

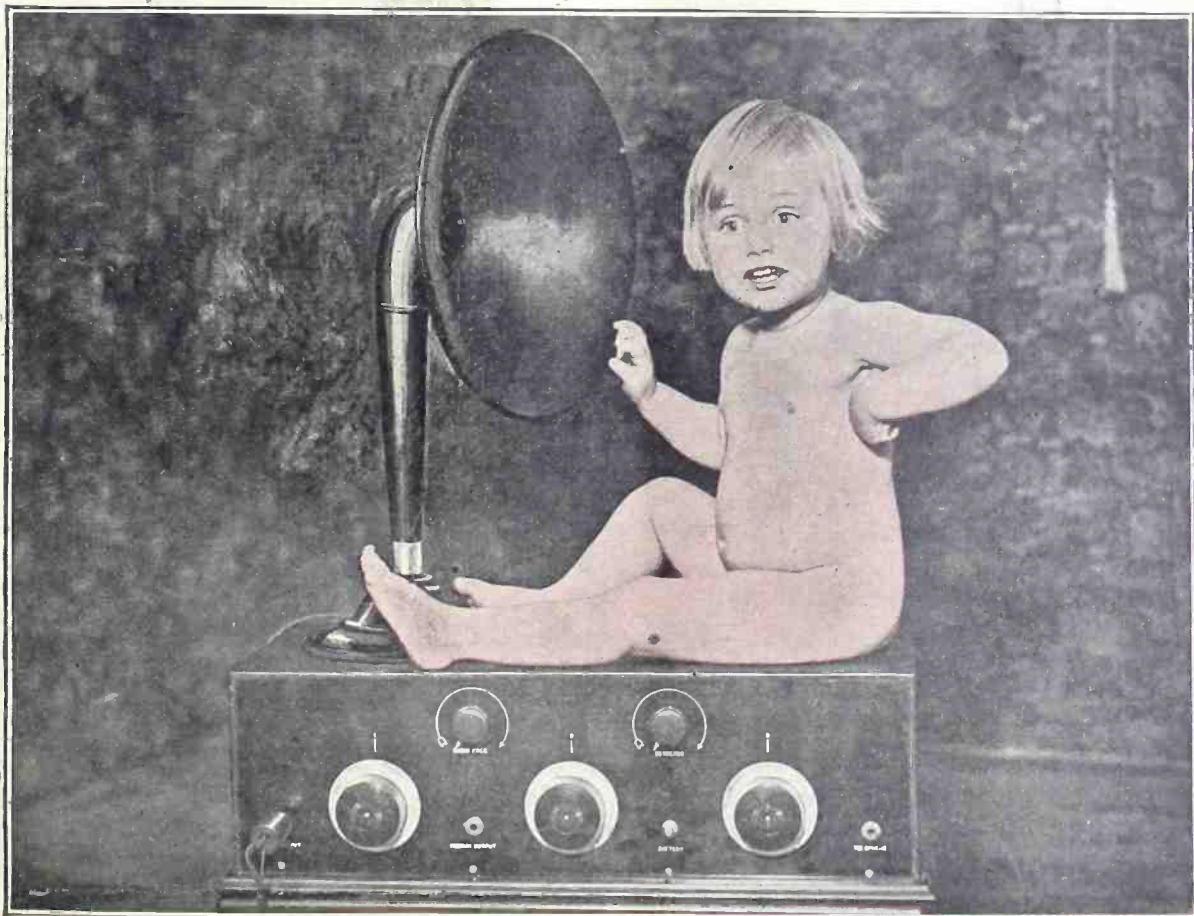
ANNIVERSARY NUMBER

RADIO WORLD

Title Reg. U. S. Pat. Off.

5¢ A COPY ILLUSTRATED EVERY WEEK APRIL 5, 1924

Vol-5 No-106



(c) Foto Topics

Complete List of Broadcasting Stations



Crosley Model 51
\$18.50

In 24 Days the Crosley Model 51 Became the Biggest Selling Radio Receiver in the World

On Monday morning, February 4th, Powel Crosley, Jr., returned to his desk after a two weeks' hunting trip in Mississippi. He brought with him the idea of an entirely new Radio Receiving Set to be added to the Crosley line.

A short conference with his engineers followed. On Tuesday morning, February 5th, a model had been completed and tested. These sets were put into production immediately after the model was approved.

On Tuesday afternoon, February 5th, night letters were sent to the leading distributors of The Crosley Radio Corporation announcing this new model, which had been called MODEL 51. Wednesday afternoon, the orders commenced coming in, showing the faith of the distributors in anything brought out by this Company. Announcements were made in leading metropolitan newspapers of the country on Saturday and Sunday,

February 9th and 10th. Shipments commenced about February 13th and were immediately followed by an avalanche of complimentary letters and orders, and have increased steadily ever since.

Production started at 50 a day—and increased to 200—then 300—and on February 28th, just 24 days after the thought of this set had been put into being, the production reached 500 a day. Orders were received on February 28th for 1,115 of these sets—every effort being made to increase the production to 2,000 sets per day to supply the phenomenal demand for this new model.

This message was written on February 29th in the face of promises of an even greater record than is indicated here.

The demand for this set has not in any way lessened the sale but has increased the orders on various other models in the Crosley line.

NOW WHAT IS THIS SET THAT HAS MADE SUCH AN ENVIABLE RECORD, WHICH IN 24 DAYS HAS, WE BELIEVE, BECOME THE BIGGEST SELLING RADIO RECEIVING SET ON THE MARKET?

It incorporates a tuning element made famous in the Crosley Model V, the \$16.00 set used by Leonard Weeks of Minot, N. D., in his consistent handling of traffic with the MacMillan Expedition at the North Pole; a genuine Armstrong regenerative tuning and detective circuit.

Now, to this has been added a one stage of audio frequency amplification. With the well-known Crosley Sheltran 9 to 1 ratio transformer, giving an unusual volume. Thus, this set uses 2 vacuum tubes.

It is the ideal all-around receiver. For local and nearby broadcasting stations, it will operate a loud speaker, giving phonograph volume in the home. Under reasonably good receiving conditions, it will bring

in stations up to 1,000 miles, with sufficient volume for the average sized room.

When receiving conditions are bad, however, head phones should be used on distant stations.

This Receiver is unusually selective—it incorporates standard sockets so that all makes of tubes can be used. The various units are mounted on beautifully engraved grained panels, and mounted in a hardwood, mahogany finished cabinet, which completely encloses all parts and tubes.

A glance at this beautiful instrument sells it, and the results it gives create many friends for it. Perhaps the most startling thing of all is its price—\$18.50. Add 10% west of the Rocky Mountains.

Licensed under Armstrong Regenerative Patent No. 1,113,140

THE CROSLLEY RADIO CORPORATION

POWEL CROSLLEY, Jr., President

Formerly
The Precision Equipment Company and Crosley Manufacturing Company

4401 ALFRED STREET

CINCINNATI, OHIO

CROSLLEY

Better - Cost Less Radio Products

ESSEX RADIO SPECIAL

Proof of Results—Can't Be Beat at Four Times the Price

GUARANTEED

exactly as represented—
read testimonials

Works on a Pulley Line

The landlord will not allow me to put a permanent aerial up so I have a run of about 40 feet on a pulley line and I run wire out. Last evening I received with your set KDKA at Pittsburg, WYG at Schenectady and all the local stations. Anyone in doubt about your set refer them to me.

E. T. PETERS,
118 Waverly St., Yonkers, N. Y.

Does All You Claim for It

I bought your parts and without any previous experience built the set in one evening and it is bringing in distant stations loud and clear. It does all you claim for it.

RALPH L. HARDEN,
St. Louis, Mo.

Picks Up on the Detector Alone

Your SX RADIO SPECIAL sure is a wonder. It beats my honeycomb set and picks up distant stations on detector alone.

EDGAR R. TAYLOR,
1039 Simpson St., N. Y. C.

SX Special Is Selective

I can substantiate your claim that your SX RADIO SPECIAL is selective, simple to operate and a sure DX getter. I have experience with various hook-ups but none can compare in my estimation to yours.

GEO. PETERS, 519 Central Ave.,
Jersey City Heights, N. J.

Gets Canada to Pittsburgh

I tuned in at 8.35 and heard the Northern Electric Co., Montreal, Canada, and without any trouble I picked up WGY Schenectady, KDKA Pittsburg, all before 10 P. M.

MATTHEWS MENDICINO,
406 E. 19th St., N. Y. C.

No Dead Spots

I am located in one of Brooklyn's dead spots, where it is impossible to receive with a crystal set, but now with your SX RADIO receiver they come in with remarkable volume. As a DX receiver this set is a wonder. It has already pulled in 40 stations from all parts of the country.

M. A. W. RUSIN,
Brooklyn, N. Y.

Far Superior to Any

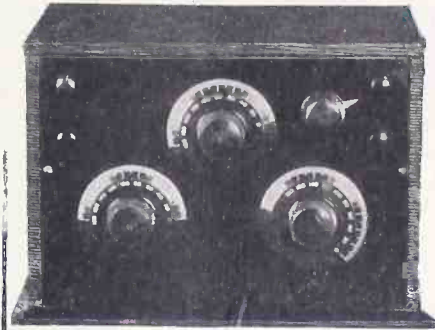
I wish to state that after hearing quite a number of other one tube sets yours is far superior to any I have heard. It not only tunes in distant stations but same do not fade. It holds the stations for any length of time, clear and with great volume.

B. H. M. CLARK,
375 Main St., Danbury, Conn.

\$15 SET
COMPLETE

\$20 SET
COMPLETE

Includes Cabinet, Tubes
and All Batteries



AS SET LOOKS WHEN COMPLETED

This set, that only costs a mere fraction of the elaborate made-up sets, gives results that equal equipment costing from fifteen to one hundred and seventy-five dollars more.

It contains the four essentials in Radio receiving—Simplicity, Distance-getting, Selectivity, and Volume.

It is so simple that the average twelve-year-old boy can set it up and have it operating in one hour's time. It permits tuning out all stations except the one wanted, and it gets the station that you want when you want it.

Plenty of volume at all times; in fact, many Essex fans tell us that they actually can operate a loud speaker under normal conditions.

SET INCLUDES

Vario-Coupler, Special Winding, 23 Plate Essex Condenser, 17 Plate Essex Condenser, Leatherette Cabinet, Standard Essex Socket, Rheostat, 6 ohms, will work with any tube, 4 Binding Posts, Hard Rubber, 7x10 Hard Rubber Panel, 3-3" Dials, 4 Pieces Bus Wire, 1 Length Spaghetti.

This set comes to you with complete book of instructions covering assembling, requiring not over one hour of your time even if you have never put a set together before.

We have prepared a booklet which gives detailed information on the Essex Radio, with simplified and schematic drawings, and will be glad to send it to you on receipt of the price of fifty cents. One of these booklets is included free with every outfit.

Essex Radio Service

617 WEST 125TH STREET

NEW YORK CITY

What They Say about the BEL-CANTO

Best Bargain Yet

I wish to take this method of showing my appreciation of your loud speaker, which I consider the best bargain yet, and is worth twice the money. You are welcome to use my name in this connection because I think the speaker deserves a good boost.

CHARLES ROSE,
6 Beaver St., N. Y. C.

Wonderfully Clear and Loud

Your Bel-Canto loud speaker is a wonder. It is remarkable to hear how wonderfully clear and loud it reproduces the music. There is no distortion and the loud notes of the organ and the highest notes of the singer can be perfectly heard.

C. W. ALBANY,
Albany, L. I.

To Hear Is to Buy

A short time ago my neighbor purchased one of your Bel-Canto Loud Speakers, and after having heard it, I want you to send me one, at your earliest convenience. Check enclosed.

G. F. WILSON,
Brighton, Colo.

Texas to Canada on Bel-Canto

I think it is as good as one selling for three or four times more. I have tuned in everything on it from Texas to Canada.

LOYD LATZ,
Circleville, O.

50% Better Than I Expected

Received the loud speaker in fine shape. It works fine—50% better than I expected. Am using 22½ volts on amplifiers instead of 90 volts, as you recommended, with a home-made modified single circuit set, detector and two stages of amplification.

JOHN T. CAVANAUGH,
Muskegon Heights, Mich.

Runs It on a 22½ Volt "B" Battery

I cannot give too much praise to my Bel-Canto. I am running it on a 22½ volt "B" battery, and have had the following stations loud and clear: KGO, KFI, KHJ, CRCK, WFAA, WSB, WBAP, WBZ.

F. M. GETCHEL,
Oshkosh, Wis.

So Good He Wants Another

Received your loud speaker and am quite pleased with it. Kindly send me another one as soon as possible. Am enclosing check for \$10.00.

FRANK C. LAEGEN,
Wallkill, N. Y.

\$25 for \$10



THE FAMOUS BEL-CANTO ACOUSTICAL AMPLIFIER

Direct from
Manufacturer to You

You cannot buy the BEL-CANTO through any dealer. Only direct from us. We save you these three profits—Distributor, Jobber & Dealer.

GUARANTEE

Money back any time within ten days if dissatisfied. We further guarantee to the publication carrying this advertisement that each and every speaker will be sold on the above terms and the instrument will be exactly as offered in this issue.

7 Points of Bel-Canto Superiority.

1. Our own fiber horn Crystalline finish.
2. Our own adjustable loud speaking unit, giving a wide range of tone quality and volume without distortion.
3. The base of cast iron, weighing four pounds, eliminating top heaviness.
4. All other metal parts are of heavy cast aluminum, highly polished.
5. Complete instrument stands 24 inches high, 10 inch bell.
6. Guaranteed for one year from date of purchase against mechanical defects of any kind.
7. No auxiliary batteries required. Just plug in on 2nd stage.

PRICE
\$10.00

Call at our factory, send us your check, money order or pay postman \$10.00. Prepaid to any part of U. S. and possessions. Tel. Vanderbilt 8959

C. O. D. Delivered Free to Your Door

BEL-CANTO MFG. CO.

HENSEL-BONIS CO., INC.

GENERAL OFFICE & FACTORY:

417-419-421 E. 34th St., NEW YORK CITY

Pleased Users of the BEL-CANTO

Very Much Pleased

I am not a testimonial writer, but feel that the Bel-Canto merits appreciation. The tone is excellent and distortion minimized. We are very much pleased with it.

L. S. HAUGWITE,
Suffolk, Va.

Bel-Canto Is Best

During the past two years I have tried out several types of loud speakers, none of them retailing for less than \$25, but not one of them can begin to come up to the Bel-Canto in my estimation.

R. F. SIGGELKOW,
Lanark, Ill.

None Compare with Bel-Canto

I have tried several other loud speakers, but yours has proven its worth both in volume and quality of tone. I want to say that one would have to go a long way to find a loud speaker that will compare with Bel-Canto.

FRED ZIEMENDORFF,
Fort Wayne, Ind.

Exactly as Advertised

The famous Bel-Canto Acoustical Amplifier received by me is in every respect as advertised. An A-1 Loud Speaker. I am more than pleased with it. Radio fans should grasp the opportunity of saving more than \$15.00 when they are in need of a speaker.

EDW. DAPP,
Harrisburg, Pa.

Better Than Any I Have Ever Heard

Enclosed check for \$10.00 and please ship me one of your loud speakers at once. I have just heard the one purchased by Mr. Holland of this city. It works better than any I have ever heard.

E. D. JAYNER,
Spartanburg, S. C.

A Fine Piece of Radio Furniture

Have heard a good many makes of loud speakers, but can safely say that in my estimation, the Bel-Canto is as good as any I have heard selling for \$25.00 or more. The article in itself is a fine piece of radio furniture, as it has a very fine finish, and nowhere about it does it show any cheapness.

ALFRED C. TUFFERY,
Seamen's Church Institute,
N. Y.

USE
EVEREADY
Radio Batteries
-they last longer

The New and Perfect Variable Grid Leak
65¢



THE BRADY LEAK
 Although it is cartridge type it is different in principle from any Variable Grid Leak you have ever used before.



COMPLETE WITH MICA CONDENSER AND PERFECT LEAK MOUNTING \$1⁰⁰

At your dealers—or post paid on receipt of purchase price.

A.C. BRADY CO.
 Improved Radio Apparatus
 108-SEVENTH AVE. NEW YORK CITY

Tubes Repaired \$2.50
 GUARANTEED
 All Standard Types W. D. 11 and 12 U. V. 199 - 200 - 201A
 RADIO TUBE SERVICE CO.
 239 Centre St., near Grand St. New York City

DO NOT ASK FOR A GRID LEAK
 Ask for a **DAVEN RESISTOR**



It is Just as Easy and Means a Lot More.

DAVEN RADIO CO.

"Radio Resistor Specialists"

10-12 Campbell Street Newark, N. J.

VACUUM TUBES REPAIRED

WD-11, WD-12, UV-201A, UV-199 and others for **\$2.50**

Quick service. All tubes repaired by us guaranteed to work as good as new. Send your dead tubes. All you pay is \$2.50 plus postage to postman.

THOMAS BROWN CO.

511-519 ORANGE ST. NEWARK, N. J.

Genuine Ken-Rad Radio Tubes \$3.49
 Type 200 or 201A
 Every tube absolutely guaranteed.
 Write for list of other radio bargains. Cash or C.O.D.
MARTIN HARDWARE CO.
 105 N. Main Street Hamilton, Mo.



A SENSATION HIRSCH

Radio World
 The Radio News
 The Sun-Globe,
 The Telegram-Mail,
 The Tribune,
 The World.

In fact all radio writers are unanimous in their praise of the

HIRSCH \$2.50 VACUUM CRYSTAL TUBE

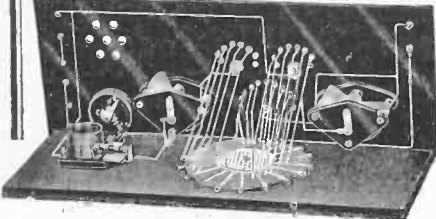
WHAT IT IS
 A fixed crystal mounted inside an ordinary small bulb. The vacuum tube then is simply an unusual method of mounting a fixed crystal.

WHAT IT DOES
 Makes it impossible to tamper with adjustment. The rod electrodes provide a spring mounting to protect it from shocks. The vacuum prevents any contamination of the crystal surface.
 For Reflex Sets—Nothing Better

Manufacturer's Agents
ELLESS RADIO EXCHANGE, INC.
 49 Vesey St., N.Y. Cortlandt 0405-8788

Complete Parts for 1 and 3 Tube

REINARTZ



Consisting of	Our Price
7x18 Formica Panel	\$1.70
Bakelite Socket	.45
Howard Var. Rhoo	1.35
23-Plate Var. Condenser	1.45
11-Plate Var. Condenser	1.35
1 Reinartz Coil	1.95
Freshman Var. Grid Leak and Condenser comb.	.75
3 Switch Levers	.75
8 Binding Posts	.40
2 Doz. Switch Pts.	.40
25 ft. Tinned Wire	.15
Baseboard for Mtg.	.25
Blueprint with complete instruction for assembling and wiring	.50
Reg. Price, \$21.69	\$11.45
Our Price	

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.

VARIABLE CONDENSERS

\$7.00 value, 43 Plate Vernier	\$3.95
6.50 value, 23 Plate Vernier	3.45
6.00 value, 11 Plate Vernier	2.95
1.75 value, 3 Plate Vernier	1.15
4.30 value, 43 Plate NOW	1.75
3.70 value, 23 Plate NOW	1.45
3.30 value, 11 Plate NOW	1.30
2.25 value, 5 Plate NOW	1.25
Complete Parts for ALL Receivers	
1-Tube Era	\$20.90
2-Stage Amplifier	12.95
Honeycomb Receiver	17.95
Ultra Audion	8.95
Overland Circuit	8.25
Hayes DX	10.95
Superdyne Receiver	15.85
Long-45 Circuit	16.25
Cockaday	11.95
Super Heterodyne	92.50

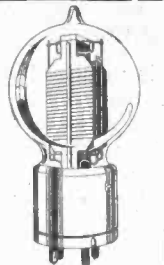


509 S. STATE ST. Mall Orders Address Dept. W-6, Chicago, Ill.

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:

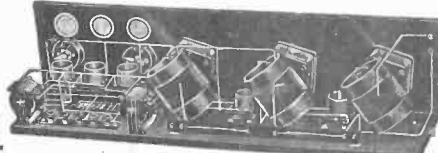
1. You have saved money through the hundreds of radio bargains made possible by our enormous buying power.
2. You have been served intelligently by men who are qualified radio experts.
3. You have bought quality apparatus because we handle nothing but brand-new merchandise GUARANTEED to give complete satisfaction.



Western Electric VT-2 Tubes \$7.45

Complete Parts for 3, 4 and 5 Tube

NEUTRODYNE



With FREED-EISMAN OR FADA LICENSED PARTS for 5-Tube Set as follows: 7x28x3-16 drilled and engraved panel with baseboard.



Automatic Electric Headset \$3.65

- 2 Audio Frequency Trans.
- 3 Eric Bazels
- 1 .001 Mica Condenser.
- 1 i. M. F. D. By-Pass Cond.
- 3 Filament Control Jaska.
- 3 4-lacch Dials.
- 1 Howard Vernier Rheostat.
- 1 Howard Plain Rheostat
- Strip of Bakelite.
- 8 Binding Posts.
- 2 Fifth Sockets.
- 3 Gang Fifth Socket with mounting and screws.
- 20 Feet Bus Bar Wire.
- Screws, Nuts and Miscellaneous set.
- Construction Book and Schematic Print.
- Grid Leak and Mica Condenser.

3-Tube Set \$28.60 5-Tube Set \$46.25

New Catalog Ready!

Send 10c for copy today!

Save On Specials Here!

COCKADAY	Fisher SPLIT VARIOMETER	\$2.75
COILS \$1.95	Tri-Coil R. F. TRANSFORMER	\$1.85
at	Genuine 3 in. and 4 in. BAKELITE DIALS	25c
Columbia TUNED AIR-CORE TRANS. FORMERS, set.	Moulded VARIOMETERS and COUPLERS, values up to \$7.00.	\$3.65
at	West. Electric VT2 TUBES, ea.	\$7.45
Freshman GRID LEAK and CONDENSER		65c
100-ft. RIBBON AERIAL		\$1.45
Double PHONOGRAPH ATTACHMENTS		65c

FORMICA
 PANEL sq. in. 1 1/2c
 TUBING in. 10c

HONEYCOMB COILS

1,500 Turns	\$1.50
1,250 Turns	1.50
1,000 Turns	1.25
750 Turns	1.00
250 Turns	.75
150 Turns	.60
100 Turns	.50
75 Turns	.40
50 Turns	.40
35 and 25 Turns	.40



Hookups!

SAVE MONEY WHOLESALE RADIO SERVICE COMPANY

BUY DIRECT AT MANUFACTURER'S PRICES

9 CHURCH STREET, NEW YORK CITY

COMPLETE PARTS FOR FAMOUS

8 TUBE SUPER HETERODYNE

"THE ROLLS-ROYCE OF RADIO RECEPTION"

- 3 Radio Frequency Transformers, 5,000 to 25,000 meters
- 1 ATX Audio Transformer for First Stage
- 1 ATZ Audio Transformer for Second Stage
- 2 1 mfd By Pass Condensers, Type C-1000
- 1 Tuned Filter Coupler, Type H-34
- 1 Oscillo-Coupler, Type BW-21
- 1 8"36"x1/4" Bakelite Panel, drilled and engraved.
- 1 Baseboard

- 1 Terminal Panel, 1/4"x8 1/2"x1 1/2"
- 1 .001 mfd Cardwell 43 Plate Condenser
- 1 .0005 mfd Cardwell 23 Plate Condenser
- 2 Universal Geared Dials for Micrometer Control of Condensers
- 1 Frost Double Circuit Jack
- 1 Frost Single Circuit Jack
- 1 Cutler Hammer Battery Switch
- 1 Super Heterodyne Manual—This is a 65 page book containing all information of construction and operations of the Super Heterodyne Receiver.

- Blueprints and panel lay-out free with each order.
- 3 General Radio—10 ohm Rheostats for Single Tube
- 2 General Radio—6 ohm Rheostats for Second and Third Tubes
- 1 General Radio Potentiometer—400 ohm Type 214-A
- 3 Dubilier Mica Grid Condensers
- 2 .00025 mfd Fixed Condensers
- 1 .002 mfd Dubilier Fixed Condensers
- 1 .006 mfd Dubilier Fixed Condensers

\$92.50

5 TUBE NEUTRODYNE SET

- 1 7x26 Baseboard
- 3 Neutroformers.
- 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 7x26 Drilled Panel
- 1 .00025 Dubilier Condenser
- 1 2 Meg. Leak
- 2 .006 Mica Condensers
- 8 Binding Posts
- Spaghettil 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

COCKADAY, 4 Circuit Tuner With Push-Pull Amplifier

This is the set that Cockaday described as being able to receive over distances of 3,000 miles. You can't build anything better. (Parts are those specified by Cockaday.)

- 1 Cockaday Improved Bakelite Coil
- 2 Ameco 26 Plate Ver. Condensers
- 2 Amylex Gridensers
- 1 Bradleyleak
- 5 Melco Sockets
- 1 Ameco 6 ohm Rheo.
- 3 Ameco 20 ohm Rheos.
- 1 Pacent Single Jack
- 2 Pacent Dble. Jacks
- 2 Amertran Trans.
- 1 Como Push-Pull Input
- 1 Como Push-Pull Output
- 2 Switch Levers
- 11 Switch Points
- 2 Switch Stops
- 1 Dubilier Cond. .0005
- 1 Dubilier Cond. .00025
- 1 Durham Var. Leak 48,000
- 1 Ameco 400 ohm Potentiometer
- 1 7x24 Panel
- 1 3x2 1/4 Sub-Panel
- 1 12x12 Panel
- 1 7x24 Baseboard
- Blueprints, Wire, etc., with each order.

\$52.50

TUBES

Genuine R. C. A.

UV200, UV201A

UV199

WD11, WD12

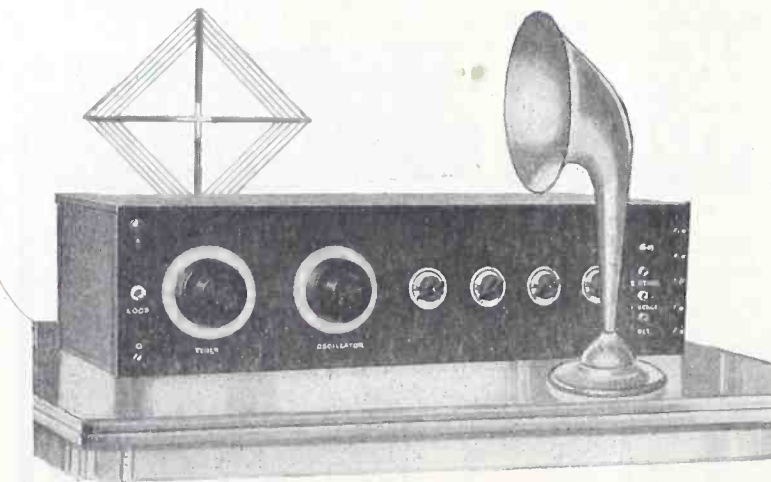
\$4.50

FREED-EISEMANN 5 TUBE NEUTRODYNE, NR-5, LIST PRICE, \$150—OUR PRICE, \$125.00.
 FREED-EISEMANN 5 TUBE KNOCKDOWN, Model KD-50, LIST PRICE, \$80—OUR PRICE, \$62.50.
 FADA 5 TUBE KNOCKDOWN, LIST PRICE, \$65.00—OUR PRICE, \$49.50.

THE WRS—FAMOUS 5 TUBE NEUTRODYNE BUILT OF LICENSED HAZELTINE PARTS IN A BEAUTIFUL MAHOGANY CABINET READY TO OPERATE—WITHOUT TUBES OR BATTERIES—\$59.50.
 FADA—5 TUBE NEUTRODYNE BUILT OUT OF GENUINE FADA PARTS IN A BEAUTIFUL MAHOGANY CABINET READY TO OPERATE—WITHOUT TUBES OR BATTERIES—\$72.50.

Write us as to what you need and let us surprise you with our low prices. Send Money Order, or pay the Postman. Money back if not satisfied. Postage paid on all orders over \$5.00.

"THE STANDARD OF COMPARISON"



Most Selective Receiver Known

Send for the 32 page illustrated book giving latest authentic information on drilling, wiring, assembling and tuning 6 and 8 tube Ultradyne Receivers.



50c

ULTRADYNE

The Improved
SUPER-HETERODYNE

Employs "Modulation System," an entirely new principle of radio reception just developed and perfected by R. E. Lacault, A. M. I. R. E., technical editor of Radio News and formerly Radio Research Engineer with the French Signal Corps Research Laboratories.

This principle is of such a basic character that the sensitiveness is increased over that of any known receiver. Weakest signals are made to operate the loud speaker. Results secured by the Ultradyne exceed by far those obtained with reflex, super-regenerative, Neutrodyne and even the well known Super-Heterodyne. This is true in regard to selectivity, range, signal audibility, simplicity and general efficiency.

The "Modulation System" is employed exclusively in the Ultradyne, the improved and simplified Super-Heterodyne.

Write for Descriptive Circular

PHENIX RADIO CORP.

5-9 Beckman Street

New York City

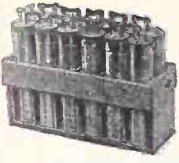
RADIO HORN
 Has clear, natural tone and an exceptionally fine appearance. Your receiver fits in base. Mail a dollar bill for horn like picture, knocked down, prepaid. Easily assembled by anyone.
\$1.00
FOX MFG. COMPANY, DEPT. C
247 So. Broadway, Los Angeles, Cal.

PATENTS Domestic and Foreign, Trade Marks and Copyrights, Infringement Suits and Interference Cases.
 Booklet "Mere Light on Patents" Sent Free
MAX D. ORDMAN
 Reg. Pat. Lawyer
 Mech. and Elect. Engineer
 Specializing in Radio
 1503 Woolworth Bldg., N. Y. City Tel. Whitehall 7048-1


Save
1/2 Price
 of
New Tubes
 Burned out or broken tubes repaired and guaranteed equal to new.
Harvard Radio Laboratories
 200 Old Colony Ave.
 South Boston, Mass.



STOP "B" BATTERY EXPENSE
 SUPER RECHARGEABLE "B" BATTERY AT PRACTICALLY THE SAME PRICE AS DRY CELLS
\$3.95
 100 Volts or more in Special Trays
 12 Cells—24 Volts—Capacity, 2000 M.A. Hours
NEGLEY-HIMMER, Jr.
 Laboratories
 310 CANAL STREET, NEW YORK CITY
 Mail Orders Promptly Filled
 Dealers Apply for Terms



THORIO
 RADIO TUBES
 1 1/2-3-6-8-8 V. 1/4 AMP. DETECTOR
 FIT STANDARD SOCKET - g. WORK
 ON ANY CIRCUIT - MAIL YOUR ORDER TO
HAYDEN-SALESCO.
 JERSEY CITY - N.J.



RADIO WORLD, the only radio paper that keeps right up to the minute on all radio news—It's **NEWS** when you see it in **RADIO WORLD**

Better Tone for Your Radio!
 FRANK D. PEARNE, famous Radio engineer, says TRANSCONTINENTAL RIBBON Aerials aid reception by combining maximum surface with minimum resistance. FORREST, eminent inventor, says, "I get best results by twisting Ribbon Aerial, 2 twists per 50 feet." Complete with snap hooks soldered to ends for instant attachment to insulators.
Transcontinental 50-Foot RIBBON COPPER AERIAL \$1.50
 75-Ft. \$2.25
 100-Ft. \$3.00
 150-Ft. \$4.50
 Clearer tone, greater volume, increased distance and selectivity guaranteed or your money refunded! Improves any set, tube or crystal. A laboratory product, with capacity, resistance and strength calculated to give better results.
Try It Without Risk! If your dealers cannot supply you, order direct from manufacturer, enclosing price. 100-foot length most generally used. Money-back guarantee protects you.
Acorn Radio Mfg. Co. 1806 S. Racine Ave. Dept. 222 CHICAGO
TRANSCONTINENTAL RIBBON AERIAL
DEALERS! Write for Special Offer!



BRISTOL SINGLE CONTROL RADIO RECEIVER

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

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

Choice of Aerial or Loop
 Where conditions make it difficult to install an outside aerial, as in congested sections of cities, good results can usually be had by using inside loop. In fact, the directional feature of the Loop often brings in stations not possible with a stationary aerial.
 Mounted in solid mahogany case with walnut finish, the Bristol Single Control Radio Receiver is handsome in appearance. The price is \$190.00. Bulletin 3013-BT describing this set will be mailed on request.



Lattice Coil Specialties

Variometers
 Variocouplers
 R.F. Transformers
 Micro-Mike
 Condensers
 Plate Coils
 Tapped Coils

ESTRU LATTICE COIL PRODUCTS have been designed so as to produce as nearly as possible IDEAL INDUCTANCE in various forms. It was not the intention in designing, to produce Miniature Apparatus, the small size being the result of careful electrical design with no UNNECESSARY Mechanical parts which would detract from the electrical efficiency.

YOU will appreciate these facts as set forth in our COMPLETE DESCRIPTIVE LITERATURE, which will be sent on request and in reading our GUARANTEE which goes with all ESTRU PRODUCTS.

DALTON WHITTIER TRUE CO.
ESTRU
 MANFRS. CHICAGO.
 2905 WEST MADISON STREET




BRISTOL
 TRADE MARK
AUDIOPHONE
 REG. U. S. PAT. OFFICE
LOUD SPEAKER

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

Made in three models:

Audiophone Senior.....Price \$32.50
 Junior Audiophone.....Price 22.50
 Baby Audiophone.....Price 12.50



THE BRISTOL COMPANY
 WATERBURY, CONNECTICUT



5 TUBE SUPER REGENEDYNE SET

ON TO LONDON

Via Super Regenedyne

The sensational coast to coast loud speaker set is now available for immediate delivery.

Again SIDBENEL contributes notably to Radio Advancement. It is now possible to get distant stations loud and clear, even with the powerful local stations in progress. Tone is beautiful and static remarkably reduced.

You will be amazed when you hear stations ranging in the vicinity of 2000 MILES come in on your loud speaker. The dial at your command controls every state in the Union. Just pick them out.

If your out-door aerial is not available, a loop aerial will serve just as well. This offers you the advantage of taking your set with you when you go for a trip on your motor boat, when you go camping, or when you take long automobile outings.

Super Regenedyne Receiver, \$65.00

Sidbenel GET THE THRILL OF POWER

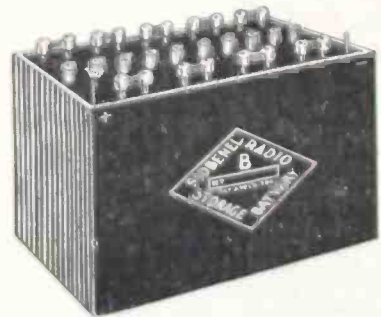
YOU DON'T HAVE TO BUY MORE "B" BATTERIES ONCE YOU INSTALL A SET OF SIDBENEL'S RECHARGEABLE "B" BATTERIES IN YOUR SET.

THEY ARE THE MOST POWERFUL AND FINEST CONSTRUCTED BATTERIES YET PRODUCED, GIVING YEARS OF SERVICE.

IT IS REVOLUTIONIZING ALL IDEAS OF RADIO ECONOMY, EFFICIENCY AND ENDURANCE.

LOOK OVER THE ILLUSTRATED PICTURE; SEE EVERY PART FOR YOURSELF.

ONE CENT IS ALL that it costs to recharge a SIDBENEL BATTERY. You can do so very easily by connecting it to your rectifier, home charger or farm generator. Complete and very easily explained directions come with the purchase of all batteries.



A COMPLETE SIDBENEL STORAGE "B" BATTERY JUST WHAT YOU GET

A battery built in a genuine hard rubber jar (not glass), good large pasted plates of exceptional higher power, an improved cover for each individual cell, counter sunk to prevent loss and is sealed in with compound. Heavy lead terminals to connect plates from cell to cell. Best cedar treated separators. Extra large vent caps for making it easy to inspect the cells. Real market value of battery \$10.00—for rubber case type. The very best your money can buy for a durable and efficient battery.

PRICES

	Assembled	Knocked Downs
22½ volts—1 Unit.....	\$5.90	\$4.00
45 volts—2 Units.....	9.80	7.75
90 volts—4 Units.....	18.00	14.75
115 volts—5 Units.....	22.50	17.75
145 volts—7 Units.....	27.50	21.50

Alternating current rectifier for charging direct from lamp socket.....

2800 MILLI-AMPERE CAPACITY—Two Year Written Guarantee with Every Battery.

**SIDBENEL
ELECTRIC MFG. CO., INC.**

25 West Mt. Eden Avenue, New York



Catalog on Request. Radio Map 16c.

RADIO WORLD

[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879]

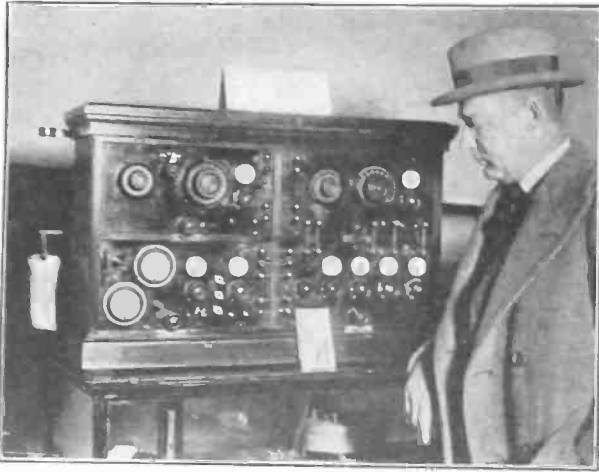
A Weekly Journal Published Every Wednesday and Dated Saturday, by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y. Phones: Lackawanna 6976 & 2063.

Vol. V, No. 2. Whole No. 106

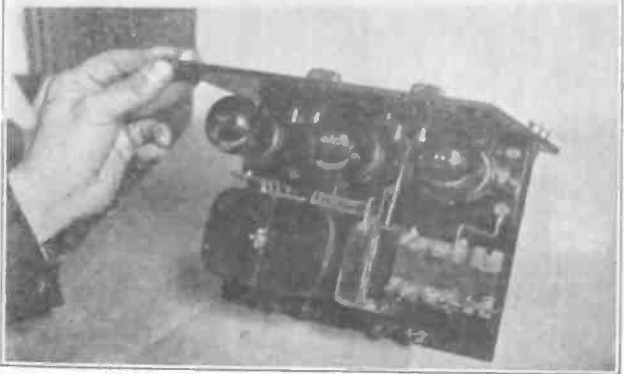
April 5, 1924

15c. per copy, \$6.00 a year

NOVELTIES FEATURE WASHINGTON SHOW



(H. & E.-Wide World)



EXTREMES—An 8-tube superheterodyne and cabinet, built by J. W. Beers, Forest Glen, Md., and a crystal set in a matchbox were shown in contrast at the recent Washington Show. The matchbox is a quarter the size of the white paper in the lower foreground. An interested visitor at the show is eyeing up the difference in bulk between the two before hearing the difference in performance.



(H. & E. Wide World)

USES AN OLD "KATY"—Thus did one exhibitor at the Washington Show try to set the 1924 style for straw hats of vintage of 1923 or earlier, with a crystal receiver built in. At right, also at the show, the boat and set used on geological survey trip through the Grand Canyon. From this boat the adventurers threw their ground wire into streams and tried other freak methods of reception, all with excellent success. The boat was named the Grand.



(K. & H.)
NO DISTORTION—That is what Sidney Kasindorf (2-ATV) decided would be the rule in his amplifier. He built two stages, using the push-pull transformer system that requires three tubes. The panel width is ten inches, as ruler shows. Sidney said that he never heard clearer loud reception than he gets now, but warned the best transformers must be used.

Super-Autodyne a 5-Tube DX Getter

By Charles H. M. White
Consulting Engineer

AMONG the much-discussed receivers of today is the well-known super-heterodyne. Although it looks very much complicated and mysterious, it is, in reality, a very simple circuit. The basic principle of the super-heterodyne is the conversion of short-wave signals to those of much longer wavelength, then amplifying these new long waves by means of several stages of radio-frequency amplification and then finally detecting or rectifying them for use in loud speaker or phones.

From this last part on, the super is nothing more than any other set or circuit with added stages of audio-frequency amplification. In other words, the super is a long wave radio-frequency receiver with a first detector (No. 1) tube that is used to convert the short or high frequency waves received by the loop to long or low frequency waves which are more efficiently adaptable for radio-frequency amplification.

There are two detectors in the circuit: the first detector (No. 1), which is the conversion to long wave detector, and, the second detector (No. 5) which converts the long waves to audio-frequency waves for use in the phones or additional audio-frequency amplification.

The super-autodyne receiver differs from the standard super-heterodyne in that tube No. 1 is used as both detector and oscillator. This tube is kept in the continual state of oscillation. The oscillations of this tube are slightly in excess of the frequency of the carrier oscillations of the received signal, thereby producing a beat note of a frequency which is the difference of the two.

For example, if the station oscillations were 1,000,000 cycles per second and the oscillations of the first detector were 1,100,000 cycles per second, then, the beat note would be 100,000 cycles per second.

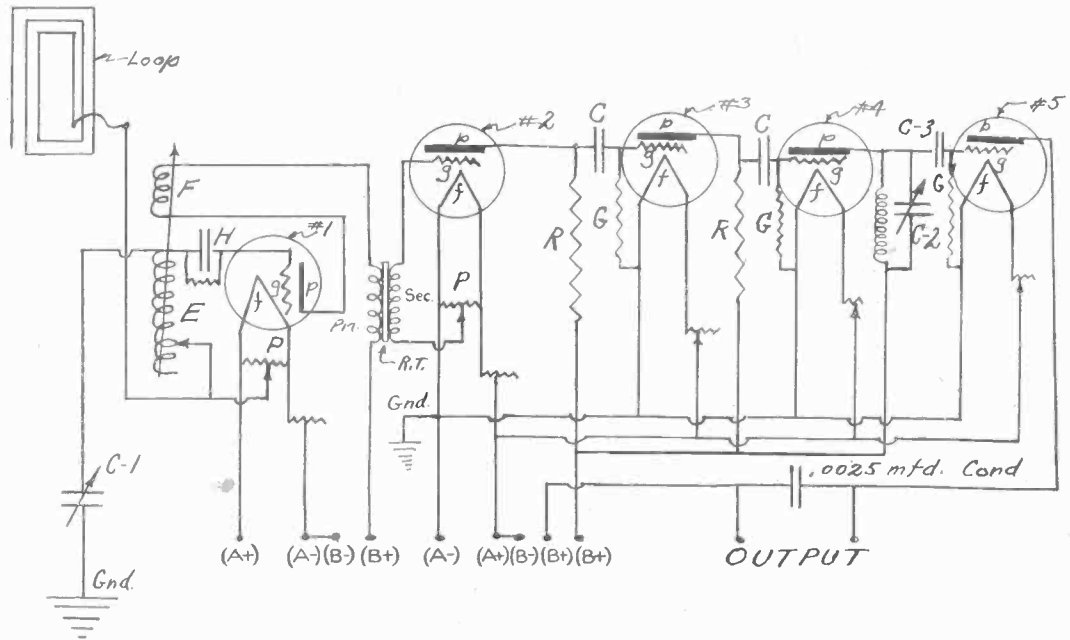
Now, if the original received signal were modulated to carry voice or music, then, likewise, the new beat note wave of 100,000 cycles per second would be similarly modulated. Therefore, the new long wave would be a replica of the original wave in modulation, only the wave-length or frequency of the carrier is converted to a new value.

Since it is possible to amplify more efficiently signals of lower frequencies it is only more reasonable

to expect that the super-heterodyne is more efficient per tube than any other style of RF receiver.

The super-autodyne is a little more simple than the super-heterodyne, as previously explained. It will be noted that the first R. T. unit is a transformer designed for high wave radio-frequency amplification. There are several radio manufacturers placing such a transformer on the market. The remaining stages of radio-frequency amplification are resistance coupled since this type of coupling produces a very cheap and efficient method.

Before the signal is passed into the final tube (No. 5) to be detected or rectified to audible frequencies, it is passed through a tuning unit formed by the coil L and the condenser C-2.



Circuit diagram of Super-Autodyne set. Two steps of audiofrequency may be added, the additional wiring being the same for all audio amplifiers.

This unit aids in keeping out all extraneous signal noises and increases the sharpness of tuning. The preliminary tuning element of this receiver is afforded by the coupler E-F and the condenser C-1.

The very fact that this single circuit tuner is broad is an aid in this receiver because when heterodyning it is necessary slightly to detune in order to get the long wave beat note for amplification.

If in a sharp tuning receiver this is done, the loss in signal strength would be much more severe, hence making it necessary to use a separate tube for heterodyning. Any ordinary flat (pancake type) of short wave loop will suffice.

The inner connection of the loop should be connected to the receiver. In this connection the loop does not strictly act as a loop aerial and therefore is only slightly directional. While the selectivity of the autodyne is not as great as that of the heterodyne, it is sufficient for all but the most severe requirements, and, as it costs less and its construction is simpler, it is a receiver well worth considering.

(Continued on page 16)

Girls in New York Dance to DX Music

Clarity and Volume Produced on Loud Speaker — Circuit Diagram to Be Published Soon

S TRAINS of music from KPO, San Francisco (423 meters) came over the loud speaker to New York with sufficient sustained volume this week to enable a group of stage girls to rehearse a dance to the jazz. It's about 3,000 miles, remember!

The girls did the dance just as an experiment. It worked. The volume and clarity of the music was the subject of favorable comment.

And what was the circuit? How many tubes? Loop or aerial? Was it a reflex, duplex or noflex circuit?

The diagram and constructional data will be published in an early issue of RADIO WORLD.

That's that. But, seeing the pulchritude, and especially the dancing, required all of one's concentrated attention. There was no chance to think about any radio circuits.

Among the girls who danced were Polly Archer, Caddie Carr, Irma Dale and Ruth Laird. The scene was Ned Wayburn's studio.



HANDS ON KNEES, stage girls dance to radio music. They are Caddie Carr, Ruth Laird, Polly Archer, and Irma Dale.



(Wide World Photos)
With perfect rhythm, induced by jazz from Station KPO, San Francisco, Polly Archer and Caddie Carr, stage girls, are shown above dancing in New York. Note the radio set at right, with loud speaking horn. Gracefully the girls bend backward and seem to enjoy it. They were snapped at Wayburn's school of dancing.



UP AND UP describes girls' position in this dance.

The Construction of a Battery Charger

By *Walt. S. Thompson, Jr., E. E.*

Part II

AFTER the transformer has been assembled, the panels drilled and all accessories purchased, the builder is now ready to assemble the battery charger.

The first step is to mount the various pieces of apparatus on the front panel H. The binding posts and fuse clips are put in place, each with a soldering lug on the back of the panel. The switch G is next mounted, then the two terminals to which the lamp cord is connected and lastly the ammeter A.

The two terminals for the lamp cord should be small binding posts mounted for making connections back of the panel. This is so the lamp cord can be run through the small hole between the binding posts and terminated on them. The apparatus assembled on the panel is shown by Fig. No. 1.

The transformer should next be mounted to the backboard J by means of the four mounting bolts M, being held away from the board as shown by Fig. 1. From this figure it is evident that the mounting bolts must be threaded for about two inches and that each must have four washers and three nuts. Next the

In connecting the lamp cord to the two binding posts the following procedure will be found most satisfactory. Pull the end of the cord through the hole provided for it and then through a fiber washer which should fit the cord snugly and should be larger than the hole in the panel. Knot the two wires together so that the cord cannot slip back through the washer and then fasten a wire to each binding post. In this way an accidental tug on the cord will not pull the wires from the binding posts, the strain being taken by the fiber washer.

The panel and the backboard can now be fastened to the baseboard I by means of wood screws, holes for which have been drilled. The brass strips K should be drilled at $\frac{1}{4}$ " from each end; should have a right angle bend made $\frac{1}{2}$ " from each end and should be mounted with small brass bolts as shown by Fig. 1.

The remaining wiring should next be completed. The terminals W, X, Y and Z in Fig. 4 should be connected as indicated diagrammatically by Fig. 3 and pictorially by Fig. 1. These connecting wires should be No. 18 cotton and rubber insulated wire and should be kept as far away from the tube as possible. The two filament current leads indicated in Fig. 3 should be connected as shown in Fig. 1 using No. 12 cotton and rubber insulated wire. These connections should

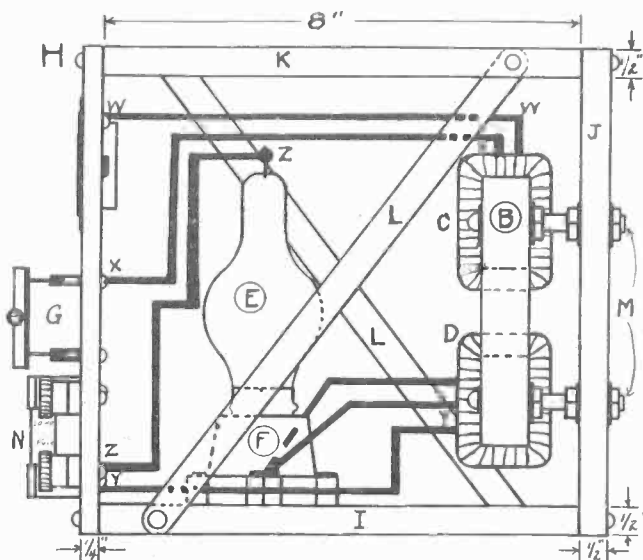


Fig. 1. Schematic diagram of the complete charger, showing arrangement of parts on front and back panels. The heavy black lines designate the wiring.

tube socket F should be mounted on the baseboard I as indicated by the same figure.

A schematic diagram of the wiring of the charger is shown by Fig. 2. From this figure it is evident that the primary winding C is connected directly across the 110-volt supply main and that the eight turn part of the secondary winding D is connected to the tube filament, while the 60 turn part supplies the necessary voltage for charging the battery. This diagram forms the basis for the diagram given in Fig. 3, this more complex diagram showing how each part of the charger is connected and also illustrating the functions of the various parts.

The connections on the back of the panel are shown by Fig. 4. These connections should be made with No. 18 wire, taking care to follow the diagram closely.

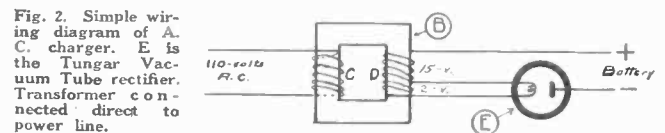


Fig. 2. Simple wiring diagram of A. C. charger. E is the Tungar Vacuum Tube rectifier. Transformer connected direct to power line.

be made with great care, following the diagrams very carefully if a burnt out tube is to be avoided.

The final step in the construction is the placing of the braces L as shown by Fig. 1. These braces are not absolutely essential, but will add so materially to the ruggedness of the frame that they should be used.

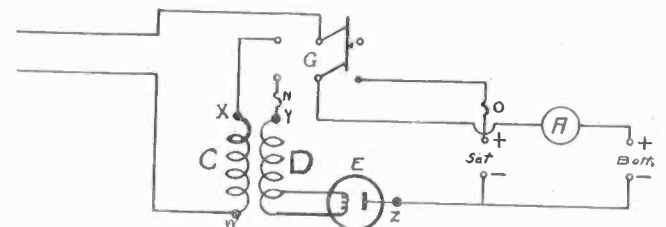


Fig. 3. Same as Fig. 2, but giving wiring diagram for switches.

When in use, the battery and charger can be located under the table on which the radio set is mounted, or at any other convenient place. The filament leads from the set should be connected to the binding posts on the left of the panel, the battery leads to the two binding posts on the right of the panel and the lamp cord to some convenient lighting system outlet. These connections are permanent and do not need to be disturbed unless it is necessary to move the apparatus.

When the switch is thrown to the left, it is evident from Fig. 3 that the alternating current circuit is completed and that the battery is on charge. The ammeter now reads the charging rate. When the switch

(Concluded on next page)

Quality as Key to Real Enjoyment

By Paul B. Findley

WHEN radio broadcasting started, the fan who had any sort of a set at all drew gasps of wonder from his friends when they heard some local station grinding out phonograph music. A year later, and the craze was for long distance records. Then came loud-speakers whose raucous beatings were an insult to the public's good taste.

Developed by men of brief experience in the art, and having little or no knowledge of the acoustic principles involved, many of the early loud-speakers were merely glorified telephone receivers, fitted to a horn and designed "by guess and by gosh." Now that radio is settling down to a means of entertainment that must stand on its own merits in competition with other forms, the public is demanding a quality and volume of reproduction so faithful to the original that the listener can close his eyes and forget that he is not in the studio or concert hall.

Such faithful transmission and reproduction of a radio program is possible only when every link in the chain is carefully designed and skilfully operated.

Making a Battery Charger

(Continued from preceding page)

is thrown to the right, the alternating current circuit is broken and the battery is connected to the set, the ammeter now reading the discharging rate. When

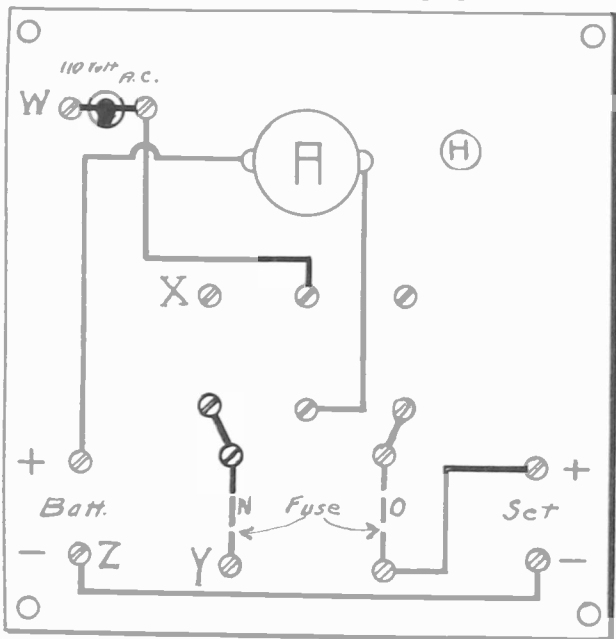


Fig. 4. Schematic diagram of front panel layout. A designates ammeter and is connected to plus binding post going to plus of storage battery. The switch automatically connects the battery to charger or to set.

the switch is opened and perpendicular to the panel, all circuits are open and no current can flow.

From the above it is evident that a throw of the switch will connect the battery to the set or will put the battery on charge or will disconnect the battery altogether, eliminating all connecting and disconnecting of leads formerly necessary when a battery was to be charged.

(This is the second and final article. The first article appeared in RADIO WORLD of March 29, 1924.)

The system must not fail to transmit the full range of tones; it must not add any tones of its own, recognized as "blur" or "fuzz", and caused by overloading one or more elements; it must not introduce noise, and it must give enough volume for comfort, yet not so much as to make the lower tones "heavy."

To avoid these troubles, "cut and try" methods with the human ear and memory as guides will not serve. Present-day achievements have been possible only because of measurement methods and standards resting on fundamental researches extending back more than a generation. The high-quality carbon microphone of today is a direct descendant of the granular carbon transmitter on which Bell System engineers were working as early as 1886.

Some of the practical details which spoil radio listeners' enjoyment were pointed out in a recent paper by W. H. Martin, of the American Telephone and Telegraph Company, and Dr. Harvey Fletcher, of the Western Electric Company. Perfectly intelligible speech can be transmitted in which tones ranging from 500 to 2,500 cycles only are employed, but in order to obtain naturalness of effect comparable with that when listening to the original, the range must be extended at both ends to include 100 cycles and 3,000 cycles. If music also is to be enjoyed, the upper range must be still further extended to 5,000 cycles or more. To include so long a range requires close attention to details of both the broadcasting and the receiving apparatus, as the tendency is to cut off both ends of the range.

In describing the broadcasting apparatus in detail, the speaker first outlined the correct arrangement of the studio where the program is produced, stressing the fact that a room which gives no reverberation is just as bad as one giving too much. It is generally recognized that a bare room is undesirable, as the reverberations cause one note or syllable to follow over into the next, producing an unpleasant jumble of sound; but it is a very common error to cover the walls, floor, and ceiling of the studio as completely as possible with sound-absorbing material, cutting off all echo and making the music sound "dead." This condition also makes it very difficult for a singer or violinist to keep on the key, as they are accustomed to getting the pitch of each note from the reverberation of the preceding one. In a series of tests conducted by Prof. W. C. Sabine, a group of musicians constantly picked a particular reverberation condition as being best for the piano. The amount of padding needed differs somewhat, of course, according to the instrument or instruments used.

When, as is often the case, the program is presented in an assembly room or concert hall, it is obviously impossible to change the acoustic properties of the room. The best solution of the problem is then in properly locating the microphone transmitter. When a symphony concert is broadcast, the best place for the microphone has been found to be from thirty to fifty feet in front of the orchestra and ten to twenty feet from the ceiling. This location picks up the sound of the orchestra as a whole, and does not catch too much reverberation or incidental noise from the audience. It is not desirable to scatter several microphones through the orchestra, as with this arrangement the noises from part of the instruments will be transmitted with greater intensity than that from others, and the balance of the ensemble will be lost.

A Two-Tube Loop Set of Great Power

By Byrt C. Caldwell

THE type of set which I am going to describe in this article, is undoubtedly the most remarkable which has been developed to the present time. In actual comparison, it has given louder signals than an ordinary regenerative set using six tubes and outdoor antenna.

This set used but two tubes, and a loop as a collector. It is a one-tube super-regenerative set, employing one step of audio frequency amplification. It is much more powerful than even the three-tube super-regenerative set. The reason for this is that the three-tube set uses but one method of changing the resistance of the circuit, i. e., either the negative resistance of the feed-back is kept constant and the positive resistance of the grid is varied, or the positive resistance of the grid circuit is kept constant, and the negative resistance of the feed-back is varied.

This set, however, combines both of these methods in the proper phase relation. The amplification, therefore, is much greater for a given number of tubes. This set, if constructed with care, from good parts, is fairly easy to operate. After several hours' practice, no trouble at all is experienced in tuning and working the set. However it is not advisable for the novice to attempt to construct this set. A person should have built at least one tube set, and he must be thoroughly acquainted with its operation, and with the operation of the super-regenerative circuit.

For the dealer, who wishes a set which gives a tremendous amount of volume, it is extremely satisfactory. Its volume, however, can be regulated, and it is, therefore, also an ideal home set.

The circuit diagram published herewith shows the hook-up to vary only slightly from the conventional single circuit regenerative set and one step. The only additions are the two large coils, and the filter circuit before the amplifying transformer. In fact, it is not a difficult matter to change the single circuit receiver over into this set, provided it is a set which uses the tickler feed-back. No rheostats are necessary, but one is shown in the diagram. This controls only the second tube, and is for the purpose of reducing the volume of the signals, as it would be too great with the full power of the set on the local stations. If this is used, connect it in on the circuit diagram at the point A.

The diagram of the front of the panel shows the lay-out and the dimensions. It will make the work on the panel easier, if you cut a piece of paper to the size of the panel, which is 7" x 14" and lay out all the dimensions on this paper. Then place the paper on top of the panel, and with a sharp pointed instrument, mark the panel for the positions of the instruments. Two large honeycomb or duo-lateral coils are required, one of 1,250 turns, and one of 1,500 turns, and several small ones. 35, 50, and 75 turn coils are the correct size. The condenser which is used for tuning has 11 to 23 plates. The small fixed condensers should have a mica dielectric. The filter circuit, which consists of two 12,000-ohm non-inductive resistance units, a .005 mfd. fixed condenser, and an iron core

choke coil, is placed close to the primary of the transformer, which is placed directly in back of the second tube. For the best results, power tubes should be

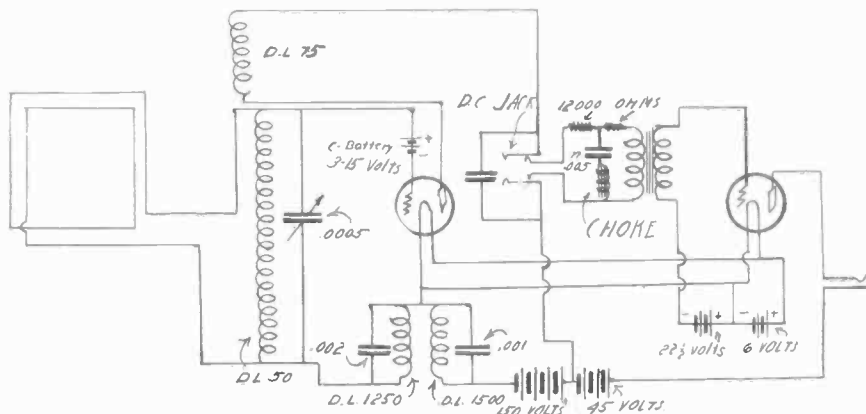


FIG. 1. Wiring diagram of Caldwell 2-tube set. Separate C batteries are used for each tube. More than 150 volts may be used for more volume. The rheostat is not shown, but is placed in the negative A battery lead. Short leads are important in this circuit.

used in this set. If it is not possible to obtain these, use UV201A tubes. Under no circumstances, use the soft detector tubes. They will not work in a super-regenerative set. The binding posts for all of the batteries are placed on the back of the set, for convenience. Jacks are used, so that the first tube alone may be used for the purpose of tuning, and when it is not desired to use the loud speaker. When using both tubes, do not connect a good pair of phones in, if you want to keep the phones. By arranging the apparatus as shown in the diagram, it is possible to use very short connections. Of course, they should all be soldered. A loop should be used with this set, as it has been proven that a super-regenerative set operates best when used with a loop. It should consist of about twenty turns on a three-foot loop, and the wires should be spaced about a quarter of an inch or less. A clip should be provided, so that the number of active turns may be varied.

It will be noticed that a very high plate voltage is used. About 150 volts are used on the first tube, and 45 additional on the second, making about 200 volts on the amplifier. The grid battery for the second tube is 22½ volts, and for the first is from three to twelve volts.

In operating this receiver, loosen the coupling between all of the coils. Then connect all of the batteries, and light the filaments. Place the plug in the first jack. A high whistle should be heard. If this whistle is not heard, bring the large coils closer together. If it is still not heard, go over all of your connections, making sure that they are all solid. Make sure that all contacts, of the tubes in their sockets, and the plugs in the jacks, are good, and then see that the honeycomb coils are connected properly. When the whistle is heard, bring the two small coils together until a click is heard. If you do not hear the click, go over everything, exactly as described above. When both tubes are oscillating, tune in the stations with the condenser. When you have one tuned in, bring the small coils together until the signals are as loud as possible. Then bring the two large coils together. A point will be reached where a tremendous amount of amplification takes place. When this point is

(Concluded on next page)

Boy Scouts Inspect Electrical Plant



SCOUTS of Brooklyn and Queens inspected the Bell system laboratories. (1) First step in manufacture of 10,000 watt tube; (2) J. B. Johnson, inventor, demonstrating; (3) measuring strength of heated wire in vacuum; (4) two extremes of tubes; (5) finished products.

(Concluded from preceding page)
 reached, take out the phones, and plug in the loud speaker and regulate the volume with the rheostat. Further fine adjustments of the coils and the condenser may be made.

The quality of the music received in a set like this

is better than that obtained with an ordinary regenerative set. It is the lowest-priced power set which can be built, and due to the fact that it uses a loop, it causes no interference. It is entirely probable, that the set of the future will be some derivation of this type of super-regenerative receiver.

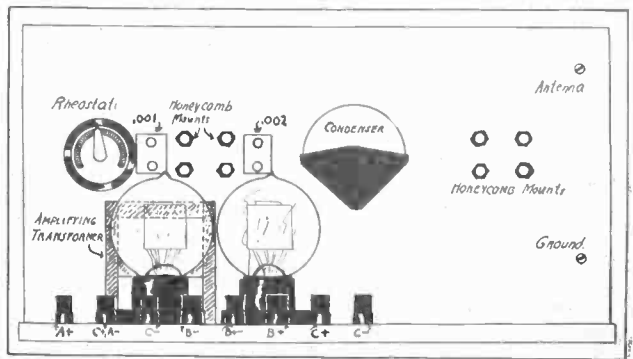
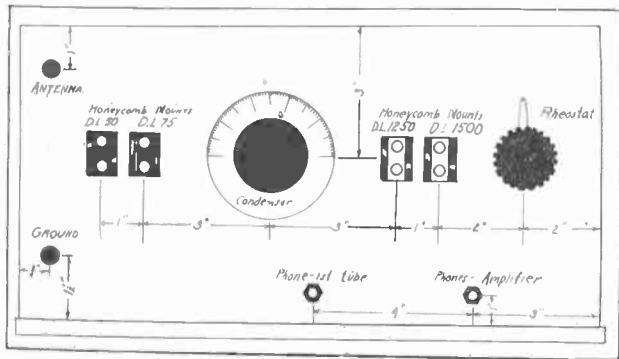


FIG. 2. Front panel layout giving dimensions and measurements for drilling. The low wave coils are on right hand side, the high on the left. Fig. 3 (at right) shows layout of apparatus on baseboard and rear of panel.

By HERBERT HOOVER: Secretary of Commerce, Who Regulates Radio

Who Shall Pay for Broadcasting?

PROFESSOR EDOUARD BRANLY, noted French scientist, inventor of the coherer that made the success of Marconi and Lodge possible, has just been made a Chevalier of the Legion of Honor by the French Government. He is eighty.



(K. & H.)

Super-Autodyne Circuit

(Continued from page 10)

The constants of the units for this circuit are: The condenser C-1 is a 11 or 13 plate air variable, C-2 is a 43 plate variable, the condensers C are .05 mfd. fixed paper condensers, and, C-3 is a .00025 mfd. mica fixed condenser. The unit H is a grid leak and condenser of suitable size for the tube No. 1.

The leaks G are 2 megohm leaks, and, the leaks R are 1 megohm leaks. All these leaks are standard and may be purchased. The unit E-F is any ordinary 180-degree vario-coupler; the coil F being the rotor and E the stator.

The coil L is a 400-turn honeycomb coil. The potentiometers P are 200 ohm potentiometers.

It will be noted that separate "A" and "B" batteries are used for the tubes No. 2, 3, 4, 5, and, No. 1. This is done to insure quiet operation and sharper tuning. The receiver as illustrated has no audio-frequency amplification. Audio-frequency amplification of any well-known type can be added and the same batteries as used for tubes No. 2, 3, 4, and 5 can be used. It will also be noted that after preliminary adjustments

HOW profound the changes in radio communication have been since the regulatory Act of Congress approved in August, 1912, is indicated by the fact that the whole telephonic application is practically a discovery since the act was passed.

During these 12 years, radio has come into use for many other important communications. It is used for communication with aircraft and has found a very important development in a practical compass for ships which seems likely to even reduce the cost of government aids to navigation.

This increase in use has been due to the tremendous discovery and improvements in the character of apparatus. The discovery of the vacuum tube for amplification was the foundation for all telephonic work. The tuning and assembling apparatus has been improved to such an extent that we are able to confine sending and reception signals to smaller bands of wave lengths than was the case 12 years ago.

At the time the act was passed the wave band occupied by each sending station was so broad that only half a dozen channels were open for sending. Now it is possible if the maximum use were made of technical development, to send many times that number.

For practical reasons, however, the wave lengths available for telephonic purposes in the present development of the art are much more limited than those for telegraphic purposes and are today practically limited to the range between 200 and 600 meters. Within this area we have about seven possible bands, for sending in any one locality.

The number of telephone broadcasting stations that can be operated from any one place is, however, more limited than this because of interferences of one locality with another. With the system of staggered zones set up by the Department it has been found possible to work broadcasting stations on three different wave lengths within each zone. No doubt the number of available wave lengths will steadily increase with improvement in the art and better adjustment between different purposes.

If the mechanical condition of the art today were as it was 12 years ago, the vast volume of radio communication now constantly in motion in the ether would create such a pandemonium of interference that the whole art would break down. Were it not for the regulation and the very tenuous voluntary cooperation of today, we should have pandemonium despite the development of the science.

One problem as yet totally unsolved is how we can secure perpetually full and complete broadcasting service in such fashion that it will support itself otherwise than in dependence upon the sale of manufactured articles or upon advertising. It seems to me we must leave this question to further experience and do not favor a solution by any license and charge upon receiving sets as is imposed in other countries. So far as I am advised, the United States is the only country which does not impose a license upon or regulate receiving sets.

there are only two main tuning controls in the receiver, the condensers C-1 and C-2. And, in reality, C-2 is adjusted very little, hence leaving C-1 as the only active control. For economy it is advisable to use low filament consumption tubes in this circuit, to reduce the separate "A" battery expense.

Bank Winding Pays Compound Interest

By Leroy Western

TO the average radio constructor the term banked winding usually means one of the hardest pieces of work possible for him to undertake. Banked winding looks hard, but in reality it is a very simple form and once the constructor gets used to using this method, he will wind practically all his coils in at least two or possibly three layers.

The three layer system is so very similar to the two layer that we will not describe it in detail here, but from the description given below and the diagrams herewith of two layer banked winding, no trouble at all will be experienced in adding a third layer.

There are many advantages to this form of winding, among them being that the distributed capacity of the resulting inductance is reduced very greatly in relation to a single layer winding and the inductance of a coil wound with a given amount of wire over a certain space is greatly increased over the single layer type.

When we get down to actual figures on inductance we find that for a given amount of wire a two layer bank wound coil will tune to one and one-third times

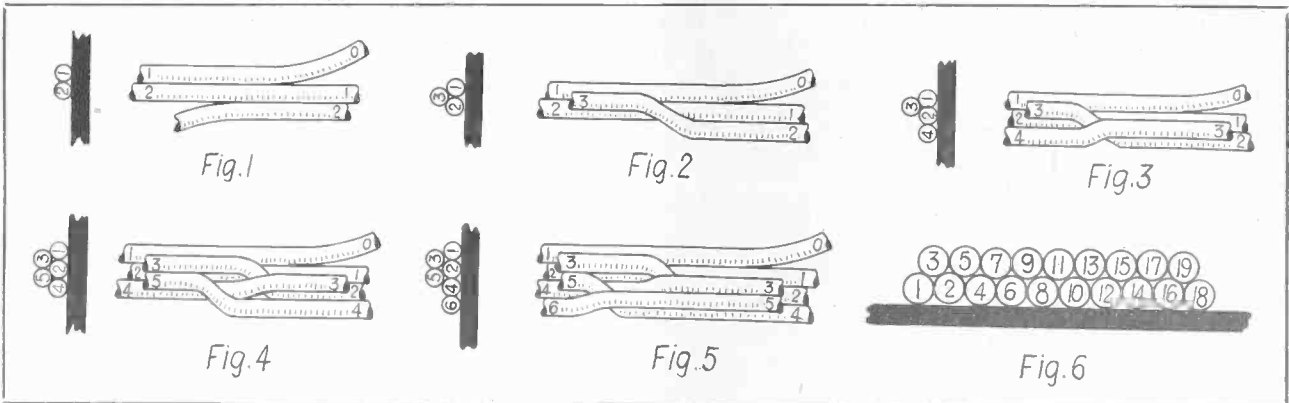
the finished winding, these kinks will show up as a sort of a spiral down the length of the coil.

Fig. 6 herewith shows a section view of a coil containing 19 turns of wire, indicating the relative positions of the turns. The figures in the circles indicate the number of that particular turn of wire.

All the above may sound rather complicated, but do not let it scare you away from trying this form of winding. Three or four trials will enable you to perform a very creditable job.

Trouble may be experienced at first in keeping the wire tight and firm so that the top turns do not slip down between the bottom turns.

This can be eliminated by first winding a layer of ordinary tire tape over the core, not allowing the edges to over-lap, but winding it in a spiral form covering the entire tube. Trim the ends of the tape off flush with the ends of the core in order to present a neat appearance. The winding can then be done directly over the tape and by drawing the wire rather tight it will sink slightly into the tape and be held



the wavelength of a single layer coil of the same number of turns. Remember that this is done with no increase in the amount of wire used.

Aside from this advantage there is a 50% saving in space. Banked winding must not be confused with the ordinary type of two layer winding in which one layer is merely wound directly over the next. The latter is an extremely inefficient method of winding coils and has no advantage over the single layer type aside from occupying less space, and is far less efficient.

The diagrams herewith illustrate the successive steps in the winding of a two layer coil. First wind two turns in the ordinary manner as illustrated in Fig. 1. At the beginning of the third turn carry the wire from alongside of the end of the first turn up and over turn 2 so that it lays in the slight hollow between turns 1 and 2. Run this turn 3 completely around this coil and when you come to the point where turn 2 ended, bring the wire down and over turn 2 as illustrated in Fig. 3. Proceed around the coil with turn 4 until you come to the position shown in Fig. 4. Bring the wire up and over turn 4 into the position shown and continue turn 5 until the result shown in Fig. 5 is obtained. Now bring the beginning of the 6th turn down over turn 5 and continue with the winding in this method. Each "kink" of the wire where it goes from one level to the next should be made smoothly yet fairly abruptly. Each turn should be placed about one-quarter of an inch from the one before it so that in

firmly into position. An excellent method of fastening the beginning and end of the wire is to drill three holes in the form in a line parallel with the edge and about one-quarter of an inch apart. Push about six inches of the wire into the first hole, bring it up to the second one and push it back into the third. The kinks thus formed in the wire will hold it firmly.

In case the constructor desires to try three layer winding, the following hint is given. Wind the first five turns to the position illustrated in Fig. 4. Now instead of bringing turn 6 down as shown in Fig. 5, bring it up so that it lays between turns 3 and 5. Turn 7 then goes on the core directly alongside of turn 4 and turns 8 and 9 are placed directly on top of it, 8 opposite 5 and 9 opposite 6. The winding is then continued in this same manner.

This form of winding is particularly effective as a space saver in long wave receivers, but even for short wavelengths and in portable sets it gives excellent results.

If still greater saving of space is desired, a coil approximating a honeycomb coil in size and efficiency may be made by winding on a core one inch wide by an inch and one-half in diameter as many turns of two layer banked winding as it will hold. Over this winding place two layers of oiled silk or Empire cloth and proceed to wind two more layers. This can be continued until as many turns as are desired are wound on the coil.

RADIO WORLD

TELEPHONES:
LACKAWANNA 6976 and LACKAWANNA 2063
PUBLISHED EVERY WEDNESDAY (Dated
SATURDAY OF SAME WEEK)
FROM PUBLICATION OFFICE,
1493 BROADWAY, NEW YORK, N. Y.
BY HENNESSY RADIO PUBLICATIONS
CORPORATION
ROLAND BURKE HENNESSY, President
M. B. HENNESSY, Vice-President
FRED S. CLARK, Secretary and Manager
1493 BROADWAY, NEW YORK, N. Y.
Boston Representative: Chas. E. M. White, 1367 Com-
monwealth Avenue, Allston, Mass.
Chicago Representative: Mat H. Friedman, 519 East 60th
Street, Chicago, Ill.
San Francisco Representative: Conger & Johnston, Hol-
brook Building.
Los Angeles Representative: Conger & Johnston, Higgins
Building.
European Representatives: The International News Co.,
Breains Bldgs., Chancery Lane, London, Eng., Paris,
France: Brentano's 38 Avenue de l'Opera.

Roland Burke Hennessy
Editor

Herman Bernard N. N. Bernstein
Managing Editor Technical Editor

SUBSCRIPTION RATES

Fifteen cents a copy. \$6.00 a year. \$3.00 for six
months. \$1.50 for three months. Add \$1.00 a year
extra for foreign postage. Canada, 50 cents.

Receipt by new subscribers of the first copy of RADIO
WORLD mailed to them after sending in their order, is
automatic acknowledgement of their subscription order.
Changes of address should be received at this office two
weeks before date of publication. State whether sub-
scription is new or a renewal.

ADVERTISING RATES

One page: One time—\$150.00.
Half, Quarter, Third and Two-thirds pages at propor-
tionate rates.
One inch, one time—\$5.00. Per space line \$0.40.
On four consecutive issues, 10% discount.
On thirteen consecutive issues, 15% discount.
Cover and preferred-position rates made known on
application.
Terms: 30 days net. 2% 10 days.

CLASSIFIED ADVERTISEMENTS

Five cents per word. Minimum, 10 words. Discount
of 10% on 4 consecutive issues—15% on thirteen consecu-
tive issues. Cash with order.

Entered as second-class matter, March 28, 1922, at
the Post Office at New York, New York, under the act
of March 3, 1879.

IMPORTANT NOTICE

While every possible care is taken to state correctly
matters of fact and opinion in technical and general writ-
ings covering the radio field, and every line printed is
gone over with a scrupulous regard for the facts, the
publisher disclaims any responsibility for statements re-
garding questions of patents, priority of claims, the proper
working out of technical problems, or other matters that
may be printed in good faith and on information furnished
by those supposed to be trustworthy. This statement is
made in good faith and to save time and controversy in
matters over which the publisher cannot possibly have
control.

APRIL 5, 1924

Following New York's Lead

AS announced on this page re-
cently, the lead of New York
City in installing a municipal broad-
casting plant would be followed by
other cities. The expected has
come to pass. Already the munic-
ipal boards in a half dozen large
cities are considering following
New York in this direction in the
near future.

RADIO WORLD has received letters
from two mayors, asking for de-
tailed information on the subject
and word arrives that the local
authorities have called meetings in
two other cities for the purpose of
considering immediately an ap-
propriation for broadcasting sta-
tions.

And thus it goes. Where are the
self-appointed wise men of two or
three years ago, who insisted quite
loquaciously, if not convincingly,
that radio was only a fad?

THE THIRD YEAR OF RADIO WORLD

FRANK A. MUNSEY, who should know, once said that it was hard to
start a publication, but that it was harder to kill one. Mr. Munsey
does not seem to have found either difficult.

RADIO WORLD, the first number of which appeared in April, 1922, has
passed through all the vicissitudes that overtake every new publication.
Through them all we have had only one thought in mind—how could we
improve the paper from week to week and month to month. But we have
never been lost in a grey mist labelled "lack of interest."

This publication aroused interest among the radio public from its very
first issue and has succeeded in continuously holding it. Its many thou-
sands of readers form a solid phalanx of loyal, interested week-in-and-
week-out readers who have formed the RADIO WORLD habit and whose
ranks are being augmented every week by new enthusiasts.

The news-stand circulation of this publication is a very large one, but
it is altogether likely, judging from what we know of the publishing busi-
ness, that the subscription list of RADIO WORLD is the largest of its kind.
A rather broad statement, that, but easily substantiated by records.

It is no slight task in these days to make a new publication financially
successful, but that is what we have done with your favorite radio paper.
This has been made possible only because the publishers and editors have
had one thing constantly in mind—how best to serve radio and its follow-
ers. Any other thought would have led only to confusion and failure.

Here is our solemn promise for the future: to continue to be just as
loyal to our readers as our readers have been to us; to be independent at
all times and to tell the truth as we see it; not only to keep up with the
times but slightly ahead; to print news when it is news, keeping ears alert
and eyes forward, so that our readers will not only know and see in type
and pictures all the very latest developments in this remarkable science
but also see them FIRST in this paper.

Another year looms large, and we shall continue to serve you, our
friends and readers, so that our success of the first two years shall lead to
bigger and better things for all of us.

Now for that increased and hitherto undreamed-of circulation figure
which we have set out to reach—and which we shall reach, never fear!
THE EDITOR.

Celebrities Send Greetings as We Enter Third Year

Secretary Roosevelt Sends "All Good Wishes"

EDITOR, RADIO WORLD:

I AM very glad to avail myself
of this opportunity of sending
my greeting to all the readers of
the RADIO WORLD. In my position
as Assistant Secretary of the Navy,
I have been constantly in contact
with radio work. The more I see
of it, the more convinced I am of
its great value to the world.

From a naval standpoint, it is ab-
solutely indispensable. Civilization
is based on communication, and
radio is one of the great modern
developments along this line.

With all good wishes, believe me,
Yours very truly,
THEODORE ROOSEVELT.

Dr. Frank Crane's Greetings Received

GREETINGS to all the radio
fans reached by your paper!

You are listening in to the be-
ginning of one of the most signifi-
cant development of human activ-
ity. Multiply all the achievements
of the telegraph and the telephone
by x, and you will get some idea of
the future of radio.

FRANK CRANE.

* * *

What the Radio News Editor Thinks of Us

EDITOR, RADIO WORLD:

HEARTIEST congratulations for
the second anniversary of
RADIO WORLD.

The writer considers RADIO
WORLD the best radio weekly in the
country today and wishes you con-
tinued success.

Yours very truly,
H. GERNSBACK,
Editor, Radio News.

The Radio Woman

Girl on Cycle

Tunes in DX

Chugging of Motor and Bumpy Roads Cause Worse Interference Than Static or Overlapping of Signals

ONE of the greatest pleasures enjoyed by Hilda Tausher, plump Berlin fraulein, is riding on her friend's motorcycle through the streets of that city carrying a radio set and having a loop strapped to her back. She wears earphones as does the motorcycle engineer himself.

The girl does the tuning and manages to get DX stations, although the roads of the countryside and the explosions of the motor create difficulties much more distracting than static or crosstalk.

The sight of the couple attracted considerable attention, especially as the girl's posture necessitated exhibiting the quality of her silk stockings.

As is known, a loop is directional, which makes us wonder what happens when the pilot turns a corner. In changing their direction, the set might automatically tune from a station in Hamburg to another in Paris.

WHERE'S THE SET? The damsel plump being transported on her sweetheart's motorcycle in the streets of Berlin wears earphones, just as he does. She has the loop strapped to her back. Notice that her phone cord runs forward. Does she carry the set in her lap? Anyway, there's no mystery as to where she wears her stockings.

(International)



Contrasts 24 Years In Radio Art

Washington Girl Demonstrates 1900 Crystal Set and the 1924 Super-Heterodyne to Group of Admirer Friends

THE marvelous strides made by radio during the last twenty-four years are attested to by Miss Frances Robinson, of Washington, D. C., who, after a thoroughgoing study of the technique of radio, gives her expert opinion that the super-heterodyne of 1924 is somewhat superior to the crystal set of 1900.

Miss Robinson took great delight in exhibiting to a gathering of her friends the other day the constant not only between the appearance of the two sets, but also the mighty comparison of performance.

She brought in on a loop at Washington KGO, Oakland, Calif., on the loud speaker, and some of her friends danced to the musical strains from across the continent.

The cabinet of the super-het contains the A and B batteries in left and right compartments. The set is the latest type which employs eight tubes. Two stages of audio-frequency amplification are used for the loud speaker.

The accompanying photograph shows Miss Robinson holding an old-time crystal set in her lap. By the way, this crystal set was resurrected from an old curiosity shop in England and not from King Tut's Tomb.



(K. & H.) FRANCES ROBINSON, Washington girl, shows the difference between the superheterodyne of today and the crystal set of 24 years ago.

To Learn to Tune, Experiment

By Alexander G. Fleming

IF the reams of paper that have been printed with matter devoted to the tuning of receivers in general were collected, it would take a statistician quite a while to find out just where they would reach to. That is not necessary, however, as most of the instructions are of little use—to the average fan and owner at least.

Unless you are learning a poem or story by heart, most instructions are valueless, as any owner of a set will testify. They are not at fault at all—in fact, they may be perfect and tell just the way the receiver should be operated—under the original testing conditions. But conditions change—perhaps your conditions are not the same as in upper Massachusetts or out in San Francisco.

Therefore, the only way of learning to tune a receiver is by sitting down and carefully listening to the reception, and then by turning your dials intelligently see if you cannot improve the reception. You may be using too tight coupling, or too much filament or plate battery. Maybe you do not tune your secondary circuit in exact resonance with the rest of the circuit. Any number of minor adjustments may prove that you are working the set incorrectly.

One thing you should avoid is condemnation of a receiver or circuit before you absolutely know how to tune it. It may take you a month of constant tuning to find out all the little tricks. The way to find out is by manipulating and experimenting. Take no man's word for granted in the matter of how to tune a receiver. There is a certain way of going about it, but there is no set rule that is necessary to get a station. Try out different ways and see just which way is best, remembering, of course, not to let the set squeal and annoy your neighbors. You will be surprised to find out that there are several methods of tuning your receiver, but there is just one good way—and it is up to you to get that one right way.

Be intelligent, however, no matter what you do.

Just because a pamphlet or magazine article says a certain thing, is no reason for doing the exact opposite. The important thing is that no man can cover all the little details of such a broad subject thoroughly with reference to all details. He may be perfectly right in his statements, but that should not stop a man from doing something if he thinks it is a better way.

As an instance of this, take the following, which is an extract from an article on a single-circuit receiver: "Turn up the first tube and rotate the dial marked coupling, until a squeak is heard. When that is done, move the handle marked potentiometer around until it is just past that squeak point, and the voice or music will be heard." Now how much better would it have been for the man to tell the fan to turn the tube down to the point where the music or speech was just clearly audible, with no squeal?

The people that make that receiver are going to be a nuisance to the neighboring receivers due to letting their sets oscillate unnecessarily, and it will probably take the owner some time before he finds out, whether by accident or through the services of some friend, that the better way is to stop the squeal and not let his set oscillate violently. Needless to say, there are thousands of people that are purchasing receivers today who never as much as turned a dial before, and they are treating the machine like a very delicate mechanism, like a watch or very expensive chronometer.

Sets as they are built today are not meant to stand hard knocks, such as dropping them or knocking them around, but just the same they cannot be hurt by OPERATING THEM CORRECTLY, which is what every owner wants to do. The way to do it is to experiment and find out. There is no such thing as a set way of doing it, even though there are thousands upon thousands turned out by the same factory. They all vary in some slight manner, and they are not all operated under the same conditions, so they cannot be operated in the exact same manner.

Developing a New Language

Explaining the Sometimes Meaningless Language of "Brass Pounders"

RADIO amateurs and fans have originated, and are at the present time developing, a universal language of their own. It has even been intimated that some day this or a similar elaborated language may become useful to the peoples of the world as an abbreviated language for the written word.

Hundreds of radio fans and amateurs are now using many of the standard radio code terms and phrases in their writings, and several are successfully using the code for making notes in their daily business.

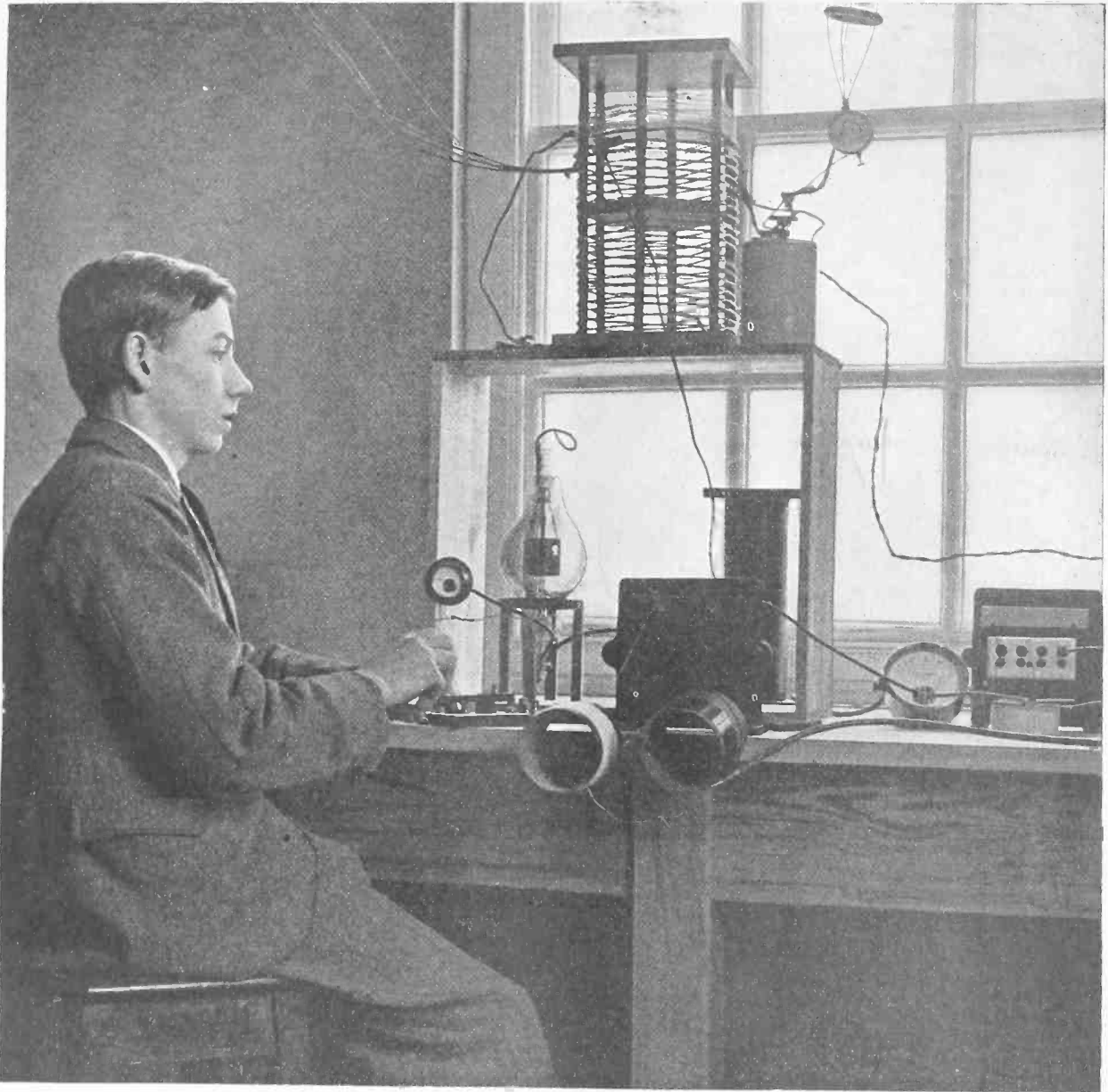
There is nothing mysterious or remarkable in the code. It is very simple and not unlike the Phillips code, which is generally used by wire telegraphers in sending press dispatches. This radio code is based upon phonetic spelling, and in a long word many of the letters are deleted. For example, the word radiation in radio code is cut down to but three letters—rdn.

Following is a list of the most prominent, used by every dyed-in-the-wool radio amateur:

F.B. (fine business); O.M. (old man); O.W. (old woman); hr (hear or here); hrd (heard); u (you); wen (when); ur (your); spk (spark); gud (good); hv

(have); ruff (rough); pt (point); tubd (too bad); gess (guess); no (know or no); vy (very); cond (condenser); freq (frequency); thot (thought); wrk (work); wrkd (worked); hwsat (how's that); hw (how); cu (see you); cuagn (see you again); cul (call you later); 73s (best regards); B4 (before); 2nite (tonight); ltr (letter); sorri (sorry); tt (that); gg (going); shud (should); abt (about); trub (trouble); wid (with); gnd (ground); rdn (radiation); cntpse (counterpoise); bi (by); Hi (radio laugh); mi (my); onli (only); gv (give); sum (come); diff (difference); enuff (enough); cud (could); wkg (working); inpt (input); impt (important); pri (primary); sec (secondary); wv (wave); wi (well or will); wy (way); betr (better); gvg (giving); T C A (Thermo coupled amps); C R A (Commonwealth Radio Ass'n); cum (come); thr (there); r (are); ru (are you); cld (called); cl (call); clg (calling); rite (write); DX (long distance); tmrrw (tomorrow); fr (for); crd (card); nw (now); pse (please); sed (said); aud (audibility); cr (chemical rectifier); ant (antenna); dlver (deliver); dlvd (delivered). Most all of these were derived from the cryptic language of line telegraphers.

Boy in England Converses with U. S.

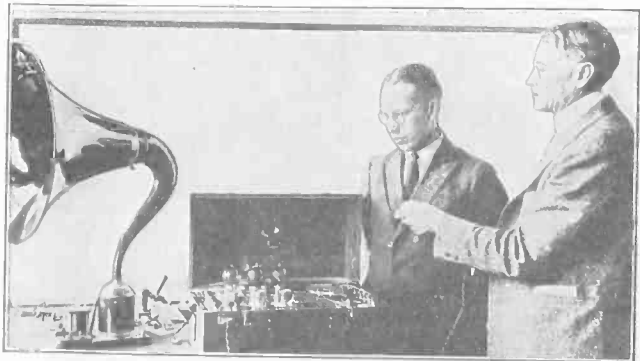


(Keystone View)

Set Built and Assembled by Mill Hill Lad Makes Record Considered Remarkable for Small Power Apparatus

C W. GOYDER, of Mill Hill, England, is shown operating his wireless transmitter which he built and assembled himself. Goyder exchanges messages with a friend near Pittsburgh, Pa., consistently. This is considered excellent work for a small power transmitter.

Although he is still a schoolboy, Goyder has made great strides in the study of radio reception and transmission. The type of vacuum tube shown in the picture resembles somewhat the old DeForest "befo' de Wah" audion.



(Wide World)

BROADCASTS HEARTBEATS

Prof. R. B. Abbott demonstrating his new microphone stethoscope at Purdue University. Stations at a distance of 500 miles heard the heartbeats of the young man shown at left. The test excited national interest.

BROADCAST PROGRAMS FROM FAR AND NEAR

Station WOS, Jefferson City, Mo.

441 Meters (680 Kcys.). C. S. T. Apr. 2—8:00 P. M.—Address: "Foliage Sprays for Apples, Peaches, Cherries and Plums," by Ashleigh P. Boles. 8:15 P. M.—Address: "Farm Motive Power," by Dave E. Darrah of Charles City, Iowa. 8:30 P. M.—Varied program presented by talent from Arrow Rock and Boonville, Missouri. Apr. 4—8:00 P. M.—Address: "Missouri," by George A. Pickens, General Secretary of the Greater Missouri Association. 8:20 P. M.—Dance program by the Douglass Melody Six Orchestra, Colored Syncoptors of Lincoln University, Jefferson City. Apr. 6—7:30 P. M.—Entire religious service of the Methodist Church, Rev. J. E. McDonald, Pastor, by line telephony from the church. Apr. 7—8:00 P. M.—Concert by the Radio Famous Missouri State Prison Band, Virgil W. Combs, Bandmaster. Piano solos by Harry M. Snodgrass, the "King of the Ivories."

Station WEAJ, New York City

492 Meters (610 Kcys.). E. S. T. Apr. 2—11:00 A. M.—Health talk under the auspices of the New York Health Speakers Service. 12 M.—Chapel Services direct from Columbia University. 4:00 P. M.—May List, pianist; Raymond C. Frank, tenor; Hazel Franklin Bailey, soprano. 7:00 P. M.—Synagogue services under the auspices of the United Synagogue of America; United Cigar Stores Daily Sport talk by Thornton Fisher; Viola Ellis, contralto; talk by the American Bond and Mortgage Company; talk under the auspices of the American Agriculturist; the sixth of a series of lectures on "Practical American Politics," by Schuyler C. Wallace, Supervisor of Government of the Home Study Department of Columbia University; the tenth and last of a series of Philharmonic Concerts for students conducted by William Mengelberg, direct from Carnegie Hall.

Apr. 3—11:00 A. M.—Popular Thursday morning talks. 4:00 P. M.—Michael Speciale and his Hotel Carlton Terrace Orchestra. 7:00 P. M.—Interdenominational services under the auspices of the Greater New York Federation of Churches; United Cigar Stores daily sport talk by Thornton Fisher; Geraldine Marwick, soprano; talk by Harowitz Bros. & Margareten; talk by the Bank of America; program direct from Hunter College, Dr. Henry T. Fleck, conductor; Columbia Records, direct from Columbia Recording Studios. American Chicle Company's Orchestra.

Apr. 4—11:00 A. M.—Talk under the auspices of Country Life; Consolidated market and weather reports by the United States and N. Y. State Departments of Agriculture and American Agriculturist. 4:00 P. M.—Josiah B. Free, baritone; Mildred MacLean, soprano; Children's Hour program. 7:10 P. M.—Lorna Lincoln, lyric soprano, accompanied by Paul Haussler; "The Happiness Boys"—Billy Jones and Ernest Hare; Harold J. Bray, tenor, accompanied by Estelle Ashton Sparks; B. Fischer and company's "Astor Coffee" Dance Orchestra.

Apr. 5—4:00 P. M.—Dance program by the Mount Royal Orchestra

Station WGY, Schenectady, N. Y.

380 Meters (790 Kcys.). E. S. T. Apr. 2—6:30 P. M.—Adventure story, courtesy Youth's Companion.

Apr. 3—7:45 P. M.—Musical program by Albany artists: J. Reid Callanan, piano; Pluma MacIntosh, reader; Mrs. Raymond N. Fort, soprano; Claud J. Holding, violin; Mrs. Horatio S. Bellows, contralto.

Apr. 4—8:00 P. M.—Concert of Union College Musical Club broadcast from the Ten Eyck Hotel, Albany, N. Y., including address, "Music in College Life," by Dr. Charles A. Richmond, president of Union College. 10:30 P. M.—Dance music by Union College Dance Orchestra from Hotel Ten Eyck ballroom, Albany, N. Y.

Apr. 5—9:30 P. M.—Dance music by Romano's Orchestra, New Kenmore Hotel, Albany, N. Y.

Station WGI, Medford, Mass.

360 Meters (830 Kcys.). E. S. T. Apr. 2—12 M.—Selection on the Ampico in the Chickering; literary five minutes; selections of the Brunswick. 12:40 P. M.—New England weather forecast furnished by the U. S. Weather Bureau. 5:30 P. M.—Closing stock market reports, world market survey, U. S. Department of Foreign and Domestic Commerce. 6:00 P. M.—Boston police reports, Boston Police Headquarters. 6:35 P. M.—Code practice. 7:20 P. M.—"Science Up to Date," by the Scientific American. 7:30 P. M.—Evening program.

Apr. 3—12:40 P. M.—New England weather forecast furnished by the U. S. Weather Bureau. 5:30 P. M.—Closing stock market reports. Live stock market reports. Agriograms furnished by the U. S. Department of Agriculture. 6:15 P. M.—Boston Police Reports, Boston Police Headquarters. 7:00 P. M.—Evening program.

Apr. 4—12:40 P. M.—New England weather forecast furnished by the U. S. Weather Bureau. 12:45 P. M.—Closing report on Farmers Produce Market report. 3:00 P. M.—Afternoon musicale. 5:30 P. M.—Closing stock market reports. 6:15 P. M.—Code practice. 7:00 P. M.—Boston police reports, Boston Police Headquarters. 7:30 P. M.—Evening program.

Station KGO, Oakland, Cal.

312 Meters (960 Kcys.). P. T. Apr. 2—1:30 P. M.—New York stock exchange quotations and weather report. 3:00 P. M.—Short musical program. 6:45 P. M.—Final stock exchange quotations and weather report, news items.

Apr. 3—1:30 P. M.—New York stock exchange quotations and weather report. 6:45 P. M.—Final stock exchange quotations, weather report and news items. 8:00 P. M.—California String Quartet; Edna Sutton Stark, reader; Edna Linkowski, pianist; Ruth Waterman, contralto; KGO Minstrels.

Apr. 4—1:30 P. M.—New York stock exchange quotations and weather report. 3:00 P. M.—Short musical program. 6:45 P. M.—Closing stock exchange quotations, weather report and news items.

Apr. 5—12:30 P. M.—New York stock exchange and U. S. weather report. 8:00 P. M.—Three-act comedy, "It Pays to Advertise," by KGO Players; music by the Arion Trio. 10:30 P. M.—Dance music by orchestra of St. Francis Hotel, San Francisco, Cal.

Station KDKA, Pittsburg, Pa.

326 Meters (920 Kcys.). E. S. T. Apr. 3—6:15 P. M.—Concert by the KDKA Little Symphony Orchestra, Victor Saudek, conductor. 7:30 P. M.—Feature. 7:40 P. M.—National stockman and former market reports. 8:30 P. M.—Concert given by Albert R. Norton of American Guild Organists. 9:55 P. M.—Arlington time signals; weather forecast. 11:30 P. M.—Special late evening concert.

Apr. 4—12:20 P. M.—Lenten services of the Trinity Church, Pittsburg, Pa. 6:15 P. M.—Organ recital by Lucile Hale, from the Cameo Motion Picture Theatre, Pittsburg, Pa. 8:00 P. M.—Radio Boy Scout meeting. 8:30 P. M.—Concert by the Westinghouse Employees Band, conducted by T. J. Vastine.

Apr. 5—1:30 P. M.—Concert by Daugherty's Orchestra. 6:15 P. M.—Dinner concert by the Westinghouse Band. 7:20 P. M.—"Sports Review," James L. Long, sport editor. 8:00 P. M.—Feature. 8:30 P. M.—Chamber of Commerce dinner in honor of A. W. Mellon, from the William Penn Hotel.

Station WDAF, Kansas City, Mo.

411 Meters (730 Kcys.). C. S. T. Apr. 2—3:30 P. M.—Johnnie Campbell's Kansas City Club Orchestra. 6:00 P. M.—Marketgram, weather forecast, time signal and road report. Address: Weekly health talk given under the auspices of the Health Conservation Association. The children's story and information period. Music—Fritz Hamlein's Trianon Ensemble, Hotel Muehlebach. 8:00 P. M.—Program arranged and presented by Horton Connell, violinist, and other soloists. 11:45 P. M.—The "Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra, Plantation Grill.

Apr. 3—3:30 P. M.—D. Amherst Haley's Dance and Concert Orchestra. 6:00 P. M.—Marketgram, weather forecast, time signal and road report. The children's story and information period. Music—Fritz Hamlein's Trianon Ensemble. 11:45 P. M.—The "Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra.

Apr. 4—3:30 P. M.—Regular "request" program by the Leo R. Davis "Radio" Orchestra. 6:00 P. M.—Marketgram, weather forecast, time signal and road report. The children's story and information period. Music—Fritz Hamlein's Trianon Ensemble, Hotel Muehlebach. 8:00 P. M.—Program by all volunteered talent of amateurs. All who care to try their ability as radio entertainers are invited to "try out." 11:45 P. M.—The "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra.

Apr. 5—3:30 P. M.—The Riley Ehrhart Orchestra. 6:00 P. M.—Marketgram, weather forecast, time signal and road report. The children's story and information period. Music—Fritz Hamlein's Trianon Ensemble. 11:45 P. M.—The "Merry Old Chief" and the Coon-Sanders Novelty Singing Orchestra, Plantation Grill, Hotel Muehlebach.

Station KFI, Los Angeles, Cal.

469 Meters (640 Kcys.). P. T. Apr. 2—4:45 P. M.—Evening Herald news bulletins. 8:00 P. M.—Evening Herald concert. 10:00-11:00 P. M.—Hollywoodland Community Orchestra. 11:00-12:00 P. M.—Ambassador-Lyman's Coconut Grove Orchestra.

Apr. 3—4:45 P. M.—Evening Herald news bulletins. 6:45 P. M.—Y. M. C. A. concert, sales lecture and bedtime story. 8:00 P. M.—Ambassador Hotel concert. 9:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Concert by Ann Thompson, pianist, and Chief Yowlache, Indian baritone.

Apr. 4—4:45 P. M.—Evening Herald news bulletins. 6:45 P. M.—Vocal and instrumental concert. 9:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Vocal and instrumental concert. 11:00-12:00 P. M.—Ambassador-Max Fischer's Coconut Grove Orchestra.

Apr. 5—5:15 P. M.—Examiner news bulletins. 6:45 P. M.—Instrumental program. 8:00 P. M.—Vocal and instrumental concert. 9:00-10:00 P. M.—Examiner concert. 11:00-12:00 P. M.—Ambassador-Max Fischer's Coconut Grove Orchestra.

Station WFAA, Dallas, Texas

476 Meters (630 Kcys.). C. S. T. Apr. 3—1:00 P. M.—Address: Epps G. Knight, on "Things Old and New." 8:30 P. M.—The Texas Orchestra, R. L. Keith, manager, in popular music recital. Apr. 4—1:00 P. M.—Address: Dr. Robert Stewart Ayer, president emeritus Southern Methodist University. 8:30 P. M.—Charles Scogin, baritone; William Pennington, pianist and tenor; Charles McKinney and his Old-Time Fiddlers.

Apr. 5—12:30 P. M.—Address, Judge Eugene B. Mose, "Providing Things Honest." 3:30 P. M.—Special musical program, Old Fiddlers. 8:30 P. M.—Piano recital, presenting Miss Elizabeth Gay Jones, one of ten pianists to be presented in massed piano recital May 1. 11:00 P. M.—The Adolphus Hotel Orchestra, Lawrence Morrell, director.

Apr. 6—6:00 A. M.—Radio Bible Class. 9:00 A. M.—Address, Very Rev. Harry Lee Virden. 9:30 P. M.—Popular music recital presenting the Adolphus Hotel Orchestra.

Station WOC, Danverport, Iowa

484 Meters (—Kcys.). C. S. T. Apr. 2—10:00 A. M.—Opening market quotations, garden and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations and agriograms. 12 M.—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Educational lecture. 8:00 P. M.—Organ recital, Erwin Swindell, organist; Mrs. Arthur P. Griggs, contralto.

Apr. 3—10:00 A. M.—Opening market quotations, garden and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations and agriograms. 12 M.—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—musical numbers to be announced. 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's Visit. 6:50 P. M.—Sport news and weather forecast. 9:00 P. M.—Orchestra program.

Apr. 4—10:00 A. M.—Opening market quotations, garden and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12 M.—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program, musical numbers to be announced. 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Educational lecture, "Art Appreciation," by R. J. McKinney, director Tri-City Art League. 7:20 P. M.—Sunday school lesson—International lesson for next Sunday discussed by Dr. Frank Willard Court, pastor St. John's Methodist Episcopal Church, Davenport, Iowa. 8:00 P. M.—Musical program.

Apr. 5—10:00 A. M.—Opening market quotations, garden and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12 M.—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program, musical numbers to be announced. 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Educational lecture, "The Production of Silk and Its Uses." 9:00 P. M.—Orchestra program (1 hour).

Station KFAE, Pullman, Wash.

330 Meters (910 Kcys.). P. T. Apr. 4—7:30 P. M.—Madolin and guitar solos and duets; "Secret Diplomacy," Prof. C. H. Woody; "Book Chat," Miss Alice L. Webb; "Increase of Mechanical Power in Every Day Use," H. H. Langdon, M. E.; piano solos, Margery Gessemann; vocal numbers.

Apr. 7—7:30 P. M.—"Modern Capitalization—A Cause of War," Prof. F. R. Yoder, sociologist; all high school program, by Pullman High School Radio Club.

Apr. 9—7:30 P. M.—Vocal numbers; instrumental selections; "The Burden of Armaments," Prof. Yoder; "Farm Water Supply," A. B. Crane, extension specialist.

Apr. 11—7:30 P. M.—Instrumental solos; agricultural talk; "X-Ray and Crystal Analysis," Prof. Hugh Henton, School of Mines; piano solos; "Book Chat," Miss Alice Webb.

Apr. 14—7:30 P. M.—"Economic Effects of War," Prof. E. F. Dummer, sociologist; Palouse Council Boy Scouts' program.

Station WLW, Cincinnati, Ohio

309 Meters (970 Kcys.). C. S. T. Apr. 2—10:30 A. M.—Weather forecast. 3:30 P. M.—Market reports. 8:00 P. M.—Geringer Orchestra. 9:00 P. M.—Choir program of the Beecher Club.

Apr. 3—10:30 A. M.—Weather forecast and business reports. 3:00 P. M.—Market reports. 4:00 P. M.—Piano solos by Miss Adelaide Appel. 10:00 P. M.—Concert from Cincinnati Conservatory of Music. Popular dance program by Doherty's Melody Boys.

Apr. 4—10:30 P. M.—Weather forecast and business reports. 3:00 P. M.—Stock quotations. 4:00 P. M.—Special program.

Apr. 5—10:30 A. M.—Weather forecast. 1:30 P. M.—Market reports.

Station WAAW, Omaha, Neb.

360 Meters (830 Kcys.). C. S. T. Apr. 3.—8:00 P. M.—Educational program, agricultural topic by W. J. Martin, U. P. system, Omaha, Neb., and exposition; next Sunday's Sunday school lesson by Rev. E. M. Brown.
Apr. 4.—8:00 P. M.—Bridge talks by Mrs. Guy U. Purdy, Omaha, Neb.
Apr. 5.—7:30 P. M.—Frank H. Schwartz and his Royal Orchestra, dance music and old time music.
Apr. 7.—7:30 P. M.—Mrs. E. F. Morearty, teacher of piano; concert by students, consisting of vocal and instrumental solos.

Station CKAC, Montreal, Can.

425 Meters (700 Kcys.). E. S. T. Apr. 2.—1:45 P. M.—Classic concert by Mt. Royal Hotel Orchestra. 4:00 P. M.—Weather, news, stocks, talk. 4:30 P. M.—Mt. Royal Hotel Dance Orchestra.
Apr. 3.—4:00 P. M.—Weather, news, stocks, music. 7:00 P. M.—Kiddies' stories in French and English. 7:30 P. M.—Rex Battle and his Mt. Royal Hotel Concert Orchestra. 8:30 P. M.—La Presse studio entertainment. 10:30 P. M.—Joseph C. Smith and his Mount Royal Hotel Dance Orchestra.
Apr. 4.—1:45 P. M.—Classic concert by Mt. Royal Hotel Orchestra. 4:00 P. M.—Weather, news, stocks, talk. 4:30 P. M.—Dance Orchestra, Mt. Royal Hotel.
Apr. 5.—7:00 P. M.—Kiddies' stories in French and English. 7:30 P. M.—Rex Battle and his Mt. Royal Hotel Concert Orchestra. 8:30 P. M.—La Presse studio entertainment. 10:30 P. M.—Joseph C. Smith and his Mt. Royal Hotel Dance Orchestra.
Apr. 6.—4:30 P. M.—Sacred concert.
Apr. 7.—1:45 P. M.—Mt. Royal Hotel Concert Orchestra. 4:00 P. M.—Weather, news, stocks, talk. 4:40 P. M.—Mt. Royal Hotel Dance Orchestra.
Apr. 8.—4:00 P. M.—Weather, news, stocks, talk. 4:30 P. M.—Music. 7:00 P. M.—Kiddies' stories in French and English. 7:30 P. M.—Rex Battle and His Mt. Royal Hotel Orchestra. 8:30 P. M.—La Presse studio concert under the direction of Mr. J. C. Houle. 10:30 P. M.—Joseph C. Smith and His Mt. Royal Hotel Dance Orchestra.

Station WOO, Philadelphia, Pa.

509 Meters (590 Kcys.). E. S. T. Apr. 2.—11:00 A. M.—Grand organ. 12:00 M.—Luncheon music by the Tea Room Orchestra. 5:00 P. M.—Sports results and police reports. 7:30 P. M.—Dinner music by Havana Casino Orchestra broadcast direct from the main dining-room of the Hotel Sylvania, Vincent Rizzo, conductor. 8:45 P. M.—W. O. O. Orchestra, Robert E. Golden, director; Louise Sterrett Hazel, soprano.
Apr. 3.—11:00 A. M.—Grand organ. 11:30 A. M.—United States weather forecast. 11:55 A. M.—United States Naval Observatory time signals. 12:00 M.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results and police reports. 9:55 P. M.—United States Naval Observatory time signal. 10:02 P. M.—United States weather forecast.
Apr. 4.—12:00 M.—Luncheon music by the Tea Room Orchestra. 7:30 P. M.—Dinner music from the Hotel Adelphia Concert Orchestra. 8:30 P. M.—Special program from the Fox Theatre Studio. 10:03 P. M.—Dance program by the Kentucky Kernels from the Hotel Adelphia.
Apr. 5.—11 A. M.—Grand organ. 11:30 A. M.—United States weather forecast. 11:55 A. M.—United States Naval Observatory time signals. 12:00 M.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results and police reports.

Station KSD, St. Louis, Mo.

546 Meters (550 Kcys.). C. S. T. Apr. 2.—6:30 P. M.—Program of Abergh's Concert Ensemble; Arne Arnesen, violinist, broadcast direct from Hotel Statler. 9:00 P. M.—Studio program by Margaret Nolan, soprano, Lois Gage, pianist. 11:00 P. M.—Broadcasting direct from Hotel Statler dance music played by Rodemich's Orchestra.
Apr. 3.—8:00 P. M.—Studio program of duopiano recital by Olivia Williams, and Hilda Medairy, pianists.
Apr. 5.—3:00 P. M.—Program given by group of children under fourteen years of age. 8:30 P. M.—Missouri Theatre Orchestra, concert and specialties, broadcast direct from the theatre.

Station KGW, Portland, Ore.

492 Meters (610 Kcys.). P. T. Apr. 2.—11:30 A. M.—Weather forecast. 12:30 P. M.—Concert by Darby's Orchestra of Cotillion Hall. 3:30 P. M.—Children's program. 8:00 P. M.—Concert by Elks Band, W. A. MacDougal, director. 10:00 P. M.—Dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland.
Apr. 3.—11:30 A. M.—Weather forecast. 12:30 P. M.—Concert. 3:30 P. M.—Woman's story program. Installment of "The Midlander," by Both Tarkington. 8:00 P. M.—Accordion solos by Johnny Sylvester. 8:15 P. M.—Studio program of dance music by George Olsen's Metropolitan Orchestra. 10:00 P. M.—Dance music by George Olsen's Metropolitan Orchestra.
Apr. 4.—11:15 A. M.—Market basket. 11:30 A. M.—Weather forecast. 12:30 P. M.—Program by Peck Halton's Orchestra of Cotillion Hall. 3:30

P. M.—Lecture by Margery M. Smith, nutrition expert. 7:30 P. M.—Weather forecast and market reports. 10:30 P. M.—Hoot Owls.

Apr. 5.—11:30 A. M.—Weather forecast. 3:30 P. M.—Children's program, story by Aunt Nell. 10:00 P. M.—Weather forecast and dance music by George Olsen's Metropolitan Orchestra of Hotel Portland.

Station WOAW, Omaha, Neb.

526 Meters (570 Kcys.). C. S. T. Apr. 3.—6:00 P. M.—Every child's story hour. 6:30 P. M.—Dinner program by the Saxton Family Orchestra. 9:00 P. M.—First anniversary of WOAW, concert program by Mt. Calvary Commandery, No. 1, Knights of Pythias.
Apr. 4.—6:30 P. M.—Dinner program by Ackerman's Orchestra, of Empress Rustic Garden. 9:00 P. M.—Program by 168th Regiment Band.
Apr. 5.—6:30 P. M.—Dinner program by the Blackstonian Orchestra. 9:00 P. M.—Program arranged by Harry B. Cockrell.
Apr. 6.—9:00 A. M.—Radio Chapel Service. 2:00 P. M.—Matinee program by courtesy of Nebraska Conference of Augustana Synod.

Station WAAM, Newark, N. J.

263 Meters (1140 Kcys.). E. S. T. Apr. 2.—7:00 P. M.—Ben Jacobs, tenor of the New York City Police Department Glee Club. 11:00 P. M.—Edward A. Sussman and his Original Memphis Syncopators in an outburst of harmony and jazz.
Apr. 3.—7:00 P. M.—Times Square Entertainers. 10:00 P. M.—Charles J. Saunders' Sterling Dance Orchestra.

Station WBZ, Springfield, Mass.

337 Meters (890 Kcys.). E. S. T. Apr. 3.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 7:00 P. M.—Music talk by Robert Elisha Stanley Olmsted. 7:30 P. M.—Bedtime story for the kiddies. 7:40 P. M.—Concert by Sylvia Glasser, pianist. 9:55 P. M.—Arlington time signals.
Apr. 4.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 6:00 P. M.—Dinner concert by the WBZ Orchestra. 7:30 P. M.—Bedtime story for the kiddies. 11:00 P. M.—Program of Chamber music by the WBZ Orchestra.

Station KYW, Chicago, Ill.

536 Meters (560 Kcys.). C. S. T. Apr. 3.—9:30 A. M.—Late news and comment of the financial and commercial markets. 2:35 P. M.—Studio program. 6:30 P. M.—News. 6:50 P. M.—Children's bedtime story. 7:00 P. M.—Dinner concert.
Apr. 4.—9:30 A. M.—Late news and comment of the financial and commercial markets. 6:00 P. M.—Spanish lessons. 7:00 P. M.—Dinner concert. Joska DeBabary's Orchestra. 10:00 P. M.—2:00 A. M.—Midnight Revue.

Station WHAS, Louisville, Ky.

400 Meters (750 Kcys.). C. S. T. Apr. 3.—4:00-5:00 P. M.—Selections by the Strand Theatre Orchestra. 4:50 P. M.—Local livestock, produce and grain market reports. 7:30 P. M.—Full concert under the direction of George T. Piggott.
Apr. 4.—4:00 P. M.—Selections by the Walnut Theatre Orchestra; late important news bulletins. 5:00 P. M.—Official central standard time announced. 7:30 P. M.—Concert by W. C. Crane and his Orchestra.
Apr. 5.—4:00 P. M.—Selections by the Strand Theatre Orchestra. 5:00 P. M.—Official central standard time announced. 7:30 P. M.—Concert by the Sylvian Trio.

Station WRC, Washington, D. C.

469 Meters (640 Kcys.). E. S. T. Apr. 2.—3:00 P. M.—Fashion developments of the moment. 3:25 P. M.—Report of the National Con-

ference Board. 3:45 P. M.—Piano recital by Eleanor Glynn. 5:15 P. M.—Instruction in international code. 6:00 P. M.—Stories for children.
Apr. 3.—5:15 P. M.—Instruction in international code. 8:00 P. M.—Dance program by the Bettele "Ole Orchestra." 9:00 P. M.—"Two Pioneers of the Auto Industry," by Carl W. Mitman, of the National Museum. 9:15 P. M.—Violin recital by Henri Sokoloff. 9:55 P. M.—Re-transmission of time signals and weather forecasts. 10:00 P. M.—Concert of Hawaiian music.
Apr. 4.—3:10 P. M.—Song recital by Arthur McCormick, baritone. 3:25 P. M.—Current Topics 3:35 P. M.—Piano recital by Ethel Grant. 5:15 P. M.—Re-transmission of time signals and weather forecasts. 6:00 P. M.—Stories and songs for children.
Apr. 5.—5:15 P. M.—Instruction in international code. 7:45 P. M.—Bible talk. 8:15 P. M.—Song recital by Rose Pollio, mezzo soprano. 8:45 P. M.—Concert of Hawaiian music. 9:30 P. M.—Concert by the Army Music School.

Station WOR, Newark, N. J.

405 Meters (740 Kcys.). E. S. T. Apr. 2.—2:30 P. M.—Piano selections by Frances B. Pehl of Brooklyn. 3:00 P. M.—Rose Coughlan, celebrated actress. 7:00 P. M.—Music while you dine, Ernie Krickett's Paramount Record Orchestra.
Apr. 3.—3:30 P. M.—Tenor solos by Harold Taft Wright. 6:15 P. M.—Albert E. Sonn, technical editor of the Radio Department of the Newark Sunday Call, in his weekly talk on "Radio for the Layman." 6:30 P. M.—Music while you dine; Tom Cooper's Country Club Orchestra.
Apr. 4.—3:30 P. M.—Ernest Cutting and his James Boys Orchestra. 6:15 P. M.—Agnes Leonard in songs for the children. 6:30 P. M.—Man in the Moon stories for the children. 7:00 P. M.—Billy Cripps' song revue.
Apr. 5.—8:00 P. M.—Gene Ingraham's Bell Record Orchestra. 10:00 P. M.—"Stabat Mater" (Rossini), presented by a choir of 60 voices of St. Joseph Church of Newark.

Station KPO, San Francisco, Calif.

423 Meters (710 Kcys.). P. T. Apr. 2.—12:00 M.—Time signals. 1:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M.—Jack Fair's Entella Cafe Orchestra. 4:30 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 5:30 P. M.—Children's hour. 7:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 8:00 P. M.—E. Max Bradford's Versatile Band.
Apr. 3.—12:00 M.—Time signals from the Naval Observatory. 1:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M.—Matinee program by U. S. Army Band. 8:00 P. M.—Organ recital by Theodore J. Irwin. 9:00 P. M.—Program by the Cap and Bell Club. 10:00-11:00 P. M.—E. Max Bradford's Versatile Band.
Apr. 4.—12:00 M.—Time signals; reading of the Scriptures. 1:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M.—Organ recital by Theodore J. Irwin. 4:30 P. M.—Rudy Seiger's Fairmont Hotel Orchestra.
Apr. 5.—12:00 M.—Time signals. 1:00 P. M.—Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M.—Matinee program. 3:30 P. M.—E. Max Bradford's Versatile Band. 8:00-12:00 P. M.—Dance music by Art Weidner and his popular Dance Orchestra.

Station WKAQ, San Juan, P. R.

360 Meters (830 Kcys.). E. S. T.—Broadcasts two concerts weekly as follows: Wednesdays, 7 to 9 P. M.; Fridays, 7 to 9 P. M.

Station WBAP, Fort Worth, Texas

476 Meters (620 Kcys.). C. S. T. Apr. 4.—7:30 P. M.—Concert by the Texas Christian University. 9:30 P. M.—Concert by the 25-piece mandolin orchestra of the Knights of Pythias
(Concluded on page 37)

A List Showing the Votes Cast Will Be Published in an Early Issue

Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice, whether a comedian, an opera singer, a jazz band, or a story-teller.

RADIO WORLD wants to be able to tell the world the name of the entertainer who stands highest in the regard of listeners-in.

Use the accompanying blank and mail to Broadcasting Manager, RADIO WORLD: Cut off. Fill out. Mail today.

BROADCASTING MANAGER, RADIO WORLD, 1493 Broadway, New York City.

Dear Sir:

My favorite entertainer is.....Station.....

Name.....

Street Address.....

City and State.....

Radio Going to the Dogs?—No, Says



(International)

HECTOR LISTENS IN with ear-phones, using a crystal set, but his pal, Spot (at right) prefers the loud speaker of the four-bulb set.



(International)

"WHO IS MAKING all that noise?" Spot wonders, as he hears crash of static. "Is it station CAT?"



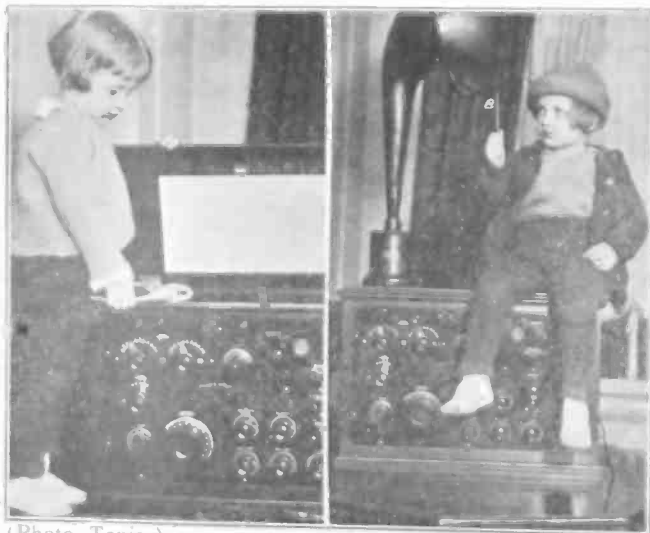
(Wide World)

"RADIO IS GETTING BETTER," said "Roxy" the popular announcer of Capitol Theatre program President Coolidge. Surgeon General S



(K. & H.)

SOCIETY GIRLS at a "radio conference" set the style in Porto Rico.



(Photo Topics)

FANS—Kathryn M. Weintraub (left) and Beatrice E. Weintraub, of Atlantic City.



(International)

PHILIP L.

WHILE HIS DAD Van Rensselaer Thorne of the Western Ele



SPECIAL BROADCASTING ORGAN at CKAC, Canada, is shown, with microphone at center (top).

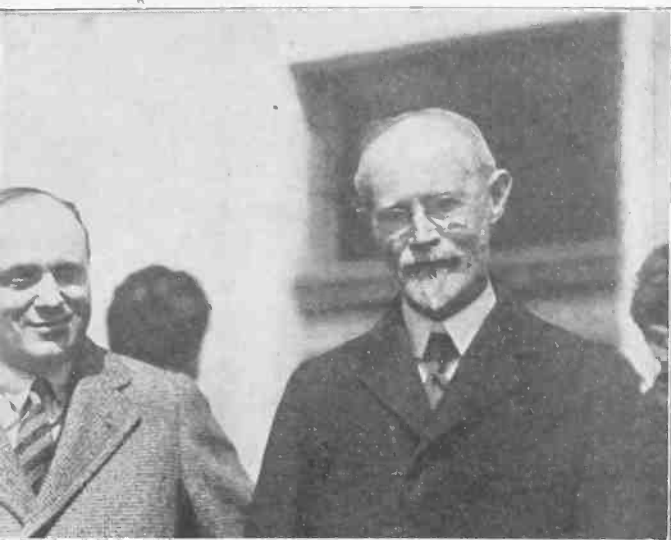


(K. & H.) **CAMPFIRE GIRLS** on a New York roof.

Tests Nine



Roxy at Washington—Children Agree



Roxy (center), on trip to Washington with his "gang". With (left) and Ireland, met Roxy at the Washington station.



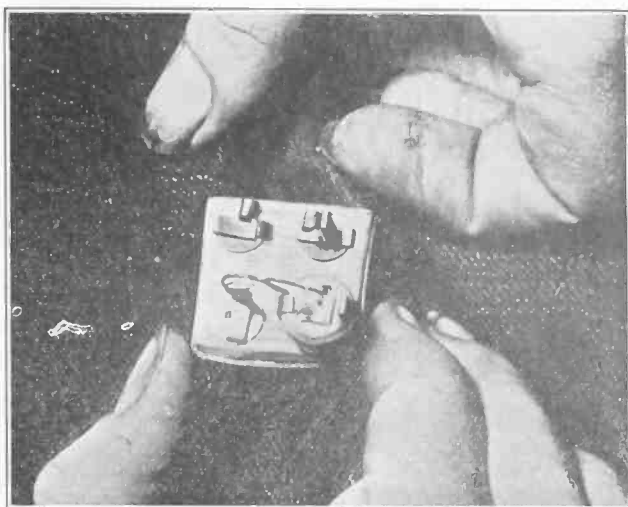
TWINS DO A TURN—Maxine and Virginia Loomis broadcasting from KFI. In song, they laud radio, warbling of the joy their set has brought them.



THOMSON



Spoke via radio from Kansas City recently, Master Philip (at right) listened in. Mr. Thomson is publicity manager Company and president of the Association of National Advertisers.



(International)

MADE OF PAPER CLIPS—This crystal set fits snugly into the pocket of Harry Gehrman, Washington, D. C., the maker of the odd apparatus. Life is getting to be just one "smallest" crystal set after another, isn't it? Carrying a crystal set in one's vest pocket or hat may be the style this summer, but Fashion dictators haven't decreed yet.

Loud Speakers Just to Sell One



(K. & H.)

"SEE?" asks salesman, but he should say "Hear?" as he plugs in nine loudspeakers consecutively, so customer can make a good choice.



(Photo Topics)

MORE STAMPS SOLD by C. J. Weyant, Fort Montgomery, N. Y., since installing a set in postoffice over which he presides.

New National Association Formed for Radio Betterment

PAPERS of incorporation for the National Radio Association, Inc., a non-profit organization, were filed at Columbus and caused considerable comment.

Among the incorporators were Thad H. Brown, secretary of state, Columbus; Roland C. Caley and Fred E. Kingsbury, of Cleveland.

Secretary Brown said the temporary quarters of the association had been established in the National City building, Cleveland. He further said that the aim of the organization was for the betterment of conditions for the radio fan.

Among other objects which the association will further, according to Mr. Brown, are:

Co-operating with all existing bodies to rid the air of useless interference; strict enforcement of all quiet hours; investigate complaints made by radio fans; protect radio fans against adverse legislation; publish a loose leaf log book; do everything possible to advance the science of radio; to properly advise radio fans regarding the installation of sets and to eliminate unnecessary dangers of fire hazards; co-operate with broadcasting stations in an effort to provide high-class and entertaining programs throughout the nation.

The aim of the association is: "All That is Best in Radio."

Mr. Brown said that radio has been sweeping the country for the past few months and that the organization had been launched with the thought that it could work great good for both the broadcast listener and the broadcast station.

Readers Ask for Radio Literature

MANUFACTURERS of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

John C. Fink, Avoca, Minnesota.
S. E. Wallace, Donnelly, Idaho.
Mac F. Whalen, Saliva School, Detroit, Mich.
Roman Debes, R. C. A., Chatham, Mass.
C. Harwood King, 9 Village Road, Bebington, Cheshire, England.
W. A. Scott, Crowville, La.
Roy L. Cramford, R. F. D. No. 1, Box 15, Kerens, Texas.
Emil Johnson, Lincoln, Neb.
E. E. Brothoff, Route 7, Winterset, Iowa.
Kentucky Radio Co., Corbin, Ky. (Dealers.)
Fred O. Bouton, 137 N. Cheyenne Ave., Bartlesville, Okla.
L. E. Wall, 496 East Tenth street, Pomona, Calif.
Donald Deman, Humboldt, South Dakota.

Production of Zig-Zag Plate Sockets Begins

PRODUCTION of a socket with zigzag plates to insure perfect contact, has been begun by the Howard Radio Co., Inc., of Chicago.

The socket accommodates any standard tube.

The Radio Trade

Crystal Set Fits Pocket and Purse

IN a leatherette covered case, no larger than that containing an ordinary safety razor outfit, comes a most compact little crystal radio receiving set that is selective, brings in local stations very loud and clear, and is ideal to give as a present. This set costs \$2, and with complete equipment (nothing else to buy), \$5.

No tubes or batteries are needed. All that is needed to make it absolutely complete are earphones, aerial and ground equipment, also lightning arrester, which are included in the price of \$5.

This little set, which is manufactured by the Pal Radio Corporation, 106 New Main Street, Yonkers, N. Y., and at such a small cost, gives marvelous results. It is ideal to pack in your grip and take along on your vacation.

It won't pay you to build a set for local stations when for a small cost you can buy a completely made set.

Perfecting Speaking Gives Large Volume

A NEW phonograph and speaker unit has been perfected and placed on the market by Ackerman Bros., 301 West Fourth Street, New York, creators of the Ackerman Loud Speaker. Clarity of tone and maximum volume have been attained with beauty of appearance and durability.

The unit has met with a good reception and the demand is growing among consumers and dealers. This unit is called

the "Model A Loud Speaker Unit" and comes complete for use on horn or phonograph with five foot cord and rubber coupling.

New Corporations

Mohegan Radio Corp., Brooklyn, \$5,000; M. A. and P. Cutler, J. Teiler. (Attorney, S. J. Cutler, 50 Court St., Brooklyn.)

Peckham-Gottburg Electric Co., Rochester, \$15,000; C. J. Peckham, W. W. Gottburg, J. E. Jones. (Attorney, A. N. Jones, Rochester.)

Metradio Corp., Manhattan, make radio machines, 250 shares common stock, no par value; A. G. Thorne, C. A. True, M. Goodman. (Attorney, L. R. Bachner, 27 Cedar St.)

A. C. Brady & Co., Manhattan, make radio instruments, 1,000 shares common stock, no par value; A. C. Brady, T. F. Frawley, A. J. Egan. (Attorneys, Frueauff, Robinson & Sloan, 67 Wall St.)

Pollemitz Electric Service Corp., New Rochelle, to P. & B. Battery and Ignition Corp.

Edward J. Boule, New Rochelle, electric storage batteries, \$10,000; E. J. and M. V. Boule, F. Caponzi. (Attorneys, Fallon & Fallon, New Rochelle.)

Liberty Radio Corp., Manhattan, to Kor-Radio Company.

Volute Instrument Co., Manhattan, radio, \$50,000; De. W. and R. Ward, M. A. Azzi. (Attorney, J. M. Holzworth, 350 Madison Ave.)

Commugraph Co., Manhattan, telephones and wireless systems, \$1,000,000; R. D. Whitmore, H. W. Cronk, M. K. Mayer. (Attorney, F. W. Burr, 256 Broadway.)

FRESHMAN VERNIER DIAL

A Bakelite dial with Vernier adjustment. A small rubber tired wheel through the slot in the dial permits you to set the dial to the exact point and obtain the same dial setting every time. Just the thing for Neutrodyne, Polydyne and Super-Heterodyne.

Price, 3 in., \$1.00

Price, 4 in., \$1.50

At your dealer's, otherwise, send purchase price and you will be supplied postpaid. Ask your dealer or write direct for free diagrams of Neutrodyne, Polydyne and Super-Heterodyne Circuits.



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

Bel-Canto Answers Critic of Price Drop

THE Bel-Canto Manufacturing Co., answering the assertion that its loud speaker, costing \$10, is being sold to the trade as a twenty-five dollar article, says: "In this quotation there is a subtle insinuation, which we want to correct. The article in question is a twenty-five dollar article and was sold first through the distributor at a discount of 50% and 10% off list.

"We are accused of selling first to the trade at twenty-five dollars and then offering to the public the same article for ten dollars. We are not offering and do not intend to offer our product to the trade. They can buy them if they want to, and quite a few have, at ten dollars each, C. O. D.

"We have sold thousands of our product since offering it direct to the consumer, at a price we heretofore sold it to the trade, without in any way cheapening our product, and the public has been quick to respond.

"Sooner or later, other manufacturers are going to sell direct to the public, not clandestinely, but exclusively and openly."

Crystal in Vacuum Is New Tube Product

THE Elless Radio Exchange, 49 Vesey Street, New York City, is marketing a sensitive fixed crystal, mounted inside a vacuum tube about three inches high. A socket of the bayonet type is provided to facilitate mounting and wiring. This unit when tested in a reflex set, gave excellent results.

The stability of this detector is due to the vacuum preventing the crystal from becoming soiled by handling and also protects it from a change in atmosphere, allowing no moisture to penetrate.

Show Free, Crowds Flock to See Sets

THE free radio show held in New York by the New York Edison Co. at its showrooms attracted large crowds. Considerable discussion of value of having all radio shows free resulted. The latest improved models of receiving sets were demonstrated before great numbers of radio fans.

Admission to the show was free, which probably accounted for the large crowds which daily crowded the extensive show rooms of the Edison Company.

The Radio Primer

What the Symbols Mean; Functions of Various Parts

Information and Instruction for the Beginner

Beginners' Dictionary

By N. N. Bernstein

ANTENNA—A length of wire which acts as a collector of radio waves.

GROUND—A wire connected to the ground acts as a return path for radio waves.

WIRE CONNECTIONS—Where wires cross and a small loop is made on the diagram it shows that those wires are not connected. If they cross in a straight line, or a small dot is made at the point of contact, it means that those wires are connected together.

RESISTANCE—Electrical resistance usually takes the form of an alloy wire. This wire offers resistance to the flow of current in any circuit in which it is placed.

FIXED RESISTANCE—A resistance which cannot be varied.

VARIABLE RESISTANCE—One which has an arrangement whereby the resistance can be decreased or increased.

VACUUM TUBE—In radio this refers to detector or amplifying tubes used in receiving and transmitting sets.

TELEPHONE RECEIVERS—The double phone headset.

VOLTMETER—Meter which measures the number of volts in a circuit.

GALVANOMETER—Meter which detects the presence of electrical currents in a circuit.

CRYSTAL DETECTOR—Detector used in radio receiving set which employs a natural or synthetic mineral to rectify the incoming signal so that it may be heard in the headphones.

BATTERY—(1) *Primary*. A primary battery (dry cell) generates a current by chemical action. (2) *Storage*. A storage battery receives and stores electrical energy from an external source.

DIRECT CURRENT DYNAMO—An electrical generator whose positive and negative polarities do not change.

ALTERNATING CURRENT DYNAMO—An electrical generator whose positive and negative polarities are constantly reversing at a given frequency.

CAPACITY—The amount of voltage a condenser can accommodate.

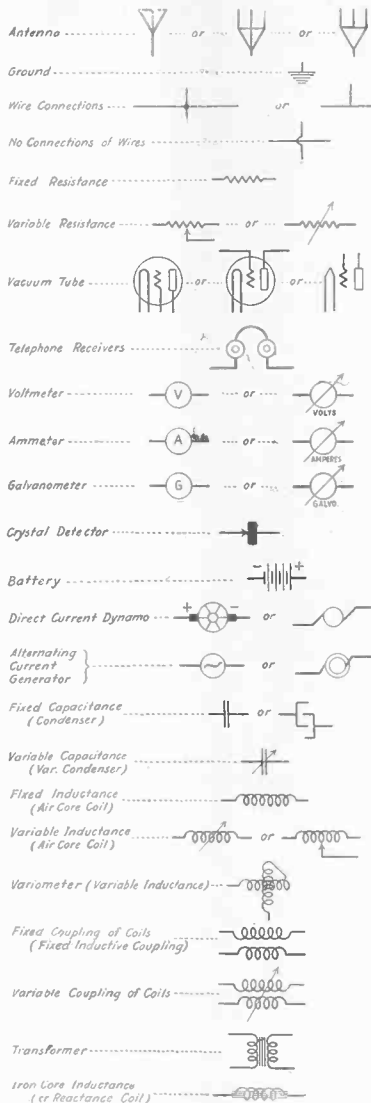
FIXED CONDENSER—One whose capacity can not be changed.

VARIABLE CONDENSER—One whose capacity can be lowered or raised by a mechanical arrangement.

INDUCTANCE—A coil of wire.

FIXED INDUCTANCE (air core)—A coil of wire without taps or means of changing its inductance value.

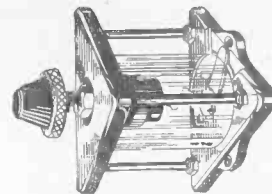
Radio Symbols



VARIABLE INDUCTANCE—(Single coil) One which uses taps or slider arrangement to vary its inductance. (Double coil)

VARIOUPLER—Two inductances, one the secondary, usually without taps, so arranged as to rotate within the outside or primary coil. The primary coil usually makes use of taps to change the inductance value.

Double Adjustable FRESHMAN Crystal Detector



for base or panel mounting. When mounted on panel only the knob shows on the front. No more searching for the sensitive spot. Merely turn the knob as you would a dial thus adjusting the crystal instead of the cat's whisker. Best for both Reflex and Crystal sets.

PRICE \$1.50

Freshman Super Crystal—Sensitive in every spot, mounted on a special non-metallic housing, eliminating howls and squeals **50c**

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

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

Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Ave. New York City

The Case of McMillan vs. Erlanger

THE Supreme Court of New York State decided some years ago, in the test case of McMillan vs. Erlanger, that no man or body of men, either in an official or private capacity, can take away the rights of the public in LIGHT AND AIR.

Patents Minus Air Equal Zero

AUGUST DREYER, noted New York Attorney, recently wrote a letter to Charles Pope Caldwell, representing Station WHN, and gave his ideas regarding the imminent closing of that station, at Loew's State Theatre Building, New York City. Mr. Dreyer ended his letter with the following paragraph:

"To make mortar, you must have the elements of cement, sand and water. Sand and cement will not make mortar unless water is used. Therefore, sand and cement would be of no use without the water. Patents are of no use in broadcasting unless the ether can be used—and the air belongs to all mankind."

RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY PHRASED FOR OUR BUSY READERS

James Denson Sayers will talk on Esperanto, the international language, from WOR tonight (Saturday). Radio devotees in England, Cuba and Mexico have made arrangements to receive the talk, the last part of which will be delivered in Esperanto. Persons unfamiliar with Esperanto are warned not to think they are receiving a Chinese broadcasting station when the international language is heard.

radio broadcasting station in Belfast, Ireland, by the first of June, advices from Belfast state. The new station will be similar to the B. B. C.'s station in London, and will operate a full program and be directed by its own officials.

* * *

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

The British Broadcasting Company plans to open a district

COMPLETE LIST OF BROADCASTING STATIONS

Compiled and Corrected to March 28, 1924

HEREWITH is presented one of the most comprehensive and authoritative lists of broadcast stations in the United States, Canada, Mexico and Cuba ever published. It contains 612 stations. Preserve it for reference.

The list, carefully corrected, with the new stations added and discontinued ones deleted up to March 28, 1924, follows:

Call	Owner	Location	Meters	Keys	Call	Owner	Location	Meters	Keys
KDKA	West'ghouse Elec. & Mfg. Co.	E. Pittsburgh, Pa.	326	920	KFJM	University of North Dakota	Grand Forks, N. D.	229	1310
KDPM	West'ghouse Elec. & Mfg. Co.	Cleveland, Ohio	270	1110	KFJQ	Valley Radio Co.	Grand Forks, N. D.	280	1070
KDPT	Southern Electrical Co.	San Diego, Cal.	244	1230	KFJK	Ashtey C. Dixon & Son	Stevensville, Mont.	258	1160
KDYL	Telegram Publishing Co.	Salt Lake City, Utah	260	830	KFJL	I. H. Warren	Dexter, Iowa	224	1340
KDYM	Savoy Theatre	San Diego, Cal.	280	1070	KFJW	Le Grand Radio	Tonawanda, Kan.	226	1320
KDYO	Oregon Inst. of Tech.	Portland, Oregon	360	620	KFJX	Iowa State Teachers' Col.	Cedar Falls, Iowa	229	1310
KDYW	Smith, Hughes & Co.	Phoenix, Ariz.	360	830	KFJY	Trenwall Radio Co.	Fort Dodge, Iowa	246	1220
KDYX	Star Bulletin	Honolulu, Hawaii	360	620	KFKA	Texas Natl. Gd. (12th Cav.)	Fort Worth, Texas	254	1180
KDZE	Frank E. Siefert	Bakersfield, Cal.	240	1250	KFKB	Brinkley-Jones Hospital	Fort Dodge, Iowa	246	1220
KDZF	The Rhodes Co.	Seattle, Wash.	270	1110	KFKC	Conway Radio Lab.	Millford, Kan.	286	1050
KDZI	Electric Supply Co.	Los Angeles, Cal.	278	1080	KFKV	F. Gray	Conway, Ark.	224	1340
KDZO	Nichols Academy of Music	Denver, Colo.	360	830	KFKX	West'ghouse Elec. & Mfg. Co.	Butte, Mont.	283	1060
KDZR	Bellingham Publishing Co.	Bellingham, Wash.	261	1150	KFKZ	Nassour Bros.	Hastings, Neb.	286	1050
KFAD	McArthur Bros. Merc. Co.	Phoenix, Ariz.	360	830	KFLA	A. R. Willson	Colorado Springs, Colo.	234	1280
KFAE	State College of Washington	Pullman, Wash.	330	910	KFLB	Signal Mfg. Co.	Butte, Mont.	248	1210
KFAF	Western Radio Corp.	Denver, Colo.	360	830	KFLC	P. E. Greenlaw	Menominee, Mich.	248	1210
KFAJ	University of Colorado	Boulder, Colo.	360	830	KFLD	Nat'l Educational Service	Franklin, La.	234	1280
KFAN	The Electric Shop	Moscow, Idaho	360	830	KFLE	Errickson Radio Co.	Denver, Colo.	268	1120
KFAU	Studio Lighting Service Co.	Hollywood, Cal.	280	1070	KFLF	E. N. Foster	Salt Lake City, Utah	261	1180
KFAW	Daily Sun	Boise, Idaho	270	1110	KFLG	Bizzell Radio Co.	Cedar Rapids, Iowa	240	1250
KFAZ	The Radio Den	Santa Ana, Cal.	280	1070	KFLH	University of New Mexico	Little Rock, Ark.	261	1150
KFB	W. T. Virgin Milling Co.	Medford, Ore.	283	1060	KFLI	Rio Grande Radio Co.	Albuquerque, N. M.	254	1180
KFBB	F. A. Buttrey & Co.	Havre, Mont.	360	830	KFLJ	Rev. A. T. Frykman	San Benito, Texas	236	1270
KFBC	W. K. Azbill	San Diego, Cal.	278	1080	KFLK	Missoula Elec. Supply Co.	Rockford, Ill.	229	1310
KFBE	Reuben H. Horn	San Luis Obispo, Cal.	360	380	KFLM	Geo. R. Clough	Missoula, Mont.	234	1280
KFBG	First Presbyterian Church	Tacoma, Wash.	360	830	KFLN	Fargo Radio Co.	Galveston, Texas	240	1250
KFBH	Kimball-Upson Co.	Sacramento, Cal.	283	1060	KFLP	Atlantic Auto Co.	Fargo, N. D.	231	1300
KFBK	Leise Bros.	Everett, Wash.	224	1340	KFLQ	University of Arkansas	Atlantic, Iowa	273	1100
KFBP	Edwin J. Brown	Seattle, Wash.	224	1340	KFLR	Morningside College	Fayetteville, Ark.	263	1140
KFBQ	Trinidad Gas & Elec. Co.	Trinidad, Colo.	360	830	KFLS	Freimuth Dept. Store	Sioux City, Iowa	261	1150
KFBU	The Cathedral	Laramie, Wyo.	283	1060	KFLT	Dr. G. W. Young	Duluth, Minn.	275	1090
KFCB	Nielsen Radio Supply Co.	Phoenix, Ariz.	238	1260	KFLU	Stevens Bros.	Minneapolis, Minn.	231	1300
KFCF	Frank A. Moore	Walla Walla, Wash.	360	830	KFLV	M. G. Sateren	San Marcos, Tex.	240	1250
KFCG	Electric Service Sta., Inc.	Billings, Mont.	360	830	KFLW	Carleton College	Houghton, Mich.	266	1130
KFCM	Richmond Radio Shop	Richmond, Cal.	244	1230	KFLX	Boy Scouts of America	Northfield, Minn.	283	1050
KFCN	Ralph W. Flygare	Ogden, Utah	360	830	KFLY	Roswell Bdcstg. Club	Long Beach, Cal.	229	1310
KFCY	Western Union College	Houston, Texas	360	830	KFMA	Alonzo Monk, Jr.	Roswell, N. M.	250	1200
KFCZ	Omaha Central High School	Le Mars, Iowa	360	830	KFMB	H. Field Seed Co.	Corsicana, Texas	234	1280
KFDA	Adlers Music Store	Omaha, Neb.	258	1160	KFMC	Wooten's Radio Shop	Shenandoah, Iowa	266	1130
KFDD	St. Michael's Cathedral	Baker, Ore.	360	830	KFMD	State Teachers' College	Coldwater, Miss.	254	1180
KFDE	University of Arizona	Boise, Idaho	252	1190	KFM	Warrensburg Elec. Shop	Springfield, Mo.	236	1270
KFDI	Oregon Agricultural College	Tucson, Ariz.	360	830	KFNA	Montana Phon. Co.	Warrensburg, Mo.	234	1280
KFDL	Knight-Campbell Music Co.	Corvallis, Ore.	360	830	KFNB	Peabody Radio Soc.	Henla, Mont.	261	1150
KFDO	H. Everett Cutting	Bozeman, Mont.	248	1210	KFNC	Glenwood Technical Asso.	Peabody, Kan.	240	1250
KFDV	Bullock's Hdw. & Spt. Goods	York, Pa.	360	830	KFND	First Christian Church	Minneapolis, Minn.	224	1340
KFDW	Gjibrech & Stinson	Fayetteville, Ark.	360	830	KFNE	Vern Peters	Whittier, Calif.	226	1270
KFDX	First Baptist Church	Shreveport, La.	360	830	KFNF	Rohrer Electric Co.	Marshfield, Ore.	240	1250
KFDY	S. D. State Col. of Agric.	Brookings, S. D.	360	830	KFN	The Radio Bungalow	Portland, Ore.	283	1060
KFEC	Meier & Frank Co.	Portland, Ore.	360	830	KFNG	Moberly H. S. Radio Club	Moberly, Mo.	246	1220
KFED	Guy Greason	Tacoma, Wash.	360	830	KFNH	Leslie M. Schafbusch	Marengo, Iowa	234	1280
KFEL	Winner Radio Corp.	Denver, Colo.	360	830	KFNI	Echophone Radio Shop	Long Beach, Calif.	234	1280
KFER	J. L. Scroggin	Oak, Neb.	270	1110	KFNJ	Latter Day Saints Univ.	Salt Lake City, Utah	261	1150
KFER	Auto Electric Service Co.	Fort Dodge, Iowa	231	1300	KFNK	Wilson Construction Co.	Dallas, Texas	268	1120
KFEV	Radio Electric Shop	Douglas, Wyo.	263	1140	KFNL	Orla William Chancellor	Galveston, Texas	240	1250
KFEW	Augsburg Seminary	Minneapolis, Minn.	261	1150	KFNO	David City Tire & Elec. Co.	David City, Nebr.	226	1330
KFEY	Bunker Hill & Sull. Mng. Co.	Kellogg, Idaho	360	830	KFNP	College Hill Radio Club	Wichita, Kan.	231	1300
KFEZ	Am. Soc. of Mech. Engineers	St. Louis, Mo.	360	830	KFNS	Hommel Mfg. Co.	Richmond, Calif.	254	1180
KFFB	Jenkins Furniture Co.	Boise, Idaho	273	1100	KFNT	Davis Electrical Corporation	Sioux City, Iowa	234	1280
KFFE	Eastern Oregon Radio Co.	Pendleton, Ore.	360	830	KFNU	Bd. of Education, Tech. H. S.	Omaha, Nebr.	248	1210
KFFO	Dr. E. H. Smith	Hillsboro, Ore.	229	1310	KFNV	Leon Hudson Real Estate Co.	Fort Smith, Ark.	233	1290
KFFQ	Marksheffel Motor Co.	Colorado Springs, Colo.	360	830	KFNW	Garretson & Dennis	Los Angeles, Calif.	254	1180
KFFR	Jim Kirk	Sparks, Nev.	226	1330	KFOW	Doerr-Mitchell Elec. Co.	Spokane, Wash.	283	1060
KFFS	Graceland College	Lamoni, Iowa	360	830	KFO	Tacoma Daily Ledger	Tacoma, Wash.	252	1190
KFFG	McGraw Company	Omaha, Neb.	278	1080	KFOA	Hallock & Watson Radio Ser.	Portland, Ore.	360	830
KFFH	Pineus & Murphey	Alexandria, La.	275	1090	KFOB	Northwestern Radio Mfg. Co.	Portland, Ore.	360	830
KFFI	Al. C. Barnes Amuse. Co.	Dallas, Texas	226	1330	KFOC	General Electric Co.	Oakland, Cal.	312	960
KFFJ	Louisiana State University	Baton Rouge, La.	254	1180	KFOD	Marion A. Mulrony	Honolulu, Hawaii	360	830
KFFK	Chickasha Radio & Elec. Co.	Chickasha, Okla.	248	1210	KFOE	Portland Morning Oregonian	Portland, Ore.	492	610
KFFL	Leland Stanford University	Stanford Univ., Cal.	226	1330	KFOF	St. Martin's College	Lacey, Wash.	258	1160
KFFM	Arlington Garage	Arlington, Ore.	234	1250	KFOG	Los Angeles Times	Los Angeles, Cal.	393	760
KFFN	Crary Hardware Co.	Boone, Iowa	226	1330	KFOH	Louis Wasmer	Seattle, Wash.	360	830
KFFO	Heidbreder Radio Sup. Co.	Utica, Neb.	224	1340	KFOI	C. O. Gould	Stockton, Cal.	360	830
KFFP	First Presbyterian Church	Orange, Texas	250	1200	KFOJ	Northwest Radio Service	Seattle, Wash.	283	1060
KFFQ	Gjelhaug's Radio Shop	Baudette, Minn.	224	1340	KFOK	Bible Inst. of Los Angeles	Los Angeles, Cal.	360	830
KFFR	Emmanuel Missionary Col.	Berrien Springs, Mich.	268	1120	KFOL	Warner Bros. Radio Co.	Oakland, Cal.	360	830
KFFS	Col. State Normal School	Gunnison, Colo.	252	1190	KFOM	Elec. Lighting Supply Co.	Los Angeles, Cal.	256	1180
KFFT	Rialto Theatre	Hood River, Ore.	280	1070	KFOO	N. M. Col. of Ag. & Mec. Arts	State College, N. M.	360	830
KFFU	Utz Elec. Shop Company	St. Joseph, Mo.	226	1330	KFOQ	Detroit Police Department	Detroit, Mich.	360	830
KFFV	Central Christian Church	Shreveport, La.	266	1130	KFOR	Hale Bros.	Detroit, Mich.	286	1050
KFFW	Ambrose A. McCue	Neah Bay, Wash.	261	1150	KFOS	Apple City Radio Club	Hood River, Ore.	423	710
KFFX	Fallon & Company	Santa Barbara, Cal.	270	1110	KFOU	Doubleday-Hill Elec. Co.	Pittsburgh, Pa.	360	830
KFFY	Star Electric & Radio Co.	Seattle, Wash.	270	1110	KFOV	Chas. D. Herrold	San Jose, Cal.	360	830
KFFZ	Clifford J. Dow	Linne, Hawaii	275	1090	KFOW	Berkeley Daily Gazette	Berkeley, Cal.	278	1080
KFGA	Robert W. Nelson	Hutchinson, Kan.	229	1310	KFOX	Post Dispatch	St. Louis, Mo.	546	550
KFGB	Earle C. Anthony, Inc.	Los Angeles, Cal.	469	640	KFOY	The Emporium	San Francisco, Cal.	360	830
KFGC	Ross Arbuckle's Garage	Iola, Kan.	246	1220	KFOZ	Prest & Dean Radio Co.	Long Beach, Cal.	360	830
KFGD	Benson Poly. Institute	Portland, Ore.	360	830	KFP	First Presbyterian Church	Seattle, Wash.	360	830
KFGE	Windisch Elec. Farm Exp. Co.	Louisburg, Kan.	234	1280	KFPA	Examiner Printing Co.	San Francisco, Cal.	360	830
KFGF	North Central High School	Spokane, Wash.	252	1190	KFPB	City Dye Wks. & Laun. Co.	San Francisco, Cal.	360	830
KFGG	Yakima Valley Radio Broad-	Yakima, Wash.	224	1340	KFPC	Coast Radio Company	El Monte, Cal.	256	1170
KFGH	casting Association	Yakima, Wash.	224	1340	KFPD	Portable Wireless Tel. Co.	Stockton, Cal.	360	830
KFGI	Alaska Elec. Light & Pr. Co.	Juneau, Alaska	226	1330	KFPE	Los Angeles Examiner	Los Angeles, Cal.	360	830
KFGJ	Church of Latter Day Saints	Independence, Mo.	240	1250	KFPG	Herald Publishing Company	Modesto, Cal.	252	1190
KFGK	Daily Commonwealth	Fond du Lac, Wis.	273	1100	KFPH	West'ghouse Elec. & Mfg. Co.	Chicago, Ill.	536	560
KFGL	Marshall Electrical Co.	Marshalltown, Iowa	248	1210	KFPI	Electric Shop	Honolulu, Hawaii	360	830
KFGM	Seattle Post-Intelligencer	Seattle, Wash.	233	1290	KFQ	Preston D. Allen	Oakland, Cal.	360	830
KFGN	National Radio Mfg. Co.	Oklahoma City, Okla.	252	1190	KFQA	Cope & Johnson Co.	Salt Lake City, Utah	268	1120
KFGO	Liberty Theatre	Astoria, Ore.	252	1190	KFQB	Wenatchee Bat. & Motor Co.	Wenatchee, Wash.	360	830
KFGP	Delano Radio & Elec. Co.	Bristow, Okla.	233	1290	KFQC	Valdemar Jensen	New Orleans, La.	268	1120
KFGQ	Hardsack Mfg. Company	Ottumwa, Iowa	242	1240	KFQD	Tulane University	New Orleans, La.	463	650
KFGR					KFQE	Ohio Mechanics Inst.	Cincinnati, Ohio	360	830
KFGS					KFQF	Daily Drivers Journal	Chicago, Ill.	286	1050
KFGT					KFQG	Gimbel Bros.	Milwaukee, Wis.	280	1070
KFGU					KFQH	I. R. Nelson Company	Newark, N. J.	263	1140
KFGV					KFQI	University of Missouri	Columbia, Mo.	254	1180
KFGW					KFQJ	Omaha Grain Exchange	Omaha, Neb.	360	830
KFGX					KFQK	Dr. John B. Lawrence	Harrisburg, Pa.	246	1130
KFGY					KFQL	Parker High School	Dayton, Ohio	283	1060
KFGZ					KFQM	Y. M. C. A.	Washington, D. C.	283	1060
KFHA					KFQN	Arnold Edwards Piano Co.	Jacksonville, Fla.	248	1210

Call	Owner	Location	Meters	Kcys.	Call	Owner	Location	Meters	Kcys.
WABH	Lake Shore Tire Co.	Sandusky, Ohio	240	1250	WGAZ	South Bend Tribune	South Bend, Ind.	360	830
WABI	Bangor Railway & Elec. Co.	Bangor, Me.	240	1190	WGI	Amer. Bend Research Corp.	Medford Hills, Mass.	365	620
WABK	First Baptist Church	Worcester, Mass.	252	1190	WGR	Federal Tel. & Tel. Co.	Buffalo, N. Y.	280	830
WABL	Conn. Agricultural College	Storrs, Conn.	265	1060	WGW	General Electric Co.	New Orleans, La.	242	1240
WABM	F. E. Doherty Radio Sup. Co.	Saginaw, Mich.	234	1180	WGY	General Electric Co.	Schenectady, N. Y.	380	760
WABN	Waico C. Grover	La Cross, Wis.	252	1190	WHA	University of Wisconsin	Madison, Wis.	360	830
WABO	Lave Ave. Baptist Church	Rochester, N. Y.	261	1150	WHA	State University of Iowa	Iowa City, Iowa	283	1060
WABQ	Hayward Col. Radio Club	Hayward, Pa.	270	1100	WHAB	Clark W. Thompson	Galveston, Texas	360	830
WABC	Scott High School	Toledo, Ohio	244	1230	WHAD	Marquette University	Milwaukee, Wis.	280	1070
WABS	Essex Mfg. Co.	Newark, N. J.	252	1190	WHAG	University of Cincinnati	Cincinnati, Ohio	222	1350
WABT	Holliday Hall	Washington, Pa.	226	1330	WHAH	Hafer Supply Co.	Joplin, Mo.	283	1060
WABU	Victor Talking Machine Co.	Camden, N. J.	263	1140	WHAK	Roberts Hardware Co.	Clarkburg, W. Va.	360	830
WABV	John H. De Witt	Nashville, Tenn.	234	1280	WHAM	University of Rochester	Rochester, N. Y.	283	1060
WABW	College of Wooster	Wooster, Ohio	270	1110	WHAP	Otta & Kuhns	Decatur, Ill.	360	830
WABX	H. B. Joy	Mt. Clemens, Mich.	242	1240	WHAR	Paramount Radio & Elec. Co.	Atlantic City, N. J.	231	1300
WABY	John Magaldi	Philadelphia, Pa.	263	1140	WHAS	Courier-Journal & Lo. Times	Louisville, Ky.	430	750
WABZ	Coliseum Pl. Baptist Church	New Orleans, La.	240	1190	WHAZ	Wilmington Elec. Spec. Co.	Wilmington, Del.	360	830
WBA	Purdue University	W. Lafayette, Ind.	360	830	WHB	Rensselaer Poly. Inst.	Troy, N. Y.	380	760
WBAH	The Dayton Company	Minneapolis, Minn.	400	750	WHC	Sweeney School Co.	Kansas City, Mo.	411	730
WBAK	Pennsylvania State Police	Harrisburg, Pa.	246	1220	WHK	Radio Box Co.	Cleveland, Ohio	283	1060
WBAN	Wireless Phone Corp.	Paterson, N. J.	360	830	WHL	Loew's State Theatre	New York, N. Y.	360	830
WBAO	James Milliken University	Rochester, N. Y.	360	830	WHM	Mich. Limestone & Chem. Co.	Rogers, Mich.	300	1000
WBAU	Star-Telegram	Fort Worth, Texas	476	620	WHN	Joslyn Automobile Co.	Rockford, Ill.	252	1190
WBAV	Republican Publishing Co.	Hamilton, Ohio	258	1160	WHB	Galveston Tribune	Galveston, Texas	360	830
WBAW	Erner & Hopkins Co.	Columbus, Ohio	399	770	WHC	H. R. Miller	Philadelphia, Pa.	254	1180
WBAZ	John H. Stenger, Jr.	Wilkes-Barre, Pa.	360	830	WHF	Gustava DeCortin	New Orleans, La.	234	1250
WBAA	American Tel. & Tel.	New York, N. Y.	492	610	WHG	Heer Stores Company	Springfield, Mo.	252	1190
WBAB	Newark Radio Laboratories	Newark, Ohio	240	1250	WHI	Fox Riv. Val. Radio Supply Co.	Necanah, Wis.	224	1340
WBBD	Barbey Battery Service	Reading, Pa.	234	1280	WHK	Journal-Stockman Co.	Omaha, Neb.	278	1080
WBBE	Alfred R. Marcy	Syracuse, N. Y.	246	1220	WHL	School of Eng. of Milwaukee	Milwaukee, Wis.	360	830
WBBF	Petoskey High School	Petoskey, Mich.	246	1220	WHM	Chronicle Publishing Co.	Marion, Ind.	224	1330
WBBS	Irving Vermilya	Mattapoisett, Mass.	240	1250	WHN	Home Electric Company	Burlington, Iowa	360	830
WBBS	J. Irving Bell	Fort Huron, Mich.	246	1220	WHU	Am. Trust & Savings Bank	Le Mars, Iowa	360	830
WBBI	The Indianapolis Radio Club	Indianapolis, Ind.	234	1280	WIK	K. & L. Elec. Supply Co.	McKeesport, Pa.	360	830
WBBL	Neal Electric Co. P. E. Neal	West Palm Beach, Fla.	258	1160	WIP	Gimbel Bros.	Philadelphia, Pa.	509	590
WBBS	Grace Covenant Presb. Ch.	Richmond, Va.	283	1060	WJ	Jackson's Radio Eng. Lab.	Waco, Tex.	360	830
WBBS	Watts Atlas Prod. Co.	Lincoln, Ill.	226	1330	WJAF	Muncie Press	Providence, R. I.	360	830
WBBS	Blake, A. B.	Wilmington, N. C.	275	1090	WIL	Continental Elec. Supply Co.	Washington, D. C.	360	830
WBBS	Mich. Limestone Co.	Rogers, Mich.	250	1200	WJG	Norfolk Daily News	Norfolk, Neb.	283	1060
WBBS	Frank Crooke	Pawtucket, R. I.	275	1090	WJK	C. L. White	Norfolk, Nebr.	360	830
WBBS	People's Pulpit Assn.	Rossville, N. Y.	244	1230	WJM	D. M. Perham	Greentown, Ind.	254	1180
WBBS	Johnstown Radio Co.	Johnstown, Pa.	238	1210	WJN	Peoria Star	Peoria, Ill.	280	1070
WBBS	N. B. Watson	Indianapolis, Ind.	227	1320	WJAQ	Capper Publications	Cedar Rapids, Iowa	268	1120
WBBS	T. & H. Radio Company	Anthony, Kan.	261	1150	WJAS	The Outlet Co.	Providence, R. I.	360	830
WBBS	Penna. State Police	Butler, Pa.	286	1050	WJAT	Pittsburgh Radio Sup. House	Pittsburgh, Pa.	250	1200
WBBS	D. W. May, Inc.	Newark, N. J.	360	830	WJAX	Nelly-Vawter Jewelry Co.	Marshall, Mo.	360	830
WBBS	Southern Radio Corporation	Charlotte, N. C.	360	830	WJAZ	Union Trust Co.	Cleveland, Ohio	360	830
WBBS	Westinghouse Elec. & Mfg. Co.	Springfield, Mass.	360	830	WJZ	Chicago Radio Laboratory	Chicago, Ill.	478	740
WBBS	J. Finke Jewelry Mfg. Co.	Fort Smith, Ark.	360	830	WJD	Denison University	Granville, Ohio	229	1310
WBBS	St. Lawrence University	Canton, N. Y.	360	830	WJE	Wm. P. Boyer Company	Washington, D. C.	273	1100
WBBS	Kaufman & Baer Company	Pittsburgh, Pa.	462	650	WJY	De Forest Radio T. & T. Co.	New York, N. Y.	360	830
WBBS	C. C. Randall	New Orleans, La.	268	1120	WJZ	Radio Corp. of America	New York, N. Y.	403	744
WBBS	Entrekin Electric Company	Columbus, Ohio	286	1050	WKA	Radio Corp. of America	New York, N. Y.	435	660
WBBS	Nebraska Wesleyan Univ.	University Place, Neb.	360	830	WKAA	H. F. Paar	Cedar Rapids, Iowa	360	830
WBBS	Alfred P. Daniel	Houston, Texas	263	1140	WKAF	Charles Loeff	E. Providence, R. I.	240	1250
WBBS	St. Olaf College	Northfield, Minn.	360	830	WKAP	U. S. Radio Supply Co.	Wichita Falls, Texas	360	830
WBBS	Villanova College	Villanova, Pa.	360	830	WKAR	United Battery Co.	Montgomery, Ala.	226	1350
WBBS	Sanders & Stayman Company	Baltimore, Md.	360	830	WKAT	Dutree W. Flint	Cranston, R. I.	360	830
WBBS	Chesapeake & Potomac Tel. Co.	Washington, D. C.	469	640	WKAY	Radio Corp. of Porto Rico	San Juan, P. R.	360	830
WBBS	Alamo Radio Elec. Co.	San Antonio, Texas	360	830	WKAZ	Mich. Agricultural College	E. Lansing, Mich.	280	1070
WBBS	Wm. Hood Dunwoody Ind. Inst.	Minneapolis, Minn.	246	1220	WKB	Laconia Radio Club	Laconia, N. H.	254	1180
WBBS	S. D. School of Mines	Rapid City, S. D.	240	1250	WKBZ	Brenau College	Gainesville, Ga.	280	1070
WBBS	Durham & Company	Philadelphia, Pa.	286	1050	WKC	W.K.Y. Radio Shop	Oklahoma City, Okla.	360	830
WBBS	J. C. Dice Elec. Co.	Little Rock, Ark.	260	1080	WKG	Cutting & Wash Radio Corp.	Minneapolis, Minn.	417	700
WBBS	Kesselman O'Driscoll Co.	Milwaukee, Wis.	261	1150	WKL	Samuel Woodworth	Syracuse, N. Y.	234	1250
WBBS	Charles W. Heimbach	Allentown, Pa.	280	1070	WLA	Waco Elec. Supply Co.	Waco, Texas	360	830
WBBS	University of Michigan	Ann Arbor, Mich.	280	1070	WLB	Vt. Farm Machine Corp.	Bellows Falls, Vt.	360	830
WBBS	Wilbur G. Voliva	Zion, Ill.	345	870	WLC	Naylor Elec. Co.	Tulsa, Okla.	360	830
WBBS	Paul J. Miller	Pittsburgh, Pa.	236	1270	WLD	W. V. Jordan	Louisville, Ky.	360	830
WBBS	Howard S. Williams	Pascagoula, Miss. (P.)	236	1270	WLE	A. E. Schilling	Kalamazoo, Mich.	283	1060
WBBS	Nicoll, Duncan & Rush	Bemis, Tenn.	226	1330	WLF	Electric Shop	Pensacola, Fla.	254	1180
WBBS	Northern Radio Mfg. Co.	Houlton, Me.	280	1070	WLG	Police Dept of N. Y. City	New York, N. Y.	360	830
WBBS	Charles Swarz	Baltimore, Md.	229	1310	WLN	Putnam Electric Company	Greencastle, Ind.	231	1300
WBBS	James P. Boland	Ft. Benj. Harrison, Ind.	266	1130	WLO	University of Minnesota	Minneapolis, Minn.	360	830
WBBS	Univ. of Mississippi	Oxford, Miss.	242	1240	WLP	Crosley Mfg. Co.	Cincinnati, Ohio	309	970
WBBS	Stix-Baer & Co. & Fuller Co.	St. Louis, Mo.	360	830	WLR	Clive B. Meredith	Cazenovia, N. Y.	261	1150
WBBS	University of Texas	Austin, Texas	360	830	WLS	Round Hills Radio Corp.	Dartmouth, Mass.	360	830
WBBS	Detroit Free Press	Detroit, Mich.	517	580	WLV	General Supply Company	Lincoln, Nebr.	254	1180
WBBS	Tampa Daily Times	Tampa, Fla.	360	830	WLY	Drivers Telegram Company	Kansas City, Mo.	275	1090
WBBS	Kansas City Star	Kansas City, Mo.	411	730	WMA	Norton Laboratories	Lockport, N. Y.	360	830
WBBS	Lawrence Martin	El Paso, Texas	268	1120	WMA	Trenton Hardware Company	Trenton, N. J.	260	1170
WBBS	Trinity Meth. Church (So.)	El Paso, Texas	268	1120	WMA	Broad St. Baptist Church	Columbia, Mo.	286	1050
WBBS	Atlanta & West Point R.R. Co.	College Park, Ga.	360	830	WMA	Utility Battery Service	Easton, Pa.	246	1220
WBBS	The Courant	Hartford, Conn.	261	1150	WMA	Chicago Daily News	Chicago, Ill.	448	672
WBBS	Automotive Electric Co.	Dallas, Texas	360	830	WMA	Alabama Poly. Inst.	Auburn, Ala.	250	1200
WBBS	Board of Trade	Chicago, Ill.	360	830	WMA	Whapton Electric Co.	Whapton, N. D.	254	1180
WBBS	Lit Bros.	Philadelphia, Pa.	395	760	WMA	Kingshighway Pres. Church	St. Louis, Mo.	280	1070
WBBS	Samuel A. Waite	Worcester, Mass.	360	830	WMA	Mercer University	Macon, Ga.	268	1120
WBBS	Slocum & Kilburn	New Bedford, Mass.	360	830	WMA	Commercial Appeal	Memphis, Tenn.	500	600
WBBS	Fargo Radio Electric Co.	Fargo, N. D.	244	1280	WMA	Doubleday-Hill Elec. Co.	Washington, D. C.	261	1150
WBBS	Kirk, Johnson & Company	Lancaster, Pa.	258	1160	WMA	Shepard Stores	Boston, Mass.	278	1080
WBBS	Church of the Covenant	Washington, D. C.	234	1280	WMA	University of Oklahoma	Norman, Okla.	360	830
WBBS	James L. Bush	Tuscola, Ill.	248	1210	WMA	R. J. Rockwell	Omaha, Neb.	242	1240
WBBS	Fallain & Lathrop	Flint, Mich.	280	1070	WMA	Syracuse Radio Telephone Co.	Syracuse, N. Y.	286	1050
WBBS	West. Elec. Co. (A. T. & T.)	New York, N. Y.	492	610	WMA	Wittenberg College	Springfield, Ohio	230	1300
WBBS	Wichita Board of Trade	Wichita, Kan.	244	1280	WMA	Charleston Radio Elec. Co.	Charleston, S. C.	360	830
WBBS	Cornell University	Ithaca, N. Y.	286	1050	WMA	C. C. Rhodes	Butler, Mo.	231	1300
WBBS	University of South Dakota	Vermilion, S. D.	280	1070	WMA	Austin Statesman	Austin, Tex.	360	830
WBBS	Borough of North Plainfield	North Plainfield, N. J.	252	1190	WMA	Lenning Bros. Co.	Philadelphia, Pa.	360	830
WBBS	Shepard Company	Providence, R. I.	273	1100	WMA	Peoples Tel. & Tel. Co.	Knoxville, Tenn.	236	1270
WBBS	Ohio State University	Columbus, Ohio	360	830	WMA	Peninsular Radio Club	Ft. Monroe, Va.	360	830
WBBS	Mobile Radio Company	Mobile, Ala.	360	830	WMA	Dakota Radio Apparatus Co.	Yankton, S. Dak.	244	1280
WBBS	Balto. Am. & News Pub. Co.	Baltimore, Md.	360	830	WMA	Sonnet Radio Mfg. Co.	Albany, N. Y.	360	830
WBBS	Hecht Company	Washington, D. C.	360	830	WMA	Valley Radio	Grand Forks, N. D.	280	1070
WBBS	Davidson Bros. Company	Sioux City, Iowa	360	830	WMA	Maus Radio Co.	Lima, Ohio	266	1130
WBBS	Will Horowitz, Jr.	Houston, Texas	360	830	WMA	Friday Battery & Elec. Corp.	Sigourney, Iowa	360	830
WBBS	Benwood Company	St. Louis, Mo.	360	830	WMA	Midland College	Fremont, Nebr.	360	830
WBBS	Hurlburt-Still Electrical Co.	Houston, Texas	360	830	WMA	Tyler Commercial College	Tyler, Tex.	360	830
WBBS	St. Louis University	St. Louis, Mo.	261	1150	WMA	Apollo Theatre	Belvidere, Ill.	224	1340
WBBS	Dallas News & Dallas Journal	Dallas, Texas	476	620	WMA	Palmetto Radio Corp.	Charleston, S. C.	360	830
WBBS	Carl F. Weese	Syracuse, N. Y.	234	1280	WMA	Evening News & Express	San Antonio, Tex.	385	780
WBBS	H. C. Spratley Radio Co.	Poughkeepsie, N. Y.	360	830	WMA	Vaughn Conservatory of Music	Lawrenceburg, Tenn.	360	830
WBBS	Electric Supply Company	Port Arthur, Texas	360	830	WMA	Lyrion Mfg. Co.	Mishawaka, Ind.	360	830
WBBS	Hi-Grade Wireless Inst. Co.	Ashville, N. C.	360	830	WMA	Kalamazoo College	Kalamazoo, Mich.	240	1250
WBBS	Times Publishing Company	St. Cloud, Minn.	485	620	WMA	Henry P. Lundskow	Kenosha, Wis.	229	1310
WBBS	Hutchinson Elec. Ser. Co.	Hutchinson, Minn.	360	830	WMA	Boyd M. Hamp	Wilmington, Del.	360	830
WBBS	Wo. Wesleyan College	Cameron, Mo.	360	830	WMA	Penn. National Guard	Erie, Pa.	242	1240
WBBS	U. of Neb. Dept. of Elec. Eng.	Lincoln, Neb.	275	1090	WMA				

By Grover A. Whalen: WHY CITY SHOULD BE ITS OWN BROADCASTER

Commissioner of Plant and Structures, New York City

To promote Education, Recreation and Civic Spirit, and to make Home Rule effective. This is the answer in thirteen words to the question, why a city should run a broadcasting station of its own.

Education is one of the functions of Government. When invention opens a way to vastly expand the field of this function, it is the duty of the city to make the utmost use of the device. The city has laboriously and at no small cost endeavored to promote education by public lectures to small audiences. The broadcasting station will multiply the audiences a hundred thousand fold.

Recreation and refreshment through entertainment

will be a function of the Municipal Broadcasting Station. With equipment as powerful or more powerful than WEAf, and without taint of commercialism, the municipal studio will attract the best talent, and the great multitude of radio fans will eagerly "tune in." Where hundreds have gathered for a municipal concert, hundreds of thousands will enjoy the music from the Municipal Broadcasting Station.

I believe the great mass of citizenship takes more interest in government than it does in any other topic, and to feed this interest with facts is one of the purposes for which municipal broadcasting has been made an agency of municipal government in New York City.

(Continued from preceding page)

Call	Owner	Location	Meters	Keys.
WOR	L. Bamberger & Co.	Newark, N. J.	405	740
WOS	Mo. State Marketing Bureau	Jefferson City, Mo.	441	680
WPAB	Penn. State College	State College, Pa.	283	1060
WPAC	Donaldson Radio	Okmulgee, Okla.	360	830
WPAH	Wis. Dept. of Markets	Waupaca, Wis.	360	830
WPAJ	Doolittle Radio Corp.	New Haven, Conn.	268	1129
WPAK	N. Dak. Agricultural College	Agricultural Col., N. D.	360	620
WPAL	Superior Rad. Tel. & Zap. Co.	Columbus, Ohio	286	1050
WPAM	Auerbach & Guettel	Topeka, Kans.	360	830
WPAP	Theodore D. Phillips	Worcester, Ky.	360	830
WPAQ	Gen. Sales & Engineering Co.	Frostburg, Md.	360	830
WPAR	Ward Battery Co.	Beloit, Kan.	236	1270
WPAT	St. Patrick's Cathedral	El Paso, Tex.	360	830
WPAU	Concordia College	Mooreau, Minn.	260	1108
WPAZ	Dr. John K. Koch	Charleston, W. Va.	273	1108
WQAA	Horace A. Beale, Jr.	Parkersburg, Pa.	360	830
WQAC	E. B. Gish	Amarillo, Tex.	360	830
WQAD	Whithall Electric Co.	Waterbury, Conn.	242	1240
WQAE	Moore Radio News Sta.	Springfield, Vt.	275	1090
WQAF	Sandusky Register	Sandusky, Ohio	240	1250
WQAL	Coles Co. Tel. & Tel. Co.	Mattoon, Ill.	258	1160
WQAM	Electrical Equipment Co.	Miami, Fla.	283	1060
WQAN	Scranton Times	Scranton, Pa.	280	1070
WQAO	Calvary Baptist Church	New York, N. Y.	360	830
WQAP	West Texas Radio Co.	Abilene, Tex.	285	1050
WQAS	Prince-Walter Company	Lowell, Mass.	266	1130
WQAV	Huntington & Guerry, Inc.	Greenville, S. C.	258	1160
WQAW	Catholic University	Washington, D. C.	236	1270
WQAX	Radio Equipment Co.	Peoria, Ill.	360	830
WRAA	Wm. M. Rice Inst.	Houston, Tex.	360	830
WRAB	Board of Public Education	Savannah, Ga.	360	830
WRAD	Taylor Radio Shop	Marion, Kans.	248	1210
WRAE	The Radio Club, Inc.	Laporte, Ind.	224	1340
WRAH	Stanley N. Read	Providence, R. I.	231	1300
WRAL	Northern States Power Co.	St. Croix Falls, Wis.	248	1210
WRAN	Radio Hawk Electrical Co.	Waterloo, Iowa	236	1270
WRAO	Radio Service Co.	St. Louis, Mo.	360	830
WRAR	Jacob C. Thomas	David City, Nebr.	226	1330
WRAV	Antioch College	Yellow Springs, O.	242	1240
WRAW	Avanue Radio Shop	Reading, Pa.	360	830
WRAX	Flaxon's Garage	Gloucester City, N. J.	268	1120
WRAY	Radio Sales Corporation	Scranton, Pa.	280	1070
WRAZ	Radio Shop of Newark	Newark, N. J.	233	1290
WRC	Radio Corp. of America	Washington, D. C.	469	640
WRK	Doron Bros. Elec. Co.	Hamilton, Ohio	360	830
WRL	Union College	Schenectady, N. Y.	360	830
WRM	University of Illinois	Urbana, Ill.	360	830
WRR	City of Dallas	Dallas, Tex.	360	620
WRW	Tarrytown Radio Research	Tarrytown, N. Y.	273	1100
WSAB	S. E. Mo. State Teachers Col.	Cape Girardeau, Mo.	360	830
WSAC	Clemson Agricultural College	Clemson College, S. C.	360	830
WSAD	J. A. Foster Company	Providence, R. I.	261	1130
WSAG	City of St. Petersburg	St. Petersburg, Fla.	244	1230
WSAH	A. J. Leonard, Jr.	Chicago, Ill.	248	1210
WSAI	U. S. Playing Card Co.	Cincinnati, Ohio	309	970
WSAJ	Grove City College	Grove City, Pa.	360	830
WSAL	Franklin Electric Co.	Brookville, Ind.	246	1220
WSAN	Allentown Radio Club	Allentown, Pa.	229	1310
WSAR	Doughty & Welch Elec. Co.	Fall River, Mass.	254	1180
WSAT	Donohoe-Ware Co.	Plainview, Tex.	268	1120
WSAU	Camp Marienfeld	Chesham, N. H.	229	1310
WSAW	J. J. Long	Canandaigua, N. Y.	275	1090
WSAX	Chicago Radio Laboratory	Chicago, Ill.	268	1120
WSAY	Irving Austin	Portchester, N. Y.	230	1300
WSAZ	Chase Radio Co.	Pomeroy, Ohio	258	1160
WSB	Atlanta Journal	Atlanta, Ga.	429	700
WSL	J. & M. Electric Co.	Utica, N. Y.	273	1100
WSAB	Alabama Power Company	Birmingham, Ala.	360	830
WTAB	Fall River Daily Herald	Fall River, Mass.	248	1210
WTAC	Penn. Traffic Company	Johnstown, Pa.	360	830
WTAD	Lewis J. Gallo	New Orleans, La.	268	1120
WTAG	Kern Music Company	Providence, R. I.	258	1160
WTAH	Carmen Ferro	Belvidere, Ill.	236	1270
WTAJ	The Radio Shop	Portland, Me.	236	1270
WTAL	Swan-Power Company	Steubenville, Ohio	266	1130
WTAM	Toledo Radio & Elec. Co.	Toledo, Ohio	252	1190
WTAP	Willard Storage Battery Co.	Cleveland, Ohio	390	770
WTAQ	Cambridge Radio Elec. Co.	Cambridge, Ill.	242	1240
WTAR	S. Van Gorden	Oseo, Wis.	226	1330
WTAS	Reliance Radio & Elec. Co.	Norfolk, Va.	280	1070
WTAU	Geo. D. Carpenter	Elgin, Ill.	275	1090
WTAU	Ruegg Battery & Elec. Co.	Tecumseh, Nebr.	360	830
WTAW	Agricultural & Mech. College	College Stations, Tex.	234	1180
WTAX	Williams Hardware Mfg. Co.	Streator, Ill.	231	1300
WTAY	The Oak Leves	Oak Park, Ill.	226	1330
WTAZ	T. J. McGuire	Lambertville, N. J.	280	1070
WTG	Kana. State Agr. College	Manhattan, Kans.	360	830
WWAC	Sanger Bros.	Waco, Tex.	360	830

Call	Owner	Location	Meters	Keys.
WWAD	Wright & Wright, Inc.	Philadelphia, Pa.	360	830
WWAO	Mich. College of Mines	Houghton, Mich.	244	1230
WWI	Ford Motor Company	Dearborn, Mich.	273	1100
WWJ	Detroit News	Detroit, Mich.	517	580
WWL	Loyola University	New Orleans, La.	289	1070
WWT	McCarthy Bros. & Ford	Buffalo, N. Y.	360	830

CANADA				
Call	Owner	Location	Meters	Keys.
CFAC	The Calgary Herald	Calgary, Alta.	430	700
CFCA	Star Pub. & Printing Co.	Toronto, Ont.	400	750
CFCF	Marconi Wireless Tel. Co. of Canada	Montreal, Quebec	440	680
CFCH	Abitibi Pow. & Paper Co., Ltd.	Iroquois Falls, Ont.	400	750
CFCI	La Cie de L'Evenement	Quebec, Que.	410	730
CFCK	Radio Supply Co., Ltd.	Edmonton, Alta.	410	730
CFCL	Centennial Methodist Church	Victoria, B. C.	400	750
CFCN	W. W. Grant Radio, Ltd.	Calgary, Alta.	440	680
CFCO	Semmelhaack-Dickson, Ltd.	Bellevue, Que.	450	670
CFCP	Radio Specialties, Ltd.	Vancouver, B. C.	450	670
CFCR	Laurentide Air Service	Sudbury, Ont.	410	730
CFCW	The Radio Shop	London, Ont.	420	710
CFDC	Sparks Co.	Nanaimo, B. C.	430	700
CFDE	Electric Shop, Ltd.	Saskatoon, Sask.	400	750
CFDF	Queen's University	Kingston, Ont.	450	670
CFDG	University of Montreal	Montreal, Que.	400	750
CFDH	Radio Engineers, Ltd.	Halifax, N. S.	400	750
CFDI	The Albertas Pub. Co.	Calgary, Alta.	410	730
CFDJ	Marconi Company	Toronto, Ont.	440	680
CFDK	Canadian Westinghouse Co.	Edmonton, Alta.	400	750
CFDL	Canadian Wireless & Elec. Co.	Quebec, Que.	410	730
CFDM	W. Canada Radio Supply, Ltd.	Victoria, B. C.	400	750
CFDN	The Vancouver Merchants Exchange, Ltd.	Vancouver, B. C.	440	680
CFDO	North Electric Co., Ltd.	Montreal, Que.	410	730
CFDP	The Edmonton Journal, Ltd.	Edmonton, Alta.	450	670
CFDQ	London Free Press	London, Ont.	430	700
CFDR	T. Eaton Company	Toronto, Ont.	410	730
CFDS	Sprott-Shaw Radio Co.	Vancouver, B. C.	420	710
CFDT	Maritime Radio Corp., Ltd.	St. John, N. B.	400	750
CFDU	Simons, Agnew & Co., Ltd.	Toronto, Ont.	410	730
CFDV	Percival Wesley Shackleton	Olds, Alta.	400	750
CFDW	The Evening Telegram	Toronto, Ont.	430	700
CFDX	La Presse Pub. Co., Ltd.	Montreal, Que.	430	700
CFDY	Vancouver Daily Province	Vancouver, B. C.	410	730
CFDZ	Canadian Independent Tel. Co.	Toronto, Ont.	450	670
CFE1	Leader Publishing Co., Ltd.	Regina, Sask.	420	710
CFE2	Wentworth Radio Supply Co.	Hamilton, Ont.	410	730
CFE3	Manitoba Telephone System	Winnipeg, Man.	450	670
CFE4	C. P. Edwards	Ottawa, Que.

CUBA				
Call	Owner	Location	Meters	Keys.
PWX	Cuban Telephone Co.	Habana	400	750
2DW	Pedro Zayas	Habana	300	1000
2AB	Alberto S.de Bustamante	Habana	240	1250
2OK	Mario Garcia Velez	Habana	360	830
2BY	Frederick W. Borton	Habana	260	1150
2CX	Frederick W. Borton	Habana	320	940
2EV	Westinghouse Elec. Co.	Habana	220	1360
2TW	Roberto E. Ramires	Habana	230	1300
2HC	Heraldo de Cuba	Habana	275	1090
2LC	Luis Casas	Habana	250	1200
2KD	E. Sanchez de Fuentes	Habana	350	860
2MN	Fausto Simon	Habana	270	1110
2MG	Manuel G. Salas	Habana	280	1070
2JO	Raul Perez Falcon	Habana	150	1990
2KP	Alvara Daza	Habana	200	1500
2HS	Julio Power	Habana	180	1660
2OL	Oscar Collado	Habana	290	1030
2WW	Amadeo Saenz	Habana	210	1430
5EV	Leopoldo V. Figueroa	Colon	360	830
6KW	Frank H. Jones	Tuinucu	340	880
6KI	Frank H. Jones	Tuinucu	275	1090
6CX	Antonio T. Figueroa	Cienfuegos	170	1760
6DW	Eduardo Terry	Cienfuegos	225	1330
6BY	Jose Gandux	Cienfuegos	300	1000
6AZ	Valentin Ullivarri	Cienfuegos	200	1500
6EV	Josefa Alvarez	Caibarien	225	1330
8BY	Alberto Ravelo	Stgo. de Cuba	240	1250
8AZ	Alfredo Brooks	Stgo. de Cuba	250	1200
8FU	Andres Vinnit	Stgo. de Cuba	225	1330
8DW	Pedro C. Anduz	Stgo. de Cuba	275	1090
8EV	Eduardo Mateos	Stgo. de Cuba	180	1660

PORTO RICO				
Call	Owner	Location	Meters	Keys.
WGAD	Sp. Am. Sch. of Radio Tel.	Ensenada	300	1800
WKAQ	Radio Corp. of Porto Rico	San Juan	360	830

MEXICO				
Call	Owner	Location	Meters	Keys.
CYL	La Casa del Radio	Mexico City, Mexico	500	600

The Radio University

A Question and Answer Department conducted by RADIO WORLD for its Subscribers by its Staff of Experts.

ADDRESS LETTERS TO RADIO UNIVERSITY DEPARTMENT, RADIO WORLD, 1493 BROADWAY, NEW YORK CITY.

I have obtained good results with a one tube set, hooked up with a vernier condenser and a variometer. Later I added one stage of amplification, still with good results. Now I am experimenting with the Autoplex circuit, and while I get good volume, the set is very noisy. I used slate as a panel. The set will work only when the ground wire is disconnected. When I disconnect my antenna and touch the binding post with my hand I can hear signals. But if I am wearing rubbers, no results will be had. What causes this?—F. H. Graham, R. F. D. 1, Industry, Pa.

If you refer to the Autoplex circuit described in RADIO WORLD for December 29, 1923, you should note that Mr. Caldwell says no ground is required. His diagram shows a ground connected to the negative lead of the A and B batteries. This is optional. Slate should not be used as a panel. It is a poor insulator of high frequency currents. You hear signals when you touch the antenna binding post with the aerial disconnected because your body acts as a collector of radio waves, though to a lesser degree than your antenna. When you wear rubbers you insulate yourself from the wooden floor and surroundings, which also act as collectors. The noise you experience may be due to a number of things. Test your A and B batteries with the head phones for internal battery noises, also test them with a voltmeter. Inspect the wiring on the set, making sure that all connections are firmly soldered. See that the tube makes good contact with the prongs in the socket. The noise may also be due to outside interference such as high tension wires near the antenna.

Please give me the name and address of a firm that can supply the coils ready made for the Superdyne.—L. M. Lindhahl, Hordville, Nebr.

The coils for the Superdyne can be procured from the C. D. Tuska Company, Hartford, Conn.

Where can I purchase the new Armstrong Super-Heterodyne? Can I make such a set myself for my personal use?—L. E. Harris, 959 Boulevard East, Weehawken, N. J.

The Armstrong Super-Heterodyne is manufactured by the Radio Corporation of America, New York City. A set of this type is difficult to build and properly adjust. It is not advisable to undertake to construct such a set unless the builder has had years of experience in making and operating all kinds of sets.

The direction of the windings of the four coils in the Superdyne set is something I wish RADIO WORLD would clear up. The four turns of the primary and the forty-two turns of the secondary (stator) I take for granted are wound in the same direction. How about the rotor and plate coil?—D. Daniels, 12 West Street, Boston, Mass.

The primary and secondary coils are wound in the right direction. The plate and rotor coils are wound in the reverse direction. This is very important, and care should be taken to follow these directions.

In RADIO WORLD for March 8, Charles Bucher has an article on a new Superdyne principle. (1)—In splitting the variometer does it matter how many turns are on the primary and secondary coils? (2)—Also what is meant by the reverse feedback coil? (3)—Is the stator used as stated for the feedback or is it a mistake and should it read rotor?—W. S. Davis, 18 Ninth Avenue, Carbondale, Pa.

(1)—According to the article, it does not matter if the variometer is prepared as directed. (2)—The reverse feedback coil in this instance is that part of the stator winding which is connected to variometer B and the ground lead as shown in the diagram. (3)—The stator is right as stated in the diagram.

In your RADIO WORLD for March 1, the article "How to Build a Reflex Distance Getter, a circuit developed by the Acme Apparatus Co., and using their parts, is interesting. Can you give me the address of the firm making these parts?—A. S. Gahl, 1116 Holman St., Covington, Ky.

Write to the Acme Apparatus Company, Cambridge, Mass.

(1)—Does wind, rain, snow or heat have any effect on the receiving station? (2)—Is there any device which can be added to an A—three-tube receiving set to convert it into a five-tube set? F. E. Whedbec, Seabrook, Md.

(1)—The elements have an effect on the reception

of radio signals. Wind has absolutely no effect on radio waves. The only way that it might cause a change in tuning would be to swing a poorly constructed antenna to and fro, thereby causing a slight change in its capacity. Rain and snow have pretty much the same effect. During a downpour of rain, signals will not be quite as loud, and slight swinging will be noticed in reception. This is due to moisture on insulators and lead in wires, and also to the amount of moisture between the antenna and the ground. The same is true of snow, with the exception that the swinging will not be quite so apparent. During snow and rainstorms there is usually considerable static. This is present much more pronouncedly in summer than in winter. Heat diminishes the intensity of radio waves, thereby causing weaker signals. That is why reception is much better in winter than in summer. (2)—We do not give advice on competitive apparatus through these columns.

I have a set at Eastport, L. I., located about one hundred yards from a breakdown transformer on a power line. The interference caused by this is very annoying and makes reception almost impossible. I have tried changing the antenna, and tried an indoor antenna, but it is no better. What can I do to stop or lessen this interference?—Aubison Burtzell, 21 East 21st St., New York City.

You are placed in a rather unfortunate position but the following arrangement may materially

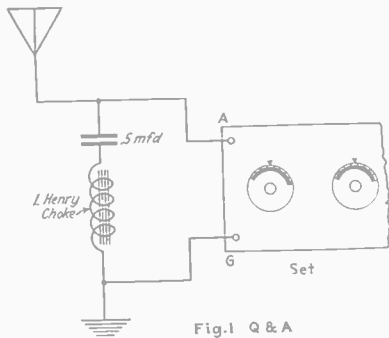


Fig. 1 Q & A

decrease the power line noise you experience. Get a one henry iron core choke coil and a one-half mfd. condenser. Follow the diagram shown in Fig. 1.

I have a Grebe CR12 receiving set, using dry cell batteries. The chart shows three in series using UV199 tubes. I only get about 40 hours use from them. Would you suggest more batteries connected in parallel?—J. O. Hines, Cisco Hotel, Cisco, Cal.

Fig. 2 shows you how to connect more batteries in series-parallel. Suggest you use three cells for each tube. If you are using three tubes, that would mean nine dry cells. With this arrangement you should get about 150 hours service or more.

On looking over my copy of RADIO WORLD for October 20, I saw the article in "A Broadcast Receiver of Simple Design," which was a single circuit set. I would like to know the distance that can be reached with fair conditions by this

outfit.—H. T. Doherty, 5633 South Elizabeth St., Chicago, Ill.

The distance is governed by local receiving conditions. In locations free from interference stations of five hundred miles away may be picked up.

(1)—In RADIO WORLD for December 29 you give a description of the autoplex circuit showing the use of spider web coils for tuning. As I have a device for winding spider webs, would you kindly give me the number of turns to be used in these coils? (2)—I have also made the Superdyne set, which works very well on local stations, but cannot seem to bring in the distant ones. Can you explain this?—H. A. Van Vollenburg, West Berkeley, Cal.

(1)—Wind forty turns of number 22 DSC copper wire on each primary and secondary. Higher wave lengths can be obtained by the use of more wire. (2)—Your trouble with the Superdyne seems to be that you do not make fine enough adjustments. Very fine tuning is necessary with this circuit, and if you use patience you will doubtless bring in the distant stations.

Will you kindly advise what rheostat to use in the Superdyne circuit that appeared in the RADIO WORLD for December 15, 22, 29? I want to use four UV199 tubes with a six-volt battery.—John Reilly, 223 1/2 Bowery, New York City.

Use a good make of 30 ohm rheostat with these tubes.

I have constructed the superdyne as outlined in RADIO WORLD and am anxious to get some additional information. (1)—Plate trouble in tuning out WGL (less than one mile away) and WNAC (five miles away). They tune very broad. Can a wave-trap be used to advantage? (2)—Should the four antenna turns on the coil be separated from the other winding by some insulating material? (3)—Will a C battery be of any advantage?—C. H. C. Chamberlain, 35 Grove St., West Medford, Mass.

(1)—Yes, a wave-trap will help you tune out WNAC, but it may not function as well with WGL. (2)—The four antenna turns on the coil are wound one-quarter of an inch apart. No insulation is used to separate it from the other winding. (3)—A "C" battery will give you a louder and clearer signal. The right voltage to use can be determined by experiment. About four volts will do for a 45-volt "B" battery.

I have constructed the Superdyne on a wooden panel and rough baseboard. I wound coils on 3/8-inch tubes and made three taps to each coil. I put 24 turns on the rotor, and say, hams, it nearly busted my loud speaker. Will build it on a good panel later. What size condenser is used in the plate to positive filament circuit?—Ed. Freeman, New Harmony, Ind.

You may use an eleven or thirteen plate condenser.

Can I use the White Radiation Killer as described in RADIO WORLD for February 23 on a Reinartz without changing the set?—J. G. Dozier, P. O. Box 438, Harrisville, R. I.

A circuit suitable for your purpose was published in RADIO WORLD for February 23, on page 11. This circuit is more suitable for the purpose than that mentioned. It accomplishes the same work.

I recently constructed the five-tube radio-frequency receiver as shown in accompanying diagram and pictorial layout, and used most of the parts specified, with the exception of two or three small details such as sockets, rheostats, potentiometer and jacks, which I had and used. I used the transformers mentioned and UV199 tubes, as specified. My trouble is that the set howls unless the volume is decreased by means of the potentiometer. When the potentiometer A in the diagram is turned to either side very much, the signals come in loud, but then the set howls and squeals. Is this correct, or have I made some error?—Leon Connolly, Chicago, Ill.

The circuit you enclose is a transformer coupled radio-frequency receiver, using two stages of radio, detector and two of audio. This set will oscillate (howl and squeal) unless the correct biasing potential is supplied to the grids of the first two tubes by means of the potentiometer. Radio-frequency receivers of this type oscillate unless properly operated. Your set is operating correctly.

Join RADIO WORLD'S University Club

And Get Full Question and Answer Service for the Coming 52 Weeks.

RADIO WORLD, 1493 Broadway, New York City:

Enclosed find \$6.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year.

Name

Street

City and State

BY DAVID SARNOFF: *Revolutionizing Radio* *By Super-Power Stations*

Vice-President, General Manager, Radio Corporation of America

[David Sarnoff, talking on the White Radio Bill before a committee of the House of Representatives, discussed radio of the future, the problem of paying artists, the aim to have a set in every home, rich or poor, and a presidential campaign by radio as set forth in the following article.]

IT has been said by a great many people and a great many corporations, some very large and able, that broadcasting depends upon the solution of the problem whereby the consumer will pay for the entertainment which he receives. In other words, it has been said that unless some method is provided whereby a means is created for collecting revenue from the user of a broadcast receiver, that the whole industry is founded on sand, and that it is bound to collapse in time, because there will be no means of supporting it.

That sort of solution to the problem is not necessary. Broadcasting can be made commercially practicable without any means being found for collecting from the consumer, for the greatest advantage of broadcasting lies in its universality, in its ability to reach everybody, everywhere, anywhere, in giving free entertainment, culture, instruction, and all the items which constitute a program, in doing that which no other agency has yet been able to do. Yes, and it is up to us of the Radio art and Industry with intelligence and technique and broadness of spirit and vision as to the future, to preserve that most delightful element in the whole situation—the freedom of radio.

Just as soon as we destroy that freedom and universality of radio and confine it to only those who pay for it—those who pay for the service, in other words—just so soon as we make of broadcasting "narrow-casting," we destroy the fundamental of the whole situation.

And, therefore, I believe very definitely that broadcasting as constituted today is commercially sound, and that it will remain so in the future, although there may be selective methods and narrowcast methods which will do no harm.

Super-Power the Solution

These may supplement the situation. There may be wired-wireless and the like. All of these will make their contributions. But fundamentally there will remain, and there must remain and be preserved that element of the broadcast situation which makes it possible for grand opera to go to the slums and to the districts of the poor as well as the rich, everywhere in the world, without any charge.

The real picture of a \$15 or a \$25 set in the home of the slums, if you please, receiving the magnificent things in the air, is the picture we must preserve and, I think, can preserve without being altogether altruistic. Moreover, we can do it on a business basis and through a means I have already suggested, publicly, namely, the super-power station.

The super-power station that I picture would be of larger power, greater range and would provide a national program of high quality. A few more super-stations located at suitable points in the country and interconnected by radio itself, would enable all of these units to send out the same program simultaneously.

But such a system would no more replace the smaller, more individual broadcasting stations, than the national magazines of large circulation replace the local newspapers. Indeed, the smaller broadcasting



Radio World.

DAVID SARNOFF, vice-president and general manager of the Radio Corporation of America, who tells in the accompanying text his idea of super-power radio stations. A radio in every home—rich or poor—is one of his mottoes.

stations might supplement the work of the super-stations by automatically and mechanically repeating the national programs sent out by the super-stations so that every city, town, village and hamlet in this country might have the benefits of such a program.

On the other hand, these smaller stations could continue to send out their individual programs as at present, when they so desired.

Copyright Problem Changes

If we get a chain of super-power stations and cover the entire country, then we create an entirely new problem as to the question of copyright music, paying for talent, handling the artist and the like. I think, you will agree, it will be a mark of distinction for an artist to be able to say "Last night I sang in the National Broadcast Station and was heard by the United States." Thousands of people would give all they possess to be permitted to go on the Metropolitan Opera House stage and be heard by a select few thousand. Many more than that would like to go on the stage which gives them the whole nation as a forum. It will bring out possibilities of latent talent residing in those who have never had the opportunity to approach the public.

But if that is impractical, if that should not prove to be the desire of budding artists, why, then, suppose we do have to pay for it? That does not frighten me. If we have a National Broadcast Station whose voice reaches over the country, and if we have to pay for the talent, we will do it.

If we have to spend \$2,000,000 or even more a year in giving the very best and only the best which can be had from that single point, making it possible for everyone in the United States to hear it, an industry of half a billion dollars per year, which I believe the radio industry will reach within the next few years, could support it if the burden were equally and equitably distributed.

Suppose the industry taxed itself 2% or 1%, or whatever the percentage might be;

that percentage would be more than would be necessary to run a first-class National Entertainment institution, paying more liberally than any theatre or any opera can pay at the present time.

Gentlemen, that is the picture as I see it, and if we live for the next five years, as I hope we shall, we may be talking of that as belonging to the past as well.

Radio is not yet in every home, but we are doing our best to put it there. The greatest effort has been made to put radio within the reach of remote farmers, tenement dwellers in the cities, the poor even more than the well-to-do. The officials of the Radio Corporation have themselves been poor. They have been farmers' sons, and ship operators, and engineers, and they have kept steadily in mind that radio would not fulfill its function for the people of America unless it brought new light, education and happiness to the remote homes, where families are lonely and the crowded places where families have hitherto been without means of recreation, enjoyment or mental improvement. * * * *

Radio as History's Rudder

Had their been radio broadcasting in 1858, there might have been no Civil War. The Lincoln-Douglas debates, broadcast, would have reached the whole nation, and speaking to a larger audience, Lincoln might have achieved his peaceful program.

Broadcasting stations, in my conception, are indeed, the bar at which causes can be pleaded for the verdicts of public opinion.

The radio audience, while it is the largest audience ever addressed by a single human voice, nevertheless has become one of the most concrete, responsive forces in America.

The speaker who is dull or rasping, or unintelligent, is immediately labelled as such by a preponderance of letters and postcards, and even telegrams, which arrive at the broadcasting station the next morning. The speaker who is forceful, brief, honest and instructive is likewise labelled by the preponderance of commendation that comes in the next mail.

Almost invariably broadcasting directors are selected on the basis of their judgment and their ability to arrange an interesting program. They are called upon to serve no other cause.

When the sole test is public interest, there is little difficulty in making decisions. The President of the United States always is a welcome speaker to the radio audience. Any candidate for the Presidency of the United States, or other high office, whether he be the candidate of the Republican, Democratic, Progressive, Farmer-Labor, Socialist, Prohibition, or any other lawfully organized party should, by the very fact of his nomination by a considerable group, establish himself as of sufficient interest to a sufficient group to warrant a hearing.

Actor Found via Ether, Finally Pays Debt

AN actor living on Long Island crossed the Sound to Connecticut and bought some parts for his motor boat. The storekeeper knew his chance customer to be an actor, trusted him, and whistled for his money. He sent him bills galore.

Finally, listening one night to a tabloid edition of a musical show broadcast from New York, he heard the actor introduced. He phoned to the station, got the actor on the wire, politely requested a check—and got it by return mail.



THE name Magnavox on a Radio Reproducer stands not only for the most careful workmanship and highest quality of material—it signifies also a fundamental operating principle utterly distinct from that of ordinary "loud speakers."

The exclusive use of this (electro-dynamic) principle by Magnavox has resulted in the production of a true Radio Reproducer accepted as the standard by which all other instruments are judged.



The base of the new model Magnavox Reproducer R3, showing *electrical modulator*—the significance of which is explained below.

Important features now offered in Magnavox Radio—the Reproducer Supreme

THE Magnavox electro-dynamic principle obviates the need of any mechanical adjustment (sometimes called a "modulator") to regulate the air-gap or change the position of moving parts. This famous principle of operation permits the use of an *electrical modulator* now a feature of R3 and R2 Reproducers.

This modulator, as the name implies, directly affects the character of the electrical circuit which creates the sound, controlling the sensitivity of the instrument and also its volume of reproduction.

Moreover, this *electrical modulator* produces a great saving of current (already reduced in the new R3 and R2 to a maximum of .6 ampere) for, by its action, the current value

can be reduced to a minimum of .1 ampere.

The new Magnavox electro-dynamic Radio Reproducers R3 and R2, in fact, are equipped with the first *true* sound modulating device ever designed. See them at your dealers and write us for catalog of Magnavox Reproducers, \$35 to \$50; Power Amplifiers, \$27.50 to \$75; Combination Sets, \$59 to \$85.

THE MAGNAVOX COMPANY, Oakland, California

New York Office: 370 Seventh Avenue

Perkins Electric Limited, Toronto, Montreal, Winnipeg, *Canadian Distributors*

PATENTS
 promptly procured. Trade
 Marks designed & registered
FREE INVENTION RE-
CORDING BLANK
 Phone Vanderbilt 7212

FREE MANUFACTURERS
PATENT CO., INC.
 220 FIFTH AVE
 NEW YORK

Federal
Radio Products
 Standard of the Radio World, 130 separate
 units, fully Guaranteed. Write for Catalog.
 Federal Telephone and Telegraph Co.
 BUFFALO, N. Y.

PANELS

7x10 ... \$0.95	7x18 ... \$1.05	7x28 ... \$2.40
7x12 ... 1.10	7x21 ... 1.95	7x28 ... 2.60
7x14 ... 1.80	7x24 ... 2.25	7x30 ... 2.75
9x14 ... 1.75	9x18 ... 2.25	9x21 ... 2.50
12x14 ... 2.25	12x18 ... 3.00	12x21 ... 3.50

3/16" thick—BLACK—1/4" add 25%
 Send money order or pay Postman.
UNION RADIO COMPANY
 144 N. Union Street Akron, Ohio

SUPERIOR PRINTING HOUSE, Inc.
 Printers and Lithographers
 Sample Card Makers in All Branches
 Publishers—Bookbinders
 190-200 Sixth Ave., Nr. Fourteenth St.
 Phones: Chelsea 7810-7811 New York City

WHOLESALE ONLY
 WE SPECIALIZE IN EQUIPPING
NEW DEALERS
 with Complete Radio Stocks
MANHATTAN RADIO CO.
 112-114 Trinity Place, cor. Liberty St., N. Y. C.

Nath. Baldwin Phones with
SHELTON
LOUD SPEAKER
 COMPLETE \$10.00
 Postpaid. Use your head-
 set for 3 purposes—Krypton-
 al combination value—Every
 pair of phones tested—Guaran-
 teed to give results.
WALTER SCOTT
 1187 B. Broad St.
 Newark, N. J.

"TATTLE-TALE"
 ONE TUBE DX RECEIVER

ONLY
\$6.50
 1000 MILE RANGE
 GUARANTEED

"Brings America to Your Ears"
 Efficient in Operation.
 Substantial in Construction.
 Beautiful in Appearance.
 Easy to Operate—Only ONE CONTROL.
 Low in Price—Easy to Install.
"Every Home Should Have a Tattle-Tale"

Just fill in the coupon below and we'll send your
TATTLE-TALE by RETURN MAIL.

SEND NO MONEY!
CONRAD RADIO COMPANY,
 78 Boylston Street, Jamaica Plain, Mass.
 Gentlemen:
 Please send me one of your **TATTLE-TALE**
RECEIVERS, for which I will pay the postman
 \$6.50 upon arrival. I understand that if I am
 not satisfied, my money will be refunded.
 Name.....
 Address.....

Schoolboys Grab
Charging Business

Rent Out Own Apparatus and
 Garage and Repair
 Men Suffer

SOME school boys in a New York
 suburban town have started what
 promises to be a lively business, and has
 already proved a fair success.
 As every fan knows, a storage battery
 must be charged to keep going. These
 boys recognized the fact and started out
 after business. Their stock in trade con-
 sisted of battery testers, chargers, and a
 fair knowledge of who had sets run by
 storage batteries, but who did not own
 chargers. This, coupled with boyish
 vigor, soon started things going, even to
 the extent of several of the boy "capit-
 alists" buying additional chargers and
 keeping three and four going at a time.
 The discovery of how this was being
 done came about by the sudden "drop"
 in charging business that a garage and
 repair man experienced. Seeing one of
 his weekly customers pass without get-
 ting a battery charged on a Monday
 morning, he stopped him and was told
 that the boys were "renting" chargers
 once a week for the sum of 25 cents per
 day or \$1.50 per month with service
 (water, etc.). On investigating, he found
 that the young men had taken away fully
 98 per cent of his "charge" business—
 which, in his estimation, was "not so
 good."
 However, it shows that no matter how
 you try, you cannot "keep a good man
 down," and that the country is full of
 good men and wise, wide-awake boys.
 More power to them!

Physician Fears Monopoly
 Radio World Publication Co.,
 New York City.

Gentlemen: I see by the daily papers
 that the A. T. & T. Co. is going to put
 about all the Broadcasting Stations out
 of business. This company states that
 everybody that buys parts and assembles
 his own receiving sets is infringing and
 liable for damage. Is this great Octopus
 going to "Kill the Radio."
 Very truly yours,
J. H. O'NEILL, M. D.

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
 1674 Broadway (At 52nd St.)
 New York, N. Y.
 Circle 4569

FOR RELIABLE UP-TO-DATE
RADIO MAILING LISTS
 Use Our Card Catalog Directory
 In Use Now With Over 200
 Radio Manufacturers and Jobbers
Your ENVELOPES ADDRESSED
At \$2.50 per 1,000
 Write for Particulars
Sydell's Radio Trade Directory
 610 W. 31st St., New York. Chickerling 9648

RADIO REX
"THE WIRELESS DOG"



A WONDERFUL NOVELTY
 Put RADIO REX in his kennel, call him, clap your
 hands, or turn on your loud speaker and out pops
 "REX" to listen. He is a DX hound. This
 marvelous toy amazes, interests, amuses your
 family and friends.
Sent prepaid for \$2.00
 NO C. O. D.
 DEALERS—Write for trade terms.
 Sells on Sight.
AY-WON TOY NOVELTY CORP.
 494 Broadway
 NEW YORK CITY

FOR THE SET BUILDER—

For the "Ready-Made Set" Fan

Do you wish to make a set which will
 really work, which is guaranteed to
 satisfy, and which is made of the best
 standard parts?
 Our set outfits include drilled panel,
 base-board, instruments of Eria, Acme,
 Cotoco, Dubilier, Signal, Amrad, and other
 high grade manufacture, bus-wire, lugs,
 and blue-prints—everything for the com-
 plete construction of the set.
 If desired we assemble the set, ready
 for wiring, at no extra charge.
 None of the sets listed below radiate and
 cause interference. They are the most effi-
 cient sets and the most satisfactory.

- Reflex. One tube. This set is equal
 to three tube sets. It incorporates
 one stage of radio-frequency ampli-
 fication, detector, and one stage of
 audio-frequency amplification. More
 selective than a regenerative set.
 Loud speaker range 50 to 100 miles.
 Range on phones up to 3,000 miles...\$15.00
- Reflex. Two tube. 500 to 1,000 mile
 loud speaker range..... 23.00
- Reflex. Three tube. Up to 3,000
 mile loud speaker range..... 33.00
- Neutrodyne. Five tube. Build your
 own and save \$105.00..... 45.00
- Ultradyn. Five tube. Similar to
 the Neutrodyne, but due to the ex-
 tremely efficient transformers no



THE BILTMORE REFLEX 4 TUBE
 neutralizing condensers are re-
 quired\$45.00
 8. Superdyne. Four tubes. The
 wonderful set just described in
 RADIO WORLD (December 15-20,
 1923). Results equal those obtained
 on an eight tube Super-Heterodyne. 38.00
 10. THE BILTMORE REFLEX. Four
 tubes. Loud speaker range up to
 3,000 miles with no outdoor antenna,
 nor even a loop. The most sensitive
 set made. Complete parts, without
 cabinet 45.00
 Completely assembled and wired, ready
 for use, as shown in illustrative
 Mahogany panel, and genuine
 hand-rubbed solid mahogany
 cabinet100.00
Biltmore Radio Company
 Boston 36, Mass., Dept. W.

BALDWIN
 HEAD SETS TYPE "C"
\$6.00 PAIR
 Include Postage Money Orders Only
O. K. RADIO OUTLET
 35 WARREN ST. NEW YORK CITY

GUARANTEED
"B" BATTERIES

Large	45 Volt	\$3.60
"	22½ "	1.80
Medium	45 "	2.75
"	22½ "	1.60
Small	22½ "	1.00

All Variable—POSTAGE FREE
 anywhere in U. S.
Satisfaction Absolutely Guaranteed
S. & H. BATTERY SUPPLY CO.
 41 Nevins Street Brooklyn, N. Y.



Have You a Neutrodyne?

Does it howl? Is it hard to control? Do you wish to eliminate neutralizing condensers and double the efficiency of your receiver?
TECHNIFORMERS are so extremely efficient that the sensitiveness of a receiver incorporating them is unsurpassed. There is no inductive coupling between them, and as a result, neutralizing condensers and potentiometers are not required to stop oscillation.
 Try them out. We assure you of satisfaction.
 Price Set of 3. For substitution in your neutrodyne. \$8.00.
TECHNIFORMER KIT. 3 Techniformers with variable condensers \$18.00.
Dealers: Write for our prices.
Technical Radio Laboratories
 Jamaica Plain Boston, Mass.

Radio Department of
The Eclipse Electric Co.
 414 West 42nd Street
In the Heart of New York

We issue monthly a list of standard apparatus at below average prices. Send your name and address to receive same.

Agents for Westinghouse A. & B. Storage Batteries. Prices upon request.

Acme Audio A-2 Transformer.....	\$3.90
Acme Audio A-2 Transformer, unmounted..	1.95
Angle Bracket to Mount Transformers.....	.10
Signal 23 Plate .005 Condenser.....	1.85
Pacnet Plugs.....	.38
Ackerman Loud Speaker, complete.....	6.75
Ambassador Phones.....	3.25
Federal Phones.....	4.75
Complete Parts for Ambassador Set.....	17.00
Complete Parts for Rasla Reflex Set.....	24.50
Complete Parts for 5-Tube Neutrodyne.....	32.00

Include money order for prompt shipment.

RADIO WORLD FOR 1923
FOR YOUR LIBRARY

RADIO WORLD from January 6, 1923, to December 29 complete, with the exception of January 13, January 20, January 27, February 24 and March 12, will be sent postpaid for \$5.00.

Many of these issues are nearly out of print, and we suggest, therefore, that orders be sent in early. Any single number, 15c; or any seven numbers for \$1.00.

Circulation Department,
RADIO WORLD,
 1493 Broadway, New York City.

NOTICE
TO ADVERTISERS

With our issue of April 19th RADIO WORLD goes to a "flat" rate—

\$5.00 per inch
\$150.00 per page

Half Pages: 5½" by 3 columns, or 8¼" D.C. \$75.00

Quarter Page: 4⅛" D.C. \$37.50

One Column, 11" .. \$50.00

Contracts made before April 19th for one inch or more for 52 consecutive times obtain our old advertising rate of \$4.00 an inch or \$120.00 a page.

A SAVING OF
20%

RADIO WORLD
 1493 BROADWAY NEW YORK

COMPLETE RADIO RECEIVING OUTFIT
 Tube, Phones, Batteries, Aerial, Lead-in Wire, Insulators All Included. 100 Miles Guaranteed.
\$17.50
 SEND NO MONEY. PAY THE POSTMAN.
 Money Back if You Want It.
NATIONAL RESERVE RADIO CO.
 17-19 BRIDGE STREET NEW YORK CITY

A & W Radio Service
 Builders of All Circuits. Complete Sets and Parts in Stock.
 Write, Phone or Call for Our Prices.
SETS BUILT IN PHONOGRAPHS
Mail Orders Given Prompt Attention
A. & W. RADIO SERVICE
 218-222 Fulton Street (Cort. 3248). N. Y. City

GLOBE
UNITUNE
 TRADE MARK
 WATCH FOR IT!
Globe Radio Equipment Co.
 217 WEST 125TH STREET, NEW YORK

The new
METALECTRIC Soldering Iron

Operates on any electric current with the simplicity and efficiency of a writing instrument.

Accepted as the logical solution to radio soldering problems by leading manufacturers and amateurs.

★ **NOW \$3.75**



Ample heat capacity
 Handle always comfortable
 Renewable tips

An indestructible all-metal quality instrument with a worth while guarantee.
 Endorsed by Tribune Institute and Radio Broadcast

If your dealer cannot supply you, order direct or write for descriptive circular. We will ship in exchange for remittance or by P. P. C. O. D.

POST ELECTRIC CO., MFRS.
 Radio Department 30 E. 42nd St., New York

SEE SUNBEAM FOR SERVICE

SUNBEAM 13 Years in the Same Spot
From Wholesaler Direct to You!

ALL parts for Neutrodyne Circuits. Knockdown Neutrodyne Set with drilled Bakelite Panel and Cabinet, \$39.50. Same set built to order, \$50.00. All (good) parts for the famous One-Knob set with drilled Bakelite Panel (Guaranteed 1500 Mile Range), \$5.95. SUPER-SEVEN-TUBE SET, from Coast-to-Coast Circuit. Price and information on request. Super-Heterodyne Sets Built to order. Prices on request.

"ANYTHING IN RADIO"
SUNBEAM ELECTRIC CO., 71 Third Avenue, New York City
 "Write to Third Avenue and Save a Third"

EVERYTHING ELECTRICAL

How Music Publisher Solves Own Problem of Copyright

Allows Broadcasting, but Insists Firm's Name Be Used in Announcing Each Rendition

Radio World, 1493 Broadway, New York City.

We beg to advise that our publications are released upon a request from the broadcasting station to which we reply in the following form:

"In reply to your application of

for permission to broadcast, without charge, copyrighted musical compositions owned and controlled by Hinds, Hayden & Eldredge, Inc., we grant you this permission for the year 1924, or until notified to the contrary by us, provided that when any such copyrighted number is broadcasted, announcement is made 'By courtesy of Hinds, Hayden & Eldredge, Inc., Publishers.'"

Cordially yours,

Hinds,
HINDS, HAYDEN & ELDREDGE, INC.

Supremacy Proven
by Every Test!

The filament control
FIL-KO-STAT
of infinite adjustment

The SCIENTIFICALLY CORRECT
RADIO RHEOSTAT
for All Tubes !!

Can You "TUNE IN"
With Your Rheostat

DX stations you never heard before? Silent tube operation is yours with a Filkostat in any hook-up, using any type of tube.

It make your tube an important tuning unit—for FIL-KO-STAT is more than a rheostat. Its critical control, spread over four turns of the knob, enables you to "tune in" DX stations that no other control on your set will get. Tube reradiation is eliminated through micrometer vernier adjustment of filament heat (electronic flow.)

Radio Stores Corporation

Sole International Distributors
HOME OFFICE, Dept. RW3

220 West 34th Street
New York

(Branches
in Leading
Cities)



Price
\$2
AT YOUR DEALER
IN CANADA
275

MADE BY
DX INSTRUMENT CO.
HARRISBURG, PA.

Unconditionally Guaranteed

SUBSCRIBE NOW AND TAKE THE WORRY
OFF YOUR MIND. RADIO WORLD, 1493 Broad-
way, New York City.

SOMETHING DIFFERENT

Chart your receiver to wave lengths or kilocycles with a set of charts. A necessity to every fan. Upon receipt of One Dollar, charts will be forwarded by return mail, postpaid.

J. E. MARSHALL

BOX 190, STATION G

NEW YORK CITY

"SPIKE"

THE STATIONS YOU RECEIVE
IN A
KASPER RADIO RECORD BOOK



Then you will know where to set the Dials, Switches and Rheostats to bring them back. This book is endorsed by thousands of professional Radio Fans in all parts of the country because it covers everything on the panel. (Copyrighted.) Can be used with any set. Contains up-to-date list of 1,100 Broadcasting Stations, Time of Principal Cities and instructions How to Record Stations. 24 Pages, Valuable Information. No set complete without one. 50c per Copy, Postpaid. For your convenience send a one dollar bill for two copies, otherwise send Money Order for one or more. No checks nor stamps.

We also furnish Kasper's "APPLAUSE CARDS," printed on stamped Postal Cards—25 mailed anywhere upon receipt of 50c.

KASPER BROTHERS COMPANY

317 Lorain Street Bank Building

Cleveland, Ohio, U. S. A.

BERMINGHAM & PROSSER CO.

Incorporated

PAPER MANUFACTURERS

105 WEST 40th STREET, NEW YORK CITY

Telephone: Pennsylvania 2049

CHICAGO

KALAMAZOO, MICH.

KANSAS CITY

Our Specialty Is High-Grade Printing Paper for Publications With
Large Circulation

AT THE RIGHT PRICE!

Papers furnished for all publication and general printing purposes, direct
from our own mills.

Coated Offset Super Machine Finish English Finish

Broadcast Programs

Station WIP, Philadelphia, Pa.

509 Meters (590 Keys). E. S. T. Apr. 3—1:00 P. M.—Luncheon music. 6:00 P. M.—Official weather forecast. 6:05 P. M.—Harold Leonard's Red Jackets. 7:00 P. M.—Uncle Wip's bedtime stories. 9:00 P. M.—Religious services by Philadelphia Branch, United Synagogue. 11:15 P. M.—Ted Weems and his Cafe L'Aiglon Orchestra. Apr. 4—1:00 P. M.—Luncheon music. 1:30 P. M.—Official weather forecast. 4:00 P. M.—Radio lesson in Mah Jongg. 6:00 P. M.—Baseball dope. 6:10 P. M.—The Jordan-Lewis Dance Orchestra. Apr. 5—1:00 P. M.—Recital by Karl Bonawitz on the Germantown Theatre organ. 6:05 P. M.—Harold Leonard's Red Jackets. 7:00 P. M.—Uncle Wip's bedtime stories. 8:15 P. M.—Program of American Indian music. Apr. 6—11:00 A. M.—Morning service.

Station KHJ, Los Angeles, Cal.

395 Meters (670 Keys). P. T. Apr. 3—12:30 P. M.—News items, weather report and music. 6:30 P. M.—Children's program. 8:00 P. M.—Program arranged by Roy F. Chesley. Apr. 4—12:30 P. M.—News items, weather report and music. 6:30 P. M.—Children's program. 7:00 P. M.—Organ recital. 8:00 P. M.—Program presenting the Studebaker Radio Orchestra from Long Beach. Apr. 5—2:30 P. M.—Program presented through the courtesy of Barker Brothers. 6:30 P. M.—Children's program. 8:00 P. M.—Program of Berenice Van Loan Gaines's compositions.



For best reception you need

The Goodman

The niftiest short wave tuner on the market. Great for present broadcasts, local and DX. Used in all parts of the world. Certificates of merit from testing laboratories. Pamphlet on request.

L. W. GOODMAN, Mfr., Drexel Hill, Pa.

Instruments of Excellence

Ballantine Tuned Radio Frequency Transformers \$9.60
and units 15.00

Parts for Acmedyne in Stock

BALLANTINE Tuned Radio Frequency Transformer \$9.60
LANGBEIN & KAUFMAN
Variometers and Variocouplers..... 7.00
AMPERITES 1.10
MYERS HI-MU Vacuum Tubes..... 4.35

Service That Is Certain

RADIO & MECHANICAL TRADING CORP.
23 Warren St. New York City

The Popular Neutrodyne!

This receiver is rapidly becoming the "Old Reliable." A five-tube tuned radio-frequency set that any inexperienced fan can operate.

SEE RADIO WORLD for March 8, 15, and 22 and get all the details which will enable you to build this reliable and powerful five-tube neutrodyne outfit. The three copies for 45c, or sent free if you send \$6.00 for yearly subscription. NOW!

RADIO WORLD, 1493 Broadway, N. Y. C.

Radio Reception Record

Eliminate that slipshod method of receiving. Know where to find a station when you want it. This book keeps a complete record of each station heard—one station to a page. Printed on high grade bond paper. Only 35 cents each. Three for a dollar bill.

JOS. M. EDWARDS

Box 8X AUBURN, ALABAMA

NEUTRODYNE PARTS

Full set of Neutroformers, Variable Condensers with dials, and Neutrodons \$13.25

Above parts are Genuine Workrite Neutroformers, made under Hazeltine patents.

Complete parts for three tube Neutrodyne tuner, (tubes, batteries, or phones not included), drilled panel, tube sockets, rheostats, fixed condensers, jack, binding posts, wire, spaghetti, and blue prints.

COMPLETE FOR \$19.95

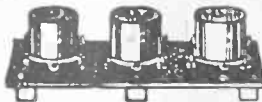
Postage additional on all shipments. Ask for our price list.

Send no money, Order by postcard. Pay the Postman.

RADIO SURPLUS STORES
HELENA, MONTANA

THE VICTORY

A Socket Built on Merit Electrically and Mechanically Perfect



Genuine Phosphor Bronze Contacts Used for Panel Mounting

List Price Triple, \$2.75; Single, \$1.00.

Insist that your dealer supply you with the genuine VICTORY SOCKET. Triples, \$2.75; single, \$1.00. Expert Drillers and Cutters of Genuine Formin Panels and Tubing. Estimates Cheerfully Given.

UNITED RADIO MFG. CO.

191 Greenwich Street New York City

REVISED EDITION JUST OUT

THE RADIO DEALER YEAR BOOK

listing manufacturers of radio apparatus by their products, showing list prices and trade marks.

The Most Complete Book of Its Kind Ever Published.

Single Copies, ONE DOLLAR postpaid. Or Free with year's Subscription to The Radio Dealer at \$2.00 domestic, \$3.00 foreign.

Send all orders to

THE RADIO DEALER

1133 Broadway New York, N. Y.

IT'S A FRAME-UP CAST ALUMINUM FRAMES

FOR YOUR RADIO SET
MAKE IT RIGID and STRONG
NO WARPING NO SHORT CIRCUITS
NO SPRINGING NO BROKEN WIRES
NO MORE CABINETS

JUST APPLY FLAT MAHOAGANY OR PLATE GLASS COVERS TO THE FRAMES

Two or More Frames Required per Set
Size "A" for 7" panels (6 1/2" x 8") \$0.85 Each
Size "B" for 5" panels (4 1/2" x 8")85 Each
Size "C" for 7" panels (6 1/2" x 6 1/2")85 Each
Size "K" for 7" inclined panel sets. (Inquire)

QUINBY RADIO FRAME CORP.
587 West 181st Street, New York

HOWARD



No. 1001
6 1/2 Ohm Rheostat \$1.10
25 Ohm Rheostat \$1.10
40 Ohm Rheostat \$1.10
Patd. 870,042

HOWARD



No. 1003
200 Ohm Potentiometer \$1.50
400 Ohm Potentiometer \$2.00
Patd. 870,042

HOWARD



No. 1004
Multi Terminal Receiver Plug
Instantaneous connection for as many as six pairs of standard receiver tips \$2.00
Patd. Aug. 28, 1923

HOWARD



No. 1002
6 1/2 Ohm Micro-rheostat \$1.50
25 Ohm Micro-rheostat \$1.50
40 Ohm Micro-rheostat \$1.50
Patd. July 10, 1923

HOWARD

Ask the man at the counter to show you the Howard line of quality Radio Merchandise. Every piece is sold with the guarantee of satisfactory performance.

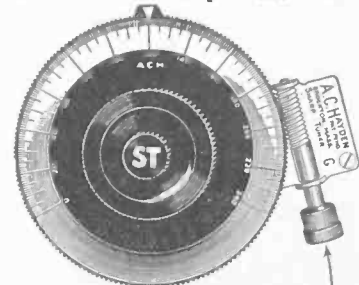
JOBBERS WRITE FOR DISCOUNTS

Send 2c. Stamp for wiring diagram and folder to Dept. J.



4248 NORTH WESTERN AVENUE

A Pleasant Surprise Awaits the User of the A. C. H. Sharp Tuner Dial



Why the A.C.H. is different

3 in. DIAL 150-FO-1
4 in. DIAL 215-FO-1

Will improve any receiving set, making difficult tuning easy

Money Back Guarantee
Price 3-inch size, \$2.50 Price 4-inch size, \$5.00
Regular fitting 5/16 shaft 1/4 and 1/16.

Extra Advantage of the A. C. H.

1. Can be attached or removed from any instrument.
 2. Rough tuning same as any dial.
 3. Movement so fine that the eye cannot detect but the ear can.
 4. Automatically locks instrument so no jer can disturb it.
 5. Dial grounded reducing the body capacity to a minimum.
 6. Special dial 2 graduations where ordinarily one.
- MAIL ORDERS SENT PREPAID IN U. S. A.
A. C. Hayden Radio & Research Co.
BROCKTON, MASS., U. S. A.

When you see it in RADIO WORLD you know it's news—not a month old.

FILL OUT AND MAIL NOW

SUBSCRIPTION BLANK

RADIO WORLD

RADIO WORLD

1493 Broadway, New York City

Please send me RADIO WORLD for months, for which

please find enclosed \$.....

SUBSCRIPTION RATES:

Single Copy \$.15
Three Months 1.50
Six Months 3.00
One Year, 52 Issues 6.00
Add \$1.00 a Year to Foreign Postage; 50c for Canadian Postage.

FREED-EISEMANN WINS ROUND ONE

In a proceeding in the Federal Court, Brooklyn, a motion was made by the Hazeltine Research Corporation to enjoin the Freed-Eisemann Radio Corporation, manufacturing certain types of receiving sets.

The Freed-Eisemann Radio Corporation charges that when the Freed-Eisemann Radio Corporation contract was signed, that the lawyers who represented both parties to the royalty contract held stock in the Hazeltine Research Corporation without disclosing this financial interest to their clients, the Freed-Eisemann Radio Corporation.

The Hazeltine Corporation collects royalties on neutrodyne receiving sets and its stock is now being offered to the public.

Judge Inch refused to issue a temporary injunction against Freed-Eisemann.

Years Cost of WEA F Put at \$250,000; Ads Net Half That

WILLIAM E. HARKNESS, broadcasting manager to the American Telephone and Telegraph Company, said that while no definite advertising policy has yet been adopted by the company, a rate is now being charged of \$100 for 10 minutes or \$400 per hour at WEA F.

Broadcasting from WEA F, Mr. Harkness says, cost \$250,000 last year, while the company did not receive half that amount through advertising. He told the committee other broadcasting stations were spending anywhere from \$10,000 to \$100,000 a year.

For Maximum Amplification Without Distortion and Tube Noise use the well known
Como Duplex Transformers
Push-Pull
Send for literature
COMO APPARATUS COMPANY
446 Tremont St. Boston, Mass.



Use Price 75¢
At dealers, or postpaid
Durham & Co., 1936 Market St., Phila.

Fans who are considerate of the comfort and pleasure of their neighbors and other radio fans in the vicinity should get RADIO WORLD for Dec. 8, Feb. 9, and Feb. 23, and see how they can conquer the squeals in their receivers that are causing so much trouble. 15c. per copy, the three issues for 45c., or start your year's subscription with any one of them. RADIO WORLD, 1493 Broadway, New York City.



THE TUBE'S THE THING Get Radio Reception Without Noise Myers RADIO VACUUM Tubes Guarantee Perfect Clarity

Hear without noise or tube hiss with Myers Tubes. They give much greater amplification, are perfect Detectors and Oscillators. They add 50% to the efficiency of your set because they reduce interference.

TWO TYPES: Myers Dry Battery Tube 2½ Volts—¼ Ampere. Myers Universal operates on either 3 Dry Cells or storage batteries. Ready for mounting. No sockets or extra equipment needed. **\$5.00 EACH**

See that you get the New Improved Myers Tubes. You will know them by the Silver Coating. Others are not guaranteed.

At your Dealer, otherwise send purchase price and you will be supplied Postpaid.

Sole Manufacturers

F. B. Myers Co. Ltd.

Radio Vacuum Tubes

240 Craig Street West

Montreal, CANADA

World's Greatest BATTERY BARGAIN

FREE

Save 50%

Thousands of Radio World 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. 6 Volt. 60 Amps. \$ 8.50
For WD-11 and WD-12 Tubes. Will run 200 hours on one charge. Rechargeable. Special 4-v. Storage Battery \$8.00	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.



1219 S. Wabash Ave.

Dept. 17

Chicago, Ill.

DO YOU WANT TO BUY, SELL OR EXCHANGE RADIO OR OTHER GOODS? TRY THIS DEPARTMENT AT 5c A WORD

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

"RADIO APPLAUSE CARDS." Six Original Designs. Latest out. Samples, 10c. 75c per 100. \$1.75 for 250. Weatherby Co., Medina, Ohio.

FREE APPARATUS for securing subscriptions for "RADIO." Write today for complete lists of premiums and our special subscription offer. "RADIO" Pacific Bldg., San Francisco, Calif.

PATENTS PROCURED. Send sketch or model today for examination, prompt report and advice. No charge for preliminary advice. Write for free Booklet and blank form on which to disclose your idea. Highest references. Promptness assured. Clarence A. O'Brien, Registered Patent Lawyer, 201-B, Security Bank Building. Directly across the street from Patent Office, Washington, D. C.

NEW YORK-FRISCO CIRCUIT. One tube receives from coast to coast, from Cuba to Canada. Copyright plans, \$1.00. E. H. Richards, 2010 Fern Court, Cleveland, Ohio.

15%-20% (per cent) DISCOUNT on all Standard Receivers. Freed-Eisemann Neutrodyne, \$125.00; New Radiolas, Crosley XJ, \$47.00. Write, Thomas Radio Co., 111 Dix Street, Muncie, Ind.

PATENTS—SEND DRAWING OR MODEL FOR EXAMINATION AND OPINION. Booklet free. Watson E. Coleman, Patent Lawyer, 644 G St., Washington, D. C.

PATENTS—Write for free Guide Books and Record of Invention Blank before disclosing inventions. Send model or sketch of your invention for our prompt Examination and Instructions. No charge for the above information. Radio, Electrical, Chemical, Mechanical and Trademark experts. Victor J. Evans & Co., 924 Ninth, Washington, D. C.

MODEL "C" Super-heterodyne and model "J" Two stage tuned radio frequency amplifier unit for sale cheap to quick buyer. These are complete units built up by expert radio engineers. A real ten tube DX receiver. E. E. GIBBONEY, Everett, Pa.

BOYS—DANDY RADIO SET—Only \$1.50. Includes coil, detector and crystal or free for a little work. Write quick. John W. Shaw, 221 A, Northeast, Room 6, Washington, D. C.

FOR SALE—First \$75 buys an A No. 1 three tube DX Radio outfit, with tubes and B Batteries. Free particulars. Frank Baertich, Troy, Indiana.

FOR SALE—Cash. Atwater Kent tuner, \$9.00. Variometer, \$7.00. Detector unit, \$4.00. All guaranteed perfect. Joseph Hervieux, 7 Melbourne Avenue, Hudson Falls, N. Y.

MAIL US YOUR DISCARDED JEWELRY. Gold Crowns and Bridges, Watches, Diamonds, Silver, Platinum and Old False Teeth. Money promptly mailed. Goods returned if offer refused. UNITED STATES SMELTING WORKS, (The Old Reliable), Dept. 55A, Chicago, Ill.

MUNZIG CIRCUIT. Two tubes do five operations. 500 miles on loop. Write at once for circuit and circulars. RAY-DEE-ARTCRAFT INSTRUMENT CO., Redlands, Calif.

MAGNAVOX R3 or M1—Latest nationally advertised reproducers. List, \$35. Introductory, \$25. The factory sealed carton is your guarantee. RADIO CENTRAL, Dept. W., Abilene, Kans.

China Bars Radio Sets, Orders Jail for All Offenders

A NEW order by the Minister of Communications prohibits the sale or operation of radio receiving or transmitting sets, except those of the Government, by Chinese citizens in their country. The ground of the order is that such an act violates existing law.

Severe prison terms for offenders were ordered.



Chart the air with SHAMROCKS

How One Fan Did It

"SOME broadcast listeners grope in the dark not knowing what is coming. Others have their entertainment thrust upon them. But I can get Cuba, Montreal and other outlying stations—from my chart which I have made with my Shamrock set. And my chart is as accurate as a ship's log—I know exactly where to get every station."

Anybody can build this set with the Shamrock kit. It gives you 3000-mile reception on a loud speaker—and permits you to log every station. The kit contains two Shamrock balancing condensers—and three Shamrock air core transformers, mounted and properly balanced on U. S. Tool condensers, made expressly for Shamrock.

Inspect this kit at your dealer's today. If he hasn't it in stock, send us the coupon below.

List Price, \$20

SHAMROCK MANUFACTURING CO.
Dept. 3, Market St., Newark, N. J.

SHAMROCK

FOR SELECTIVE TUNING

SHAMROCK MFG. CO.,
Dept. 3, Market St., Newark, N. J.

Gentlemen: Send me detailed information on the Shamrock Kit.

Name
Address
Dealer's Name

SHAMROCK for Selective Tuning

The World may now listen in on the broadcasting from

The World's Biggest Store

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

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

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

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

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

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

In addition to our Special Catalog of Radio Supplies you will surely want our New Big General Catalog if you have not already received it. If you want it, write us and say: "Send me your New Big General Catalog No. 87R28G."

Sears, Roebuck and Co.

Send for Our FREE Radio Catalog

Sears, Roebuck and Co.

Chicago—Philadelphia.

Send me FREE Radio Book No. 87R28.

Mail Coupon today to store nearest you.

Name

Postoffice..... State.....

Rural Route..... Box No.....

Street and No.....



Wavemeter is Perfected by U. S.

To serve as a standard of radio frequency the Bureau of Standards has two specially constructed wavemeters covering the frequencies in more general use from 18 to 4,600 kilocycles per second (16,650 to 65 meters). These standard wavemeters

Asbury Amplifier Unit

Audio transformer, rheostat, and socket enclosed in a beautiful wood box with bakelite panel ready to attach to your set. **\$8.50**
Green Concert Receiver enclosed in attractive cabinet (without accessories) at **\$22.50**

ASBURY BROTHERS

117 BROADWAY TAUNTON, MASS.

YOU DON'T NEED TUBES to hear programs from stations 400 to 1000 Miles Away. I can show you how to get them on YOUR CRYSTAL SET. Changes often cost Less Than One Dollar. Send self-addressed envelope for picture of my set.

LEON LAMBERT
562 So. Volusia, Wichita, Kansas

Big Money and Fast Sales

EVERY OWNER Buys Gold Initials for His Auto—You charge \$1.50, make \$1.44. 10 Orders Daily Easy.

Samples and information Free!

WORLD MONOGRAM COMPANY
Dept. 92 NEWARK, N. J.

Radios of the Better Class

Fada's Neutrodyne Complete Line
Sleeper's Monotrol Parts Sets

LEDO RADIO CO.

403 6th Ave. New York City

FAHNESTOCK CLIPS

"Popular Wherever Radio Is Used"

14 Sizes in Beautiful Display Case.

Dealers write for big money-making proposition.

FAHNESTOCK ELECTRIC CO.
Long Island City, L. I.

are used in calibrating wavemeters belonging to the Radio Inspection Service, manufacturers, colleges or others in need of standards of frequency, in radio measurements and in adjusting the radio transmitting set which is used to transmit standard frequency signals.

Each standard wavemeter consists of a variable air condenser of special design, four fixed mica condensers, a number of interchangeable inductors or coils, and a resonance indicating device. The majority of the inductors are wound with high-frequency cable in a single layer upon a skeleton frame of laminated phenolic insulating material, sometimes called bakelite.

RUSONITE

FIXED DETECTOR

ONE ADJUSTER - BAKELITE BASE

GUARANTEED—PRICE \$1.25



Rusonite Perfect Radio Crystal Supersensitive
Price Mounted 50c.
Rusonite 14K Gold Cat Whisker.....Price 25c.
RUSONITE PRODUCTS CORP.
15 PARK ROW NEW YORK



UV-201-A

Radiotron UV-201-A is a high power vacuum tube which, while suitable for a detector, is intended primarily to be used as an amplifier, at either radio or audio frequency.

It is famous for volume, for clearness and for economy of service—drawing but .25 ampere.

Price

\$5.00

Radio Corporation of America

Sales Offices—Dept. 311
233 Broadway, New York

10 South LaSalle St.
Chicago, Ill.

433 California St.
San Francisco, Cal.

Be sure that every vacuum tube you buy is marked **RADIOTRON.**



This Symbol of Quality is your protection.

Radiotrons

REG. U. S. PAT. OFF.

THIS SPECIAL SUBSCRIPTION OFFER FOR NEW SUBSCRIBERS ONLY

RADIO WORLD AND OTHER POPULAR RADIO PUBLICATIONS FOR THE PRICE OF SUBSCRIPTION FOR RADIO WORLD ALONE

Radio World has made arrangements

- by which it is possible
- to offer a year's subscription for
- any one of the following publications
- with one year's subscription for
- RADIO WORLD;**
- RADIO NEWS** or
- POPULAR RADIO** or
- RADIO BROADCAST** or
- WIRELESS AGE** or
- RADIO DEALER** or
- RADIO (San Francisco).**

This is the way to get two publications

- for the price of one!
- Send \$6.00 today for **RADIO WORLD**
- for one year (regular price
- for 52 numbers)
- and select any one of the other
- six publications for twelve months—
- Add \$1.00 a year extra for
- Canadian or Foreign postage.
- This offer good only up to and
- including April 1, 1924.
- Present **RADIO WORLD** subscribers
- can take advantage of this offer by
- extending subscriptions one year **NOW.**
- Or order thru your newsdealer.

RADIO WORLD'S SPECIAL TWO-FOR-PRICE-OF-ONE SUBSCRIPTION BLANK

RADIO WORLD, 1493 Broadway, New York City.

Enclosed find \$6.00, for which send me **RADIO WORLD** for twelve months (52 numbers), beginning and also, without additional cost, **Radio News**, or **Popular Radio**, or **Radio Broadcast**, or **Wireless Age**, or **Radio Dealer**, or **Radio** for twelve months, beginning

This Offer Good Only Between March 19 and April 20

Name

Street Address

City and State

At Last!

5 TUBE NEUTRODYNE
Knock-Down Set COMPLETE

Fine Workmanship

All Parts **MATCHED**

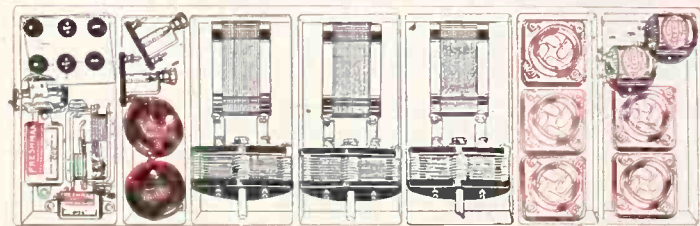
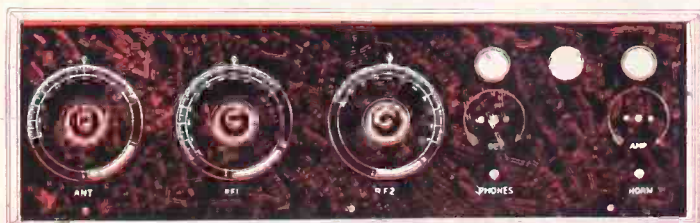
All Parts **LICENSED**

THE
DE LUXE

\$34.49
NET

NEUTRODYNE

THE DE LUXE



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

A five-tube assembly kit including everything to build a genuine Hazeltine five-tube set.

READ THIS LIST—

- 1 DRILLED Radion Mahogany Panel, engraved in gold.
 - 3 Four-inch Radion Mahogany Dials, gold engraved.
 - 2 Gold plate Jacks.
 - 3 Genuine Hazeltine Neutroformers Mounted on Comsco Condensers.
 - 2 Hazeltine Neutrodons.
 - 5 Bakelite Sockets.
 - 1 6-Ohm Rheostat with Knob to Match Panel.
 - 1 30-Ohm Rheostat with Knob to Match Panel.
 - 2 Genuine Killark Shielded Audio Transformers.
 - 1 Baseboard.
 - 20 Feet Tinned Bus-bar.
 - 1 .00025 Freshman Grid Condenser.
 - 1 Tubular Glass Grid Leak.
 - 1 Set Engraved Binding Posts.
 - 1 .002 Micon Condenser.
 - 1 .006 Micon Condenser.
- All Packed in Attractive Box.

HAROLD M. SCHWAB, Inc., 55 Vesey St., New York



Service Important in Radio's Growth

RECENT demands in the development of radio show conclusively that greater attention to service in connection with the making and operation of sets is necessary.

Service is as important to radio as service and service stations have been in the development of the automobile industry, and in time it will have as important an effect on the radio industry.

The extent of research and service work now done by leading manufacturers of radio apparatus is not generally realized. Progressive radio manufacturers who

have established their business on a permanent basis, realize that to keep abreast with developments in radio, and to make a product which will give service and satisfaction, they must maintain efficient engineering and research departments.

An illustration of the increasing care with which new circuits and improvements in radio generally are tested out in laboratories before being placed on the market is afforded by the so-called reflex circuit, designed originally by Latour, a French inventor.

Eliminate short circuits and distortion

Any panel material which will absorb moisture is apt to cause short circuits and distortion. Radion Panels are impervious to moisture. They eliminate most of the leaks of radio frequency currents where other materials fail.

Your dealer carries a stock of Mahoganite or black Radion Panels, Dials and Knobs. Experienced amateurs and professionals, too, demand genuine RADION. Try it and you will notice the difference.

RADION

The Supreme Insulation

PANELS

21

Stock Sizes

Mahoganite and Black

6x 7	6x10½	6x14
6x21	7x 9	7x10
7x12	7x14	7x18
7x21	7x24	7x26
7x30	7x48	8x26
9x14	10x12	12x14
12x21	14x18	20x24



Look for this stamp on every genuine RADION Panel. Beware of substitutes and imitations.

American Hard Rubber Co.

11 Mercer St.

New York

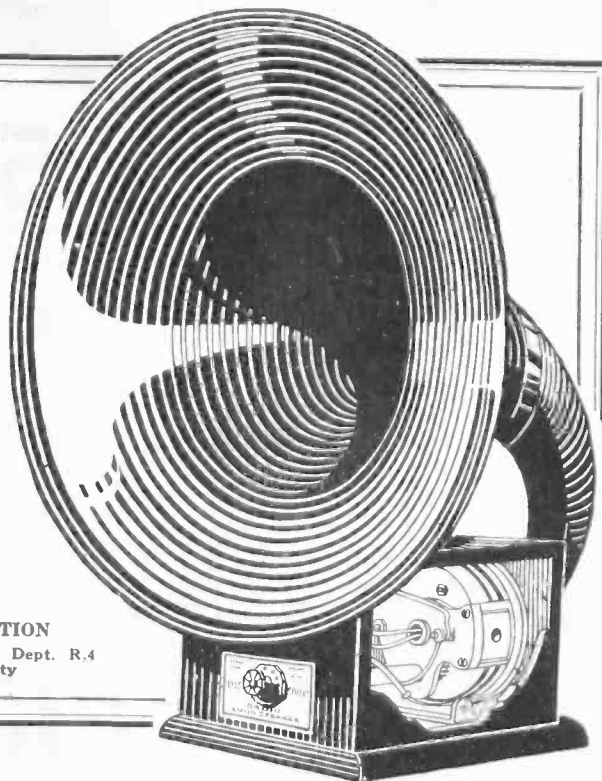
FREE

"APPLAUSE CARDS"

Millions hail this easy way to thank the broadcasters. If your dealer has none, write, giving his name to this company, which is the maker of the Dictograph loud speaker and the originator of "Applause Cards." A supply of "Applause Cards" will be mailed to you prepaid - absolutely FREE!

DICTOGRAPH PRODUCTS CORPORATION

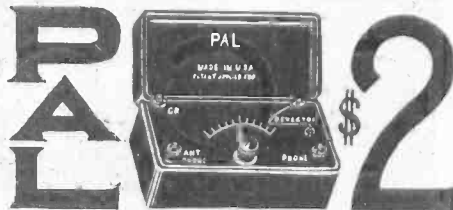
220 West 42nd Street, Dept. R.4
New York City



NOVEL RADIO SET!!

No Batteries or Tubes Needed

Clear Reception for Local Stations



SIZE OF SAFETY RAZOR BOX

Very compact, neat leatherette covered wood case. THE PAL IS ALL READY TO CONNECT TO AERIAL. Any school boy can hook this set up very quickly. Just set up according to SIMPLE DIRECTIONS FURNISHED. LISTEN IN! SMILE!

Complete Outfit \$5.00

including a PAL set, a single phone on headband, all aerial and ground wire equipment, also lightning arrester, etc., absolutely complete, NOTHING ELSE TO BUY.

HAVE YOU A TUBE SET?

Then use a PAL set for local reception and save your TUBES AND BATTERIES FOR DISTANT STATIONS. IT PAYS.

PRICE and SIZE of this set are small, but the RESULTS ARE WONDERFULLY BIG. You will be surprised and well satisfied or money refunded in 10 days. Just fill in the coupon below or send a postcard and you will get your order by return mail.

SEND NO MONEY

PAL RADIO CORP.
106 NEW MAIN ST., YONKERS, N. Y.

GENTLEMEN: Please send me the item which I have checked below, I will pay the postman on arrival.

PAL Radio Set, \$2.00

COMPLETE PAL OUTFIT (nothing else to buy), \$5.00

Name

Address

Distributors wanted.

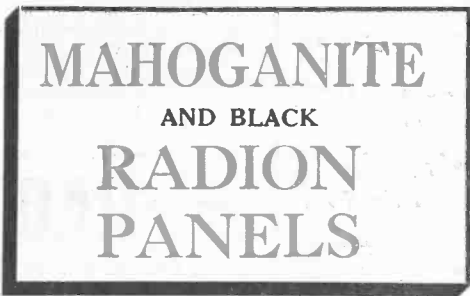
Out of the Ether

The best program that we ever heard broadcast through WHN was the one offered by the New York Letter Carriers' Orchestra and Band. These two combinations consist of some great musicians. Things now look as if our idea of offering more programs of civic organizations as they are the ones who furnish the material which the BCL's enjoy.

phone of the Missouri State Prison Band and Orchestra. Heretofore these two combinations have appeared before the mike of station WOS on the average of about five times a month, and now they can only perform twice a month.

KDKA was heard offering a splendid performance of the operetta "Roses of Marcatel." There were not many cast in the show but the few were very good singers and this being the main feature of an opera consequently everything went over in great style.

We are sorry to hear that the Missouri State Penal Board had placed a restriction on performing before the micro-



DIALS
KNOBS
TUBING
SOCKETS

MAHOG-
ANITE
BINDING
POSTS

ALL STOCK SIZES,
ALSO CUT TO ANY SPECIAL SIZE

HARD RUBBER PANELS (H-R Grade) Always in Stock

WHOLESALE

RETAIL

Complete Price List on Request

N. Y. HARD RUBBER TURNING CO.

212R Centre Street

Telephone:
Canal 8315

New York, N. Y.



FIVE TUBE FADA-NEUTRODYNE

THE FADA Neutrodyne Set is without question the best Radio Set on the market. All distant stations are "local," even on a loud speaker with this set. Very selective tuning. Easy matter to get 20 or 30 stations in one evening.

We will sell you the complete genuine FADA parts for a 5 tube Neutrodyne Set and also a Mahogany Cabinet for \$69.50 and will make this set for you FREE without any charge whatever.

\$69.50

Built for You-FREE

Satisfaction guaranteed. If this set does not work to your entire satisfaction, then return, and purchase price will be refunded to you. Tubes and batteries not included.

PERFECTION RADIO CORPORATION

78 Cortlandt St., N. Y. C.
118 Nassau St., N. Y. C.

59 Cortlandt St., in Elliot's Drug Store
119 West 23rd St.

YOU NEED A KENNEDY TUNER

Six Reasons Why

1. Tunes very sharp.
2. It covers all waves of broadcasting stations.
3. It will not radiate and interfere with the reception of your neighbors.
4. It is very simple to operate. One dial to pick station and the other dial to increase or decrease volume.
5. Receiver can be constructed for a reasonable cost.
6. Reliable, when once you receive the combination of a station and log it, you can go back any time they are on the air with the proper combinations hear them again without twisting the dials trusting to luck.

KENNEDY TUNER

\$5.00

INCLUDING GLOBE
TROTTER DIAGRAM

Takes the place of—

- 3 Honeycomb Coils at \$1.40.. \$4.20
- 1 Honeycomb Coil Mounting.. 5.00
- 1 23-Plate Vernier Condenser 5.00

\$14.20

Everything Came in Like a Flock of Sheep

It might interest you to know that I listened to WGY from 7:30 to 8:08 P. M., without a break on this one-tube wonder. Kansas City and everything out West came in like a flock of sheep.

EDGAR WILLIS, Spangle, Wash.

Distance First Night

I am having splendid luck with my set. The first night I picked up San Juan, Porto Rico.

F. L. ROHRBACK, El Reno, Okla.

Does All it Was Supposed to Do

I have given your Kennedy Tuner a good test and find that it will do everything I expected. I can bring in stations up to 1500 miles on loud speaker with ease.

ROLAND B. YOUNG, Ludlow, Mass.

Your Tuner is a Gem

I bought a tuner from you a short time ago and I must say it is a gem. Last Monday I picked up KHJ, Los Angeles, on my loud speaker very clear and plenty of volume. Sunday, KFO, San Francisco, Calif. Wishing you a success with your tuner, as it is the only one made.

HARRY GREEN, New York City.

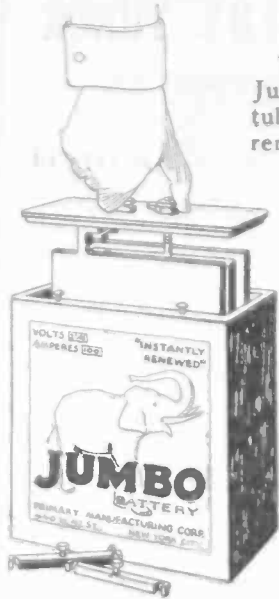
T. J. KENNEDY

Radio Globe Trotter

470 West 159th Street
NEW YORK, N. Y.

The Ideal Battery for WD12 or UV201A Tubes

The Single Jumbo for WD 12 tubes, the Double Jumbo for UV201 A tubes, will each operate 3 tubes four hours daily for forty days—with a renewal cost of 65c and 95c respectively.



This statement is based on the results obtained by thousands of users of Jumbo batteries.

Instantly Recharged

Jumbo Batteries require no service station or electric current for recharging. Spare renewal plates may be obtained from your dealer or by mail from the factory.

Jumbo battery service dealers will recharge your batteries for you WHILE YOU WAIT.

Prices—Single Jumbo, \$5.25; Double Jumbo, \$10.00

Write for descriptive folder and special trial offer

Primary Manufacturing Co.

442 West 42nd Street

New York

Longacre 1517-6763

Peanut's Crackle Heard All Over U.S.

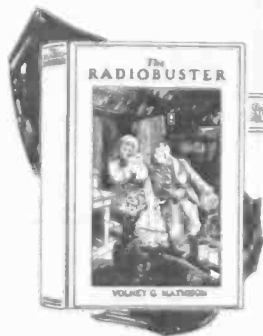
Broadcasting Orchestra Finds Basket of Hot-roasted Variety and Ether Carries Noise of Opening Them

ONE evening, not long ago, The P. S. O. C. Radio Orchestra found a basket of hot-roasted peanuts waiting for them at the studio, as a token of appreciation from a Davenport grocer. During the program the WOC announcer acknowledged receipt of the gift, and to show that the nuts were fresh and crisp, explained that he would crack one of the peanuts before the microphone, which he did.

The stunt was so out of the ordinary that it prompted response from hundreds of listeners who said the sound was received very naturally and clearly. Reports came from points from Philadelphia to Denver and from Texas to Canada.

RADIO

SEND FOR OUR COMPLETE MONEY SAVING CATALOG
TIMES SQ. AUTO SUPPLY CO. INC.
MAIL ORDER DEPT.
1746 BROADWAY AT 56th STREET
NEW YORK, N. Y.



The Only Book of Its Kind on the Market

"The Radiobuster"

by Volney G. Mathison
famous writer of radio fiction

12 Complete Humorous Radio Stories
In Book Form—182 Pages

\$1.00
Per Copy
Postpaid in the U.S.

Samuel Jones is a "sea-going" brass-ordinary stories about this most famous character in radio fiction. These fast-moving, action-filled stories have humor, real life, and punch. You will chuckle over Samuel Jones' dilemmas; grin at his ingenuity in getting out of tight places; and laugh at his clever maneuvers with the fair sea. Not that Samuel Jones isn't elated when the girls come his way; but, as he puts it, "woman is a de-cervix' animal."

We have a very attractive sales proposition for the radio dealer. Please write for it.

The supply of copies is limited. It will be to your advantage to order right now!

For Sale by

Pacific Radio Publishing Co., Inc.

Pacific Building
San Francisco

17 West 42d St.
New York City

157 E. Ontario
Chicago, Ill.

52 Irving St.
Boston, Mass.

Order your copy from the office nearest you.

RADIO TUBES

that have been rebuilt. Also a limited number of new tubes released every month for advertising purposes.

Our written GUARANTEE of full satisfaction is enclosed with every tube we send out. This protects you.

Type 201a.....\$3.00
Type 12.....1.00
Type DVI.....3.00

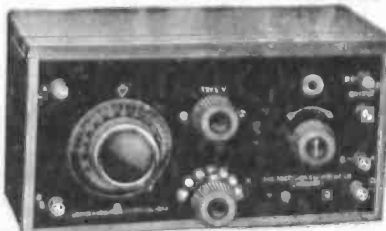
Special prices to dealers.

A. & T. RADIO CO.

Dept. A

DANVERS, MASS.

\$29.98—Nothing More to Buy



Complete Outfit!
Consists of:
Complete Set in Mahogany Cabinet
1 Vacuum Tube
A Battery - B Battery
Ribbon Aerial
Insulators - Grid Leak
Lead In - Plug
Head Phones
Ground Wire
Nothing more to buy!

THE CROSLY Ace-Type U

The Wonder Tube Outfit—famous for long distance and simplicity. Guaranteed to give 1500 mile range. Clear tone, powerful. Complete outfit—nothing more to buy.

FREE TRIAL IN YOUR HOME!
Install it in your home at our risk. Pay \$29.98 and postage when delivered. Use it 30 days. If not satisfactory, return and we'll refund your money. Order by mail from this ad.

A. V. ANTHONY & CO.
Dept. 102, Maywood [Chicago Suburb], Ill.

SEND US THE NAME OF YOUR RADIO CLUB

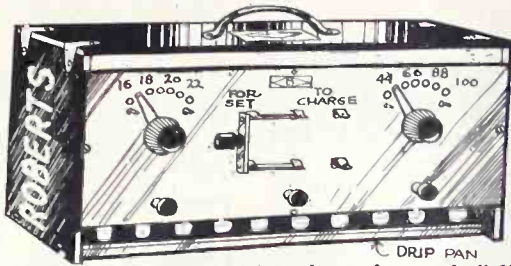
Also the names of your president and other officers. We want to add these to a list of radio clubs and officers we are preparing for publication in an early issue. RADIO WORLD, 1401 Broadway, New York.

The Roberts "B" Battery

A STORAGE BATTERY MADE OF EDISON ELEMENTS

SEE THIS BATTERY FIRST BEFORE BUYING ANY OTHER

A swing of the switch levers gives instant voltage changes on detector and amplifying tubes.



There is no change of wiring necessary. Only three (3) main terminals to connect.

The Best for Neutrodyne, Superdyne, Superheterodyne and all High-Powered Circuits. Comparison Will Prove It the Best in the Field Today. Superior in Quality, Durability, Workmanship and Finish.

SATISFACTION ABSOLUTELY GUARANTEED

- | | | | |
|--|---|--|---|
| Type A — 100 volt, with variable detector, from 16-22 volts. \$21.50 | Type B — 100 volt, with variable shifts, from 16-22 volts on detector and from 44-100 volts on amplifier. \$24.50 | Type C — 140 volt, with variable detector, from 16-22 volts. \$27.50 | Type D — 140 volt, with variable shifts, from 16-22 volts on detector and from 44-140 volts on amplifier. \$31.00 |
|--|---|--|---|

Manufactured by Roberts "B" Battery Co.

1120 Myrtle Ave., Near Broadway, Brooklyn. Tel. Bushwick 6753. Dept. H. Open till 9 P. M. Daily.

Batteries Can Be Obtained from the Following Dealers:

- BROOKLYN STORES**
- Brooklyn Radio Service Co. 577 Myrtle Ave.
 - 20th Century Radio Co. 102 Flatbush Ave. Schrader & Co. 81 South 10th St.
 - Syle Lighting Fixture Co. 166 Flatbush Ave.
 - Mantredl Battery Co. 1749 Sheepshead Bay Road.
 - Treumann Radio Shop 304 Grand Ave., Astoria, L. I.
 - Superior Supply Co. 823 Flatbush Ave.

- Autoelectric Bat. & Sup. Co. 201 Paterson St. Paterson, N. J.
- United Radio & Sport Shop 798 Broad St., Newark, N. J.

- NEW YORK CITY STORES**
- Brooklyn Radio Service Co. 17 John St.
 - Cortlandt Radio Shop 50 Broadway 77 Cortlandt St.

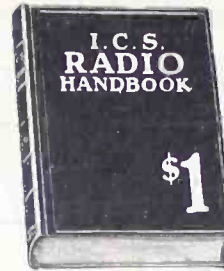
- Liberty Radio at all 4 stores
 4 John St. 106 Liberty St.
 22 Beaver St. 745 8th Ave.

- Amco Radio Shop 65 Cortlandt St. Conroy, Matthews. 147 East 76th St.
- Ideal Sport & Radio Shop 241 7th Ave., nr. 24th St.
- Romco Storage Battery Co. 146 W. 88th St.
- Bronx Tiro Works 396 Morris Ave. J. F. Purlock 878 9th Ave. Stanley & Paterson 250 West St.
- Fox Street Battery Service Co. 1014 Fox St., Bronx

DEALERS WRITE FOR TERMS

Now you can UNDERSTAND RADIO!

Take the mystery out of it—build and repair sets—explain the vacuum tube—operate a transmitter—be a radio expert!



514 PAGES
40,000 SOLD
ONLY \$1

Compiled by HARRY F. DART E.E., formerly with the Western Electric Co., and U.S. Army Instructor of Radio. Technically edited by F. H. Doane.

A practical book. Written and edited by experienced engineers, in plain language. Something useful on every one of its 514 pages. The authority that covers every phase of radio, all under one cover in one book for one dollar.

Why experiment in the dark when you can quickly learn the things that insure success? Hundreds of illustrations and diagrams explain everything so you can get the most out of whatever receiver you build or buy. Money back if not satisfied. Mail the coupon to-day.

---TEAR OUT HERE---

International Correspondence Schools
 Box 8795, Scranton, Penna.

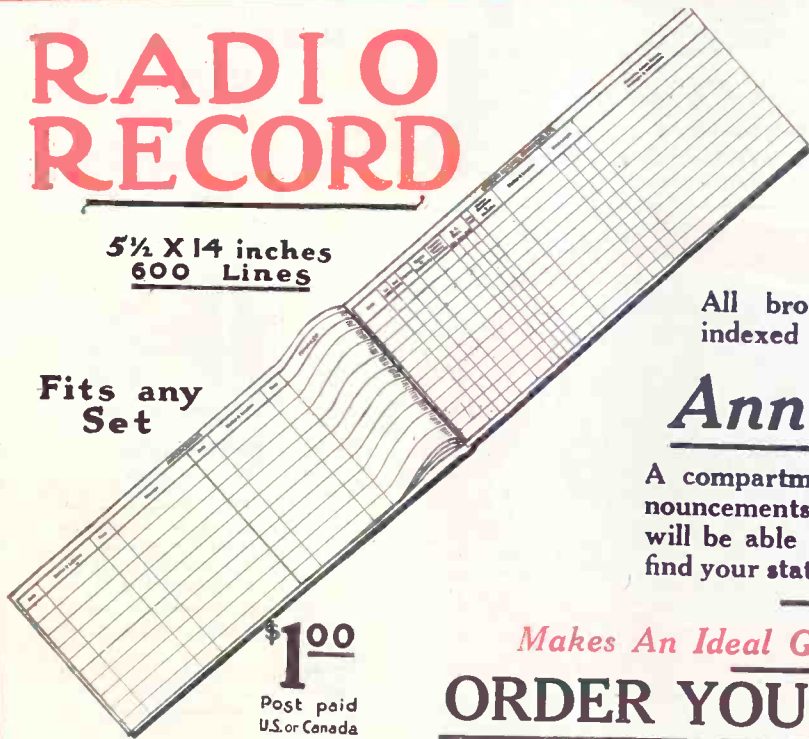
I enclose One Dollar. Please send me—post-paid—the 514-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....
 Address.....

RADIO RECORD

5 1/2 X 14 inches
600 Lines

Fits any Set



\$1.00
Post paid U.S. or Canada

A permanently bound record of all stations you have received and how you received them. Self-indexed and easy to find. Your friends can find the stations indexed as easily as you.

All broadcasting stations listed and indexed with space for new stations.

Announcements

A compartment has been provided for announcements, an invaluable feature. You will be able to keep track of these, and will find your station at once by referring to index.

Makes An Ideal Gift for the Radio Fan

ORDER YOUR COPY NOW!

DEALERS

Write for our attractive offer NOW. Fastest specialty on the market.

THE BEADLE PRINTING CO.

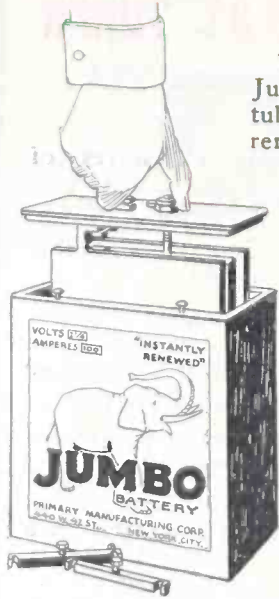
MITCHELL, S. DAKOTA

"RADIO RECORDS"

Applause Cards

60 for \$1.00. Postpaid. Stamped ready to fill in and mail.

The Ideal Battery for **WD12** or **UV201A** Tubes



The Single Jumbo for WD 12 tubes, the Double Jumbo for UV201 A tubes, will each operate 3 tubes four hours daily for forty days—with a renewal cost of 65c and 95c respectively.

This statement is based on the results obtained by thousands of users of Jumbo batteries.

Instantly Recharged

Jumbo Batteries require no service station or electric current for recharging. Spare renewal plates may be obtained from your dealer or by mail from the factory.

Jumbo battery service dealers will recharge your batteries for you **WHILE YOU WAIT.**

Prices—Single Jumbo, \$5.25; Double Jumbo, \$10.00

Write for descriptive folder and special trial offer

Primary Manufacturing Co.

442 West 42nd Street

New York

Longacre 1517-6763

Peanut's Crackle Heard All Over U.S.

Broadcasting Orchestra Finds Basket of Hot-roasted Variety and Ether Carries Noise of Opening Them

ONE evening, not long ago, The P. S. C. Radio Orchestra found a basket of hot-roasted peanuts waiting for them at the studio, as a token of appreciation from a Davenport grocer. During the program the WOC announcer acknowledged receipt of the gift, and to show that the nuts were fresh and crisp, explained that he would crack one of the peanuts before the microphone, which he did.

The stunt was so out of the ordinary that it prompted response from hundreds of listeners who said the sound was received very naturally and clearly. Reports came from points from Philadelphia to Denver and from Texas to Canada.

RADIO

SEND FOR OUR COMPLETE MONEY SAVING CATALOG
 TIMES SQ. AUTO SUPPLY CO. INC.
 MAIL ORDER DEPT.
 1745 BROADWAY AT 56th STREET
 NEW YORK, N. Y.

RADIO TUBES

that have been rebuilt. Also a limited number of new tubes released every month for advertising purposes. Our written GUARANTEE of full satisfaction is enclosed with every tube we send out. This protects you.

- Type 201a.....\$3.00
- Type 12.....3.00
- Type DV1.....3.00

Special prices to dealers.

A. & T. RADIO CO.

Dept. A

DANVERS, MASS.

\$29.98—Nothing More to Buy



Complete Outfit!
 Consists of:
 Complete Set in Mahogany Cabinet
 1 Vacuum Tube
 A Battery · B Battery
 Ribbon Aerial
 Insulators · Grid Leak
 Lead In · Plug
 Head Phones
 Ground Wire
 Nothing more to buy!

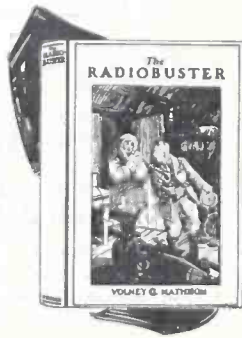
THE CROSLY Ace-Type V

The Wonder Tube Outfit—famous for long distance and simplicity. Guaranteed to give 1500 mile range. Clear tone, powerful. Complete outfit—nothing more to buy.

FREE TRIAL IN YOUR HOME!

Install it in your home at our risk. Pay \$29.98 and postage when delivered. Use it 30 days. If not satisfactory, return and we'll refund your money. Order by mail from this ad.

A. V. ANTHONY & CO.
 Dept. 102, Maywood [Chicago Suburb], Ill.



The Only Book of Its Kind on the Market

"The Radiobuster"

by Volney G. Mathison
 famous writer of radio fiction

12 Complete Humorous Radio Stories
 In Book Form—182 Pages

\$1.00
 Per Copy
 Postpaid
 in the U.S.

Samuel Jones is a "sea-goin' brass-pounder" whom Fate seems always to send where the trouble is thickest. How he lived through the gun-battles of the savage codfishers of Ungs; how he made pals of Tin-Pan Smith and Cressy Bill, and the light-scarred Hell-Fire of Pirate Cove; how he escaped the man-snatching Eskimo squaw who would marry him, and how he got clear of the Indian ghosts of Skull Island—are but a few of these extraordinary stories about this most famous character in radio fiction. These fast-moving, action-filled stories have humor, real life, and punch. You will chuckle over Samuel Jones' dilemmas; grin at his ingenuity in getting out of tight places; and laugh at his clever manoeuvres with the fair sex. Not that Samuel Jones isn't elated when the girls come his way; but, as he puts it, "woman is a deceivin' animal."

We have a very attractive sales proposition for the radio dealer. Please write for it.

The supply of copies is limited. It will be to your advantage to order right now!

For Sale by

Pacific Radio Publishing Co., Inc.

Pacific Building
 San Francisco

17 West 42d St.
 New York City

157 E. Ontario
 Chicago, Ill.

52 Irving St.
 Boston, Mass.

Order your copy from the office nearest you.

SEND US THE NAME OF YOUR RADIO CLUB

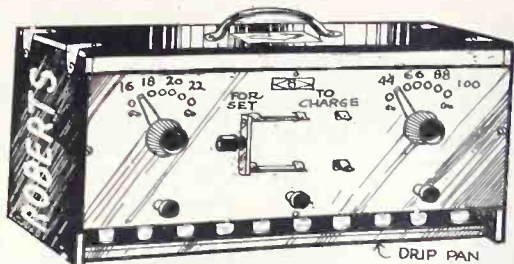
Also the names of your president and other officers. We want to add these to a list of radio clubs and officers we are preparing for publication in an early issue. RADIO WORLD, 1493 Broadway, New York.

The Roberts "B" Battery

A STORAGE BATTERY MADE OF EDISON ELEMENTS

SEE THIS BATTERY FIRST BEFORE BUYING ANY OTHER

A swing of the switch levers gives instant voltage changes on detector and amplifying tubes.



There is no change of wiring necessary. Only three (3) main terminals to connect.

The Best for Neutrodyne, Superdyne, Superheterodyne and all High-Powered Circuits.

Comparison Will Prove It the Best in the Field Today. Superior in Quality, Durability, Workmanship and Finish.

SATISFACTION ABSOLUTELY GUARANTEED

- | | | | |
|--|---|--|---|
| Type A — 100 volt, with variable detector, from 16-22 volts. \$21.50 | Type B — 100 volt, with variable shifts, from 16-22 volts on detector and from 44-100 volts on amplifier. \$24.50 | Type C — 140 volt, with variable detector, from 16-22 volts. \$27.50 | Type D — 140 volt, with variable shifts, from 16-22 volts on detector and from 44-140 volts on amplifier. \$31.00 |
|--|---|--|---|

Manufactured by Roberts "B" Battery Co.

1720 Myrtle Ave., Near Broadway, Brooklyn, Tel. Bushwick 6753. Dept. H. Open till 9 P. M. Daily.

Batteries Can Be Obtained from the Following Dealers:

- BROOKLYN STORES**
- Brooklyn Radio Service Co. 577 Myrtle Ave.
 - 20th Century Radio Co. 102 Flatbush Ave. Schrader & Co. 81 South 10th St.
 - Syle Lighting Fixture Co. 155 Flatbush Ave.
 - Mantred Battery Co. 1749 Sheepshead Bay Road.
 - Treumann Radio Shop 304 Grand Ave., Astoria, L. I.
 - Superior Supply Co. 823 Flatbush Ave.

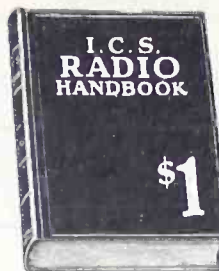
- Autoelectric Bat. & Sup. Co. 201 Paterson St. Paterson, N. J.
 - United Radio & Sport Shop 798 Broad St., Newark, N. J.
- NEW YORK CITY STORES**
- Brooklyn Radio Service Co. 17 John St.
 - 171 Broadway 50 Broadway
 - Cortlandt Radio Shop 77 Cortlandt St.
 - Liberty Radio at all 4 stores 4 John St. 106 Liberty St. 22 Beaver St. 745 6th Ave.

- Amco Radio Shop 65 Cortlandt St. Conroy, Matthews. 147 East 76th St.
- Ideal Sport & Radio Shop 241 7th Ave., nr. 24th St.
- Romco Storage Battery Co. 146 W. 68th St.
- Bronx Tire Works 398 Morris Ave. J. F. Putlock 678 9th Ave. Stanley & Paterson 250 West St.
- Ex Street Battery Service Co. 1014 Fox St., Bronx

DEALERS WRITE FOR TERMS

Now you can UNDERSTAND RADIO!

Take the mystery out of it—build and repair sets—explain the vacuum tube—operate a transmitter—be a radio expert!



514 PAGES
40,000 SOLD
ONLY \$1

Compiled by HARRY F. DART E.E., formerly with the Western Electric Co., and U.S. Army Instructor of Radio. Technically edited by F. H. Doane.

A practical book. Written and edited by experienced engineers. In plain language. Something useful on every one of its 514 pages. The authority that covers every phase of radio, all under one cover in one book for one dollar.

Why experiment in the dark when you can quickly learn the things that insure success? Hundreds of illustrations and diagrams explain everything so you can get the most out of whatever receiver you build or buy. Money back if not satisfied. Mail the coupon to-day.

—TEAR OUT HERE—

International Correspondence Schools
Box 8795, Scranton, Penna.

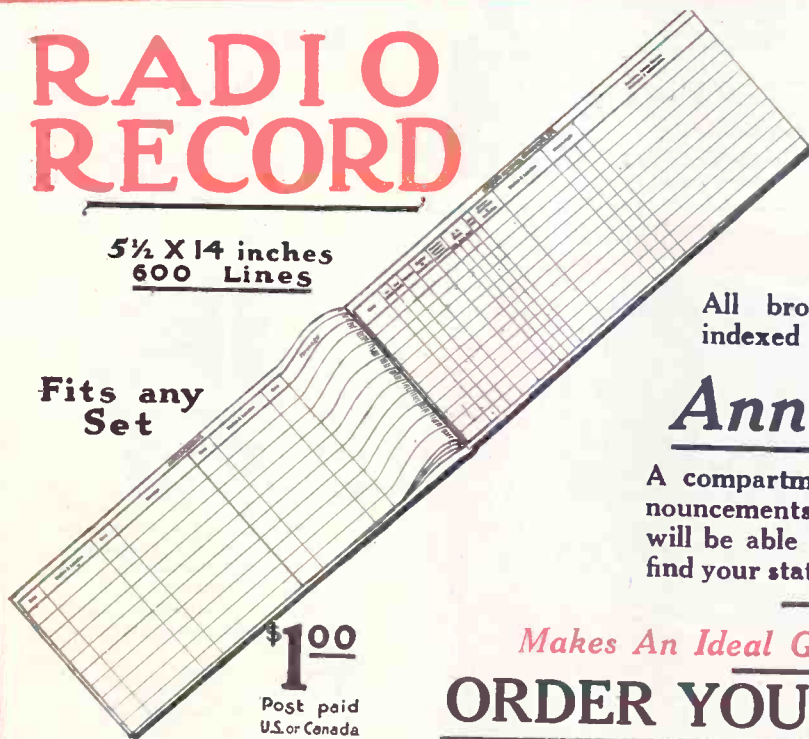
I enclose One Dollar. Please send me—post-paid—the 514-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....
Address.....

RADIO RECORD

5 1/2 X 14 inches
600 Lines

Fits any Set



\$1.00
Post paid
U.S. or Canada

A permanently bound record of all stations you have received and how you received them. Self-indexed and easy to find. Your friends can find the stations indexed as easily as you.

All broadcasting stations listed and indexed with space for new stations.

Announcements

A compartment has been provided for announcements, an invaluable feature. You will be able to keep track of these, and will find your station at once by referring to index.

Makes An Ideal Gift for the Radio Fan

ORDER YOUR COPY NOW!

DEALERS

Write for our attractive offer NOW. Fastest specialty on the market.

THE BEADLE PRINTING CO.

MITCHELL, S. DAKOTA

"RADIO RECORDS"

Applause Cards

60 for \$1.00. Postpaid. Stamped ready to fill in and mail.

DX Nite Owls Still Sending in Their DX Records

On One Tube

From R. Edwards, 50 Magnolia Ave., Arlington, N. J.

Seeing your request for DX stations I submit my records. I have a Westinghouse 1 tube Aerola Sr. and from Dec. 27, 1923, to the following date I have received the following phones:

WOR, WBS, WAAM, WJZ, WIY, WEAF, WGAO, WHN, WGY, WOO, WIP, WJAR, WSAI, WLW, WTAM, WBZ, WJAB, WJAZ, WDAJ, KYW, WEAM, WSAJ, WRC, WMC, WABC, WNAC, WEAN, WHAS, WHAM, WGR, WPAB, WTAS, WPAH, WOC, WAAW, WCAL, WEA, WBT, WWJ, WCX, WCAE, WFAB, WSAF, KDKA, KFKX (every Monday and Thursday

night at 10:30), KOP, CHYC, WCK, WDAF, WSAR, WABL, WCB, WHB, WCAD, WRW, WSB, WBBR, WQAM (come in loud), WGI, WCBC, WOA, PWX (got these through interference with WEAF), WTAY, WTAT, WABT, KCCE, WOS, WIAD, WHAZ, WMAK, WJAX, KSD, CFCF, WAB, WJAK, 76 in all.

Say, DX'ers, stay up late at night and pull them in by careful tuning.

From Coast to Coast

From Bayard Livingston, 10 Perry Street, Morristown, N. J.

I am sending you a list of "DX" stations received on a Paragon R. A. 10, with a two step

amplifier. The aerial is about sixty-five feet long, three strands of wire and between thirty to forty feet high. KGO has on three times come in on a Herald Talker. My list is: WCAE, KDKA, WJAS, WBAK, WPAB, WABT, KOV, WSAJ, WRC, WCAP, NAA, WCAO, WBT, WSB, WBBF, PWX, 6KW, 7SR, 9CE, CFCF, KCAC, CHYC, OA, CKCH, WHAS, WNAV, WMC, WOI, WOC, WIAS, KFLZ, WHAA, WJAM, WAAW, WQAW, KFKX, KDEF, WLAG, WCAL, WPAH, WIAO, WTAO, WHA, WDAF, KYW, WJAZ, WPAZ, WRM, WTAS, WCB, WMAO, WTAY, WWAE, WSAI, WLW, WEAC, WBAV, WTAM, WJAX, WHK, WPAL, WTAL, WWI, KOP, WCX, WEA, WABM, WCB, WKAR, KSD, WHB, WOS, WCK, WMAY, WMAJ, WDAF, WOO, WSY, WBAF, WOAI, WFAA, WABL, WKAQ, WSA, WEAN, WJAR, WQAM, WJAK, KFKB, and KGO.

Ackerman LOUD SPEAKER

Complete, Ready for Immediate Use.

\$9.50

Delivered Anywhere in the U. S. A.

A marvelous speaker for the price of a headset.

Superior to many of the high-priced amplifiers. Thousands of radio fans have welcomed this popular-priced quality speaker.

Standing 21" high, with 11" bell and made of heavy (Non-Vibrating) metal, together with its special loud speaking unit, this speaker reproduces voice and music far beyond expectations. Finished in plain black or brown; also special alligator grain in black and green or black crystalline.

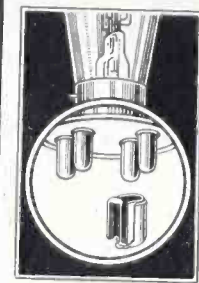
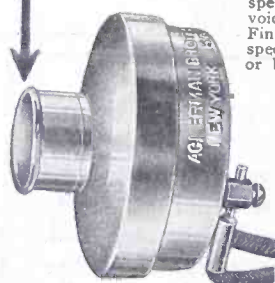
This speaker has been selected as the best value by one of the largest selling organizations in the country.

MODEL "A" LOUD SPEAKER UNIT for use with horn or phonograph, complete with 5-foot cord and rubber coupling. **\$4.00**

If your local dealer is unable to supply you send order direct to us and pay postman on delivery.

Sold on a Money-Back Guarantee.

Ackerman Brothers Co., Inc.
301 West 4th St., Dept. "RW", N. Y. C.



91 1/2%
of all tubes are needlessly destroyed.

RADECO SAFETY FUSES

GIVE COMPLETE PROTECTION
Price

50

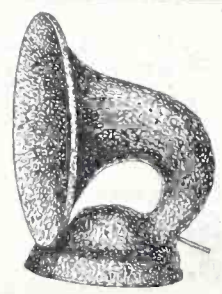
cents each

Dealers write for proposition.

Radio Equipment Company
20 Stuart St. Boston, Mass.

KELLOGG USE-IS THE TEST

Build Your Radio Set With
Kellogg
Guaranteed Parts



KELLOGG Reproducer fulfills all the requirements for home reproduction. The music or voice is projected clearly and distinctly with ample volume.

The horn is of special acoustical fibre which prevents the "tinny" sound.

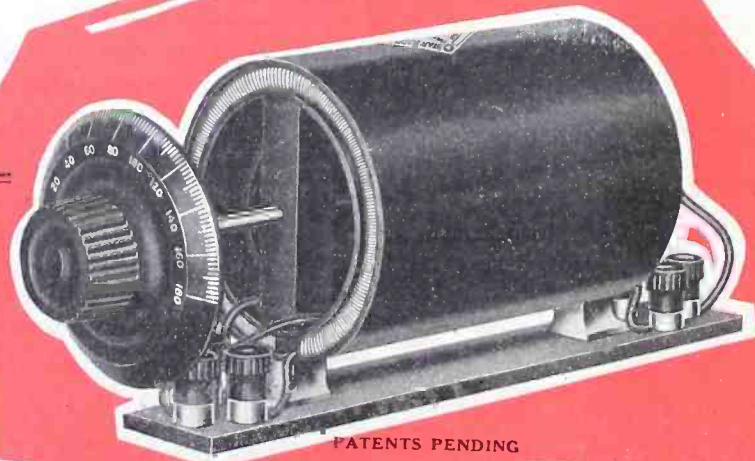
A special Kellogg unit of 2500 ohms resistance is used which delivers the speech or music with head set clarity. A type for every use. Hear one today.

Kellogg Reproducers increase the value and pleasure of your set. If your dealer does not handle Kellogg, communicate direct with us.



Kellogg Switchboard & Supply Company
1066 W. Adams - CHICAGO

USE-IS THE TEST KELLOGG



PATENTS PENDING

Coast to Coast

STAR COIL

NO SOLDERING NO BODY CAPACITY **Every Turn a Tap** NO EXTRA KNOBS NO EXTRA WORK

SEND FOR LITERATURE

STAR RADIO PRODUCTS CO.
711 S. DEARBORN ST. CHICAGO ILL.

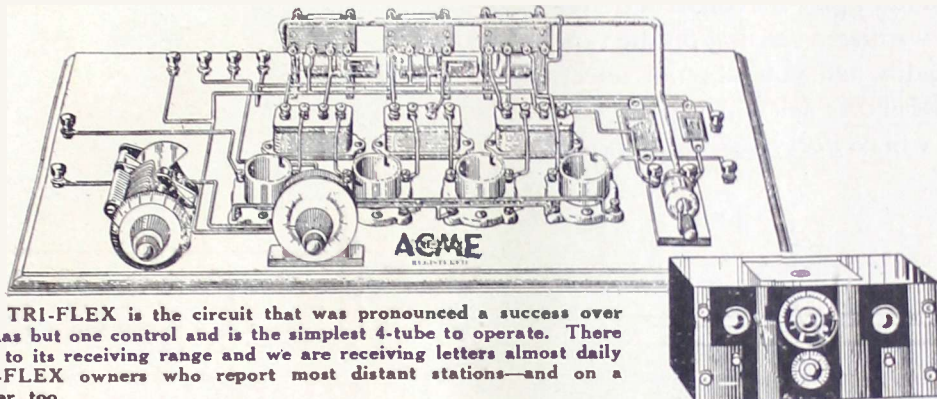
Introducing to Radio World Readers

THE
NEW

ACME TRI-FLEX

REGISTERED

RADIO
RECEIVER



The Acme TRI-FLEX is the circuit that was pronounced a success over night. It has but one control and is the simplest 4-tube to operate. There is no limit to its receiving range and we are receiving letters almost daily from TRI-FLEX owners who report most distant stations—and on a loud speaker, too.

The Acme Tri-Flex Consists of

- | | |
|-------------------------------------|----------------------------------|
| 1 24-Plate Hargold Vern. Condenser. | 1 Tri-Flex Crystal Detector. |
| 3 Acme Audio Transformers. | 4 Freshman Condensers |
| 3 Acme Radio Transformers. | 10 Feet Bus Bar. |
| 1 Acme Pot Rho. | 8 Engraved Binding Posts. |
| 4 Bakelite Sockets | 2 1/2 Inches Copper Mesh Tubing. |

COMPLETE PARTS
(as listed)

28.45

ASSEMBLED ON BOARD
(as illustrated above)

42.50

The Acme TRI-FLEX completely assembled in a beautiful piano-finish mahogany cabinet.

62.50

CABINETS

Beautiful highly polished mahogany finished cabinets ready to assemble in 5 minutes.

- | | |
|-------------|--------|
| 7 x 10..... | \$1.25 |
| 7 x 12..... | 1.35 |
| 7 x 14..... | 1.45 |
| 7 x 18..... | 1.55 |
| 7 x 21..... | 1.65 |
| 7 x 24..... | 1.75 |
| 7 x 26..... | 1.85 |

BUILD YOUR OWN

NEUTRODYNE

Complete Parts with Cabinet
FOR 5 TUBE SET

23.95

A five tube assembled kit which includes everything necessary to build a genuine Hazeltine 5 tube set. A DRILLED Mahogany or Black Panel, engraved. 3 Dials, 4 in.

- | | |
|--|-----------------------------------|
| 2 Patent Jacks. | 2 Acme Audio Transformers. |
| 3 Genuine Hazeltine Neutrodyne Transformers Mounted on Quality Condensers. | 20 Feet Bus-bar. |
| 2 Hazeltine Neutrodyne. | 1 .00025 Freshman Grid Condenser. |
| 5 Bakelite Sockets. | 1 Tubular Grid Leak. |
| 1 6 Ohm Rheostat. | 1 Set Engraved Binding Posts. |
| 1 30 Ohm Rheostat. | 1 .002 Freshman Cond. |
| | 1 .006 Freshman Cond. |

PERFECTONE



LIST \$15

A complete speaker with cord ready for use.

6.95

233 FULTON ST.
Open Till 6:30 P. M.

245 E. 59TH ST.
Open Evenings Till 10

167 W. 18TH ST.
Open Evenings Till 10

CHURCH & CEDAR
110 TRINITY PL.
Open Till 6:30



MAIL ORDER
DEPARTMENT:

167 West 18th Street

SEND MONEY ORDERS
NO STAMPS OR CHECKS

166 W. 44TH ST.
Open Evenings Till
11:30 P. M.

Brooklyn Store
20-4TH AVENUE
Opp. L.I.R.R. Depot

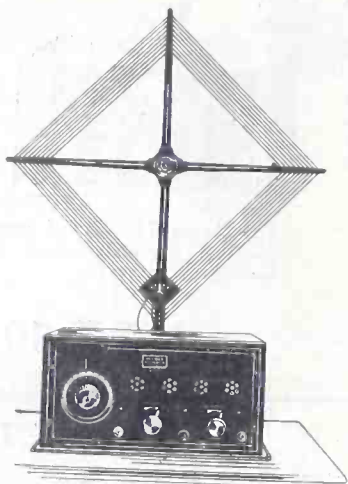
2 Newark Stores
Open Evenings Till 10
11 Saybrook Pl.
Opp. Hudson Tube
Terminal
132 Branford Pl.

MORE FOR YOUR MONEY IN A ROVA STORE THAN ANYWHERE ELSE

HOW TO CHOOSE A RADIO RECEIVING SET

Which Set for You?

The location of your home—its surroundings—its construction—all have direct bearing on the type of radio set you should select. There is *one* set which will work best where *you* live. Take home a—



\$140.00
Without Accessories

Dealers:

The Sleeper Monotrol is so easy, quick and inexpensive to install that you can send it home on trial. And once in the home it *stays* there.

Sleeper

MONOTROL

Reg. U. S. Pat. Off.

—on trial. Compare it with other sets you have heard in *your* vicinity.

If it gives you as much or greater volume—as much or greater distance—a much purer and sweeter tone—you want it.

If it is easier to tune—calling your stations by number on a *single* tuning dial just as you would call them on a telephone—you want it.

If it surpasses any set you know with more tubes and many more dials—you want it.

Without aerial or ground connections, the Monotrol is so easy, quick and inexpensive to rig up, your dealer will be glad to have you make this test on trial. Get in touch with him *today*.

SLEEPER RADIO CORPORATION
88 PARK PLACE NEW YORK

Licensed under the Grimes Inverse Duplex Invention.
Booklet on request.

THE MOST PERFECT RADIO SET IN AMERICA