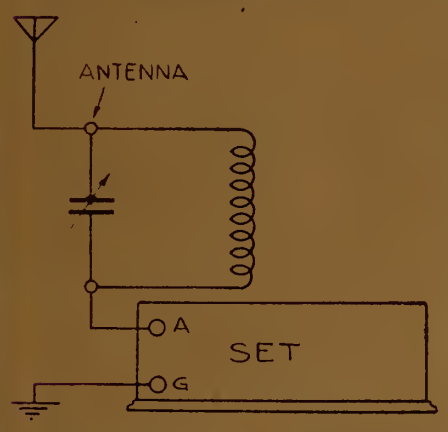
Part XXI—On the Wizard and the King, and on Wave Traps

By the Mystery Man

YOU know, it appears to me, and to Maggie, too, that many of you will see considerable interest in my new stories on the Wizard and realize I said a mouthful when I told you that for an all-around night-in-and-night-out "Go Get 'Em" it was hard to beat. Now that you have its revision and the C batteries looking at you with a "try me" smile, I am believing many of you will be sending in O. K. reports and logs a mile long. Shoot, I like to read 'em.

The King or the Wizard

And while I'm talking about circuits,



let me repeat the answer to the often asked question, "Is the King better than the Wizard?" The answer is, "Absolutely." But I also said when I published it, that it was intended only for the advanced experimenter. By that I meant "If you know your Radio," because in addition to novices and amateurs I also have several engineer friends who want hard nuts to crack. West of Stapleton fame wants to know if that was really truly my picture with the reflex hook-up that doesn't use a Radio frequency transformer. Why, certainly! Do you suppose Maggie would dare threaten anyone else with a rolling pin? And while I'm on the subject of reflexers—better send that stamped envelope of yours as reports are coming in saying the funny trick works. In fact, Maggie is thinking of trading her special for it. She offered me a trade, but my answer was "Try and get it." Who was that guy that wrote the song, "Maggie—Yes! Ma'am!"? Maggie wants to sue him for something.

What Is a Wave Trap?

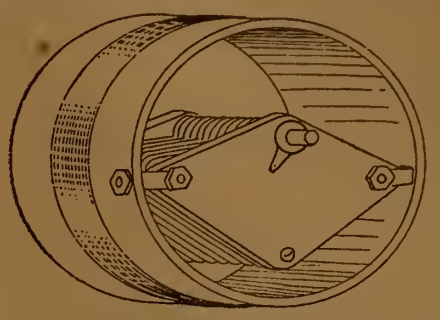
Mr. Digest just phoned me that he also wanted the King Tut history on wave traps in addition to my one brain ideas about them, hence I presume I must include Marcel's and everything.

Well, all I know about wave traps is "they work," which is not what one could say about some if not many of the new anti-somethings that are continually bobbing up.

The first wave trap you should build is a new aerial. I mean by that, that many a receiving set would tune much sharper if you would cut your aerial to a single wire 75 to 100-footer; and again, why try to do sharp tuning with a giant 43-plate condenser in your aerial circuit? Ten times out of nine an 11-plate would do the job much—oh, so much—better.

But, supposin' we have done all of this and the local stations or those close-onto-another waves still insist upon messing the deck, or some spark station keeps talking "hog latin" to you; then and then only do you need a wave trap. Well, let me see; just what is this thing they call a wave trap? Well, that's what I thought it was: It's an Eaton oscillator, an acceptor, a rejector, an absorption circuit—all of them things, all of them funny names, and yes, sir, just as certain as one of the Ben family faithfully says to you each morning, "Rise, slave, rise"—it's also a wave meter; in fact, that's what I would have called it, had I been at the christening.

Very often the question arises as to whether a wave trap is as effective upon a two or three circuit set as it would be on a single circuit. You who are now using single circuit sets should find them of much greater benefit as they are what is known as "stiff" circuits, viz., they change wave lengths or rather adapt themselves to wave length changes very slowly. Hence any device such as a wave trap will materially improve selectivity by greatly assisting the elimination of interference, whether it be phone or spark.



Types of Wave Traps

Possibly the types most prevalent on the market are those consisting of an inductance in parallel with a variable capacity, the combination being inserted in series with the antenna or in parallel with the antenna and ground, while the remaining one also consists of an inductance and capacity in parallel. Inductively coupled to the inductance is a minor inductance which in turn is connected in series with the antenna, while other methods of connecting are quite possible in order to meet certain conditions or classes of interference.

By golly, that sounds like I was writing an introduction to a wave trap text book; so, in order to keep the ice man away during this heated spell, supposin' we unlock the ice shop and build one of the babies with the distinct understanding that as we go tripping along, we or I will describe the building of several types so you may take your pick, as each type may present a "stunt" that will appeal to you as the one you want.

Building a Wave Trap

All right, let's go. For the first trap which we will construct, you will require 50 feet of number 22 dcc. or scc. wire, and we will use for our variable condenser an 11 or 13-plate of a capacity approximating .00025, a small variance not being essential.

In order that the finished trap may occupy as little space as possible, we will use tubing, selecting a size whose inner diameter will allow the condenser to be placed inside of it, so that we can anchor the tubing to the condenser (see drawing in outline) and produce a neat yet not

(Continued on page 22)

Standard Merchandise Only

S. HAMMER RADIO CO.
303 ATKINS AVE. BROOKLYN, N. Y.

Anything and Everything in Radio

$80.00 FREED-EISEMANN PARTS FOR 5 TUBE NEUTRODYNE SET..... $75.00

$120.00 FADA 4-TUBE NEUTRODYNE SET ND 160..... $105.00

$90.00 Genuine Parts for 4 TUBE MELCO SUPREME RECEIVER $85.00

PHONES		VARIABLE CONDENSERS		LOUD SPEAKERS	
$ 5.00 Turney, 3000 ohms..	$ 2.75	11-PLATE		$30.00 Music Master	$24.00
12.00 Western Electric....	10.50	$ 2.00 Signal	$ 1.40	35.00 Magnavox	29.00
6.00 Brandes	4.75	2.50 Admiral	1.45	30.00 Herald	26.00
12.00 Baldwin	7.95	2.00 Comsco	1.75	10.00 Brandes	9.50
7.00 Federal	4.95	1.80 Amsco	1.30	17.50 Pathé	16.00
6.00 Potter Precision....	4.15	23-PLATE		Baldwin Unit	4.65
5.50 Stromberg Carlson..	4.50	2.50 Signal	1.60	Amer. Radiophone Unit....	3.95
3.75 Pacent, 3000 ohms..	3.35	2.75 Admiral	1.65	RHEOSTATS	
TRANSFORMERS		2.75 Comsco	2.25	1.00 Fada 30 ohm.....	.90
7.00 Federal No. 65.....	5.45	2.30 17-Pl. Amsco	1.65	1.50 Federal 25 ohm.....	1.25
5.00 Acme	3.85	2.50 Amsco	1.95	1.00 Amsco 6 ohm.....	.85
5.00 All-American	3.85	43-PLATE		1.25 Amsco 20 ohm.....	1.00
7.00 Amertran	5.75	2.75 Signal	1.65	1.30 Amsco 30 ohm.	1.10
4.50 Thordarson	3.75	3.25 Admiral	1.80	1.50 Cutler Hammer 6 ohm Ver.	1.15
12.50 Como Dup.....	10.50	3.50 Comsco	2.85	1.50 Cutler Hammer 30 ohm Pl.	1.15
12.50 Modern P. P.....	10.50	3.50 Amsco	2.75	.90 Klosner 6 or 30 ohm.	.80
6.00 Erla	4.25	VERNIER CONDENSERS		1.00 Pacent 6, 20 or 30 ohm	.90
5.00 Amplex	4.25	11-PLATE		2.00 Filkostat	1.85
4.00 Rasla R. F.....	3.75	6.00 Hammarlund	4.95	1.80 Bradley-Stat	1.70
5.00 Duratran R. F.....	4.50	4.50 U. S. Tool.....	3.50	1.80 Bradleyleak	1.70
5.00 General Radio.....	4.35	3.50 Comsco	2.85	2.00 Ermcostat	1.70
BATTERIES		5.00 Sexton	4.25	POTENTIOMETERS	
EVEREADY DR CYCLONE		4.50 U. S. L.....	3.10	1.25 Pacent	1.10
5.50 45 Large	4.25	4.00 Amsco	2.95	1.50 Amsco	1.25
2.75 45 Small	2.45	23-PLATE		1.50 Cutler Hammer	1.15
2.75 22½ Large	2.45	6.50 Hammarlund	5.65	1.50 Klosner	1.25
1.50 22½ Small	1.35	5.00 U. S. Tool.....	3.75	VARIOCOUPLERS	
DIALS AND SOCKETS		4.50 Comsco	3.75	3.50 Fisher	2.50
3" Amsco Bakelite.....	.45	5.50 Sexton	4.50	3.50 Workrite 180 deg....	2.95
4" Amsco Bakelite.....	.80	5.00 U. S. L.....	3.45	8.00 Gilfillan	6.00
Bell Socket	.65	4.50 Amsco	3.35	4.00 Simplex	2.80
Melco Socket	.80	43-PLATE		3.25 Shamrock	2.60
Triple Socket	2.50	5.50 Hammarlund	6.25	4.00 Sleeper Fixed	3.25
Bakelite Socket	.45	5.50 U. S. Tool.....	4.25	7.00 All Wave	5.50
JACKS AND PLUGS		5.50 Comsco	4.75	MISCELLANEOUS	
Pacent Double	.70	6.50 Sexton	5.45	Cockaday Coils, Precision.	4.50
Pacent Single	.60	6.50 Sexton Automatic...	5.45	Amplex Grid Denser.....	1.25
Federal Single	.65	5.00 Amsco	3.95	Lavite Resistances, 48,000 ohms	1.25
Danstrom 6 Way.....	1.20	4.50 Amsco 17-Pl.....	3.35		
Cico 2 Way...	.55	5.50 Amsco 26-Pl.....	4.10		
Weston	.90	3.00 Compensating Condenser	2.65		
		$71.00 AMPLEX KIT	$56.50		

ALL MAIL ORDERS SHIPPED PROMPTLY. Orders over $5.00 will be shipped prepaid. Money orders or C.O.D. Not insured unless insurance charges included. Write for Price List.

The Stamp of Approval the World Over

FRESHMAN Variable Grid Leak

The Standard Unit for Every Tube Set

EVERY tube and every circuit require a different grid leak resistance. The method employed in the Freshman Variable Grid Leak permits you to adjust your circuit to any resistance you wish, from 0 to 10 megohms in an unbroken range of 180 degrees.

The Freshman Variable Grid Leak and Condenser combined, takes the place of a grid condenser, leak mounting and grid leak—and, in addition, permits an adjustment to the correct amount of resistance. The Freshman Variable Grid Leak is the most compact, the most perfect, the most efficient, the most readily adapted to all grid circuits—and the only one which is entirely sealed and always remains unaffected by any climatic conditions. It is the

ORIGINAL VARIABLE GRID LEAK

Ask your dealer or write for our free diagrams of Neutrodyne, Tri-Flex, Kaufman and other good circuits.

Either Base or Panel Type Complete with .00025 or .0005 MF. Freshman Condenser $1

Either type without Condenser 75c

At your dealer's, otherwise send purchase price and you will be supplied without further charge.

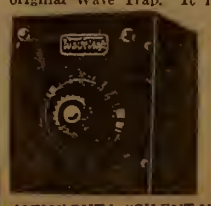
Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Ave. New York, N. Y.

An Easy Way to Cut Out Interference

Add a Ferbend Wave Trap to Your Set

It isn't hard to receive nowadays on most any good set from stations all over a country as big as the United States—if the nearby station doesn't interfere. Even then, if your set is extremely selective, and if you have the right antenna, and if you are an expert at tuning—and if you have good luck—you can perhaps tune out the offening transmitter.

Do not be misled by imitations. The FERBEND WAVE TRAP is the first inductive as well as the original Wave Trap. It is not assembled haphazardly from standard parts, but is made up of special parts designed and manufactured by us for the sole purpose for which they are used. The FERBEND WAVE TRAP is mounted on formica panel in mahogany finished cabinet 6x5x6 at $8.50 or unmounted at $6.00.



ANY NIGHT is "SILENT NIGHT" with a FERBEND!

The FERBEND TRADE MARK Wave Trap PATENT APPLIED FOR STOPS INTERFERENCE

THE FERBEND WAVE TRAP MAKES YOUR SET SELECTIVE

READ THE EVIDENCE!

It happened that Wm. L. Mann, of 767 N. Fortieth St., in Philadelphia, didn't have all these things—so he just bought a FERBEND WAVE TRAP, and now he says he has no trouble tuning out any of the four big Philadelphia stations. The same thing can be done (probably is being done) in your town. Try it!

ANY NIGHT is "SILENT NIGHT" with a FERBEND!

Wonderful Selectivity for You

with a FERBEND WAVE TRAP on your set. You will be surprised at the ease and sureness with which you can tune out that troublesome interfering local station that is always breaking in every time you get some favorite station. The FERBEND WAVE TRAP is guaranteed to tune out any interfering local station. Why wait? Order now.

Send No Money

Just your name and address, and pay postman $6.00 (plus postage) for the unmounted, or $8.50 (plus postage) for the mounted Wave Trap. If you prefer, send cash in full with order and we will ship postage prepaid. You take no risk, so order today.

"The *Original* Wave Filter"

Ferbend Electric Company

Dept. 3 19 East South Water St., Chicago

Radio Digest Illustrated

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

Published by the Radio Digest Publishing Company, Inc.
123 West Madison Street
Telephone: State 4843, 4844, 4845
Chicago, Illinois

E. C. RAYNER, Publisher
Chas. F. Smisor, Editor Evans E. Plummer, Managing Editor
H. J. Marx, Technical Editor M. W. Thompson, Associate Editor

Eastern Representative, Jacob Miller, Times Bldg., Times Square, New York; Telephone Bryant 4909

Member of the Audit Bureau of Circulations
58
PUBLISHED WEEKLY

SUBSCRIPTION RATES
Yearly in U. S. and Possessions and Canada, $5.00.
Foreign postage, $1.00 additional. Single copies, 10 cents.

Vol. VIII Chicago, Saturday, March 1, 1924 No. 8

Deafened Hear Radio

A New World Is Opened Up for Those Who Are Afflicted

IN THE hurry and excitement of equipping millions of homes with Radio sets, or the parts from which sets are made, few have paused to consider what this great new force means to those unfortunates who are hard of heariug.

Theodore Roosevelt said that it was not until he was eight years of age that he was provided with eye glasses, aud his owu words are, "a new world was opened to me." What glasses did for Roosevelt, Radio does for the deafened.

Annetta W. Peck, secretary of the New York League for the Hard of Hearing, says: "Make this distinction between deaf aud deafened. The former are born without the sense of hearing. Radio can help here. But for the latter, Radio is one of the greatest alleviations." Radio helps both deaf and blind.

Owners of Stations

Dealers and Manufacturers Largest in the Field

UNIVERSITIES, churches, banks and public utilities are some of the organizations that have obtained licenses to broadcast their programs to Radio listeners. Out of nearly all stations in the United States and Canada a survey shows more than half are being conducted by Radio manufacturers, dealers and others financially interested in Radio. There are many private individuals who have obtained broadcasting licenses, and most of these may also be classified as having some financial interest in the science. In other fields newspapers excel in the use of Radio for broadcasting.

Six cities have their own broadcasting stations. Twenty-one universities have already entered the field and more have applied for licenses. In the same category are three churches and one Bible institute, three banks and eight music, jewelry and watch firms.

One physician is conducting a broadcasting station. Among others throughout the nation are one amusement company, a yacht club, an automobile club, a plumbing and heating concern, a farm machine company and a milling firm.

Sanatorium with Receiving Sets

The Mind Relieved Goes a Long Way to Aid Patients

WILL Radio help them get better? This is a question that may well be asked of most any head of a sanatorium. Many physicians agree that the condition of the patient's mind has much to do with recovery in the treatment of tuberculosis, and if this is true, the money contributed to such institutions for the installation of receiving sets has been well spent from a strictly scientific standpoint.

Barring the scientific possibilities and merely looking upon the installation of Radio from a human angle, the investment is one of the most noble that can be made. One glance at the face of one little tot confined in a sanatorium as it listened to a bedtime story would be sufficient recompense to any person who has made a contribution. These little tots, taken from their homes and their mothers, miss their bedtime stories at night, but Radio, taking the children even closer to the land of "make-believe," has helped to fill the place in the lives of these little ones made lonely because their mothers cannot be with them.

Radio has a place in the lives of all patients separated from their homes and loved ones and the weariness of the day weighs heavily upon them, but toward evening, when Radio begins, there is a different spirit manifested at a hospital with receiving sets installed. The faces become cheerful and every listener is just as much interested in the program as if he or she were operating the dial on the set. Then, at the end of an evening of entertainment without excitement, the patients go to sleep, happy and forgetful of their plight. The next morning, their bodies refreshed and their minds clear, they are better prepared to renew their fight for health than they might have been without the entertainment of the evening before which turned their minds from thoughts of their condition.

RADIO INDI-GEST

That's Enough of Him Anyway

There was a young "Ham" from "Chi,"
Who broadcast bunk to the sky
His antenna fell,
O'er a wire charged like H—,
Found; one elbow, a boot and a tie.

—MIKE ROFARADS.

Cancel Order for One Pung Chow Set

I GOT the thing two weeks ago, and yet I can't get it to go; I set to work with wrench and pliers, and tightened nuts and twisted wires; Then put the earphones on my head, but the "insides" were somewhat dead. "Confound the thing!" I loudly cry, "I'd give ten bucks to get the guy, that told me I could pick up 'Cube' on only one punk vacuum tube." My friends suggest a new grid leak; I try it—but can't hear a squeak; they tell me all the things they get, on "peanuts" and small crystal sets. I've spent so much in fourteen days—my wife entreats—and begs—and prays, that I forget the Radio, and learn instead to play Pung Chow. At last I got an expert man, and said: "You fix it if you can!" He set to work—I saw him smile. He took his pliers, knife and file, and scraped, and bent the battery wires, and said: "You're friends are awful liars. You've got her 'hooked' entirely wrong—and four new tubes will cost a song." That night I got my favorite chair, and settled down to "try the air." I turned some knobs and heard a squeak, and then a man began to speak. At first his voice was rather low—but soon I made out "2LO"—"Good night!" I gasped—my mind went blank—and to the floor I limply sank! 'Twas London, England, that I got;—oh yes! I nearly had forgot—but I will tell you here and now—I've never learned to play Pung Chow! HUGH MCKANDAY.

Maud Muller on a Radio Wave

"Where are you going, my pretty maid?"
"Broadcasting, just once again."
"May I go with?" he softly said;
"Go chase yourself. . . . Listen in!"

MILOPLEX.

Still, WTAY, Oak Park Arms Hotel, Oak Park, might have told us it was going to cost good, hard-earned medium of exchange to come to their opening party. We refuse to quit razzing them till they explain, and we can hear money articulate. By the way, WTAY, the cab fare to your darned old party and back cost us $9.45. Don't forget to include that in your check. **Indi.**

There's Music in the Air

There's music in the air
When night falls o'er the land;
You can hear the Angels singing
Or can hear a jazzy band.
You can hear a grand contralto,
Or hear a deep bass voice.
All you need is a Radio.
You can quickly make your choice.

There's music in the air
When the family's gone to bed.
You can hear the far off concerts,
Or can hear what has been said—
By the great and mighty speakers,
Who dominate the land.
If you only have a Radio,
With loud speaker to command.

There's music in the air
While you sit alone and read;
You can hear an obbligato,
Or a plaintive love song plead.
You can hear the greatest artists,
That this country can produce.
If you'll only get a Radio,
And learn its simple use.

E. O. MOFFAT.

Just for that We Refuse

Dear Indi: I don't wish Maggie any harm, but tell her she had better keep her hands off our "Mystery Man." I think that arrangement down your column would be unique and distinctive. By all means, do it. J. A. T.

Maybe They Sell Clothing

Dear Indi: From the enclosed clipping from the Omaha Daily Bee, someone is terribly crazy for a crystal set, or sure hates Detroit, to wit:

WILL TRADE 1920 Ford roadster for crystal set. F-610, Omaha Bee.

GUYMEYERS.

Everything, M'Dear, Everything!

Dear Indi: I forgot to enclose the kink but I forgot to enclose the dollar. I hope everything will be O. K.

WHBDAF.

Now you contributors who have endeavored in vain to get your poems, bum jokes, etc., into this column have a satisfactory explanation. We've just discovered that there's quite a bit of resistance to overcome before getting your stuff set in type. The linotype operator's name is Ohm. **Indi.**

Make It Nine Tubes and It's O. K.

Dear Mr. Gest: Have you any objections if I name my new hook up "The New Indi-Gest Eight Tube Receiver?" This set is a great improvement over the old three, four and five tube sets, it operates silently, using no batteries whatsoever.

The tubes are made of polished copper and can be neatly arranged in either stair step, house top, pipe organ or cemetery gate formation, and are cut in lengths to correspond with do re me and so on up to another do. The aerial is connected to one of the do'es, each tube is tapped to a switch connected with the ground, a jack can be placed in the circuit, that's all there is to it.

Voice, music, in fact any sound not too high or too low, can be reproduced on these tubes without the use of phones. If you have any friends owning stock in Radio parts you can tip them off so they can unload before the smash comes. But please do not let this letter fall into the hands of any Radio parts manufacturers. The harder they are hit the better it suits me. They even hit me after they got me down.

PAPA PAT.

Condensed

By DIELECTRIC

For a long time Radio listeners, in parts of the country where ship code and shore stations pounded into their receiving sets with such volume as to drown out broadcast reception, lived in horror of what might happen to a beautiful solo or important speech—something over which they had no control. WNY, the chief offender in the neighborhood of New York, has, along with most other offenders, junked their spark code set and replaced it with tubes. This modernizing of code stations and raising the wave length is a great boon to many thousands of fans.

Probably all of us have uoticed the lack of blurs and buzzing, so familiar to listeuers to relaying in the past, when Radio programs are carried by both wires and the ether. The reason for this marked improvement, according to Dr. Fletcher of the Western Electric company, is traced to a more complete knowledge of sound transmission. The vibrations in human speech range in frequency from 100 to 3,000 cycles a second; vowels run in the lower and consonants iu the higher frequencies. Imperfect apparatus may eliminate one or other of these extremes and thus produce that undesired souud. Constant study of the various phases of broadcast transmission by meu trained to properly interpret what they find makes your enjoyment of Radio what it is today.

For the first time in history Radio was used to send to several millions of listeuers the funeral services of a former President. Broadcasting Station WCAP, WEAF and WJAR were selected to carry words and music from the Cathedral, where Woodrow Wilson's casket was laid, to these absent mourners all over the land. Except for the brave act of one man, listeners to WJAR, Provideuce, R. I., would have heard very little. A large decayed tree threatened to fall and sever the trunk line from New York to Providence, but this man held to a rope about the tree steadyiug it for two hours, or long enough to allow the entire ceremony to reach the Providence station. Thanks are due C. H. Williams, of Providence.

Farmers iu this country have had a most valuable service given them free in the broadcasting of prices and movements of crops, as well as talks by men of experience in their respective lines of agricultural pursuits. These talks have beeu plain discussions of methods of cultivation best suited to certain soils and climates, management of stock, etc., which brought to the farmer in his home information perhaps not otherwise acquired. Auyone interested iu farming may take advautage of the broadcasting by the Kansas State Agricultural college of a complete course on the subject, enrolliug as a Radio student and, upon passing a writteu examination, become a graduate of the first school of its kiud in the world. Here is offered (tuition free) a great opportunity.

So much is involved in the attempt at perfect trausmission of music that we may expect some time to elapse before such a thing is actually done. Organ music makes an almost uuiversal appeal. Most modern organs have what is known as an "echo" attachment, the effect of which is truly beautiful in the hands of au artist, but Radio has been unable to give this its proper value until now. An exhibition of what may be expected in the future was giveu recently before the Institute of Political and Social Science in Philadelphia. Beautiful antiphonal effects were produced there by using two sets of amplifiers, one from the maiu organ and the other actuated by the echo organ. These new devices will allow the ordinary listener to hear both at their proper value. We may rejoice in this news.

How to Make a Lighthouse Keeper's Receiving Set

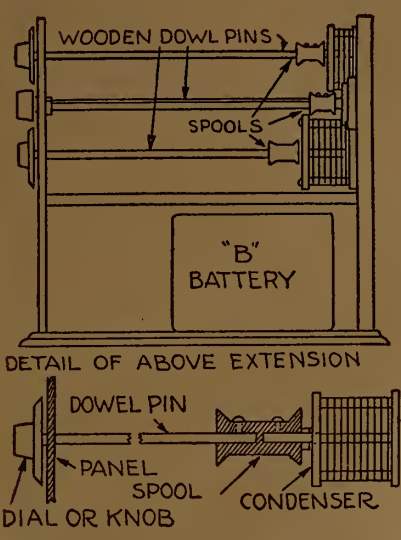
Part IV—Elimination of Body Capacity Effects

By S. R. Winters

BODY capacity effect is one of the annoying influences in the operation of some Radiophone receivers. This objectionable action of the body is not restricted to poorly designed electrical equipment. Quite the contrary may be true. A notable case is the extremely popular and efficient Radio unit built by the Lighthouse Service.

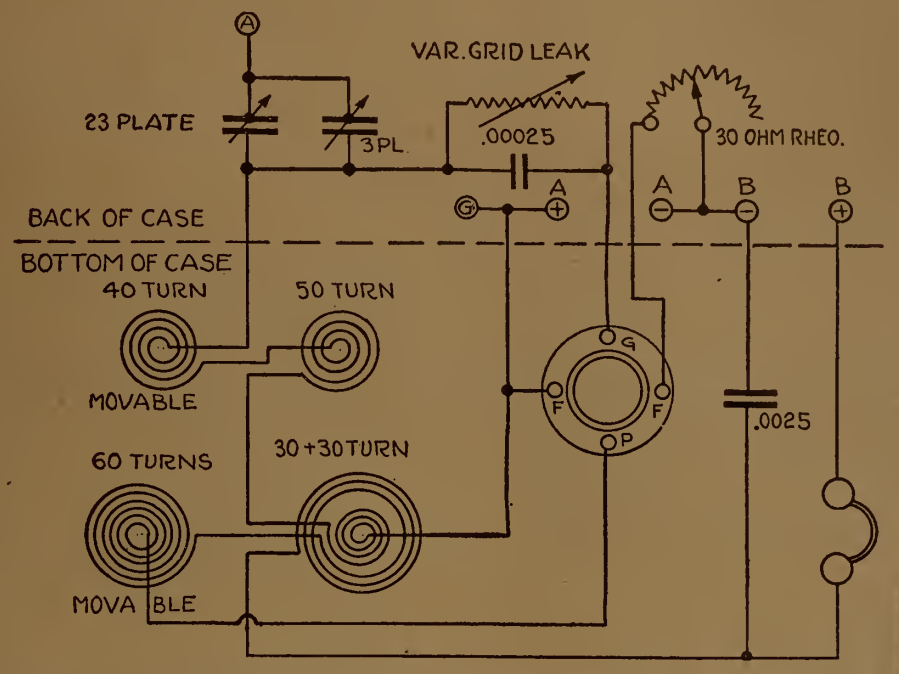
Eliminating Body Capacity

This one-tube receiver, operated by dry-cell batteries, until recently was a decided victim of body capacity effect. Even now, the complete elimination of the latter was not accomplished without a radical rearrangement of the instruments in the cabinet and, in one or two instances, the replacement of units in which it could not



be overcome. The method by which the designer effected elimination of body capacity effect offers suggestions to other operators of Radio instruments who are similarly afflicted.

This outfit had heretofore employed a WD-11 tube. UV-199 is used in the modified set. The main tuning condenser has been removed from the ground circuit and inserted in the antenna circuit. Furthermore—and this is a marked departure—the instruments have been taken from the front part of the cabinet and placed in the rear, with the exception that the phone binding posts remain on the front.



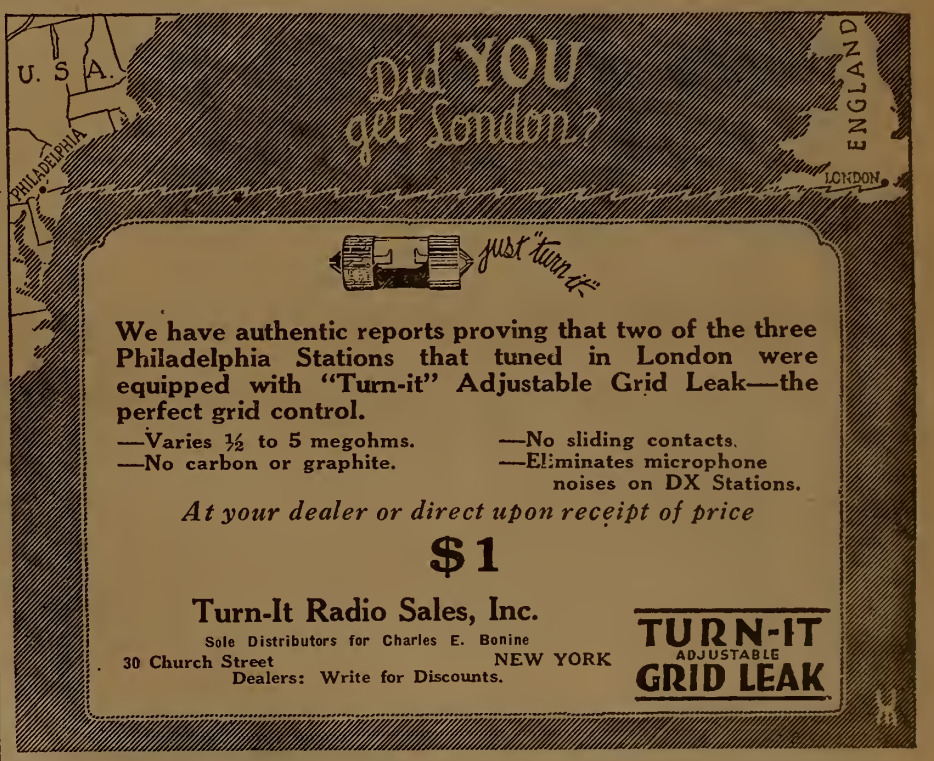
Instruments in Rear

Mounting of the instruments in the rear compartment of the container is accomplished by the use of wooden extension rods. The latter are of dowel stock, obtainable at a hardware store. These extension rods, running from the rear to the front of the cabinet, constitute an arrangement whereby the electric circuit is removed from the proximity of the operator's hands. The rods may be secured to the shafts of condensers and other instruments by means of spools. The household sewing bag may be invaded for this purpose, since a spool on which thread has been wound is suitable for this use.

A variable grid leak has been substituted for a fixed one. The former is of the following description: A disk is carved from a piece of fiberboard or from an old storage battery jar. A switch lever, after the end is cut off, is bent down about ¼ inch and formed into a circle for containing a piece of lead from a lead pencil. The pencil line is made thick at the binding post before assembling the parts. A virtue of this device is that the piece of pencil does not wear out the resistance line. This type of variable grid leak is adaptable to panel on base mounting. If, however, a panel is employed, it is necessary to remove the high polish with a piece of sandpaper before making the pencil line. Connection is made to the center part and to the binding post.

Until these modifications were made, the lighthouse set stubbornly refused to withstand body capacity effects. It was the one drawback to its universal popularity as a one-tube, dry-cell operated receiver. Various other methods to eliminate body capacity had proven futile. Now, it is said, there is no Radio equipment freer from body capacity effect than the one discussed in this series of articles.

(THE END.)



We have authentic reports proving that two of the three Philadelphia Stations that tuned in London were equipped with "Turn-it" Adjustable Grid Leak—the perfect grid control.

—Varies ½ to 5 megohms.
—No carbon or graphite.
—No sliding contacts.
—Eliminates microphone noises on DX Stations.

At your dealer or direct upon receipt of price

$1

Turn-It Radio Sales, Inc.
Sole Distributors for Charles E. Bonine
30 Church Street NEW YORK
Dealers: Write for Discounts.

TURN-IT ADJUSTABLE **GRID LEAK**

MAIL ORDERS Address **DEPT. D-6** Chicago

Got Your Copy Yet?
Our new 48-page catalog illustrates and describes 10 complete receivers and parts to build them. It contains over a thousand radio bargains which, because of our enormous buying power, have not, and cannot, be duplicated elsewhere.
SEND A DIME FOR YOUR COPY TODAY

Attention: Set-builders!
Complete Parts for ALL Receivers

Herald and Examiner Set	$ 5.95
Single Tube Erla	20.90
2-Stage Amplifier	12.95
Ultra Audion	8.95
Overland Circuit	8.25
Haynes DX	10.95
Superdyne Receiver	15.85
Long-45 Circuit	16.25
Reinartz	11.45

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

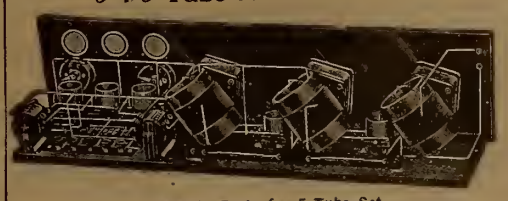
Complete Instructions
for assembling and blueprints for wiring are included with each outfit. Instructions written so everyone can understand them.

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

CHICAGO SALVAGE STOCK STORE
509 S. STATE ST.

SALVAGE MEANS SAVE: SERVICE: SATISFACTION
When you buy that radio apparatus from the Chicago Salvage Stock Store, the world's greatest radio store, you can be certain of these three things:
1. You have saved money through the hundreds of radio bargains made possible by our enormous buying power.
2. You have been served intelligently by men who are qualified radio experts.
3. You have bought quality apparatus because we handle nothing but brand new merchandise GUARANTEED to give satisfaction.

3-4-5-Tube NEUTRODYNE

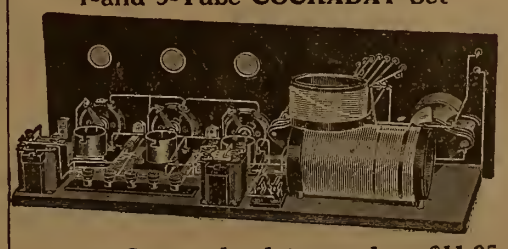


Complete Parts for 5-Tube Set

1 Set of genuine Freed-Eisman Neutroformers with Neutrodons or Fadas.
7x28x3/16 drilled and engraved panel with baseboard.
2 A. F. Transformers.
3 Erla Bezels.
1 I.M.F.D. By-Pass Cond.
1 .001 Mica Condenser.
3 Filament Control Jacks.
3 4-inch Dials.
1 Howard Vernier Rheostat.
1 Howard Plain Rheostat
1 Strip of Bakelite.
8 Binding Posts.
2 Firth Sockets.
1 3-gang Firth Socket with mountings and screws.
20 ft. Bus Bar Wire.
Screws, nuts and miscellaneous for set. Construction Book and Schematic Print. Grid Leak and Mica Condenser.

3-Tube . . . . $28.60 5-Tube $46.25

Complete parts for
1-and 3-Tube COCKADAY Set



1-Tube Set, with plain condrs., $11.95
3-Tube Set, with vernier condrs., $27.95

PEERLESS RADIO, 349 Fulton St.

BROOKLYN, N. Y.

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

LOUD SPEAKERS		HEATH'S RADIAN VERNIER CONDENSERS		PHONES	
Magnavox (new type)	$27.25	13 Plate	$4.75	Neroo	$2.35
Music Master	25.45	23 Plate	5.25	Pacent	3.45
Pathé (new type)	16.50	43 Plate	5.95	Brandes Superior	4.85
Dictograd	15.25	VARIDCDUPLERS		Federal	4.95
Stromberg Carlson	17.75	Fisher, 180°	$2.35	National Baldwin Type C	7.95
Mercury with Baldwin Unit	9.95	Shamrock	2.65	Dr. Seibt, German Phone, 6000 ohms	5.85
Natl. Baldwin Type C Unit	4.85	Sleeper, no taps	3.75	Western Electric	8.85
Manhattan Electric	22.50	Workrite	2.95	Ambassador	3.50
Brandes Table Talker	9.95	Gillfillan, small	5.95	Potter Precision	4.25
Accusticola Phonograph Unit	9.45	Gillfillan, large	7.45	Wiener Phones	3.95
VARIABLE CONDENSERS		Pathé	3.25		
11 Pl. Admiral or Signal	$1.35	Genuine All Wave	5.35	TRANSFORMERS	
17 Pl. Admiral or Signal	1.60	Cockaday Coil	1.85	Acme Audio and Radio	$ 3.90
23 Pl. Admiral or Signal	1.65	Unxld, 180°, Bakelite	1.95	All-American (all ratios)	3.90
43 Pl. Admiral or Signal	1.75	VARIDMETERS		Federal No. 65	5.95
11 Pl. Montrose Vernier Cond	2.55	Fisher, large, 600 meter	$2.55	Modern	4.95
17 Pl. Montrose Vernier Cond	2.75	Shamrock	2.65	Thordarson	3.95
23 Pl. Montrose Vernier Cond	2.85	Sleeper	5.65	Erla Reflex and Audio	4.45
43 Pl. Montrose Vernier Cond	3.65	Workrite	2.95	Akracy	3.35
11 Pl. U. S. Tool	3.35	Gillfillan, small	4.95	Modern Push-Pull	10.75
23 Pl. U. S. Tool	3.65	Gillfillan, large	7.45	Como Push-Pull	10.75
43 Pl. U. S. Tool	4.10	Pathé	2.85	Rasla Transformers	3.95

CYCLONE BATTERIES		HARD RUBBER PANELS		MAHOGANY CABINETS	
Small 22½ Volt	$ .75	7 x 10	$ .70	7 x 10	$2.45
Large 22½ Volt	1.75	7 x 12	.90	7 x 12	2.65
Medium 45 Volt	2.30	7 x 14	1.00	7 x 14	2.80
Large 45 Volt	3.45	7 x 18	1.40	7 x 18	3.05
Large 22½ Volt Eveready Battery	2.35	7 x 21	1.65	7 x 21	3.35
Large 45 Volt Eveready Battery	3.65	7 x 24	1.85	7 x 24	3.65
Small 22½ Volt Eveready Battery	1.15				
Eveready "C" Battery, 4½ Volt	.55				

MISCELLANEOUS

Bell Socket, Bakelite Panel Mounting	$ .69	Pathé Pulsiformers	$8.50	Phone Plug for 6 pr. Phones	1.25
Amsco 6 ohm Rheostat	.95	New Improved Cockaday Coils, silk wound	5.50	Phone Plug for 2 pr. Phones	$ .60
Amsco 20 ohm Rheostat	1.15	Cutler-Hammer 30 ohm Rheostat, Plain	1.20	Single Circuit Jacks	.35
Amsco 30 ohm Rheostat	1.25	Cutler-Hammer 400 ohm Potentiometer	1.20	Double Circuit Jacks	.45
Amsco 400 ohm Potentiometer	1.40	Filkostat	1.85	4" Dials, Fada Type	.45
Cutler-Hammer 6 ohm Rheostat, Plain	.95	Bradleystat or Bradleyleak	1.70	3" Dials, Fada Type	.30
Cutler-Hammer 6 ohm Rheostat, Vernier	1.20	Bruno 14 Tap Inductance Sw	.70	Triple Sockets, Fada Style	2.65
ELECTRAHDT Solder Iron	2.50	Sta-put Phone Plug	.35	Marked Eby. Bind. Posts, Ea.	.17
New Improved Cockaday Coil	5.50			Ambassador Coil	5.95
				Shelton Midget Vernier	1.40
				Freshman Grid Leak & Cond.	.75

KING MILOPLEX

(Continued from page 19)

bulky finished product. As number 22 wire averages approximately 29 turns to the inch, a tube 3 inches long will be ample for our purpose.

Wind this coil as you would any inductance, securely fastening the start and finish ends (a neat method is to drill the tube at start and finish positions and use machine screws with nut, locknut and washer). Be certain not to use varnish or shellac to hold the winding in place; in fact, if you wind your coil carefully no loosening of it can occur. When finished with the winding, our next step is the fastening of or anchoring the variable condenser on the inside of the coil. No definite directions can be given for this operation, yet the constructor can readily work out so simple a problem.

When mounted, the start winding connection should be connected to the rotor connection on the variable condenser, while the finished winding should connect to the fixed plates of the variable condenser. (See Figure 2.)

The trap is now complete and may be mounted by means of the condenser upon your panel, or, if you prefer, installed in a small cabinet where it is available whenever desired.

This type of wave trap, as simplified, is most efficient when connected in series with your antenna, and is quite effective toward eliminating broadcasting stations whose wave length is near that of the station wanted. But it is not capable of eliminating spark stations.

Connecting the Wave Trap

In making a series connection of the wave trap to the antenna, it is only essential that the antenna wire be removed from the receiving set and connected to the starting winding of your coil, which is connected also to the rotor of the condenser, while to complete the installation, a connection is also run from the antenna binding post on your receiving set to the finish winding on the coil, which connects also to the fixed plates on the condenser.

Tuning Out Interference

In order to tune out an interfering station, no attempt should be made to tune the receiving set beyond lighting the tubes and inserting the phone plug. When this has been done, you should tune the set, by using only the wave trap, to the wave length of the interfering station, adjusting both the trap and filament controls until the loudest reception is heard. This accomplished, you tune in the station desired, using only the tuning devices on the receiving set. It sometimes happens that a very slight readjustment of the wave trap condenser—often its first adjustment—will improve reception of the desired station.

More Trap Designs to Follow

By golly. I just re-read the above, and it sounds so dead like, I could well pass it off on a chinaman for six collars. You know I can say do it this way or that way, but when it comes to writing "how-to-build" specifications, I have no chin—you know what I mean. But stick, you know the general idea and I'll follow with several other trap designs that will keep the home fires burning and father late to bed.

Why, certainly, I'm going to give you one that will cut out spark stations also, but if you don't start now you will possibly miss the big idea and then have to do a lot of letter writing to me. Build this one, get it all ready and next week I'll show you how to put a dooficker on this week's trap that will cut out both phone and spark, and they tell me cutting out spark is a hard trick. I used to cut it out with a hickey so simple you'll laugh, and if they are not too hot I'll do so again next week. I say if they are not too hot; you know sometimes they are at such a white heat they cause what is known as coil excitation, which, I suppose, means the coil gets so excited it says, "Forget it!"

Let's eat.

(TO BE CONTINUED.)

STA-RITE RADIO BATTERIES SAVE YOU 60%

And Guarantee You in Writing 2 Years of Better Battery Performance

STA-RITE RADIO BATTERIES are made especially for Radio and the big saving is made possible by coming direct to you instead of thru distributors, dealers, etc. Boxes are made of oak, finished in mahogany and the plates very thick and will give a steady discharge over a long period. No premiums, just good, honest battery value.

TRY TO BEAT THESE PRICES

2 Volt for W. D. 11 and 12	$4.00	6 Volt 60 Amphr. -	$ 7.50
4 Volt for U. V. 199 Tubes	7.00	6 Volt 80 " -	8.50
RADIO B. STORAGE		6 Volt 100 " -	10.00
Glass Jars, Heavy Plates—Case of 12 Cells, 24 V.	4.90	6 Volt 120 " -	12.10
		6 Volt 150 " -	14.00
		6 Volt 200 " -	17.00

Get Yours Today—NOW—Send No Money

The batteries are fully guaranteed in writing and shipped subject to examination on the day your order is received. You pay on delivery or deduct 5 per cent if full cash accompanies order. You may deduct 10 per cent if two or more are ordered at one time.

STA-RITE BATTERY CO.

Department 5 LOUISVILLE, KY.

Radiotron UV-199

A Small Tube That's a Big Performer

Radiotron UV-199

for detection or amplification

$5.00

The new UV-199 is proving a mighty popular member of the Radiotron family, particularly for portable sets.

For quiet operation—great ruggedness—uniform operation Radiotron UV-199 is unsurpassed. Each new Radiotron has marked a big step in radio advancement. The RCA mark is the foundation of radio growth—and your protection when you buy. Ask for Radiotrons—and look for the mark.

RCA

This symbol of quality is your protection

Radio Corporation of America

Sales Offices—Dept. 313

233 Broadway, New York

10 South LaSalle St., Chicago, Ill.

433 California St., San Francisco, Cal.

Radiotrons

REG U. S. PAT. OFF.

The Air-Way

Wonder Set of Radio

"Getting Pacific coast stations strong with loud speaker on type F," writes E. S. White, Lowell, Mich. "Heard concerts from Havana, Cuba, Forth Worth, Texas, Atlanta, on a loud speaker," Austin Rhemer writes from Chicago. W. E. Culver, Savannah, Ga., says, "I get stations from all over the country loud and clearly." "Picked up 72 stations—ten in Canada, and get them back any time I want them," writes Jas. Berne, Aberdeen, So. Dak. Like this hundreds certify the genuine quality and perfect performance of Air-Way—a radio set built to represent the highest permanent quality, and offered at nominal and fair price.

Four Tube—(Loud Speaker Set)

Guaranteed Under Seal

This is not a "cheap" or "bargain" set. Only the finest quality instruments are used. Employs the reliable tuned radio frequency circuit with one step radio frequency, detector, and two steps of audio. Capable of coast to coast reception and use of any loud speaker to its full efficiency. Reproduces in loud, clear, melodious tone. Critical—selective. Recording position of controls for any station enables resetting at same position to bring station back. Quiet in operation, simple to tune. Furnished in beautiful Mahogany finished cabinet. Responsible dealers can show you this Air-Way. Ask to see it or write to us.

Air-Way sets are put out under sealed guarantee. Thorough testing of each set on actual broadcasting by our experts insures perfection.

Manufactured and Guaranteed By

AIR-WAY ELECTRIC APPLIANCE CORPORATION

TOLEDO, OHIO

B-METAL CRYSTALS

SUCCESS BRINGS IMITATIONS

LOOK FOR OUR NAME on the B-Metal box and be certain of getting the kind of B-Metal Crystals you expect to buy i. e., the B-Metal that has become famous for its loud talking qualities, and First, Last, and Always has been sold under this label. READ B-METAL REFINING COMPANY ON THE BOX OR PASS IT BACK TO THE DEALER for if our name is not there, our well-known and well-tested guarantee is not behind it.

B-METAL WAS NEVER ON THE MARKET UNTIL WE PUT IT THERE, and we stand squarely behind every B-Metal product bearing our name printed plainly on the package.

We do not offer premiums to assist the sale of REAL B-Metal.

B-METAL REFINING COMPANY

525 WOODWARD AVENUE DETROIT, MICH.

Formerly at 3134 Trumbull Avenue

Chicago Branch: 53 West Jackson Blvd., Chicago, Ill.

New York Branch: 222 Fulton Street, New York City

PRICE 50 CENTS

WEIGHS ONLY 8 OZ.

The Scientific

A $200,000.00 COMPANY stands squarely back of the guarantee on every *Scientific* headset

SEND NO MONEY!

20,000 TURNS EQUIVALENT TO 3,000 OHMS

THE PHONE IT TOOK A SOLID YEAR TO DESIGN

Order TODAY by Postcard and Pay Postman on arrival

$2.95 POST-PAID

LOUD SPEAKER UNIT $1.95

We Guarantee The *Scientific* Headset to be the greatest value on the market. Try it for five days. If not satisfactory send it back and your money will be refunded immediately. Circular on request. Dealers wanted.

THE SCIENTIFIC ELECTRIC WORKS

98 Brookline Ave. DEPT. W. BOSTON, MASS.

Agents for New York and Vicinity—AMBASSADOR SALES CO., 74 Cortlandt St., Phone Cortlandt 6296

Simple Explanation of Radio for Everybody

Chapter XI—Radio Frequency Amplification

By M. W. Thompson

THE following article is the twenty-third 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 XIII—The Neutrodyne Receiver.

Chapter XIV—The Reflex Circuit.

RADIO receivers at present seem to be featuring two things—tuning and amplification. Increased efficiency in the tuners means greater selectivity and less difficulty in finding desired stations. Increased amplification assures greater range and increased volume. The word "amplification," whenever mentioned, must be qualified with a phrase to determine which of two types of amplification it is, for in Radio there are two kinds.

In a previous chapter we discussed audio frequency amplification which is inserted in the circuit after the signals have passed through the detector and are in the form of impulses occurring at audible frequencies. Such amplifiers, properly designed, will increase the volume of programs, clearly and faithfully, up to tremendous strength; they do not, on the other hand, increase the range of the outfit.

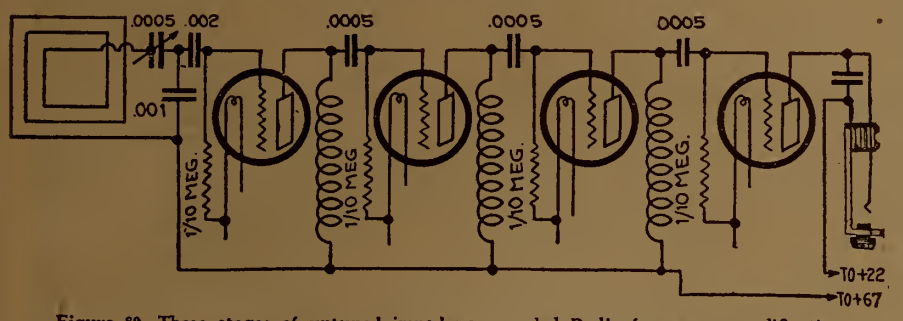


Figure 89—Three stages of untuned impedance coupled Radio frequency amplification.

Increasing Range

The range of a receiver is governed by the "threshold value" necessary to actuate the detector. For every detector, whether crystal or tube, there is a certain minimum amount of energy essential to the passing of signals. Very weak signals do not affect the detector and are never heard. If they could be strengthened before they were impressed on the detector, the range would be greatly increased. That is the purpose of Radio frequency amplifiers and it is surprising to consider the number of methods of coupling tubes that have been devised to accomplish this.

Neutrodyne, superdyne, Radiodyne, sunset, Abele, phusiform, Rice, CR-12, transformer-coupled, impedance-coupled, resistance-coupled, capacity-coupled, superheterodyne—each is a method of hooking up vacuum tubes to get efficiency from them as Radio frequency amplifiers. Every one of these methods has something in its favor; also, every one of them has some more or less important drawback. Neutrodyne and super-heterodyne will be taken up as separate chapters, but the rest can be discussed here.

The filament circuits of tubes connected as Radio frequency amplifiers are identical with the filament connections of those used for audio frequency work. The plates of all tubes connect to the plus B battery terminal. The grids must be connected to a coupling device and then to the filament circuit as in the case of audio frequency amplifying tubes. Only in the matter of coupling units do these Radio frequency (R. F.) amplifiers differ.

In Figure 89 we have a circuit showing the frequency of the incoming signal, at which setting it offers 100 per cent opposition (known as "infinite impedance") to

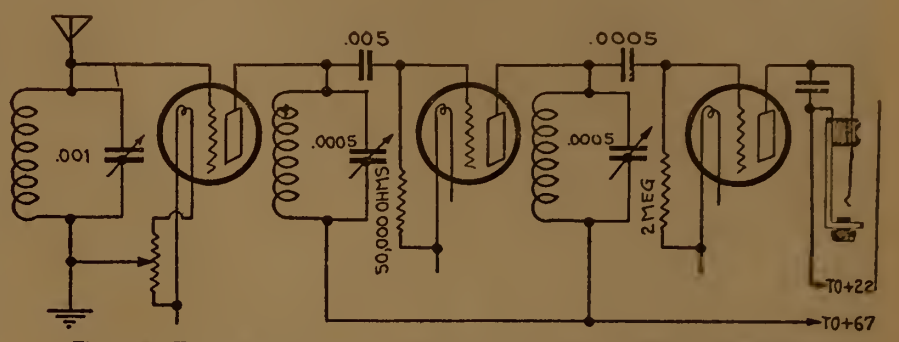


Figure 90—Two stages of tuned impedance coupled Radio frequency amplification.

Four-Tube Circuit

four vacuum tubes, the fourth being the detector. The first three tubes, it will be seen, are connected together by inductances. These inductances are wound so they offer sufficient opposition (impedance) to currents oscillating at frequencies between 50,000 and 4,000,000 per second, to prevent these currents from passing through them; yet, the direct unvarying current from the B battery readily passes to the plate. The principle is that the variations in the plate current of the first tube, since they are at Radio frequencies cannot pass through the inductance A and choose what is, to them, an easier path and go through the .002 condenser to the grid of the next tube. This continues through each tube until, when signals have reached the detector, they have tremendous volume and a powerful signal will be heard.

Figure 90 also shows an impedance-coupled outfit, but in this case the impedance is tuned. Such a circuit gives much greater amplification per tube, but, since each circuit must be tuned with great care, it is difficult to control. It is also likely to be very unstable and to oscillate at any moment. The theory here, is that each circuit is tuned exactly to the signals and, as in the case of the untuned impedance hook-up, the signals choose the easier path and go to the grid of the next tube.

The Rice System

The Rice system, shown in Figure 91, while remarkably simple and easy to build, came after many of the more complicated circuits. Fans will do well to experiment with this system, although the writer cannot say just how many stages would prove practical. The writer's set contained a 100-turn honeycomb in the aerial connected in series to a 5-plate variable condenser. The secondary circuit contained a 50-turn honeycomb shunted by a .001 vernier variable condenser. A large variocoupler could be substituted for the honeycombs. The inductance in the plate circuit is a 100-turn honeycomb, spider web, G-R or other coil. Both tubes are hard tubes, either 199, 299, 201A or 301A. Careful initial adjustment of the grid leak is necessary, although it is said that the action here is not that of a grid leak.

A very interesting circuit is the one employed by French amateurs and shown in Figure 92. This is a combination of tuned Radio frequency amplification and regen-

(Continued on page 24)

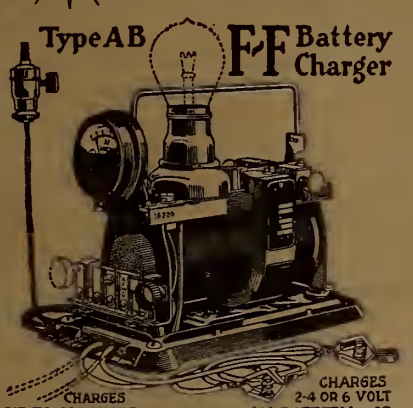
F-F

CHARGES RADIO A BATTERIES
CHARGES RADIO B BATTERIES
CHARGES AUTO BATTERIES

The Triple Duty

BATTERY CHARGER

Type AB F-F Battery Charger



CHARGES UP TO 120 VOLTS OF "B" BATTERIES AT ONE TIME

CHARGES 2-4 OR 6 VOLT "A" BATTERY - OR 6 VOLT AUTO BATTERY

THE type A. B.-F-F charger performs three duties economically. Charges radio 2, 4 or 6 volt "A" battery, radio "B" battery up to 120 volts and auto batteries. Average cost per charge about a nickel. Solidly built—will not get out of order. Foolproof and simple. The first successful charger — introduced over ten years ago. Type A. B., price $20; West of Rockies, $22; Type 6 for 6 volt "A" or auto batteries, price, $15; West of Rockies, $16.. "B" battery charging attachment, $2.50 extra.

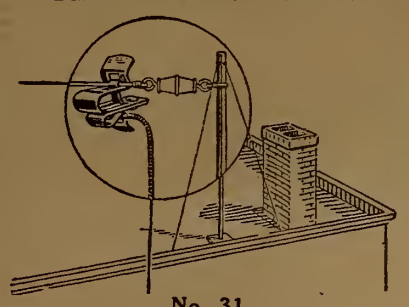
Write for literature, including station calls, hints on battery upkeep and wiring diagrams for basement installation of batteries. We'll furnish you name of dealer who will supply you the genuine F-F charger.

THE FRANCE MFG. CO.

10424 Berea Road, CLEVELAND, OHIO

FAHNESTOCK'S

RADIO PRODUCTS

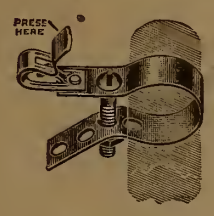


No. 31

The Antenna Connector

Snap larger connector over Antenna Wire; insert Lead-in Wire into smaller clip and a perfect connection is the result.

Improved Ground Clamp



Equipped with Fahnestock Patent Wire Connectors Easily Attached.

No Soldering—For Radio Use Only

Our name stamped on all our products. None genuine without it.

FAHNESTOCK ELECTRIC CO.

Long Island City, N. Y.

Dealers can obtain Fahnestock Products from following distributors:

BOSTON
Wetmore-Savage Co.
F. D. Pitts Co.
DETROIT
Detroit Electric Co.
CHICAGO
Barawik Co.
MILWAUKEE
Julius Andrae & Sons Co.
PHILADELPHIA
H. C. Roberts Elec. Supply Co.
PITTSBURG
Ludwick, Hommel Co.
WESTERN DISTRIBUTORS
Marshall & Co., Los Angeles, Cal.

Bring your set up-to-date

Switch points have passed out of date. They are uncertain and unsatisfactory. Walnart Inductance Switch 1-10 points, permits of better soldering and insures positive contact. Only one hole to drill. Simply and quickly installed.

ASK YOUR DEALER

Catalog of complete line of Walnart parts on request

$1.25 WITH DIAL

The base of this instrument is Continental Bakelite Dielecto XX, the perfect dielectric insulation (licensed under Bakelite patents).

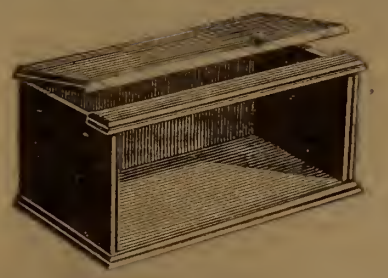
WALNART ELECTRIC MFG. CO.

1249 W. Van Buren St., Dept. 424 CHICAGO

In Canada: WRIGHT RADIO CO., Overbrook, Ottawa, Canada, Canadian Distributor

Campbell XX RADIO CABINETS

"from the lumber to you"



Campbell XX Radio Cabinets, designed by expert Cabinet Makers, are made absolutely accurate in size, and will fit standard panels perfectly.

Made of extra dry high-grade lumber, in solid Mahogany or Walnut, also, Mahogany or Walnut high piano rubbed or bright finishes.

WILL NOT WARP OR CRACK

PRICES

Cash with order, prepaid *east* of Missouri River, *west* add 15 cents to quoted price.

Send Post Office Money or Express Order or Bank Draft.

Panel Sizes	*Walnut or Mahogany Finish*	*Genuine Walnut or Mahogany*
6 x 7	$2.74	$ 4.80
6 x 10½	3.36	5.96
6 x 14	3.54	6.70
6 x 21	4.86	8.72
7 x 7	2.94	5.52
7 x 10½	3.54	6.28
7 x 12	3.68	6.38
7 x 14	3.84	7.12
7 x 18	4.24	7.30
7 x 21	5.50	10.06
7 x 24	6.52	11.48
7 x 26	8.78	14.50
7 x 28	9.00	15.00
Special Cockaday	9.40	15.50

SPECIAL SIZES TO ORDER

Manufacturers' and Distributors' inquiries solicited.

THE PERKINS-CAMPBELL CO. (*Established 1879*)

410-440 New St., Cincinnati, O. Reference Dun or Bradstreet's

RADIO FOR EVERYBODY

(Continued from page 23)

coil B have been set, it will be found perfectly feasible to calibrate the scale of condenser C2 in wave lengths. For the tubes; coil A is about 70 turns with an average diameter of 3½ inches; C1 is either .0005 or .001, depending on the antenna used; coil B is 40 turns wound single layer on a 3½-inch tube, tapped every two turns and set at right angles to A; C2 is .0008 or .001 mfd. Once the three taps on coil B have been set, they require no more adjustment and tuning is chiefly a matter of swinging the calibrated condenser C2. Keep the two plate circuit taps between the grid tap and the lower end of the coil.

(TO BE CONTINUED.)

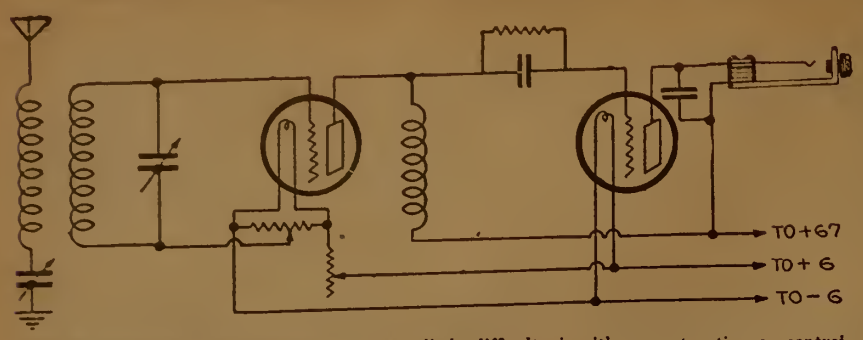


Figure 91—The Rice system seems to present little difficulty in either construction or control.

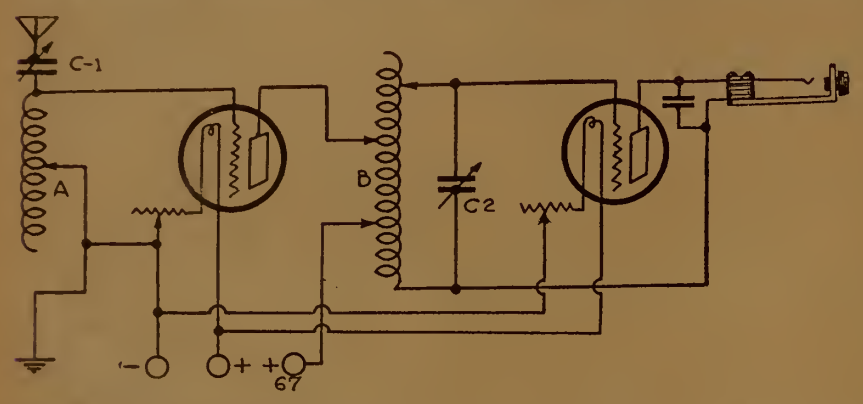
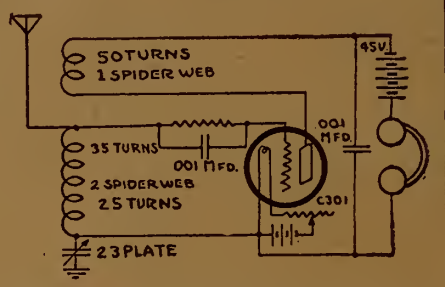


Figure 92—The French amateur's equivalent of the American "ham's" Reinartz—the Abelé receptor.

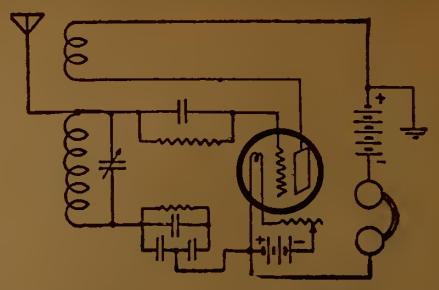
eration; more important, it cannot reradiate. Once the taps on the coupling fan who would like to try this, the following suggestions are made: Use two hard

Grounding Positive Side B Battery in Flewelling

As an electrician and student of Radio when a boy, I have today some Radio

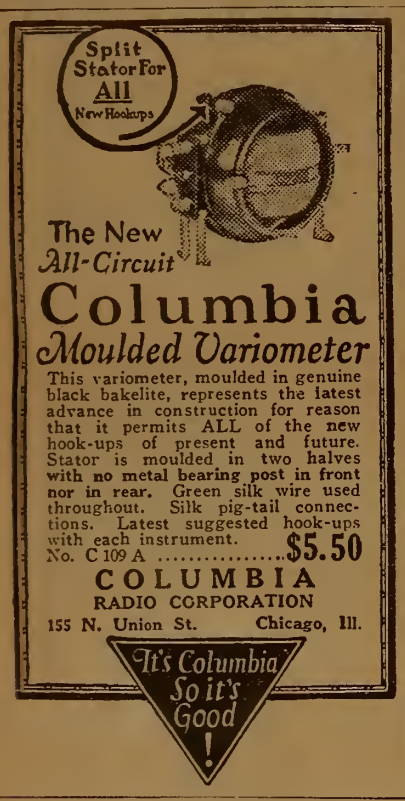


knowledge. I find that many fans who try the Flewelling circuit without success are satisfied with results obtained from grounding the positive side of the B battery and run the aerial to the grid to decrease the resistance until suited to the circuit. This also reduces body capacity.



I have tuned in KHJ on one amplifier tube, using 45 volts on the plate. The coils, as shown on the second diagram have a variometer effect in the circuit.—W. J. P., Detroit, Mich. (By mistake, this article was published in the February 26 issue without the illustrations.—Editor.)

A variocoupler could be used in the Miloplex circuit, but is not recommended because it will not give results comparable with a variometer.



The New *All-Circuit*

Columbia

Moulded Variometer

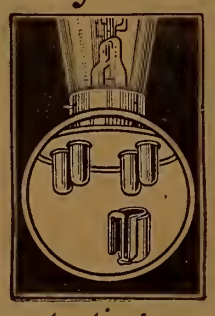
This variometer, moulded in genuine black bakelite, represents the latest advance in construction for reason that it permits ALL of the new hook-ups of present and future. Stator is moulded in two halves with no metal bearing post in front nor in rear. Green silk wire used throughout. Silk pig-tail connections. Latest suggested hook-ups with each instrument.

No. C 109 A **$5.50**

COLUMBIA
RADIO CORPORATION
155 N. Union St. Chicago, Ill.

It's Columbia So it's Good!

RADECO Safety Fuses

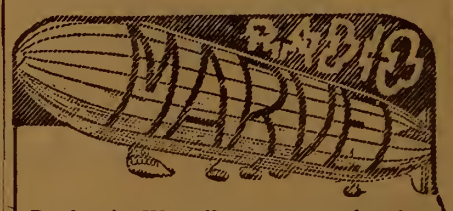


Are protecting countless Radio Tubes

DEALERS

Add this profitable sales maker to your line and make satisfied customers. If you are not handling this fast selling specialty write us at once.

Radio Equipment Co.
New England's Oldest Exclusive Radio House
20 Stuart St. BOSTON, MASS.



Dealers! We offer you merchandise at prices below competition! Write now for our amazing offer!

	Westinghouse Storage B Batteries	$ 6.39
18.00	Westinghouse Rectigon Charger, A. C.	14.63
18.50	Homecharger "Gold Seal," A. C.	14.95
35.00	R-3 Magnavox	31.50
	TRANSFORMERS	
5.00	Acme, Audio and Radio Freq.	3.95
	Globe High Ratio	3.45
7.00	Federal No. 65	5.55
	Ackracy, type 20	3.95
12.50	Pr. Como Push and Pull Trans.	10.50
1.00	Saturn Automatic Plug	.80
1.75	22½ V. B Batteries, small	.75
3.00	22½ V. B Batteries, large	1.45
4.75	45 V. B Batteries, medium	2.00
5.50	45 V. B Batteries, large	2.90
	PHONES	
10.00	Brunet French, 4000 ohms	6.50
6.00	Brandes Superior, genuine	4.75
	Nerco Phones	2.50
	PARTS for 5 Tube Neutrodyne Set	46.75
7.00	Pioneer Bakelite Variocouplers	4.95
6.50	Pioneer Bakelite Variometers	4.85
	Hydrometers, small	.35

REMITTANCES MUST INCLUDE POSTAGE

SEND FOR OUR FREE MONTHLY PRICE LIST DEPT. R. D.

MARVEL RADIO CO.
132 NASSAU ST., NEW YORK

DISTANCE on ALL wave lengths

REACH OUT!

Use TRI-COIL Radio Frequency Transformers and get those distant stations you've been fishing for! Use TRI-COIL and make ONE tube operate a loud speaker with the "TRI-COIL Reflex." YOUR $2 DEALER HAS TRI-COIL..... **$2**

FREE "How to Build The TRI-COIL Reflex" free at your dealer's or direct from us.

BROOKLYN METAL STAMPING CO.
718 Atlantic Ave.
Brooklyn New York

Radio Supplies at Cut Prices

	BATTERY CHARGERS	
	Tungar Type Charger	$ 9.21
	Homchargers	13.25
	CONDENSERS	
	Crosley D	1.80
	Bremer-Tully No. 23 Vernier	3.85
	Bremer-Tully No. 43	4.39
	17 Plate Standard	1.04
	23 Plate Standard	1.12
	23 Plate Vernier	1.98
	VARIOCOUPLERS & VARIOMETERS	
	AC Dayton Coupler	5.35
	AC Dayton Variometer	4.88
	LOUD SPEAKERS	
	Manhattan	19.20
	Atlas	17.50
	Baldwin Standard	19.25
	B3 Magnavox	24.80
	M1 Magnavox	24.80
	Western Electric 10-D	39.50
	Western Electric Vic. Att.	9.25
	Baldwin C Unit	5.21
	Atlas Unit	9.60
	NEUTRODYNE PARTS	
	Bremer-Tully complete parts for 5 tube	34.90
	Air Core Transformers	1.73
	Neutrodons	.69
	TRANSFORMERS	
	Acme Audio	3.55
	No. 45 Jefferson Trans.	5.15
	No. 41 Jefferson Trans.	3.35
	Dayton Fan Trans.	3.95
	Killark Trans.	2.00
	Geraco Trans.	3.25
	General Radio Trans.	3.95
	Amertran Trans.	5.10
	PHONES	
	Western Electric	8.50
	Baldwin C	8.45
	Frost	2.85
	SETS	
	Precision Ace	14.95
	Crosley VI	21.25
	Crosley XJ	48.75
	B. T. Neutrodyne 5 tube	87.50

Write for Agent's Price List. Always Include Parcel Post and Insurance.

VALLEY RADIO SUPPLY CO.
2206A Locust St., ST. LOUIS, MO.

The new **TWITCHELL AUXILIARY TUNER** connected to your present set will enable you to bring in the long and short wave stations which your present set cannot get. It also cuts out all local stations so you may bring in distance any time without local interference. Copyrighted diagram of this tuner 50c, or with all parts $9.00. Complete instrument in walnut cabinet, ready to use, $15.00. Transportation prepaid.

MY HIGHLY IMPROVED REINARTZ brings in all important stations on this Continent loud, clear and without distortion. We dance to music from Atlanta and Los Angeles.

Build one of these wonderful 3 tube sets from my blueprint and specifications, price 50c, or with a complete and perfect double-wound spiderweb coil $3.00 by mail. Picture of this set on a glass panel with every order. This copyrighted circuit is the most successful of any Reinartz modification yet produced, and is imitated the most. Thousands are in use.

My W. D. 11 Circuit is especially designed for use with the "Pickle" tube and brings out the full value of that little tube as no other circuit can. Stations 1000 miles away come in clearly on one tube. This set is small, complete, portable. For the man who wishes the highest efficiency, this is the set to build. Price of blueprint and specifications, 50c, or with complete and perfect windings, $3.00. Photo of set with every order. Sets built from these copyrighted plans will receive all broadcasting stations operating under the new laws. Their wave length range is from 170 to 800 meters.

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

S. A. TWITCHELL
1925 Western Avenue Minneapolis, Minn.

Genuine **Miller-B-Metal** Crystal

(Pat. Pending)

50c

Offer Extraordinary

Two extra pieces of Genuine Miller-B-Metal will be included with each interchangeable container. Each of these pieces of Miller-B-Metal is alive and loud-talking—exactly like the one in the interchangeable container.

So you get three pieces for the price of one.

Actively alive and sure of contact describes Miller-B-Metal. Get the most out of your set and begin to really enjoy the concerts.

Sold under money-back guarantee.

Beautiful folder on request.

DEALERS

Ask for our sales plan. It means real dealer profits.

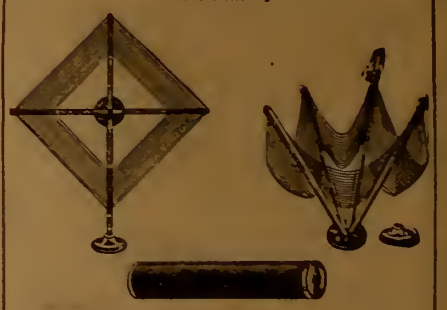
A. H. Miller Radio Co.
1222 20th Street DETROIT, MICH.

NAZELEY'S

PORTENA

Folding Loop

Patent Pending



Folds up like an umbrella—Works like a charm.

Spread 28 inches

Genuine Bakelite Facings; 85 ft. green covered wire; rich mahogany finish. In an individual morocco covered tube.

List $7 each

One Dozen to a Case

J. NAZELEY CO.
571 Hudson St. NEW YORK CITY

Construction of a Four Tube Reflex Neutrodyne

Part II—Panel Layouts

By H. J. Marx

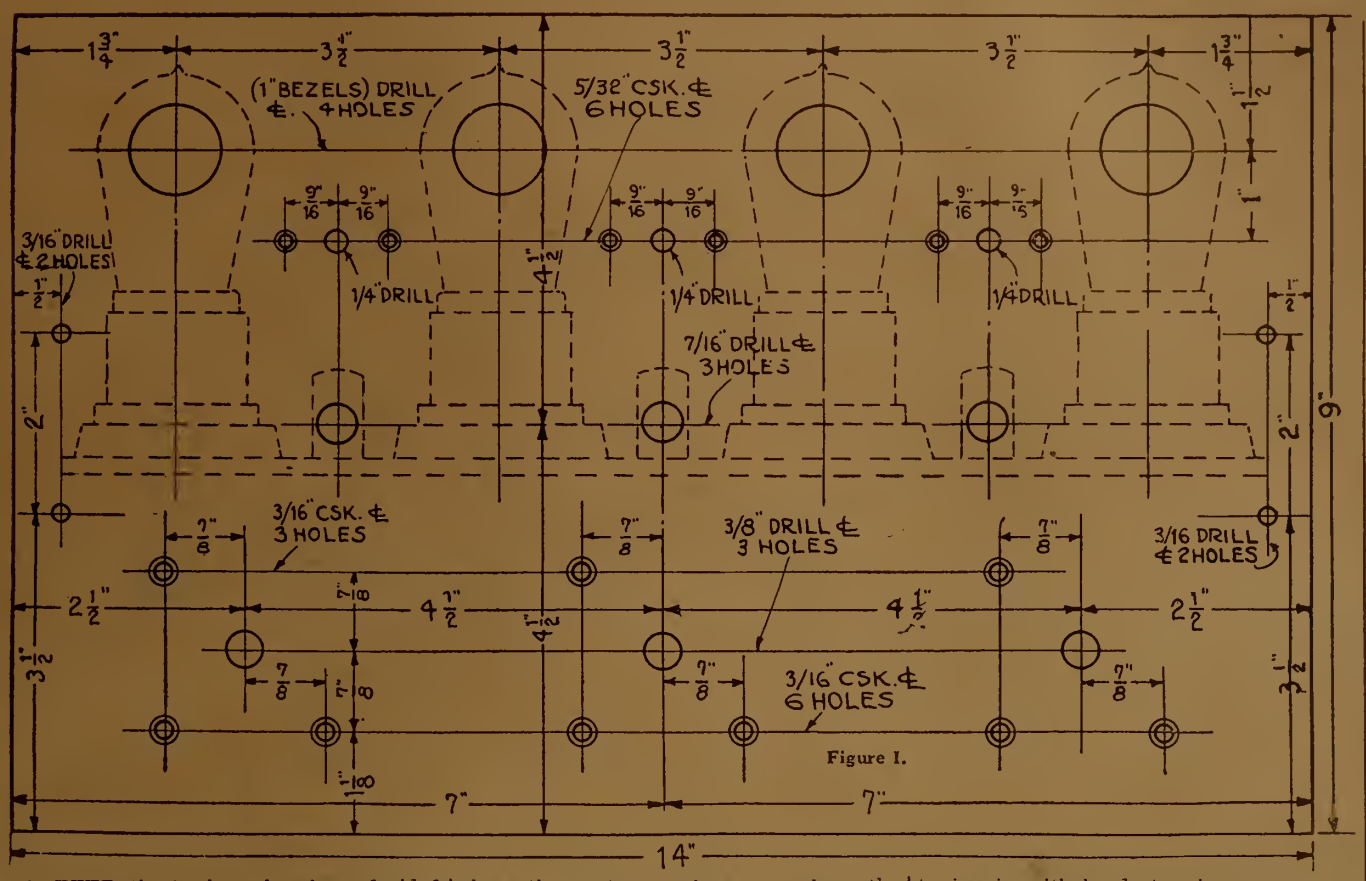


Figure I.

AFTER the hook-up has been decided upon and the list of parts required are on hand, the laying out of the panel naturally follows. In the case of this receiver it was decided to make the set as compact as possible, without disregarding the problem of interference. For this reason the layout of brass shielding, the use of which is optional, has been included. This shielding brass is of ½-inch stock, fairly hard and should be well straightened so as to lie flat against the panel. The question of clearance for holes in the mounting of the apparatus will be taken up later.

Panel Layout

In Figure 1 the layout of the main panel (9 by 14 inches) is given. It is logical that the three rheostats are the least used in tuning and are therefore placed in the upper part of the panel. The location of the three jacks is optional. That is, either along the center as shown, or along the lower part of the panel. If placed in the latter position, there will, of course, be no trailing phone cords across the condenser dials. The disadvantage, however, is that long leads are required between the sockets on the shelf and the jacks underneath. For this reason the jacks are located along the center line and also because the jacks will be used merely for tuning in with headsets, since permanent loud speaker connections can be made to the two right-hand binding posts. The small subpanel is supported by means of these jacks, as indicated by dotted outline. The three condensers run along the end of the panel, spaced at 4½-inch centers. If the standard form of air core transformer coils were used, this spacing would be too close. The procedure in this set was varied somewhat, as will be noticed in the rear arrangement which will be described and illustrated in the next article. Since condenser mounting holes have not been standardized, it will be necessary to order each set of three countersunk holes to conform to the requirements of the particular condenser used. It is advisable to make the shaft hole ⅜ inch even though the shaft may only be ¼ inch in diameter, inasmuch as this will provide plenty of clearance so that, if the mounting holes are not sufficiently true, there will be no possibility of the shaft rubbing against the panel and making the rotation of the dial difficult.

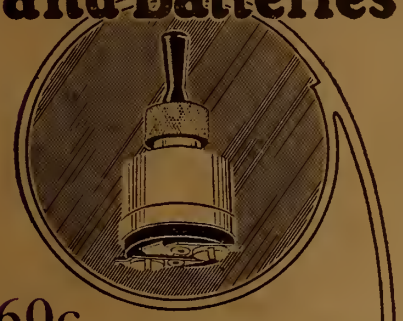
Main Panel Shield

The layout for shielding the main panel is shown in Figure 2. By examination of the hook-up diagram given in Part I, it will be noticed that the negative A battery and the rotating plates of the second condenser are both grounded to the ground binding post on the main panel. This brass shielding on the main panel only covers the lower half, since no capacity effects should be experienced with the upper controls. It does come up far enough, however, to take in the ground binding post, and in this way the shield is automatically grounded without further connections. No clearance is made for this hole, so that the head of the post screw makes electrical contact with the brass.

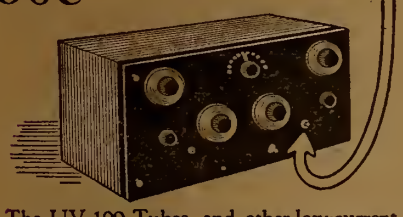
The first condenser doesn't have the rotary plates grounded direct and for this reason, in mounting, no part of the condenser should come in contact with the shield. If bosses or spacing washers are used, the clearance of the ½-inch holes is sufficient to take care of this. In some cases, however, it may be necessary to use small fiber washers similar to those that plumbers use for kitchen faucets. These are placed on the mounting screw between the shield and condenser and prevent contact with the parts. Most variable condensers of the higher quality have the end plates in electrical con-

(Continued on page 26)

Saves Tubes and Batteries



60c



The UV-199 Tubes, and other low-current radio tubes, need to be protected with a Bradleyswitch. It is almost impossible to tell if the tubes are burning, especially in a well-lighted room. With a Bradleyswitch, you can open the filament circuits and positively prevent accidental discharge of the batteries, overnight. The Bradleyswitch is inexpensive insurance. *Sold by leading dealers and jobbers.*

ALLEN-BRADLEY CO.
290 Greenfield Ave., Milwaukee, Wis.
Mfrs. of the Universal Bradleystat

Bradleyswitch
PERFECT BATTERY SWITCH

CLEAR RECEPTION ASSURED

A Crosley brings in distant Stations Easily.

Listen to Crosley Broadcasting Station WLW.

NO MATTER which Crosley Receiver you choose, you can be assured of unexcelled performance at the lowest price. The Model X-J has proven especially popular. With it, Stations in all parts of the United States and Canada may be clearly heard. Even Honolulu has been frequently brought in from the eastern seaboard.

Compare These Prices

Crosley Model VI—a Two Tube Set ..... $ 30
Crosley Model X-J—a Four Tube Set ..... $ 65
Crosley Model X-L—a Four Tube Consolette $140

Special Mahogany Stand for Model X-L, $25

For Sale by Good Dealers Everywhere.

Write for free Catalog.

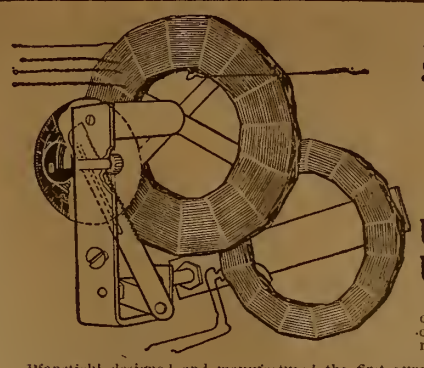
The Crosley Radio Corporation

Powel Crosley, Jr., President

Formerly The Precision Equipment Company and Crosley Manufacturing Company

3491 Alfred St., CINCINNATI, OHIO

The Largest Manufacturer of Radio Receivers in the World



PRICE
$5.00

Pfanstiehl

Try This

UNIVERSAL TUNING UNIT in Your Favorite Circuit

Pure inductance is impossible with coils wound in layers on insulating forms. Losses of various kinds occur and only a small loss is needed in an extremely weak signal to make it impossible for you TO GET THAT DX STATION.

Pfanstiehl designed and manufactured the first pure, no-loss inductance coil, vastly improving the efficiency of the Reinartz circuit.

A year ago Pfanstiehl developed a system by which two of these pure inductances could be mounted to assure maximum signal strength, greatest selectivity, continuous variability and smooth and correct mechanical action, which means minimum to maximum inductance wth only one turn of the dial.

This unit has been included in a popular commercial set all through the year 1923, and its success has led to imitations. That is the best proof of its superiority.

THIS UNIVERSAL TUNING UNIT

Can be used in the most popular circuits of the present day. Try it in your own favorite hookup and note the difference.

Try Pfanstiehl Pure Inductances
Far more efficient than honeycomb coils

	Turns	List Price	Wave Lengths
P-201	25	$ .55	190-340
P-202	35	.59	125-470
P-203	50	.65	170-650
P-204	75	.74	220-960
P-205	100	.90	300-1300
P-206	150	1.10	470-1980

Pfanstiehl Inductance R. S. P. (Reinartz), $1.75 each. Pfanstiehl Ultra Audion, 95c each

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

Pfanstiehl Radio Service Co.
Highland Park, Ill.

$3.50
With Dial $4.00

You KNOW It's Right When It's a

PREMIER PART

$3.00 and worth it

"MICROMETER"
Trade Mark
Variocouplers
Cure the New Wave Length Troubles

A HIGHLY SELECTIVE VARIOCOUPLER having 180-degree orientation and 20 Antenna taps. Wound with No. 24 green single silk wire. Eighty turns on stator—fifty-five on rotor. Wave lengths range from 150 to 800 meters. All metal parts brass highly nickeled—stays "put" at any angle. Bakelite button on each tap wire permitting easy and safe soldering. Micrometer is a high quality coupler at a reasonable price.

"MICROSTAT"
Trade Mark
Super Vernier Rheostat

"MICROSTAT" is in a class by itself as a precision instrument for the perfect control of the filament current in detection tubes. Everyone knows that you must control this current to the finest degree if you are going to get the ultimate from any set. "MICROSTAT" does all this. New principle. Two windings in parallel—one 6 ohm—other 40 ohm. Absolutely noiseless—infinite control—handles any tube. Cap. 3 amp. Bakelite moulded—silver etched dial.

SEND FOR FREE BULLETIN NO. 92

19 Years Making Quality Electric Products

Premier Electric Company
3810 Ravenswood Ave. CHICAGO

Ask Your Dealer for Premier

FOUR-TUBE NEUTRODYNE

(Continued from page 25)

nection with the rotary plates, and by keeping these end plates in contact with the shield, the grounding of the rotary plates on this second condenser will be automatically taken care of. For this reason no clearance is provided for the three mounting holes in this condenser. In the case of the third condenser, the procedure of that of the first is followed. No special arrangements are required for fastening the shielding to the panel provided it lies sufficiently flat. The condenser mounting and the ground binding post will hold it in position.

The Subpanel

The subpanel in this case is very small, only 13 by 4¼ inches, and is merely used to support the four sockets, the two audio frequency transformers and the five battery binding posts. The three sets of two holes between the socket location are for the mounting of the subpanel on the three jacks in order to provide for the shortest possible leads. The audio frequency transformers and the sockets should be set in such a position that the terminals are arranged as indicated by the letters in this subpanel layout (Figure 3). The holes drilled for mounting the transformers and sockets are indicated as countersunk on the underside. This countersink should be omitted if the subpanel shield (Figure 4) is used.

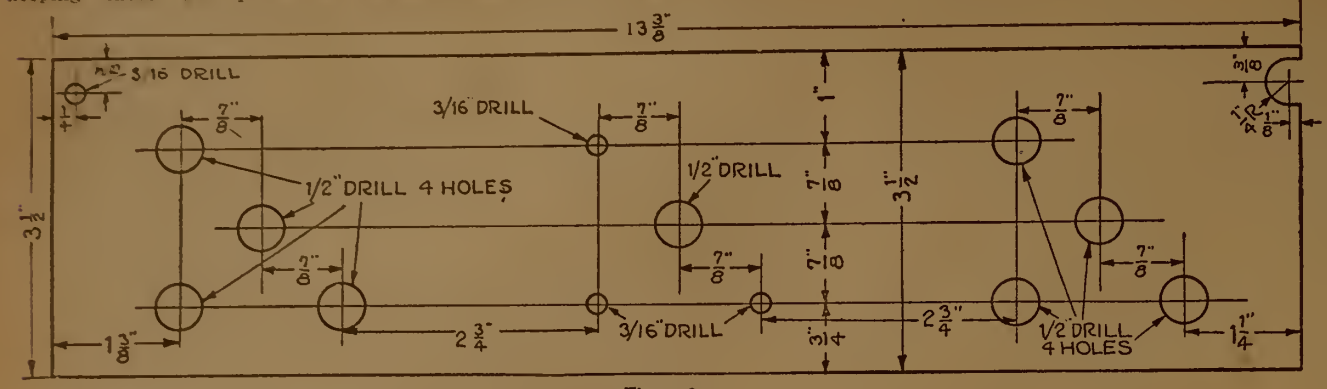


Figure 2.

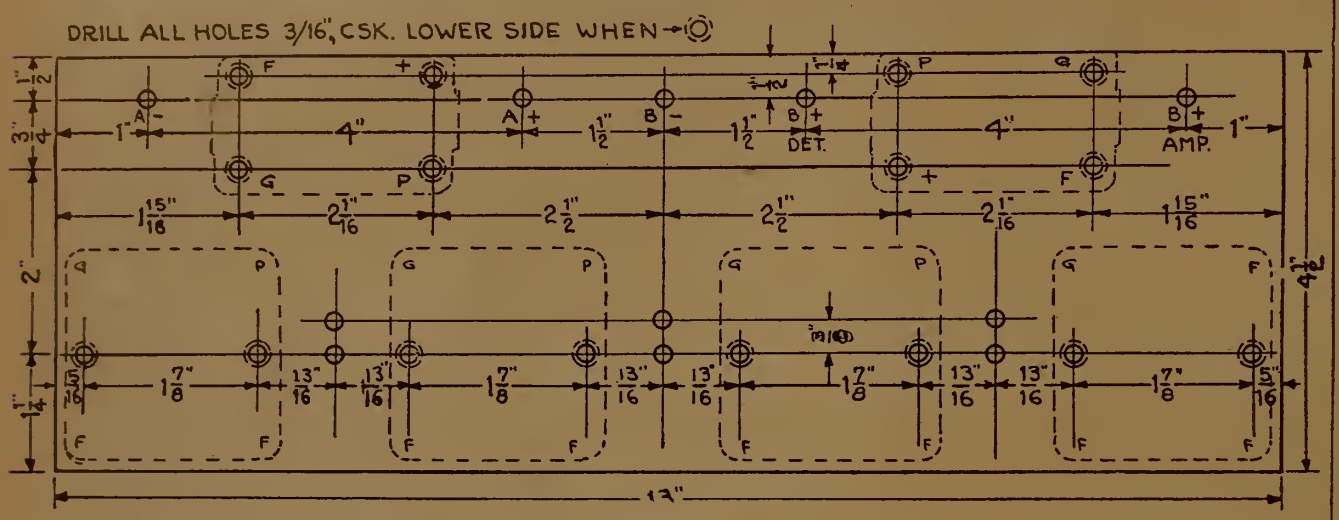


Figure 3.

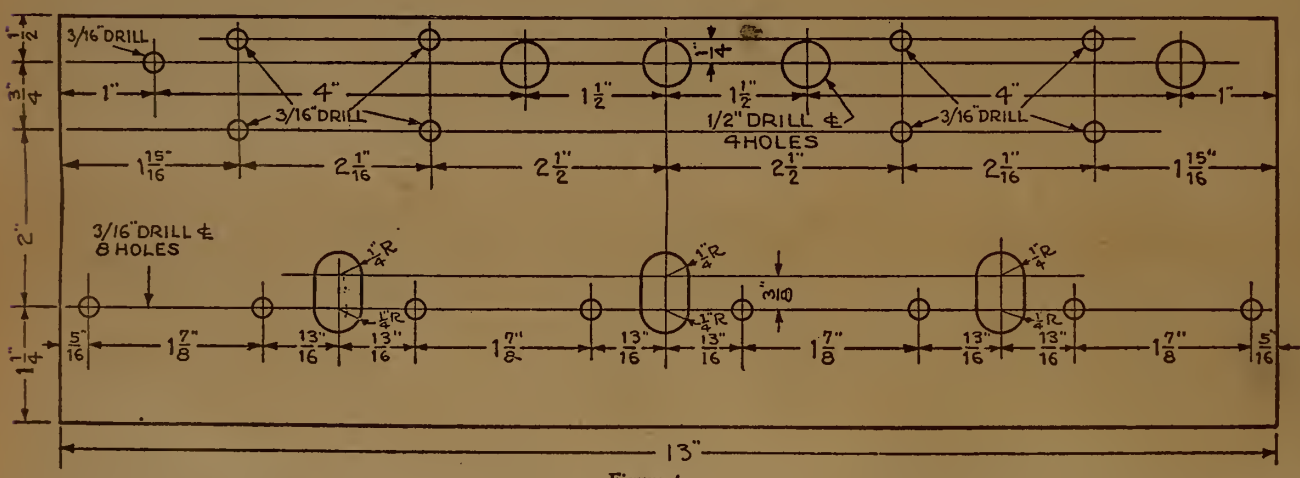


Figure 4.

Subpanel Shield

The writer has found that where this double-deck layout of the panel is utilized for neutrodyne circuits the interference between the magnetic field of the audio transformers and that of the neutrodyne coils is the direct cause of distorted reception. For this reason care must be taken to arrange the apparatus as indicated.

The shielding layout shown in Figure 4 takes care of automatically grounding the frames of the two audio transformers, and where metal sockets are used, the frames of the sockets are also grounded. Inasmuch as the negative A battery is grounded, no clearance is provided for this binding post. The remaining binding post must not touch the parts shielding, so ½-inch holes are drilled in this shielding to provide proper clearance around the post. The same clearance is to be provided for the holes used in mounting the subpanel on the jacks. In mounting the sockets and transformers on this subpanel round-head brass machine screws are used. The brass nuts should be on the shield side of the subpanel, and after they have been tightened up, the projecting length of the brass screws should be cut off and filed even with the face of the nut, or the rotating plates of the condenser may strike against them. In case large condensers are used it may be necessary to first check up this point before final assembly.

(TO BE CONTINUED.)

Headset Troubles

If there is a rattle in one of the phones, carefully remove the shell cap and the diaphragm, and see that there is no dust or filings between the magnet and the diaphragm. Filings will "stick" to the magnet sometimes, and as the diaphragm vibrates, will cause noise. In putting in the phones, see that the colored cord goes to the positive terminal of the B battery and the other to the plate of the last tube. —J. B. Owen, Blair, Okla.

The Cat's Whisker

On some crystals, only a light contact of the cat's whisker is needed. Galena and silicon are of this kind. Iron pyrites take a firm heavy contact, while in using carborundum the point of the cat's whisker even can be jabbed under the surface of the crystal. Phonograph needles are excellent for use with this kind of detector.

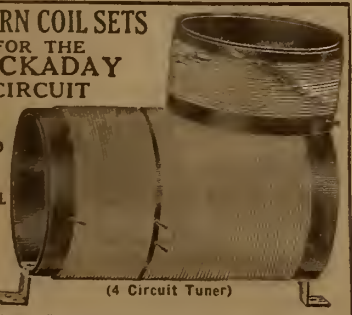
Burned Out or Broken
RADIO TUBES REPAIRED
All Tubes Guaranteed to Work Like New
Mail Orders Given Prompt Attention
24 HOUR SERVICE—All Tubes returned P.P. C.O.D.

RADIOTRONS	CUNNINGHAMS
WD-11 or 12	C-11 or 12
UV-200	C-300
UV-201	C-301
UV-202	C-302
UV-201A	C-301A
UV-199	C-299
DV-1 or 2	DV-6 or 6A

$2.75

RADIO TUBE CORP.
70 Halsey St. Newark, N. J.
SEND TO NEAREST REPAIR BRANCHES
"RADIO TUBES" 39 West Adams St. Chicago, Ill.
RADIO TUBE SPECIALISTS 137 Market St. Phila., Pa.
GLOBE ELECTRIC CO. 609 Cham. of Com. Bldg. Pittsburgh, Pa.
WELLSTON RADIO CO. 1479 Hodiamont Ave. St. Louis, Mo.
RIDENOUR, SEAVER & KENDIG Caxton Bldg., Cleveland, Ohio

EASTERN COIL SETS FOR THE COCKADAY CIRCUIT
Are the STANDARD and in UNIVERSAL USE



DUE TO THEIR PROVED EFFICIENCY IN THIS WONDER CIRCUIT
Made as per specifications of Mr. Cockaday. "D" Coil bank-wound.
Complete Assembled Set B, C and D Coils on GENUINE BAKELITE tubing, wound with No. 18 Double Silk Covered Wire $4.25
Original and new improved hook-ups with material lists FREE with each set of coils.
GENUINE LAVITE RESISTANCES 48,000 Ohms $1.50
These resistances control the tone of the Cockaday circuit and eliminate all transformer distortion, modulating the tone after the fashion of the best of phonographs.
Mail Orders Filled—Dealers Communicate
EASTERN RADIO MFG. CO.
22 Warren Street, Dept. R. D., NEW YORK, N. Y.

Duo-Reflex
Tube for Tube-the Most Powerful Circuits Ever Built. Write for free Bulletin No. 16
Electrical Research Laboratories
CHICAGO. ERLA

Your Choice Free
Limited Supply
Your prompt action gives you one bound volume with each annual subscription. New or renewal.
Greatest Collection of Radio Information
A. B. C. Lessons for Radio Beginners.
Two, Three, and Four Tube Reflex Circuits.
The Famous Miloplex with Various Hook-ups.
Reinartz Long Distance Circuits—Ultra Reinartz.
Flewelling Popular "Fliver" Circuit.
Single Tube Reflex Circuits—Super-Heterodyne
Five Tube Neutrodyne, Special R. D. Hook-ups.
In addition to these features, the current issues give you all the live news in Radio. The popular Q. and A. Department, How to Operate Your Set, Advance Broadcasting Stations Programs, and a correct list of all Broadcasting Stations.

65 Copies
Serving as a Radio Reference Library
You receive 52 issues with your Subscription and 13 issues in each bound volume
Bound Volumes 3, 4, 5 and 7 now ready.
This offer good only in U. S. and Possessions, and Canada.
This offer not good through dealers or subscription agencies, but must be sent us direct with the full subscription price. Remittance must be by check, money order or draft.

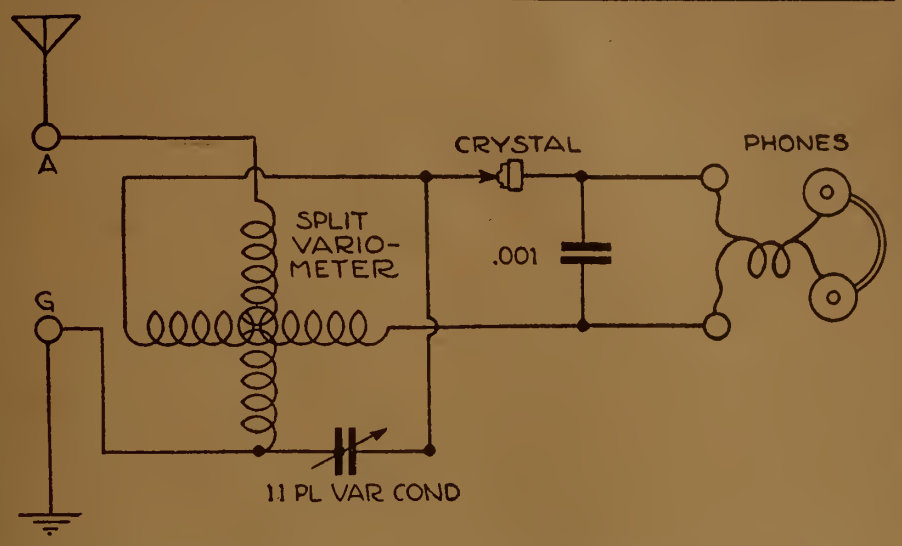
RADIO DIGEST, 123 W. Madison St. Chicago
Check Offer Desired
☐ One year's subscription, and choice of one volume. Send Vol. .... Enclose...$5.00
☐ One year's subscription, and choice of two volumes. Send Vols. .... Enclose . 7.00
Additional Bound Volumes at $2.00 each.
Name .....
Address .....
City ..... State.....

Crystal Hook-Up with Split Variometer

Simple Circuit Gives Volume on a Crystal

The author of the circuit shown in the accompanying diagram claims to have received signals from a distance of 1,000 miles and more on a crystal. He says, "I am using a split variometer which has been so successful in tube circuits. The hook-up is simple and will cause no difficulty for the experimenter to build. There are only two controls, the rotor of the split variometer and the 11-plate condenser. These together with a .001 fixed condenser, and a good crystal are the parts used in the circuit. I have heard distant stations clear and loud and have tuned out locals."—Chas. P. Lee, 153 Holmes Street, Frankfort, Ky.

NEW CIRCUIT WITH TWO CONTROLS



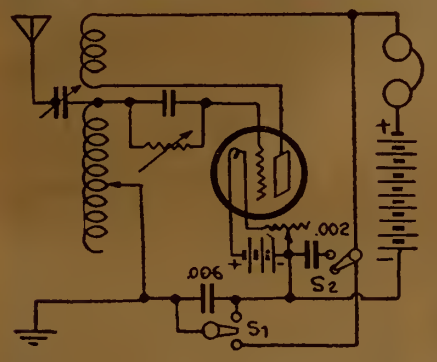
WORKSHOP KINKS? EARN A DOLLAR—

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

Three Good Sets in One

The enclosed kink applied to the Flewelling set makes it possible to have three good sets in one, changes from



one type to the others being instantly effected by means of two small single-pole double-throw switches. Two supers and a straight regenerative set are possible.

As shown in the diagram, the only addition is one .002 condenser and an extra switch. The condenser is connected from the special plate lead through the switch to the negative filament lead.

By cutting out the .002 and shorting the .006 by means of the switches, the set is a plain regenerative set; when the .002 is placed in the circuit we have the super described in the July 14, 1923, issue of Radio Digest, with the one exception, that the tickler coil is not tapped. This circuit gives good results with an untapped tickler, so the Flewelling fans will not need to make any other change in their sets. Cutting the .002 out and the .006, the circuit is again a straight Flewelling.

This method provides an easy and economical method of changing from one set to another so that the action of the three circuits may be studied.

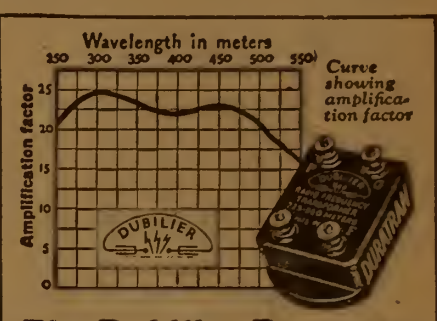
It should be noted that with the switching arrangement used no damage can be done to the set by careless manipulation of the switches if the precaution of separating the two points on S1 is observed.—Bemis & Floyd, Springfield, Mass.

Troubles with Tubes May Be Easily Fixed

Certain types of gassy vacuum tubes used as detectors will give rise to noises which sound very much like static unless the filament battery voltage is adjusted up to the proper value.

It is desirable with all tubes to examine the contact pins in their base occasionally to make sure that these have not corroded. In cases where these tips have been tipped with solder, corrosion or oxidation may take place. The pins may be cleaned with very fine sandpaper.

The word "kilocycle" is taking the place of a "wave length" and is a Radio term used to designate more accurately the operating conditions of a broadcasting station.



The Dubilier Duratran

The radio frequency transformer that amplifies uniformly over all broadcasting wave lengths. Price $5.00 at good dealers.

Dubilier Condenser and Radio Corp.
44-50 West Fourth Street, New York

CODE MADE EASY

Just Published **$1.** Radio Alphabet

in THREE simple and fascinating FIVE MINUTE PICTURE LESSONS which you cannot forget.

A boy of eight learnt ten consecutive letters in five minutes. $1.00 buys complete confidential course from Dept. D., KWIKKODE, 724 Beresford Avenue, Winnipeg, Man.

C R L Non-Inductive Potentiometer

Gives complete control of plate potential or grid bias without the choking effect of wire resistors. This feature of the C R L Potentiometer alone (freedom from inductance) entitles it to your most careful consideration. And when you see how ruggedly simple it really is and how superior to other potentiometers in strength, neatness and mechanical construction, you will agree with the thousands who now use them, that the C R L Non-Inductive Potentiometer is "the best on the market."

The pure graphite resistor is not touched by the sliding contact and hence is free from wear. A brass disc can be brought to bear at any one of an infinite number of points smoothly, gradually and noiselessly. A transparent cover protects the working parts from dust and moisture and permits a clear view of the interior.

No. 110 (400 Ohms) . . $1.75
No. 111 (2000 Ohms) . . 2.00
(BY PARCEL POST, 10C EXTRA)

Every instrument is carefully tested and fully guaranteed.

Central Radio Laboratories
312 16th Street, Milwaukee, Wisconsin
Non-Inductive
CRL POTENTIOMETER

CARTER

"TU WAY" Plug $1

THE ORIGINAL

The FIRST plug to take more than one head set at the same time.

Takes all types of cord tip terminals. No tools needed. Large knurled screw heads.

Fits all jacks.

There is only one Carter plug. Refuse "just as good" substitutes.

Write for catalog of other Carter Radio Products.

Carter Radio Co.
205 S. STATE STREET
CHICAGO

Trade **"THORIO"** Mark

Detector—Amplifier

Radio Tubes

Filament licensed under U. S. Pat. 1,422,019

Guaranteed

1½, 3, 6 and 6 Volt, ¼ Ampere Detector. FIT STANDARD SOCKET AND WORK ON ANY CIRCUIT. THOUSANDS OF SATISFIED CUSTOMERS.

Get In Line

$4.00 each, delivered in U. S.

HAYDEN SALES COMPANY
Jersey City, N. J. Agents Attention

No. 804

$15.00

complete with Baldwin Type C Loudspeaker unit.

At Last!

the true, pure voice of RADIO

The "Madera" Die-cast Wood

"CLEARSPEAKER"

made from an artificial wood, twice as dense as natural wood, with acoustic properties that will give your radio set a power and tone-quality you never dreamed possible.

If your Dealer does not have it, write us, giving his name and address.

American Art Mache Co.
347 West Austin Avenue CHICAGO

ALL SET AND READY TO GO—New Edition

Kasper's Radio Record Book

Greater volume—Many improvements. Up-to-date list of broadcasting stations of U. S., Can., Cuba, Porto Rico and Philippine Islands. This new publication is beyond comparison to anything on the market and will always be recognized as the only copyrighted radio record book in which one can readily copy a complete reading of his set according to the stations he receives, not only the dials and switches but also the location of each rheostat controlling the detector and amplifiers.

Our Slogan Has Always Been—DON'T WASTE YOUR TIME

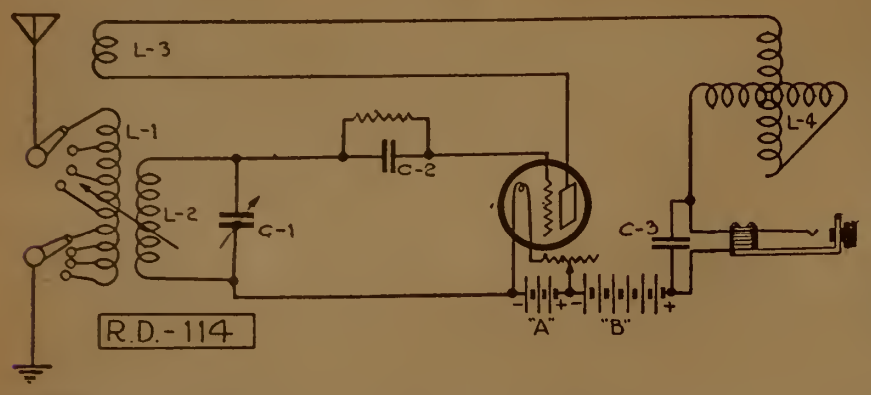
Looking for Stations you have had, simply copy the readings of the stations you get in a "KASPER RADIO RECORD BOOK," then, when you want it—IT'S THERE. Daily programs are kept separate and ample space is allotted to record 30 different stations in each daily section that you will want to hear week after week, making records for 210 stations.

This book can be used with ANY SET, contains illustration and instructions HOW TO RECORD STATIONS. No Radio Set complete without one. 50c per copy, postpaid. For your convenience, send a one dollar bill for two copies, a bank check or P. O. money order—no stamps.

For sale at Radio Shops and News Dealers or order direct from

KASPER BROTHERS' COMPANY
317 Lorain St. Bank Bldg. CLEVELAND, OHIO, U. S. A.

FLORIDA SPECIAL HOOK-UP R.D.-114



THEY say the sunny South isn't very sunny when it comes to Radio receiving, but here's Mr. G. H. Fischer of Jacksonville, Florida, who says his circuit is bringing in more volume than any set he ever used. He also emphasizes its unusual simplicity of operation and selectivity in tuning.

A paragraph from his letter says:

"At first glance you recognize the old Paragon or three-circuit tuner, but I have taken the plate circuit and inserted a coil of 8 turns number 22, wound directly over the primary winding. By setting the coupling to the degree of selectivity desired, the plate variometer can be set for its best point of regeneration and all tuning done with the vernier condenser and taps. The volume is surprising, and I am able to cut out 100-watt C. W. stations located within four blocks of my home."

The key letters shown in the diagram can be identified as follows: L-1, primary of 180 degree coupler; L-2, secondary of same; L-3, 8 turns number 22 wound immediately on top of L-1; L-4, variometer; C-1, vernier condenser, .0007; C-2, .00025 condenser with 10-meg. leak, and C-3, .0025 by-pass.

In constructing a set, a wood-form variometer is handy, as sub-panels may be attached to it, or even transformers, sockets, and other parts may be fastened on it by means of screws.

Review of Books

222 Radio Circuit Diagrams. A complete and up-to-date collection of modern receiving and transmitting hook-ups. The book includes 284 diagrams and illustrations. Price, $1.00.

Within the Atom. By John Mills. May be read by the Radiophan with interest for it deals with that infinite particle as associated with electrons, and all chemical and all electrical phenomena. Price, $2.00.

How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, $2.00.

An Introduction to Radio. A real book for the amateur. This treatise comes in two volumes. 96 pages in each volume, fully illustrated, with flexible leather covers. Price two volumes, $1.

Experimental Wireless Stations. By P. E. Edelman. Simple directions are given in this book for making Radio equipment for the transmission of messages over long distances. Price, $3.00.

Vacuum Tube Receivers. By O. F. Heslar. A book that tells how to make a simple set. How to make the cabinet. It includes a 27 by 36-inch layout blueprint. Price, 75 cents.

The Armstrong Super-Regenerative Circuit. By George J. Eltz, Jr., E. E. This is a De Luxe edition of this famous circuit. Profusely illustrated and fully explained. Fifty-two pages. Price, $1.00.

Elements of Radio Communication. By Ellery W. Stone. A splendid, well connected, complete, accurate and up-to-date discussion of every phase of Radio telegraphy and Radiotelephony. Written in simple language. The subject is presented from the physical rather than from the mathematical standpoint, avoiding the use of higher mathematics. Price, $2.50.

Radio for the Amateur. By A. H. Packer and R. R. Haugh. The underlying principles of Radio thoroughly explained in simple language and understandable illustrations. This book will teach you how to construct and operate a receiving set successfully. Price, $1.50.

The book department of the Radio Digest is prepared to send you any of the books on Radio published, whether listed in our Book Review or not. Let us know what book you want, send us your check and we will see that the book is mailed to you. Postage stamps in payment for books not accepted. Send money order or check. Radio Book Department, Radio Digest, 123 W. Madison St., Chicago, Ill.

The Reader's View

Interference by Hams

In January 5 issue of the Radio Digest, on page 14, there is an article written by G. W. Weston of Kansas City, Mo., on code interference, and he seems to think that the hams are the only ones who do this code work. I would suggest that he read the article on page 16, which is headed "Learn the Code," and may be he would find out some interesting facts.

In our town there are three transmitters —2CW and I have a spark set. None of these transmitters have been on the air since July 1, 1923, and yet every little while some one hops us about tearing up the air. How could we with our sets not going? That is the mistake made by many a B. C. L. They don't know their onions.—W. H. Sullivan, Macomb, Ill.

WELL SOLDERED WIRES WILL DOUBLE YOUR DISTANCE!

Every radio expert will advise you: "Solder your connections carefully! A poor iron won't do!" Metallectric is ideal for radio.

NOW $3.75

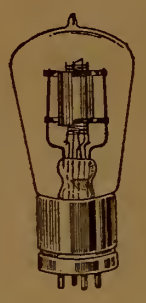
METALLECTRIC

Made exclusively for Radio. There's no substitute for a Post. Order one today.

At your Dealer or Write Direct

Post Electric Company
30 East 42nd Street, New York City

WE REPAIR THE FOLLOWING **RADIO TUBES**



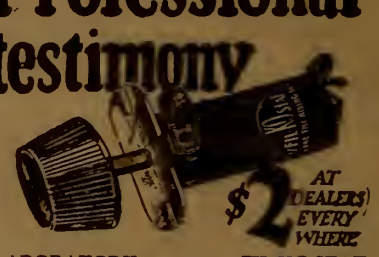
Dealers and Agents write for Special Discount
Mail Orders Solicited and Promptly Attended to

WD-11, WD-12, Our Specialties

WD-11	$3.00	DV-6A	$3.00
WD-12	3.00	UV-199	3.00
UV-200	2.75	C-299	3.00
UV-201	3.00	UV-201A	3.00
C-300	2.75	C-301A	3.00
C-301	3.00	Marconi	3.00
DV-6	3.00	Moorhead	3.00
DV-1	3.00	6 V. Plain Det.	2.75
DV-2	3.00	6 V. Plain Amp.	3.00

H. & H. RADIO COMPANY
P. O. Box 22-A
Clinton Hill Station NEWARK, N. J.

Professional testimony



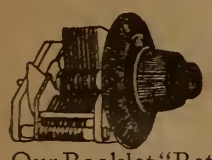
LABORATORY tests prove FIL-KO-STAT superior to all other rheostats. It guarantees scientifically correct filament control and longer tube life. R. B. Clarkson, Radio Data Expert, in his artilce on Filament Control says: "only the FIL-KO-STAT construction appears to give the ideal results."

30 ohms full resistance—adjusted to all tubes—no discs to break—not a carbon powder rheostat.

FIL-KO-STAT

Made and Guaranteed by
DX Instrument Co. Harrisburg, Pa.
Radio Stores Corp., 218 W. 34th St., New York
Sole International Distributors

For
Better Tuning
use
Only the Originals
B-T
Tuners and Condensers lead the line



Our Booklet "Better Tuning" will improve your knowledge of Radio. Ask your dealer or send 10 cents.

Better Tuning B-T Price 10c

BREMER - TULLY MFG. CO.
532 S. Canal Street, CHICAGO

Instruments of Excellence

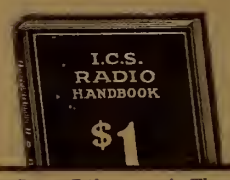
Langbein & Kaufman Vario-couplers and Variometers	$ 7.00
Malone-Lemmon Condensers	7.50
Control-O-Meters	12.50
Ballantine Tuned Radio Frequency Transformers	9.60
Units	15.00
Curcoids—The Supreme Inductance by Means of Precision Coupling Coils.	7.50

PARTS FOR ACMEDYNE NOW IN STOCK

Amperites	$1.10
Meyers Hi-Mu Tubes	4.35

Radio and Mechanical Trading Corp.
23 Warren St. New York City

RADIO HANDBOOK



Only $1

514 PAGES

Just off the press! The greatest book on Radio ever written. Price only $1. Filled with sound, practical, tested information for every radio fan, from beginner to hard-boiled owl. Written, compiled, and edited by men of national reputation. Every page tells you something useful—and there are 514 pages. Mail $1 to-day and get this I. C. S. Radio Handbook before you spend another cent on parts. *Money back if not satisfied*

TEAR OUT HERE

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 8278-F Scranton, Penna.

I enclose One Dollar. Please send me —postpaid—the 514-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....

Address.....

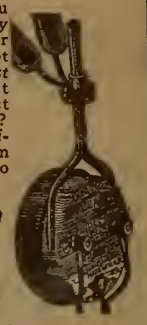
EVEREADY Radio Batteries *—they last longer*

Conspicuous for vitality and endurance —the right batteries by test and proof for every radio use.

NATIONAL CARBON CO., INC.
Headquarters for Radio Battery Information
New York San Francisco
CANADIAN NATIONAL CARBON CO., LIMITED
Factory and Offices: Toronto, Ontario

Guaranteed Head-Sets

"RED-HEADS" are *guaranteed* radio phones. You run no risk when you buy them. Money back if, after 7 days' trial, you're not satisfied that they're the *best* receivers on the market at the price. Why not act *right now* and get a pair? It'll mean getting the *maximum* from broadcasting from the day you put them into use.



RED-HEAD RADIO RECEIVERS

NOW READY

The new 1924 Model F $6.50 Per Pair Complete | The new "Red-Head" Jr. $5.00 Per Pair Complete

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

THE NEWMAN-STERN COMPANY
Dept. R. D., Newman-Stern Bldg., Cleveland

DEALERS
PROMPT SHIPMENTS LIBERAL DISCOUNTS

"ERLA"
New Type
Reflex
Transformers

All Erla reflex parts in stock including Hilco Variocouplers and Rathbun Condensers.

Dealers send for Catalog and discounts

Note !!
We are the largest exclusive Radio Jobbers in the Middle West

HUDSON-ROSS
123 W. Madison St. Chicago

The New KEYSTONE RADIO LIGHTNING ARRESTERS

The new Keystone Arrester is made of genuine Bakelite with moulded-in binding posts and provides maximum protection against lightning and static charges. Fully approved by Underwriters—should be in every aerial lead the year 'round. Absolutely weather, dust and damp proof and has no vacuum to lose—it will operate for years. This pioneer arrester is backed by 31 years' experience in lightning arrester design. Sold in a red box by Dealers everywhere.

ELECTRIC SERVICE SUPPLIES CO.
17th & Cambria Streets
PHILADELPHIA

Monadnock Bldg Chicago
50 Church St New York

First Aid and Helpful Hints for Listeners In

Chapter I—Operating the Regenerative Receiver

By Peter J. M. Clute

IN SINGLE circuit and double circuit vacuum tube receiving sets, the energy of the incoming Radio frequency oscillations is impressed directly upon the detector, rectified, and then passed to the phones. If part of this latter energy is fed back again into the grid circuit of the tube, the grid potential is greatly increased. This regenerative effect produces an increased value of plate current, allowing a greater amount of energy to flow through the receivers which results in much louder signals.

Two methods of feedback reception are in common use for producing this regenerative effect, namely, the circuit employing a tickler coil and the so-called "tuned plate" circuit.

Tickler Coil Feedback

The diagram in Figure 1 shows a regenerative receiver making use of a tickler coil, which is connected in series in the plate circuit and so arranged as to be inductively coupled to the secondary of the tuning element. In this type of circuit when the incoming oscillations are impressed upon the circuit, the current in the plate circuit is composed of pulsations of both audio and Radio frequency.

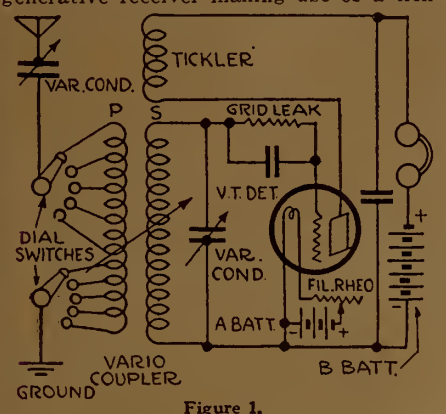


Figure 1.

The Radio frequency component of this current, flowing through the tickler coil, causes Radio frequency oscillations to be induced in the secondary. The resultant increased oscillation in the grid circuit is then amplified in the detector tube, the additional effect of this regeneration greatly augmenting the signal audibility.

If the tickler coil does not have the correct polarity with respect to the secondary, the oscillations will be weakened instead of strengthened. Obviously, the proper polarity is obtained by simply reversing the tickler coil connections. Careful adjustment of the tickler is quite essential in order to avoid any distortion of the incoming oscillations, the latter condition existing whenever the coupling between grid and plate circuits is too great.

Tuned Plate Hook-Up

In addition to receivers with tickler coils in the plate circuits, regeneration may also be obtained by resorting to the tuned plate hook-up. In place of the tickler coil there is substituted a variometer, which, having an adjustable and continuously variable inductance, does not require inductive coupling with the secondary coil. Figure 2 illustrates a circuit of this type.

In the tuned plate circuit, the capacity existing between the grid and plate is utilized for coupling purposes, the variometer serving to tune and feed back into the grid circuit the added plate circuit potential. The degree of regeneration may be varied by regulating the plate variometer only, the primary and secondary variable condensers being used for fine tuning.

Figure 3 shows a variation of the regular tuned plate receiver with variometers connected in both grid and plate circuits. After tuning the variocoupler to approximately the desired wave length, the grid and plate variometers are varied together until a plucking sound is heard, indicating that the circuits are in resonance. If a slight howling follows, it is a sure indication that the tube is in a state of oscillation, which condition may be remedied by careful adjustment of the filament current, fine plate voltage regulation and careful tuning.

Use of Honeycomb Coils

The use of three honeycomb coils, as in Figure 4, produces quite a flexible regenerative receiver. Two of the coils are connected as primary and secondary of a variocoupler and the third is used in the plate circuit as a tickler coil. This arrangement permits inductive regenerative coupling between grid and plate circuits, tuning and coupling being effected by moving the primary coil, and signal strength being regulated by adjusting the tickler, that is, by changing its position relative to the secondary. Accommodation of any desired wave length is easily accomplished by proper selection of other combinations of honeycomb coils with different numbers of turns.

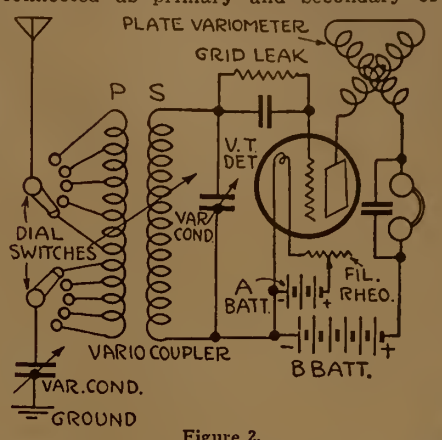


Figure 2.

The necessity of careful regulation of the various elements in any regenerative receiver in order to obtain increased signal audibility, cannot be overestimated. Circuits of this nature are generally quite sensitive and selective and the adjustment of the amount of regeneration is extremely critical. Hence, it is necessary to thoroughly comprehend the various details in the operation of such circuits so

(Continued on page 31)

ON ONE TUBE

Broadcasting from Atlantic Coast, Mexico, Hawaii, Canada and Cuba heard in California by users of CROSS COUNTRY CIRCUIT. Range due to simplicity of set and only one tuning control. Easily and cheaply built by any novice. Dry cell tubes may be used. All instructions, blueprint panel layout, assembly photo, etc. Postpaid, 25c. Stamps accepted.

VESCO RADIO SHOP
Box D-117 OAKLAND, CALIF.

DEALERS SEND FOR FREE 48-PAGE CATALOG

Dealers who handle quality products should get our unusually attractive discounts.

All high grade standard sets and supplies.

All orders shipped on day received.

Write TODAY for catalog
FEDERAL RADIO COMPANY
Distributors of
Standard Radio Sets and Supplies
1900 Harney St. OMAHA, NEBRASKA

CATALOG E19-100 PAGES FREE
Latest Reflex and Neutrodyne Circuits
EVERYTHING IN RADIO
One of the largest complete stocks in the world. 40 diagrams of latest Hookups.
DEALERS ALL OVER THE U.S.
Making big profits handling our supplies. 24-hour service. Goods shipped same day order received.
American RADIO Mfg Co
WHOLESALE RADIO DISTRIBUTORS
Dept. V, 6 W. 14th St., Kansas City, Mo.

Worksman Radio Service
"THE ACCENT IS ON SERVICE"
14-16 Vesey St. NEW YORK

VARIOCOUPLERS
$3.50 Workrite 180° Silk Wound.....$2.95
3.50 Fisher, Large, 90°..... 2.75
2.75 Fisher, 180°..... 2.25
VARIOMETERS
$3.50 Workrite $2.95
5.00 Pathé Moulded 2.25
3.50 Fisher, Large 2.85
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 plate.....$2.25
5.00 R. C. 43 plate..... 2.95
PHONES
$18.00 DR. SEIBT IMPORTED "SUPER HEADSET" $5.90
$12.00 N. & K., Imported.....$5.90
We specialize in the FAMOUS AMBASSADOR LONG DISTANCE CIRCUIT. Write for list of parts for this set. Either single or three tube set.
Price of parts for single tube set.....$15.60
Price of parts for THREE TUBE SET..... 28.90
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.

World's Greatest BATTERY BARGAIN
FREE Written 2-Year Guarantee Your Proof of Performance
Save 50%
Thousands of Radio Digest Readers will profit by this amazing offer. They will buy the famous 2-year guaranteed World Battery at the lowest price ever quoted. They will get a hydrometer and a "B" Battery FREE. And they get the best battery built.
Compare These Prices
Five Per Cent Discount for Cash with Order

Special 2 Volt Storage Battery $5.00	For UV-199 Tubes. Same features as 2 Volt.
For WD-11 and WD-12 Tubes. Will run 200 hours on one charge. Rechargeable. Special 4-v. Storage Battery $8.00	6 Volt, 60 Amps..$ 8.50 6 Volt, 80 Amps.. 10.00 6 Volt, 100 Amps. 12.50 6 Volt, 120 Amps. 14.50 6 Volt, 140 Amps. 16.00

Send No Money. Just clip this ad and mail with your name and address. The battery you specify will be shipped to you the day your order is received. When the battery arrives, inspect it—read our 2-year guarantee before you pay one penny. Get the "B" Battery and hydrometer FREE. Order today.
WORLD BATTERY CO.
Dept. "L,"
60 E. Roosevelt Road
Chicago, Ill.
"B" Battery and Hydrometer

Improved again!

ALWAYS a leader, the new improved construction brings the MAGNATRON DC 201A to the very front rank of dependable vacuum tubes. It will give better results in any circuit!
The MAGNATRONS, both the type DC 201A and the DC 199, now list at only $5. At this low price they are the outstanding buy in radio.
Your Dealer Has Them!
Dealers: Write at once!
CONNEWEY ELECTRIC LABORATORIES
309 Fifth Avenue NEW YORK CITY

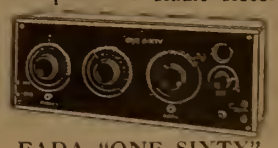
Practically indestructible
MICADENSERS are sturdily, accurately built of metal and mica to give long dependable service. Every one true to rating. Compact, convenient shape, completely equipped with mounting screws, hex nuts and soldering terminal lugs.
"We prove the Capacity"
Sold by the best radio dealers.
Send for descriptive circular.
Manufactured by
THE BEN FRANKLIN RADIO MFG. CO.
27th and Superior Ave. Cleveland, Ohio

YOU DON'T NEED TUBES
to hear concerts from out of town. If you want to get new stations
ON YOUR CRYSTAL SET
write me today. I get new records every day from people using my plans who hear programs on Crystal from stations
400 TO 1000 MILES AWAY
No tubes, batteries or amplifying apparatus necessary. I hear KDKA (Pittsburgh Pa.) on Galena. You may already have everything you need and just have it connected up wrong. Send self-addressed envelope for picture of my set, and reasons why you need my plans.
LEON LAMBERT
501 South Volutsia, Wichita, Kan.

LOUD EVERYWHERE
TUNE-IN ANYPLACE
ATOMITE
POWER VOLUME
50c—ALL DEALERS—50c
OR BY MAIL
HIGHEST VALUE FOR ALL REFLEX HOOKUPS
SATISFACTION GUARANTEED
NION FIXED DETECTORS ARE LOUD AND CLEAR.

Get today the
Easily kept Radio Record Book.
Where I Go by Radio.
Unique system. Every line complete Record.
Accurate List Radio Stations. Other features, too.
Now used everywhere.
Popular Edition. Space 300 Records, 2 for $1.00
Holiday Edition, 700 Records $1.00
Dealers get Discount. For Sale at all News-stands, Bookstores and Radio Dealers.
Order today.
Radio Book Department
PROGRESS PRESS
Union, South Carolina, U. S. A.

The Dependable Radio Receiver



FADA "ONE SIXTY"
with the
NEUTRODYNE CIRCUIT
The FADA "One Sixty" is the four-tube Neutrodyne radio receiver that in selectivity, volume, distance and clarity equals the best results of any five-tube set of any type or make. Owners say, "If we don't get 'em on the loud speaker, we don't count 'em." Consistent performance on loud speaker from stations 1500 to 2000 miles away and sometimes much further.
Price $120 at dealers
Extra for tubes, batteries and 'phones
F. A. D. ANDREA, Inc.
1581 Jerome Ave., New York City
Fada RADIO

Questions and Answers

Super-Heterodyne

(06260) EAD, Platteville, Wis.

I am anxious to buy the very best set that it is possible for an amateur to successfully operate. I have been advised to leave the super-heterodyne alone and to buy a set of the following description: One stage of Radio frequency amplification with neutrodyne condenser and tuned secondary circuit, the detector circuit being of the ordinary regenerative type with a varlometer in series with the plate."

I do not know what the above quotation means, but I want to get something that will give me the best possible service.

A.—The super-heterodyne circuit is undoubtedly a superior type. However, whether or not it is to be recommended for the average layman is another question. Much skill is essential to its successful operation. We are pleased to state that a detailed discussion of this circuit has appeared during January in Radio Digest, to which we invite your attention.

We are recommending in the regenerative type of receiver the circuit shown on page 22 of the October 6, 1923, issue as a superior type well within the ability of the novice both as to construction and operation.

Circuits employing other principles, notably the Reflex De Luxe, are offered through Radio Digest. This is also recommended as a highly efficient circuit. A detailed diagram and description was given in the September 19 issue.

Honeycomb Coils

(05838) AAL, Gardena, Calif.

I am constructing a double circuit crystal set using Giblin and Remler coils. What size wire is used in these coils? A 150-turn coil is rated at 281 meters. Would it be all right in the second circuit shunted with a 11-plate condenser, or would it be better to use a smaller coil and a 23-plate condenser? I wish to receive on 360 to 500 meters.

Should the antenna point towards or away from the sending station for best results?

Will Giblin and Remler coils work all right in the Miloplex circuit?

A.—Number 24 dcc. wire will serve for winding the coils mentioned.

We are recommending a 75-turn coil with a 23-plate condenser as the 150-turn coil and an 11-plate condenser would not permit of tuning as low as 360 meters wave length.

Antenna being somewhat directional, should be set up to point away from desired station.

The coils you contemplate can be used in the Miloplex circuit, although we prefer to recommend the variometer of specifications for best results.

Current in Buzzer

(06051) TC, Kirksville, Mo.

We thank you for your letter of November 13 in answer to our letter No. 05778. We are glad to have a rough estimate of the wave length of the diagram submitted. We can now order a meter covering this kind of wave.

1. When using a crystal detector the buzzer test is used to determine when the crystal is working. Does this current have a regular wave nature, or is it of the nature of opening and closing an ordinary light circuit? If you can refer us to anything which would explain the kind of current which passes from the buzzer to the crystal we will thank you very much.

A.—The current passing in buzzer test has a wave nature of high frequency vibrations, which is commonly termed Radio frequency.

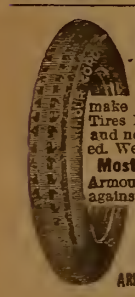
Neutrodyne Jacks

(06237) ETB, Cleveland, Ohio.

In the wiring diagram of the five-tube neutrodyne, on page 13 of the August 25 issue, are not the lifting portions of the first and second stage jacks shown on the wrong leaf of the jacks? I take it that the springs are in the right order but the lifting contact is shown on the wrong leaf.

A.—You are correct in the matter of lifting contact indicated on the wrong leaf of jack. Connections are correct, however.

RADIO FANS! BALLOON AERIAL!! Take advantage of our calm days by using a balloon aerial. XYZ results without overloading or overamplifying. Price $5.00 C. O. D. Parcel Post, including an extra 36 inch pilot balloon, the same as used by the U. S. Weather Bureau, pipes and fixtures for making your own hydrogen, fine aluminum wire for balloon netting, special aerial wire, reel and instructions.
Everett Scanlon, Radio Specialties
Lakewood, Rhode Island



Sell TIRES
DIRECT FROM FACTORY
We want an auto owner in each locality to advertise Armour Cords. You can make big money and get your own sample Tires Free, by sending us orders from friends and neighbors. No capital or experience needed. We deliver & collect direct. Pay you daily.
Most Liberal Tire Guarantee Ever Written
Armour Cords guaranteed by Indemnity Bond against Blow Out, Wear and Tear, Stone Bruise, Tread Separation, Blistering and Rim Cut for 12,500 miles. We are actual manufacturers. Write today for great Special Offer to Agents, and low Factory Prices.
ARMOUR TIRE & RUBBER CO., Dept. 358 Dayton, O.

CELERUNDUM
The Crystal With a Soul
(Reg. U. S. Patent Office)
Reception Louder Clearer More Natural
Functions with any conductor.
No Special Cat-Whisker necessary.
Will not burn out..... 50c
Celerundum "DE-TEX-IT"
A perfect fixed detector..... $1.25
Celerundum Products carry a MONEY BACK GUARANTEE
Celerundum Radio Products Co.
Laboratory and Office 170 Summer St., Boston
Standard Radio Corp. Chicago

Insure Your Tubes
KANTBLO
PROTECTIVE UNIT
is an absolute safeguard against the blowing out of any tube in your set. Can be used with sets of any type. Price..... $3
Improved Neutrodyne Circuit
Complete specifications. Set of three sheets..... $3
Parts supplied for construction of this circuit.
The Kelley Test Set
is invaluable to the man who builds his own set. Has any number of uses for the Radio fan. Neutralize your set with this unit. Price..... $8
If your dealer cannot supply you with either the KANTBLO or the Test Set, please write us.
KELLEY
Radio Laboratories, Inc.
26 E. 42nd St., NEW YORK

WHOLESALE ONLY
Jobbers and dealers will find it to their advantage to get our quotations on all standard radio items.
Manhattan Radio Co.
112 Trinity Place, New York City

Standard Radio Parts AT REDUCED PRICES

American headsets, 3000-ohms	$3.25
American Adj. loud speaker units	2.85
Audio Amp. transformers, 4 to 1	3.10
Moulded bakelite variocoupler	4.10
Moulded bakelite variometer	3.90
Excelsior 180 degree variocoupler	2.25
43 pl. var. condenser, moulded ends	1.80
23 pl. var. condenser, moulded ends	1.55
43 pl. vernier condenser with dial	3.60
23 pl. vernier condenser with dial	2.80
Bakelite sockets	.27
3 Bakelite dials	.19
Durham var. grid leaks	.42
Fixed tubular grid leaks, all sizes	.18
Grid leak mountings	.18
Switch levers	.12
Lead-ins	.22

And 101 other items at reduced prices. All orders under $5.00 must include postage. Money order or C. O. D. accepted.
Advance Electric and Radio Co.
Box 501, 112-14 Trinity Place, New York City

RUSONITE
RADIO CRYSTAL
Entire Surface Sensitive
The Recognized Standard Crystal Rectifier Used All Over the World
Hundreds of Thousands of Satisfied Users.
Rusonite Has Revolutionized Crystal Radio Reception.
"THE PERFECT SYNTHETIC CRYSTAL"
Guaranteed
Price mounted 50c
Rusonite Catwhisker 14K Gold
Supersensitive; will not oxidize
Price 25c
Order from your dealer or direct from
Rusonite Products Corporation
15 Park Row, New York, N. Y.

We Want Agents
to sell RADIO SETS and Supplies
(Part or Whole Time)
Standard, well advertised merchandise—the kind everybody knows and wants. Make handsome profits representing us. $5 a day easy in spare time. $10 to $20 a day made by many. Buy parts wholesale, sell them at retail. Assemble sets and sell at big profits—or sell our complete sets. Flanagin of Keokuk, Iowa, picked off
Big Pay! $50.00 A Week Up! Schultz of St. Cloud, Minn., has averaged over $50 a week selling radio sets and parts to city and farmer trade. You can do as well—or better. Outfit FREE!
$13 in One Hour
Makes $75 to $150 a week regularly. Begin by selling in spare time. Others do as well and better. Establish yourself in the radio business. No investment required. Write for agency in your locality.
OUTFIT FREE
Address Mail Order Division, Desk 15.
WAVELAND
Radio Co. Inc., 1027 N. State, Chicago

RADIO TUBES, Sold, Exchanged, Repaired. Free Circular. AMERICAN RADIO TUBE WORKS, IRVINGTON, N. J., U. S. A.—Adv.

BARGAIN: New Western Electric Loud Speaker with 3-tube Amplifier, complete, $110.00. Perfect order. Cost $161.00. Shipped C. O. D., subject to examination. Write Box 460, Winona, Minn.

PATENT ATTORNEYS
PATENTS. Booklet free. Highest references. Best results. WATSON E. COLEMAN, Patent Lawyer, 644 G Street, Washington, D. C.

IVORY RADIO PANEL. White Pyralin Ivory makes most beautiful set of all. Guaranteed satisfactory. Any size, 3/16" thick, 3c per square inch. Sample sent. E. P. Haltom, 614 Main, Dept. D. Fort Worth, Texas.

Laboratory Tested Tubes
Insure best reception. Each tube individually tested for perfect reception and high electron emission. Standard R. C. A. tubes, laboratory tested, at no increase in price.
UV-200, 201-A, 199, 11, 12 } $5.00 each postpaid
C-300, 301-A, 299, 11, 12 }
Central Radio Bureau
2140 Storm Street AMES, IOWA

One Right Way to Charge Batteries
That is to charge them yourself with a real motor generator set. Ask us why the
OHIO MOTOR GENERATOR CHARGER
is the cheapest and best way to keep your radio batteries up, and why it will bring back the most badly sulphated and run down battery.
The Ohio Electric & Controller Co.
5910 Maurice Ave. CLEVELAND, O.

$25.00 LOUD SPEAKER
with Unit and Cord for
$9.50
On account of the unethical methods pursued by the average Radio dealer, I have decided to sell my product direct to the consumer, thus eliminating the factory sales agent, the distributing jobber and dealer, and saving for the consumer four profits. My speaker would sell in the retail store for $25.00.
Buy direct and save the difference. My price, $9.50, delivered anywhere in United States or Canada. Orders filled in rotation.
EMIL DECLYNE
15 Park Row, Room 612, NEW YORK CITY
Send M. O. or C. O. D. Dept. R. D., Barclay 6298

Save Your Windows
No longer do you need to bore holes through your window frames.
No longer do you need to have trouble with grounded Lead-ins on wet nights.
Electrad Lead-ins fit under closed windows. Can be bent to any shape. Covered with fireproof electrical insulation of 1000 volts resistance. Can be used over and over again. Moved from window to window. Fitted with Fahnestock clips.
Price 40c
At your dealers, or direct if he cannot supply you.
ELECTRAD, Inc.
428 Broadway, New York
DEPT. "L"

YOUR
ERLA REFLEX SET
Rewired to Use the
New Selectoformer, $10.00
ERLA REFLEX 1-2-3 TUBE SETS BUILT WORK GUARANTEED
R. WEISENMAYER
5608 S. Michigan Ave.
CHICAGO, ILL.

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
No. 322A—22½ volt, variable, regularly $3.00..... $1.85
No. 345A—45 volt, 8 taps, regularly $5.50..... $3.25
AYRES BATTERY CORPORATION, Cincinnati, Ohio

RADIO TUBE REPAIRING
ALL TUBES REPAIRED
Guaranteed Like New
Detectors or Amplifiers... $2.75
One Amp., 6 Volt Tubes Changed to ¼ Amp. Tubes
Agents Wanted. Free Circular
American Radio Tube Works
Irvington, New Jersey, U. S. A.

RADIO BY MAIL
Our New Price List
Send us a postal or letter with your name and address and you will receive our new price list just off the press. This new list contains over 500 Bargains and lists every standard radio product made. It also contains prices on many "Hard to Get" special parts, such as **Machine Screws and Nuts, Pig Tail Wire, 5 Kinds Bus Wire, Cockaday Parts, Mica, Tools, Shielding, Insulating Cloth,** and many other articles.
When You Can't Get It Elsewhere Try
Simplex Radio Supply Co.
1806 Lafayette Avenue ST. LOUIS, MO.
For Our Regular Bargains See Last Week's Issue.

Gates Model 2-1-2 Jr.
Dealers! Here's the receiver that's getting countrywide acclaim. Beautifully designed in mahogany—surprising in tone and volume.
Write for Circular
Dealers only write for catalog A1001
WAKEM & McLAUGHLIN INC
225 E. ILLINOIS ST., CHICAGO

Radiophone Broadcasting Stations

Corrected Every Week—Part IV

Alabama:
Auburn, WMAV
Birmingham, WSY
Mobile, WEAP
Montgomery, WKAN

Arizona:
Phoenix, KDYW, KFAD, KFCB
Tucson, KFDH

Arkansas:
Conway, KFKQ
Fayetteville, KFDV, KFMQ
Fort Smith, WCAC
Little Rock, KFLQ, WCAV

California:
Bakersfield, KDZB
Berkeley, KRE
El Monte, KUY
Fresno, KMJ
Hollywood, KFAR
Long Beach, KFMY, KSS
Los Angeles, KDZF, KFI, KFNC, KFSG, KHJ, KJS, KNV, KNX, KUS
Modesto, KXD
Oakland, KGO, KLS, KLX, KZM
Paso Robles, KFNL
Richmond, KFCM
Sacramento, KFBK
San Diego, KDPT, KDYM, KFBC
San Francisco, KFDS, KPO, KSL, KUO
San Jose, KQW
San Luis Obispo, KFBE
Santa Ana, KFAW
Santa Barbara, KFHJ
Santa Rose, KFNV
Stanford Univ., KFGH
Stockton, KJQ, KWG

Colorado:
Boulder, KFAJ
Colorado Springs, KFFQ, KFKZ
Denver, AA3, KDZQ, KFAF, KFEL, KFKH, KFLE, KLZ
Greeley, KFKA
Gunnison, KFHA
Trinidad, KFBS

Connecticut:
Hartford, WDAK
New Haven, WPAJ
Storrs, WABL
Waterbury, WQAD

Dslawars:
Wilmington, WHAV, WOAT

District of Columbia:
Washington, WABE, WCAP, WDM, WIL, WJH, WMU, WQAW, WRC

Florida:
Jacksonville, WABG
Miami, WQAM
Pensacola, WGAN, WLAV
St. Petersburg, WSAG
Tampa, WDAE
West Palm Beach, WBBJ

Georgia:
Atlanta, WBBF, WSB
Gainesville, WKAY
Macon, WMAZ

Idaho:
Boise, KFAU, KFDD, KFFB
Kellogg, KFEY
Moscow, KFAN

Illinois:
Belvidere, WOAG
Cambridge, WTAP
Carthage, WCAZ
Chicago, KYW, WAAF, WDAP, WJAZ, WMAQ, WSAH, WSAX
Decatur, WBAO, WHAP
Elgin, WTAS
Galesburg, WRAM
Joliet, WWAE
Lake Forest, WABA
Lincoln, WBBM
Mattoon, WQAL, WTAN
Monmouth, WBBU
Oak Park, WTAY
Peoria, WJAN, WQAX
Rockford, KFLV, WIAB
Streator, WTAX
Tuscola, WDZ
Urbana, WRM
Zion, WCBD

Indiana:
Brookville, WSAL
Greencastle, WLAX
Greentown, WJAK
Indianapolis, WBBI
La Porte, WRAF
Marion, WIAQ
Mishawaka, WOAO
Muncie, WJAF
South Bend, WGAZ
West Lafayette, WBAA

Iowa:
Ames, WOI
Atlantic, KFLZ
Boone, KFGQ
Burlington, WIAS
Cedar Falls, KFJX
Cedar Rapids, KFLP, WJAM, WKAA
Davenport, WOC
Dexter, KFJV
Fort Dodge, KFER, KFJY
Iowa City, WHAA
Lamoni, KFFV
Le Mars, KFCY, WIAU
Marshalltown, KFJB
Ottumwa, KFIL
Shenandoah, KFNF
Sigourney, WOAD
Sioux City, KFMR, WEAU
Waterloo, WRAN

Kansas:
Anthony, WBL
Hutchinson, KFHX
Iola, KFID
Louisburg, KFIL
Manhattan, WTG
Marion, WRAD
Milford, KFKB
Peabody, KFNX
Topeka, WJAQ, WPAM
Towanda, KFJW
Wichita, WEAH

Kentucky:
Lexington, WQAH
Louisville, WHAS WLAP

Louisiana:
Alexandria, KFFY
Baton Rouge, KFGC
Franklinton, KFLD
New Orleans, WAAB, WAAC, WABZ, WCAG, WGV, WIAF, WTAF, WWL
Shreveport, KFDX, KFHF, WGAQ

Maine:
Bangor, WABI
Portland, WTAJ

Maryland:
Baltimore, WCAO, WEAR
Frostburg, WPAQ

Massachusetts:
Boston, WNAC, WTAT
Dartmouth, WMAF
Fall River, WSAR, WTAB
Lowell, WQAS
Mattapoisett, WBBG
Medford Hillside, WGI
New Bedford, WDAU
Springfield, WBZ
Worcester, WABK, WDAS

Michigan:
Ann Arbor, WCBC
Berrien Springs, KFGZ
Dearborn, WWJ
Detroit, KOP, WCX, WWJ
East Lansing, WKAR
Flint, WEAA
Houghton, KFMW, WWOA
Kalamazoo, WOAP, WLAQ
Menominee, KFLB
Mt. Clemens, WABX
Petoskey, WBBP
Port Huron, WBBH
Rogers, WHT, WBBO
Saginaw, WABM

Minnesota:
Duluth, KFMS
Hutchinson, WFAN
Minneapolis, KFDZ, KFEX, KFMT WBAH, WCAS, WLAG, WLB
Moorhead, WPAU
Northfield, KFMX, WCAL
St. Cloud, WFAM
St. Paul, AV7

Mississippi:
Coldwater, KFNG

Missouri:
Butler, WNAR
Cameron, WFAQ
Cape Girordeau, WSAB
Columbia, WAAN
Independence, KFIX
Jefferson City, WOS
Joplin, WHAH
Kansas City, WDAF, WHB, WMAJ, WOQ
Marshall, WJAT
St. Joseph, KFHD
St. Louis, KFEZ, KFGJ, KSD, WCK, WEB, WEW, WMAY, WRAO
Springfield, KFNH, WIAI
Warrensburg, KFNJ
Webster Groves, WOAL

Montana:
Billings, KFCH
Bozeman, KFDO
Butte, KFKV, KFLA
Havre, KFBB
Helena, KFNY
Stevensville, KFJR

Nebraska:
Fremont, WOAE
Hastings, KFKX
Lincoln, WFAV, WMAH
Norfolk, WJAG
Oak, KFEQ
Omaha, KFCZ, KFFX, WAAW, WIAK, WNAL, WOAW
Tecumseh, WTAU
University Place, WCAJ
Utica, KFGV
York, KFDR

Nevada:
Sparks, KFFR

New Hampshire:
Laconia, WKAV

New Jersey:
Atlantic City, WHAR
Camden, WABU, WWAF
Gloucester City, WRAX
Lambertville, WTAZ
Newark, WAAM, WABS, WBS, WOR, WRAZ
N. Plainfield, WEAM
Paterson, WBAN
Trenton, WMAL, WOAX, WWAB

New Mexico:
Albuquerque, KFLR
Roswell, KFMZ
State College, KOB

New York:
Albany, WNJ
Buffalo, WGR
Canandaigua, WSAW
Canton, WCAD
Cazenovia, WMAC
Ithaca, WEAI
Lockport, WMAK
New York, WBAY, WEAF, WIIN, WJX, WJY, WJZ, WLAW, WQAO
Port Chester, WSAY
Poughkeepsie, WFAF
Rochester, WABO, WHAM
Rossville, WBBR
Schenectady, WGY, WRL
Syracuse, WBBE, WFAB, WLAH, WNAN
Tarrytown, WRW
Troy, WHAZ
Utica, WSL

North Carolina:
Asheville, WFAJ
Charlotte, WBT
Wilmington, WBBN

North Dakota:
Fargo, KFLY, WDAY, WPAK
Grand Forks, KFJM, KFJQ
Wahpeton, WMAW

Ohio:
Canton AQ6
Cincinnati, WAAD, WHAG, WLW, WSAI
Cleveland, KDPM, WHK, WJAX, WTAM
Columbus, WBAV, WCAH, WEAO, WMAN, WPAL
Dayton, AW5, WABD
Dover, WABP
Granville, WJD
Hamilton, WRK
Lima, WOAC
Newark, WBBA
New Lebanon, WPG
Pomeroy, WSAZ
Sandusky, WABH, WQAF
Springfield, WNAP
Toledo, WABR, WTAL
Wooster, WABW
Yellow Springs, WRAV

Oklahoma:
Bristow, KFJK
Chickasha, KFGD
Oklahoma City, KFJF, WKY
Norman, WNAD
Okmulgee, WPAC
Tulsa, WGAF, WLAL

Oregon:
Astoria, KFJI
Arlington, KFGL
Baker, KFDA
Corvallis, KFDJ
Hillsboro, KFFO
Hood River, KFHB, KQP
Medford, KFAY
Pendleton, KFFE
Portland, KDYQ, KFEC, KFIF, KGG, KGN, KGW

Pennsylvania:
Allentown, WCBA, WSAN
Altoona, WGAW
Butler, WBR
Easton, WMAP
East Pittsburgh, KDKA
Erie, WOAV
Grove City, WSAJ
Harrisburg, WAPB, WBAK
Haverford, WBAQ
Johnstown, WBBY, WTAC
Lancaster, WDBC, WGAL
McKeesport, WIK
Parkesburg, WQAA
Philadelphia, WABY, WBBT, WCAU, WDAR, WFI, WGL, WIAD, WIP, WNAT, WOO, WWAD
Pittsburgh, KQV, WBBK, WCAE, WJAS
Reading, WBBD, WRAW
Scranton, WQAN, WRAY
State College, WPAB
Villanova, WCAM
Washington, WABT
Wilkes-Barre, WBAX

Rhode Island:
Cranston, WKAP
East Providence, WKAD
Pawtucket, WBBQ
Providence, WEAN, WJAR, WRAH, WSAD, WTAG

South Carolina:
Charleston, WNAQ, WOAH
Clemson College, WSAC
Greenville, WQAV

South Dakota:
Brookings, KFDY
Rapid City, WCAT
Sioux Falls, WFAT
Vermillion, WEAJ
Yankton, WNAX

Tennessee:
Knoxville, WABV, WNAV
Lawrenceburg, WOAN
Memphis, WMC
Nashville WABV

Texas:
Abilene, WQAQ
Amarillo, WDAG, WQAC
Austin, WCM, WNAS
College Station, WTAW
Corsicana, KFNC
Dallas, KFFZ, WDAO, WFAA, WRR
El Paso, WDAH, WPAT
Fort Worth, KFJZ, WBAP
Galveston, KFLX, WHAB, WIAC
Houston, KFCV, WCAK, WEAY, WEV, WRAA
Orange, KFGX
Plainview, WSAT
Port Arthur, WFAH
San Antonio, AS6, WCAR, WOAI
San Benito, KFLU
San Marcos, KFMU
Tyler, WOAF
Waco, WIAD, WLAJ, WMAC
Wichita Falls, WKAF

Utah:
Ogden, KFCP
Salt Lake City, KDYL, KFLH, KZN

Vermont:
Bellows Falls, WLAK
Springfield, WQAE

Virginia:
Arlington, NAA
Blacksburg, WEAE
Fortress Monroe, WNAW
Norfolk, WTAR
Richmond, WBBL

Washington:
Aberdeen, KNT
Bellingham, KDZB
Everett, KFBL
Lacey, KGY
Neah Bay, KFHH
Pullman, KFAE
Seattle, KDZE, KFHR, KFJC, KHQ, KJR, KTW
Spokane, KFIO
Tacoma, BE1, KFBG, KGB, KMO
Walla Walla, KFCF
Wenatchee, KDZI, KZV
Yakima, KFIQ

West Virginia:
Charleston, WPAZ
Clarksburg, WHAK

Wisconsin:
Fond du Lac, KFIZ
Kenosha, WOAR
La Crosse, WABN
Madison, WHA
Milwaukee, WCAY, WHAD, WIAO
Neenah, WIAJ
Osseo, WTAQ
Slight, WAR
St. Croix Falls, WRAL
Waupaca, WPAH

Wyoming:
Casper, KFEV
Laramie, KFBU

Alaska:
Juneau, KFIU

Hawaii:
Honolulu, KDYX, KGU
Lihue, KFHS

Porto Rico:
San Juan, WKAQ

British Isles:
Aberdeen, 2BD
Birmingham, 5IT
Bournemouth, 6BM
Cardiff, 5WA
Glasgow, 5SC
London, 2LO
Manchester, 2ZY
Newcastle, 5NO

Canada:
Bellevue, CFCO
Calgary, CFAC, CFCN, CHBC, CHOM, CKCX
Edmonton, CFCK, CJCA
Halifax, CHAC
Hamilton, CKOC
Iroquois Falls, CFCH
Kingston, CFRC
London, CFCW, CJGC
Mont-Joli, CJCM
Montreal, CFCF, CFUC, CHYC CKAC
Nanaimo, CFDC
Olds, CJCX
Ottawa, OA
Quebec, CFCJ, CHCD
Regina, CKCK
St. John, CJCI
Saskatoon, CFQC
Sudbury, CFCR
Toronto, CFCA, CJCD, CJCN, CJSC, CKCE
Vancouver, CFCQ, CHCL, CJCE, CKCD
Victoria, CFCL, CHCE
Winnipeg, CKY

Cuba:
Caibarien, 6EV
Cienfuegos, 6AZ, 6BY, 6CY, 6DW
Colon, 5EV
Havana, PWX, 2AB, 2BY, 2CX, 2DW, 2EV, 2HC, 2HS, 2JQ, 2KD, 2KP, 2LC, 2MG, 2MN, 2OK, 2OL, 2TW, 2WW
Santiago, 8AZ, 8BY, 8DW, 8EV, 8FU
Tuinucu, 6KJ, 6KW

Mexico:
Mexico City, CYB, CYL

PART IV—STATION DATA

(The following schedules complete the alphabetical station data list, Part III of which was given last week.)

WWJ, Detroit, Mich. 517 meters. 500 watts. The Detroit News. Daily ex Sun, 9:30-9:45 am, household hints; 9:45-10:25, health talks; 10:25-10:30, weather; 11:55-12, time; 12:05-12:45 pm, music; 3:30-3:35, weather; 3:35-4:15, markets; 5-6, sports, April 22, and every other week, 8:30-10 pm, concert. Sat, night silent. Thurs, 10-12 pm, "midnight special"; Sun, 2 pm, 7:30, church services. Fill in weeks, 7-8:30 pm, concert; Sun, 11 am, 5:30, church services. Eastern.

WWL, New Orleans, La. 280 meters. 100 watts. Loyola Univ.

2AB, Havana, Cuba. 240 meters. Alberto S. de Bustamante.

2BD, Aberdeen, Scot. 495 meters. British Broadcasting Co.

2BY, Havana, Cuba. 250 meters. Frederick W. Borton.

2CX, Havana, Cuba. 320 meters. Frederick W. Borton.

2DW, Havana, Cuba. 300 meters. Pedro Zayas.

2EV, Havana, Cuba. 220 meters. Westinghouse Elec. Co.

2HC, Havana, Cuba. 275 meters. Heraldo de Cuba.

2HS, Havana, Cuba. 180 meters. Julio Poever.

2JQ, Havana, Cuba. 150 meters. Paul Perez Falcon.

2KD, Havana, Cuba. 350 meters. E. Sanchez de Fuentes.

2KP, Havana, Cuba. 200 meters. Alvara Daza.

2LC, Havana, Cuba. 250 meters.

2LO, London, Eng. 369 meters. British Broadcasting Co.

2MG, Havana, Cuba. 280 meters. Manuel G. Salas.

2MN, Havana, Cuba. 270 meters. Fausto Simon.

2OK, Havana, Cuba. 360 meters. Mario Gareio Velez.

2OL, Havana Cuba. 290 meters. Oscar Collado.

2TW, Havana, Cuba. 230 metres. Roberto E. Ramires.

2WW, Havana, Cuba. 210 meters. Amadeo Saenz.

2ZY, Manchester, Eng. 385 meters. British Broadcasting Co.

5EV, Colon, Cuba. 360 meters. Leopold V. Figueroa.

5IT, Birmiugham, Eng. 420 meters. British Broadcasting Co.

5NO, Newcastle, Eng. 400 meters. British Broadcasting Co.

5SC, Glasgow, Scot. 415 meters. British Broadcasting Co.

5WA, Cardiff, Wales. 353 meters. British Broadcasting Co.

6AZ, Cienfuegos, Cuba. 200 meters. Valentin Ullivarri.

6BM, Bournemouth, Eng. 385 meters. British Broadcasting Co.

6BY, Cienfuegos, Cuba. 300 meters. Jose Ganduxe.

6CX, Cienfuegos, Cuba. 170 meters. Antonio T. Figueroa.

6DW, Cienfuegos, Cuba. 225 meters. Eduardo Lerry.

6EV, Caibarien, Cuba. 225 meters. Josefa Alvarez.

6KJ, Tuinucu, Cuba. 275 meters. Frank H. Jones.

6KW, Tuinucu, Cuba. 332 meters, 100 watts. Frank H. Jones. Slogan, "If You Hear the Koo of the Cuckoo You Are In Tune With Tuinucu." Mon, Tues, Fri, Sun, 9 pm, music. Wed, Thurs, Sat, 6:30 pm, music. Central.

8AZ, Santiago, Cuba. 240 meters. Alfredo Brooks.

8BY, Santiago, Cuba. 250 meters. Alberto Ravelo.

8DW, Santiago, Cuba. 275 meters. Pedro C. Andux.

8EV, Santiago, Cuba. 180 meters. Eduardo Mateos.

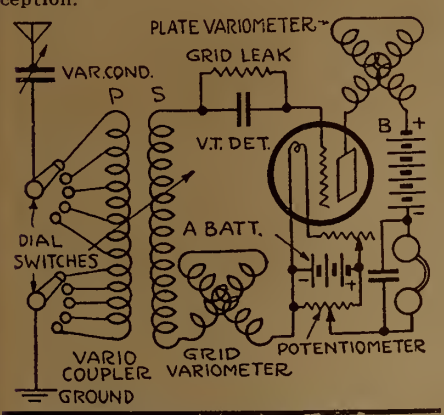
8FU, Santiago, Cuba. 225 meters. Andres Vinnet.

(This completes the alphabetical station data list. Part I, the first installment of the four-part list, will appear next week.)

HINTS FOR LISTENER IN

(Continued from page 29)

as to be able to eliminate whistling or howling and to obtain distortionless reception.



Amplifying Incoming Signals

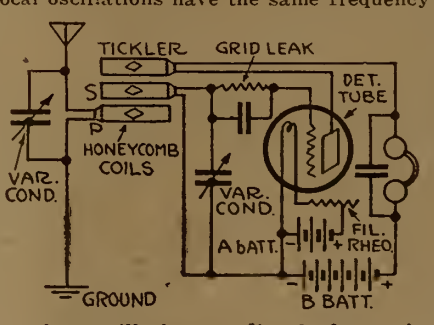
Receivers of the regenerative type possess the characteristic of not only amplifying the incoming signals but, by increasing the degree of coupling between grid and plate circuits beyond the position of maximum amplification, a condition of oscillation will be obtained in the circuit. In this manner, the set will act as a receiver of undamped or continuous wave signals working upon the heterodyne principle.

Distortion of the signals received, even to such a degree as to render them unintelligible, will result from too much regeneration. By properly adjusting the coupling between plate and grid circuit, a setting may be found where amplification may be obtained with little or no distortion. By using too much coupling, the adjustment will become critical, with the attendant result that the tube will finally oscillate and thus become a generator of high frequency. These high frequency oscillations, radiated from the receiving aerial, will be heard by receiving sets in the neighborhood and will cause some degree of interference in DX reception.

When the frequency of the oscillations emitted from the vacuum tube differs from that of the incoming signals, a beat note will be audible in the receivers, as a result of superimposing upon the oscillations picked up from the broadcasting station, the local oscillations set up by the tube itself. By tuning a regenerative receiver, with the tube in an oscillating condition, the howling resulting from the beat effect will change in pitch up and down the scale. As previously mentioned, this condition will produce considerable interference, inasmuch as the local oscillations radiated from the antenna will cause whistling notes in receivers in the vicinity.

Adjusting to a Condition of Resonance

When tuning a circuit of the regenerative variety with tickler coil, the filament current should first be regulated to a point below the normal filament brilliancy. The primary and secondary circuits are then adjusted to a condition of resonance with the incoming wave; the proper amount of regeneration is obtained by regulating the coupling between the tickler coil and the secondary. The filament current is next increased by gradually reducing the amount of resistance in the circuit to the point where signals come in loudly and clearly without any howling or distortion. Under this condition, the local oscillations have the same frequency



as the oscillations radiated from the broadcasting station. It is a condition known as zero beat, due to the fact that there is no frequency difference, consequently no beat note.

The Familiar Regenerative Whistle

If the tuning is varied either way from this condition of synchronism, a high-pitched whistling note will be audible, gradually falling in pitch until it is replaced by speech or music. Further change will result in a low whistling note, gradually increasing to a shrill whistling sound.

It is thus apparent that the tuning adjustments in a regenerative circuit are so critical it will be found advisable to use vernier condensers, and vernier rheostats. These devices permit very small changes in the tuning of the circuit and in the adjustment of filament current, so that the point of maximum amplification may be easily obtained and the sounds received will be free from distorting effects.

When properly operated the receiver should never be permitted to oscillate. If any squeals or howlings are heard when the set is not in oscillation, the cause may be either that two broadcasting stations are heterodyning, or a broadcasting station and a nearby receiver are heterodyning, or two oscillating receivers in the vicinity are heterodyning.

Body Capacity

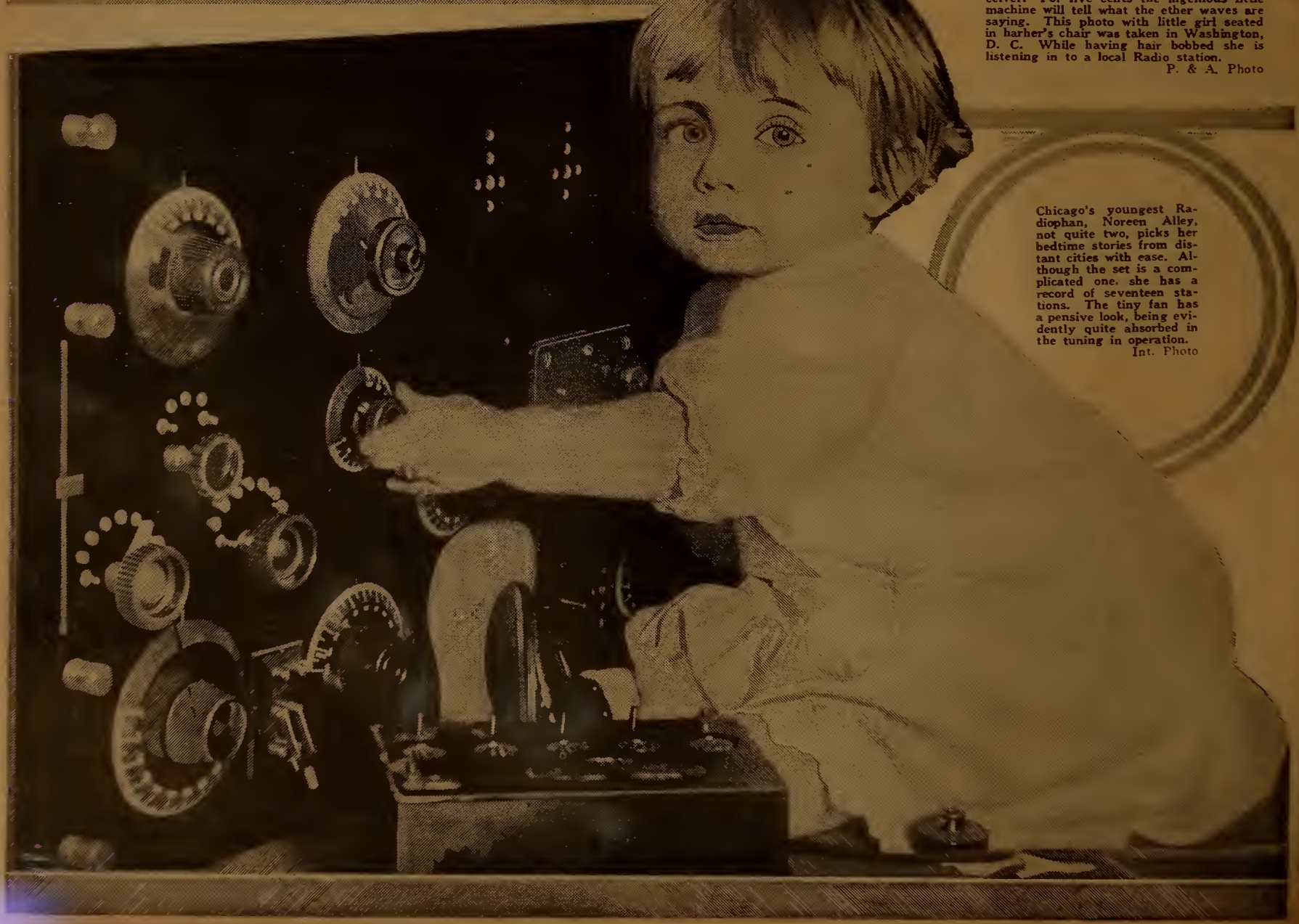
The use of the regenerative arrangement complicates the operation of a standard set a little, but at the same time louder signals will be heard than would be obtained from a simple receiving set. The regenerative effect is likely to give rise to all sorts of noises in the telephone receivers. Often in tuning, there will be a fading of signals when the hand is brought near the dial or other parts of the apparatus. If the signals are clear but faint when not touching any part, it is evident that the tube is not oscillating and better tuning is necessary. To eliminate this capacity effect of the body, it is found desirable in some cases to line the inside of the box or panel with a very thin copper or lead foil shield, being particularly careful not to short-circuit any of the connections by keeping the shield clear of any metal parts of the set. This electrostatic screen should then be grounded.

(TO BE CONTINUED.)

Radio Illustrated

The receiving set shown at the left, with its constructor Will Lesher, of Washington, is so small that he can carry it about in his vest pocket. Its actual dimensions are a trifle less than one by one by two inches, yet he hears local stations quite plainly.
Int. Newsreel Photo

And now comes the nickel-in-the-slot receiver. For five cents the ingenious little machine will tell what the ether waves are saying. This photo with little girl seated in harher's chair was taken in Washington, D. C. While having hair bobbed she is listening in to a local Radio station.
P. & A. Photo



Chicago's youngest Radiophan, Noreen Alley, not quite two, picks her bedtime stories from distant cities with ease. Although the set is a complicated one, she has a record of seventeen stations. The tiny fan has a pensive look, being evidently quite absorbed in the tuning in operation.
Int. Photo