

March 28

1925

15 Cents

RADIO WORLD

Title Reg. U.S. Pat. Off.

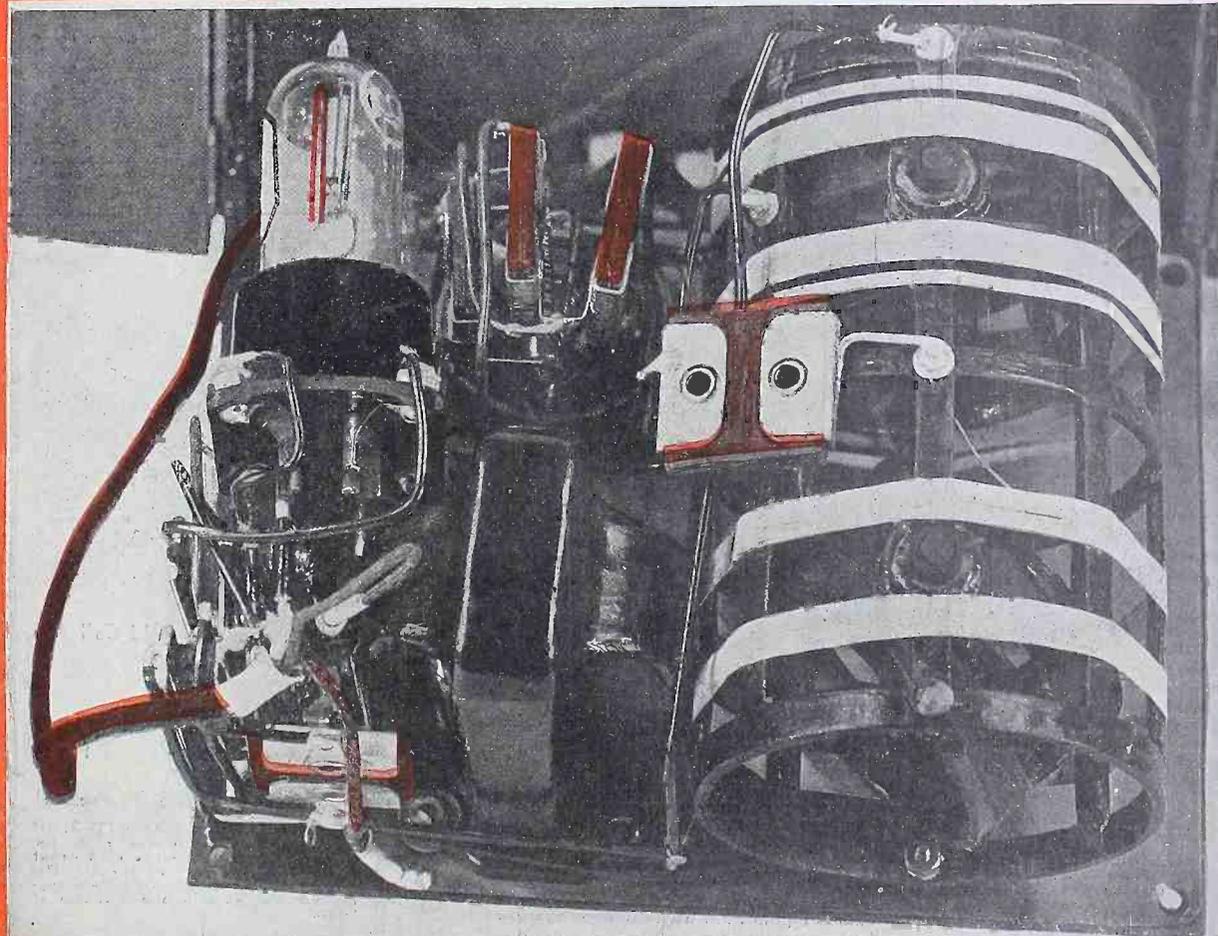
195-157

Vol. 7. No. 1. ILLUSTRATED Every Week

COMPLETE PROGRAMS EIGHT DAYS IN ADVANCE!

A Portable That Gets Most DX and Volume Possible on Two Tubes

By HERBERT E. HAYDEN



THE 1-A 1925 PORTABLE (as seen from rear) gets the most volume and distance possible on two tubes. See page 3 for Herbert E. Hayden's article.

A 3-TUBE REFLEX FOR THE NOVICE

By FEODOR ROFPATKIN

The 1925 Model DX Wonder With Resistance AF

Quality Parts—Lowest Prices

Complete Kit for 1925 DX Wonder 5-Tube Set as specified by Radio World \$43.50
 New Freshman Knockdown Kit 31.50
 Ultradyne 8-tube Kit—list \$90 70.00
 Acme Reflex Kit—list \$80 60.00
 Acme Reflex Kit—list \$60 45.00
 Acme D. Coil Unit—list \$15 10.95
 Acme transformers, all types 3.58
 Brownie Var. Detector—list \$7.00 1.50
 Bremer-Tully 3-clr. Tuner Kit \$5 3.55
 Eastern Coils for 1925 DX set 8.95
 Daven Resistances and Kits, 25% off list!

Radio Shop

Thordarsen Transformers 3 1/2 to 1 \$2.75
 Thordarsen Transformers 6 to 1 2.95
 Federal Transformers No. 65 and 63A 4.55
 Eastern Coils for Roberts Circuit 5.95
 Apex Dials, all types 25% off list.

All Bruno Parts in Stock.
 20% Discount Off List on All Sets.

GEORGE'S RADIO SHOP
 214 St. Nicholas Ave., cor. 121st St.
 New York City
 10% Deposit with order, balance to Postman

THE IDEAL COILS
 Described by J. E. Anderson, with full winding directions, in March 7 and 14 issues. Send 30c, get both. RADIO WORLD, 1493 Broadway, New York City.

JOFFE-GOLBERT CO.

Gilfillan Neutrodyne
 Somerset Receivers
 Marwal Sets
 Amplion Speaker
 Radio Furniture
 Radio Accessories

Distributors of

33 WEST 40TH ST. NEW YORK

Write for the FREE working drawings of the set that heard LONDON and all the big European stations:

ELGIN SUPER-REINARTZ

the set that leads in selectivity and distance. Your name and a stamp will bring the drawings—FREE!

ELGIN RADIO SUPPLY CO.
 Dept. A, 207 E. Chicago St. Elgin, Ill.

CROSLEY

RADIO CATALOG FREE

Describes fully the complete line of radio frequency sets, regenerative sets (licensed under Armstrong U. S. Patent No. 1,113,149) and parts

Write for Catalog Today

THE CROSLEY RADIO CORPORATION
 PO BOX 100, CROSLEY JR., President
 3404 Sassafras Street Cincinnati, Ohio

Over 130 standard radio parts, each bearing the Federal iron-clad performance guarantee.

Write for Catalog.

Federal Telephone & Telegraph Co.
 Buffalo, N. Y.

AT BARBLEY'S
"The AMBASSADOR MAN"

GENUINE AMBASSADOR PARTS

Ambassador Tuning Coil \$4.85
 Ambassador Baby Coil 4.85
 Ambassador R. F. Coil 2.65
 Ambassador Low Loss Cond. 4.25
 Ambassador Baby Cond. 1.80
 Ambassador Transformers 3.50

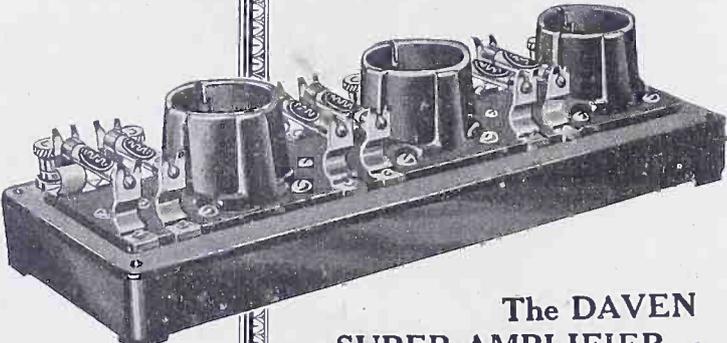
Special!
4-TUBE AMBASSADOR R. F. KIT
\$26.95 Exceptionally Selective

Set wired in a beautiful 7x18 Cabinet. Factory built. All wiring beneath sub-base \$40.00
 Sold on a money-back guarantee. Ask RADIO WORLD about us and our work.

WE ARE THE OFFICIAL AMBASSADOR SERVICE STATION

Barbley's Radio Service
 (Dept R.W.) 135 Liberty Street, New York City
 MAIL ORDERS SOLICITED
 Ref.: Coal and Iron National Bank

The Resistance Coupled Audio used in Bernard's 1925 DX Wonder



The DAVEN SUPER AMPLIFIER

To the Home Set Builder the *Daven Resistance Coupled Amplifier* will be found the most ideal. It simplifies the construction of his receiver, which, when completed, will reproduce the broadcasted concerts with a faithfulness not obtainable with any other method of amplification.

Let your next amplifier be Resistance Coupled, for this is the only method of audio amplification whereby high and low tones are amplified alike, therefore distortionless.

★ Your Dealer can supply you with the Daven Super Amplifier—Sold Everywhere

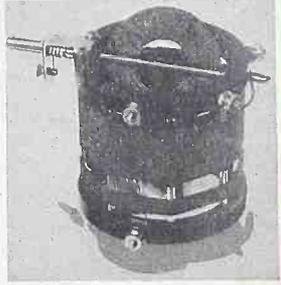
DAVEN RADIO CORP.
 "Resistor Specialists"
 Newark New Jersey

Obtain from your Dealer, the "Resistor Manual," our complete handbook on Resistance Coupled Amplification. Price 25c. If your Dealer cannot supply you, we will send one direct, postpaid for 35c.

DAVEN RADIO

THE ARISTOCRAT OF AMPLIFIERS

It's Wound on Quartzite Class II



Replace your old Coil with the

"Bruno" 77

and Wonder at the Difference!

The Bruno 77 is the latest word in Radio! The pancake Tickler eliminates the ear splitting whistles common to all 3 circuit tuners—and makes any set sharper. The Quartzite glass rods provide an ideal support for the wires with a minimum of losses.

A Coil with Lower Losses Cannot Be Made!

If the Bruno 77 Quartzite Tuner does not improve your set—your dealer will return your money—only the dealers who adhere to this policy are handling Bruno Products. Price \$7.

RADIO FREQUENCY COIL
 \$3

Use the coupler and RFT for Bernard's 1925 model 5-Tube DX Wonder. Both coils endorsed by Herman Bernard. Complete coil for Hayden's 1-A Portable, wound on Quartzite, \$8.50.

If your dealer cannot supply you, write us.

BRUNO RADIO CORP.
 222 FULTON ST., NEW YORK

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 Paper Published by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y. Phones: Lackawanna 6976 and 2063

Vol. VII. No. 1. Whole No. 157

March 28, 1925

15c per copy, \$6.00 a year

A Portable That Works a Speaker on One Stage of Audio

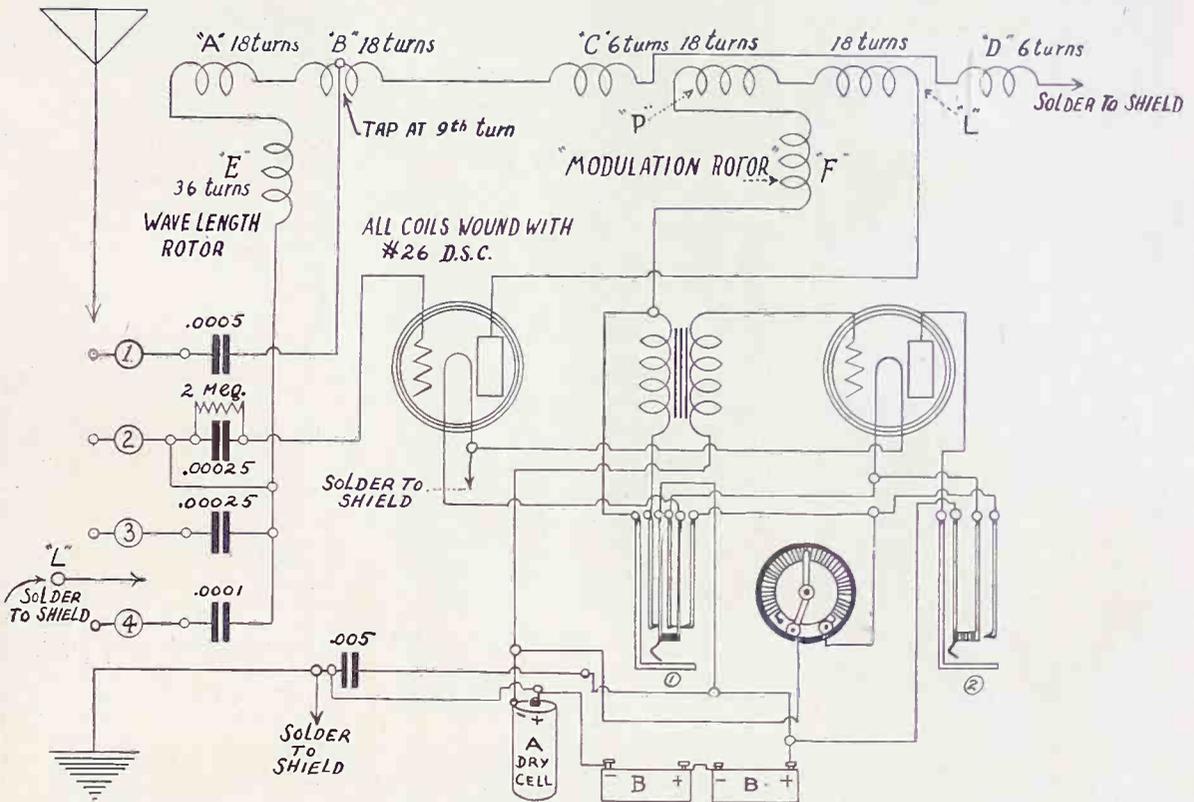


FIG. 1, the circuit diagram of the Model 1-A 1925 Portable, consisting of a regenerative detector, exclusively tuned by inductance, and a stage of transformer-coupled audio-frequency amplification. The tuning elements are in effect two variometers on three tubings, a common stator form and two rotors. The fixed condensers Nos. 1, 2, 3 and 4 are for accommodation to special aerial requirements, rendering all antennas serviceable with the set, with the possible exception of a loop. The detail of the condenser use is shown in Fig. 2.

[A circuit of amazing distance-getting power is the Model 1-A 1925 Portable, as described herewith by Herbert E. Hayden. This circuit is essentially the 1-Tube DX Dandy, as published in the October 4 issue of RADIO WORLD, with but one stage of transformer-coupled audio-frequency amplification added. So great is the volume from the detector stage of this great DX set that one audio stage was all-sufficient for loud-speaker volume from local stations when the set was used in New York City. The circuit is along the lines of the Radiola III, sold commercially by the Radio Corporation of America, and the results obtainable, as described by Mr. Hayden, are also those of the Radiola III.]

By Herbert E. Hayden
ILLUSTRATIONS BY THE AUTHOR

THE desire to receive signals from distant stations is growing, if anything. The ruling topics of conversation

among radio fans is the list of DX stations they received last night. "How many tubes?" the indulgent listening friend inevitably asks. "Two," is the reply of many fans. How is this wonderful array of distant stations receivable? It is due to the efficiency of the set, the employment of regeneration in its most effective form, and the use of inductance in tuning. Selectivity is at its height in this set, which I have called the Model 1-A 1925 Portable, and sensitivity is wonderful. When these two virtues are thus combined you have the distant-getting qualities that are so strongly appealing to a large number of fans. Even those who have no special taste for DX will find this circuit a wonder, indeed, for its tonal quality is sweet and pure. It is a set anybody can build and everybody will enjoy. The use of 1½-volt dry-cell tubes adds to the attraction of the set.

At my home in Brooklyn I regularly tune in Miami, Fla., also Zion City, Ill., two

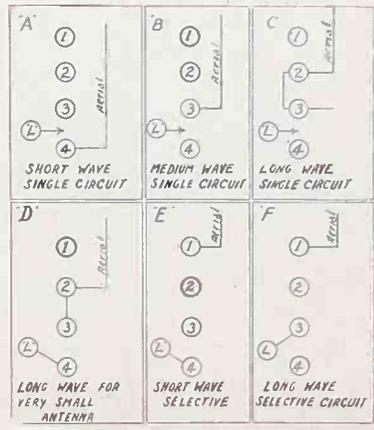


FIG. 2, detail of aerial connections to set.

The Operation of Hayden's Set

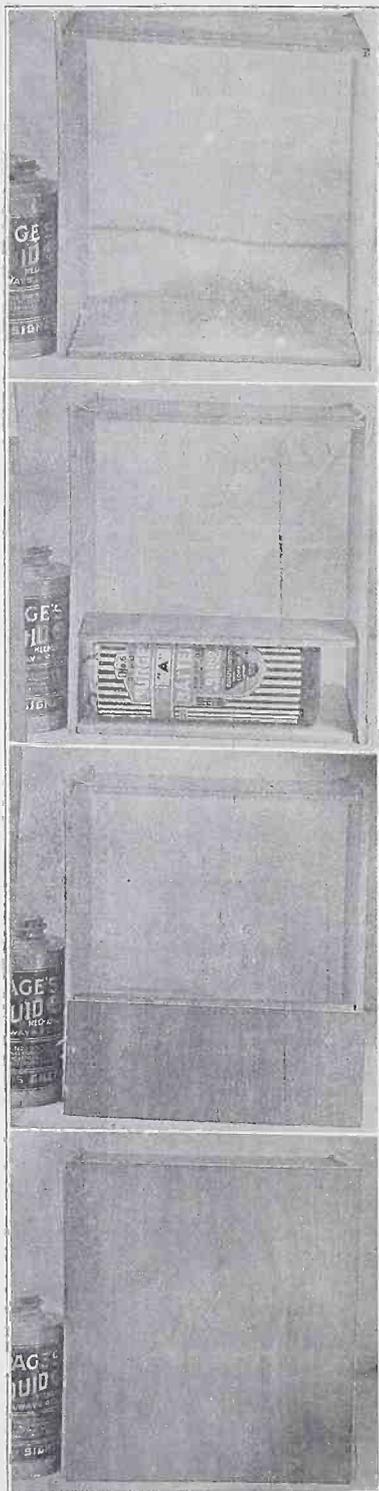


FIG. 3, gluing the boards together; Fig. 4, housing the dry cell; Fig. 5, attaching the bottom "frontpiece," and Fig. 6, the back board attached. The dimensions for the respective slabs are given in the text by Herbert E. Hayden. The photos read from top to bottom.

DX stations, by the way, that seem to favor Brooklyn. KDKA, Pittsburgh, comes in like a local and operates the speaker to the Queen's taste. I have had no trouble at all in tuning out local stations and

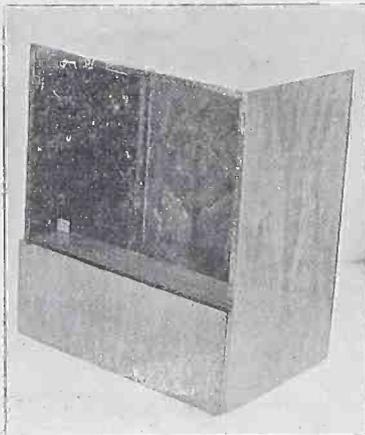


FIG. 7, showing cabinet before the front doors are placed. Note the right-angle to which the panel will be affixed. One such angle is at each rear corner of the slab atop the battery compartment and at a corresponding perpendicular point of the cabinet top, inside.

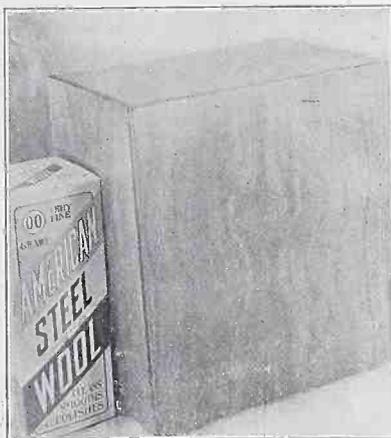


FIG. 8, the cabinet as it looks from the rear, before steel wool is rubbed over the surface. The rubbing process tends to give the wood a hand-somer finish and takes off the "rough spots" not so noticeable when the wood is in an unfinished state, but which would show up after the surface is treated with shellac.

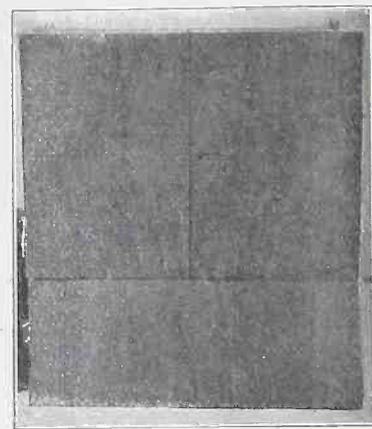


FIG. 9, the appearance of the cabinet, this time a front view, after the rubbing process has been completed and the wood has been given several coats of shellac. Allow one coat to dry thoroughly before applying the other. Note the darkened appearance.

aerial service was entirely satisfactory, while 60-foot outdoor aerial, with lead-in and ground leads 20 feet extra, total antenna system 80 feet, produced the DX performances that I have cited. Therefore, I recommend this set as the one for DX fans to build, especially those who may desire to take the set along with them on trips. The antenna in that case may be a wire strung on insulators between trees or other supports. The fixed condensers in the aerial circuit make the set adaptable to any antenna conditions, either at home or "on the road." Even a barbed wire fence proved good enough to bring in stations 500 miles away on a recent test I made on a week-end motor camping trip.

Condensers Aid Selectivity

The fixed condensers and the manner of their inclusion in the aerial circuit are important contributions to the selectivity of the set. In Fig 1 you will notice the four fixed condensers. No. 1 is .0005 mfd. capacity, Nos. 2 and 3 are .00025 mfd. each and No. 4 is .0001. The similarly numbered panel posts are used to cut in

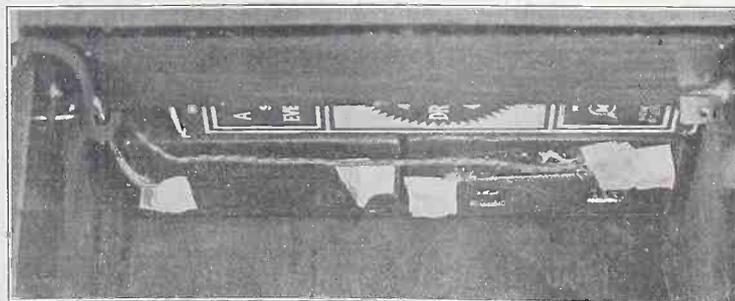


FIG. 10, how the batteries are placed in the cabinet. "The lid is off" the compartment in this instance. Note the dry cell in the foreground, right behind it the two B batteries, from which the spring part of the Fahnestock clips has been removed for space economy.

bringing in Chicago broadcasters when fancy impelled me to seek Chicago programs, while Denver, Toronto, Atlanta and other distant stations are regular "visitors." Some of the distant stations do not come in loud enough to operate a speaker, although all the locals do.

As for antenna requirements, they are almost the minimum. An indoor aerial may be used with complete satisfaction. An outdoor aerial will bring in a little more distance. Even on a 40-foot indoor

the desired condenser (Fig. 2). Often when the correct setting is established it will not have to be changed, but if a distant station isn't as clear as desired, try out different aerial switch settings and your problem will be solved at once. Notice that at one setting the aerial is connected directly to one side of the grid condenser, the other side of which goes to the grid of the detector tube. Across this grid condenser is the 2-megohm grid leak. When any of the condensers is cut

The Improved DX Dandy Set

in as shown in Fig. 2 the effect is to add capacity in series with the antenna, which cuts down the electrical length of the antenna, or cut in capacity in parallel, for higher wavelength, for utmost selectivity. When condenser No. 1 is cut in also some of the inductance in the aerial tuning coil is eliminated, serving further to cut down the wavelength. The added advantage of this system is the wide range of wavelengths that can be tuned in. The entire broadcast band is receivable with a certainty.

A Glimpse at the Coils

The tuning system, aside from the fixed aerial condensers, encompasses two variable coils or ticklers in inductive relationship to stators or fixed coils. The first stator, at left in Fig. 1, is split, consisting of the conductively coupled windings A and B. Another way of expressing it is to say that A and B are one winding in two separate parts. The winding E is a rotor, also conductively coupled to A and B. The shaft for E (wavelength control) is inserted through a shaft-hole bushing, the split stator windings being on either side of this shaft hole. The winding B is tapped at the middle (ninth turn), the tap being connected to one side of the .0005 fixed condenser, No. 1. The rest of the windings consist of two more stators, each divided as was the previous stator. The lead from the end of B is connected to one of the divisions of the stator winding, C, which is one-half of the stator CD. The only remaining stator is PL, connected to the plate of the detector tube at the end of L. This stator, at the beginning of P, connects to the rotor. Thus part of the plate inductance is the stator PL and part the tickler F. The circuit, therefore, is tuned by a double variometer, specially wound. No variable condensers are used in the set. There are really only two continuous windings, if one disregards the manner of physical separation. One is the wavelength and coupling winding EABCD, the other the plate winding FPL. The plate tickler is called the modulator. It controls regeneration, i. e., volume.

Operation Simplified

Filament-control jacks are used in this circuit so that the set is automatically turned on when the jack plug is inserted and turned off when the plug is pulled out. Either the detector output may be plugged in or the audio-amplified output. J1 is the detector jack, J2 the audio jack.

The panel is only 7½" wide x 5½" deep. Altogether the completed set is one of the most compact efficient circuits that can be built. The panel template is shown in Fig. 2, with drilling dimensions.

Making the Cabinet

Figs. 3 to 12 show the progressive construction of the case. Using ¼" wood cut the following sizes:

- Two 9½" x 5" (sides).
- Two 7½" x 5" (top and bottom).
- One 8" x 8½" (back cover).
- Two 4" x 6" (doors).
- One 7½" x 1¼" (strip inside front doors).
- One 31/16" x 8" board for bottom front.

That makes a total of nine pieces of wood to be used in the construction of the cabinet or case. Mahogany, walnut or any other wood, even pine, may be used.

Fig. 3 shows the sides and the top and bottom. First glue the sides to the bottom, as shown, then glue on the top. The 7½" x 1¼" inside piece is then glued on, leaving just enough space for the dry cell, which is laid horizontal (Fig. 4). Both WD11 type of tubes are to be operated

from this single 1½-volt dry cell, in the interests of portability. Room remains for the B batteries in the rear of the dry cell, as will be shown later.

Next attach the front lower section (Fig. 5). The rear cover is next attached (Fig. 6). The front doors are shaped to fit the remaining space (Fig. 7). Note the little brass angles screwed to the corners to hold the panel in place. The case is then sandpapered and polished with No. 00 steel wool (Fig. 8), after which several coats of shellac are applied. This gives a cabinet the appearance shown in Fig. 9. The B batteries are put in place, behind the dry cell (Fig. 10), the Fahnestock clip extensions being snipped off the B batteries, in the interest of space conservation.

How the Catch Works

One push-button catch is placed on each door (Fig. 11) so that the doors will stay closed, yet when it is desired to open them, may be pulled right out, the catch yielding to slight pressure. Fig. 12 shows more clearly where the brass angles are placed so as to support the panel which is yet to be affixed. The catches engage the board that is partly in view in Fig. 12, at inside of cabinet top. Fig. 13 discloses the completed cabinet, with a handle on top, four corner brackets for protection of the cabinet in transportation, and with a knob on each door plainly shown.

Next week panel and handle templates (exact size) will be published.

[This concludes Part I of Herbert E. Hayden's three-part article on how to build the Model 1-A 1925 Portable. Part II will be published next week, issue of April 4, and Part III, the conclusion, April 11.]

THE MODEL 1-A 1925 PORTABLE, by Herbert E. Hayden, a 2-Tube DX Set of Wonderful Volume and Tone, fully described in RADIO WORLD, issues of March 28, April 4 and 11. Send 30 cents, get the April 4 and 11 issues, telling all about the construction of the coils and the completion of this successor to Hayden's famous DX Dandy. RADIO WORLD, 1493 Broadway, New York City.

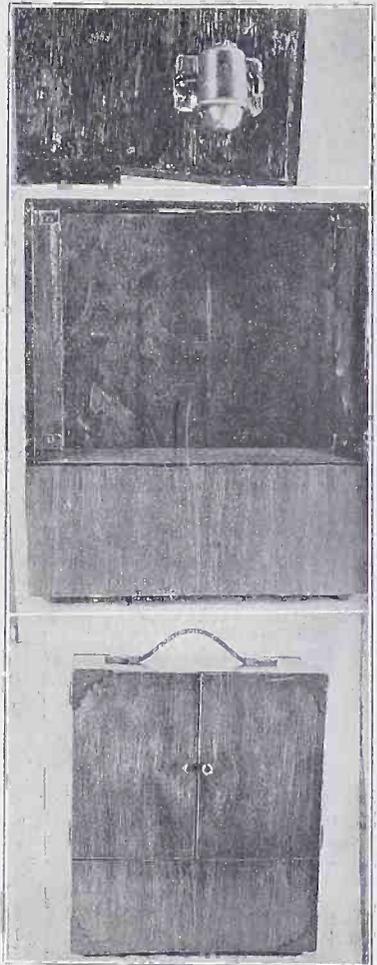


FIG. 11 (top), the catch used to hold each door in place; Fig. 12, the stage of the theatre of action with three of the four brass angles in view and one door hinge (right, upper); Fig. 13, the completed cabinet.

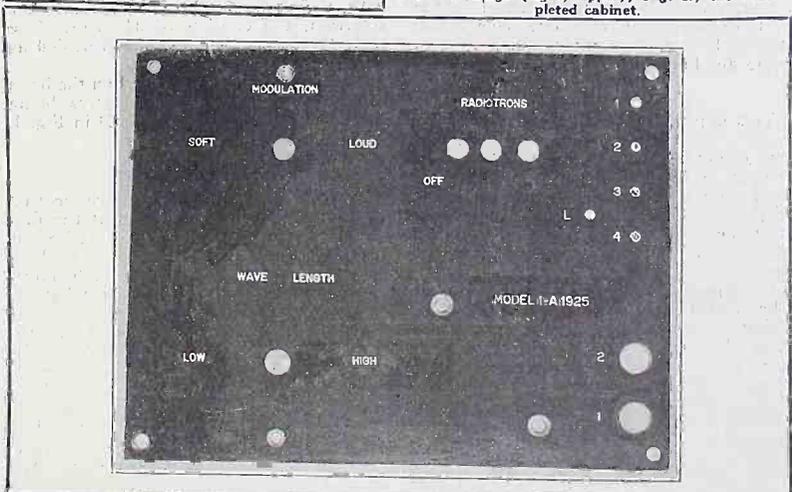


FIG. 14, the panel as it looks after drilling. The designations are optional. "Modulation" will appear above the plate tickler, "Wavelength" above

the aerial tuning coil rotor. The fixed condenser binding posts will be connected in their proper places, Nos. 1, 2, 3 and 4 (top, right). Nos. 1 and

TETRAZZINI ON AIR, HEARD BY 10,000,000

LONDON.

TETRAZZINI sang to her largest English audience when her voice was

broadcast from the London station. It is estimated that 10,000,000 persons listened to her in this country.

A 3-Tube Reflex for the Novice

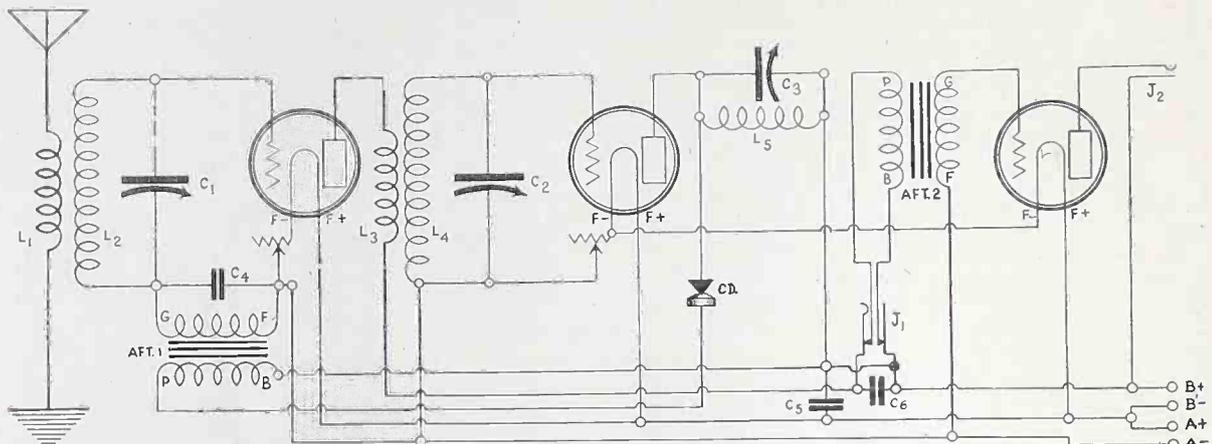


FIG. 1. Wiring diagram of a 3-Tube Reflex for the Novice. It consists of two stages of tuned radio-frequency amplification, crystal detector, one stage of audio reflexed in the first RF tube and a second stage of unreflexed audio. The set has three controls, all .0005 mfd. variable condensers. The rheostat at left controls the reflexed tube. The one at right, of half the value of the other rheostat, controls the remaining two tubes. The set will work well on the 11 and 12 type of tubes, fed by three parallel-connected No. 6 dry cells. The plate voltage should be about 90 for all tubes.

By Feodor Rofpatkin

THE natural desire of the radio experimenter is to improve what he has, to get a set better than the one he is using. The satisfaction of this normal desire is obtained, of course, by using more tubes. In the February 21 issue of RADIO WORLD was published "A 1-Tube Reflex for the Novice." Many readers who built this set with complete satisfaction expressed a desire to improve upon it, so that even greater distances could be received and a loud speaker used with fine volume. Therefore the circuit for accomplishing this is published (Fig. 1). It consists of two stages of tuned radio-frequency amplification, crystal detector, one audio stage (reflexed in the first radio stage) and one free audio stage. The transformer coupling type of audio amplification is used.



FEODOR ROFPATKIN

A Stable Reflex

This is probably one of the most stable reflexes that the novice could attempt. Its distance-getting qualities are due largely to the employment of regeneration, obtained by tuning the plate coil of the second RF tube (L_5) to resonance with the grid of that tube. The crystal detector that I used was the Freshman, and to the merit of the crystal I ascribe a large part of the success of the hookup. The crystal is of the semi-adjustable type. Being panel-mounted, this crystal affords easy adjustment, and once the correct setting is found it may remain there for days or weeks without change. It will be found that some kind of reception will be obtainable almost at any setting of the crystal, but the most sensitive spot will be found after a few minutes' experimenting. Then volume will be great and the signal quality of almost matchless excellence.

Coils for the Set

The coils for the set should be like those used in the 1-tube adaptation, since success was so great in that case. If a tubing is used, for instance cardboard, it should be 3" in diameter and 4" high for winding the two radio-frequency transformers,

L_{1L2} and L_{3L4} . The other coil, L_5 , is wound on the same diameter, but the tubing in this case need be only 3" high, as there is no primary to accommodate, this being the impedance plate coil. The RFT are wound with No. 22 double cotton covered wire. Pierce two holes near the top of the tubing, parallel to each other, and insert one end of the wire from the spool. Pull it through for 6" length, then lace the end through the remaining hole. These two holes serve as the anchorage for this terminal, the beginning of the primary. Twelve turns are wound in either direction, then 6" excess is left for later connection in the set, and the new wire terminal anchored. Cut the wire. Leave $\frac{1}{4}$ " space and puncture two more parallel holes. Then wind 42 turns of the same kind of wire in the same direction as previously, allow 6" excess, cut the wire and thread it as formerly through two holes.

When two coils are wound the same as described you will have completed L_{1L2} and L_{3L4} . The plate coil, L_5 , is wound with the same kind of wire, in either direction, and consists of 32 turns. The same "terminal facilities" are provided as heretofore.

The inductance is calculated on the basis of .0005 mfd. variable condensers being used. These are C_1 , C_2 and C_3 in Fig. 1. Normally they have 23 plates.

Optional Phone Jack

A double-circuit jack is shown, so that earphones may be plugged in at the first audio output, for those who desire the option of earphone use. They should insert a push-pull A battery switch, interrupting the lead that goes from A battery plus to the filament plus of the last tube, at extreme right in Fig. 1. Mount the switch on the panel. This switch enables you to extinguish the last tube when listening on the two others. If no earphone service is desired, omit the double-circuit jack, bringing the lead from the end of L_3 to the P post of the second audio transformer (AFT2) and connecting the B post of that AFT to B plus. Only one B plus voltage is necessary, normally 90. Remember that P1 and P, P2 and B, S1 and G, S2 and F (or A) are designations for the same posts on audio transformers.

The Crystal Hookup

One novel connection concerns the crystal. Note that one side of the crystal is connected to the plate of the second tube;

one terminal of the plate coil L_5 is also joined to the plate of this tube. The other side of the crystal goes to the P post of the first audio transformer, the other terminal of the primary of AFT1 going to B plus battery lead. This connection may be made to the B plus right angle of the double-circuit jack. The end of the plate coil also connects to this same lead. If more convenient, reverse the connections to the primary of AFT1.

The fixed condensers used are C_4 , .002; C_5 , .001; C_6 , .001. These may be Freshman or Dubilier.

Those desiring to use commercial coils may employ the .0005 type radio-frequency transformers (L_{1L2} and L_{3L4}) made by Wallace, Bruno, Eastern (pickle-bottle), Arc and others.

Correct Condenser Connections

In wiring the set connect the stators of the variable condensers to the grid ends of the respective coils L_2 and L_4 . These are shown on the upper part of the coil diagram in Fig. 1. The condenser rotors go to A battery minus. In the case of C_1 , the rotor goes to the G post of the AFT1 and reaches negative A through the audio transformer secondary.

The fixed condenser C_4 is mounted across this secondary, one side of the condenser to the G post, the other to the F post. Note that this connection to negative A is made to the battery lead, not to negative filament post. Thus the resistance of the rheostat is not included in the radio part of the circuit. The filament circuit can scarcely be rated as radio.

In the case of the plate condenser C_3 , connect the stator to the plate of the second RF tube, the rotor to B plus.

The panel layout and assembly plan are shown in Figs. 2 and 3. The panel is 7x21", as marked, and the dimensions for drilling are given, except for the mounting holes for the variable condensers, as these will depend on the type of condensers used. Only a single-circuit jack is shown in the assembly plan (under the crystal), as the double-circuit one is optional for earphone fans. The picture and schematic diagrams show both jacks. The crystal detector is at right, top, on panel.

Correct Polarities

In making coil connections see that the two terminals of the primaries and secondaries that are close together (the end of the primary and the beginning of the secondary) go to like potentials. That

Picture Diagram for Wiring Rofpatkin's Reflex

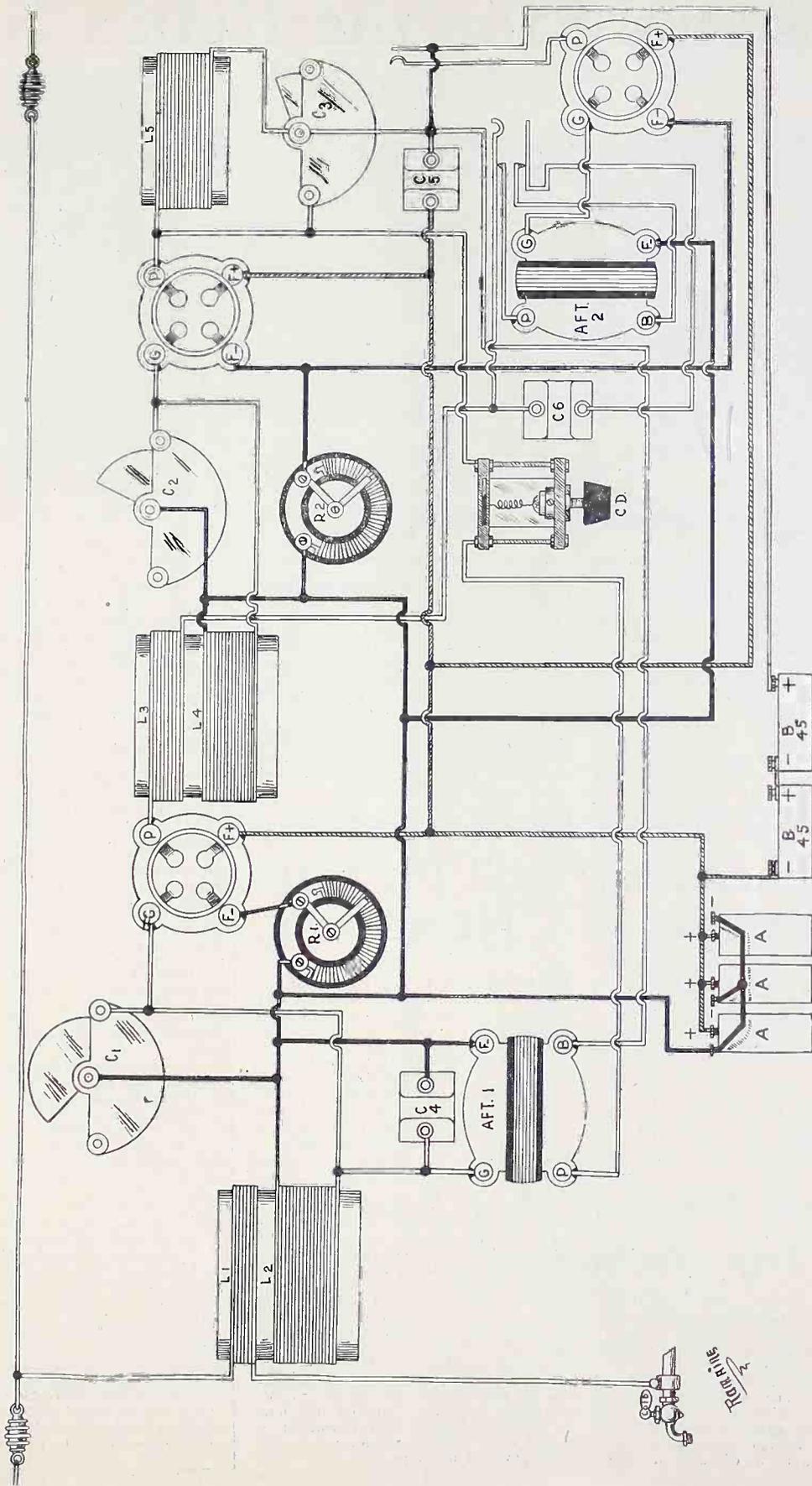
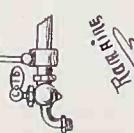


FIG. 4, the wiring of a 3-Tube Reflex for the Novice, shown in picture form. Note how the aerial coil is connected, the beginning of the primary to aerial, the end of the primary to ground. The beginning of the secondary goes to neg-

ative A battery and the other secondary terminal to grid. That keeps like potentials together, so far as possible. The plate of the second RF tube, from the end of L5, goes to B+ and may be connected to the jack at extreme right.



Assembly for the Reflex Set

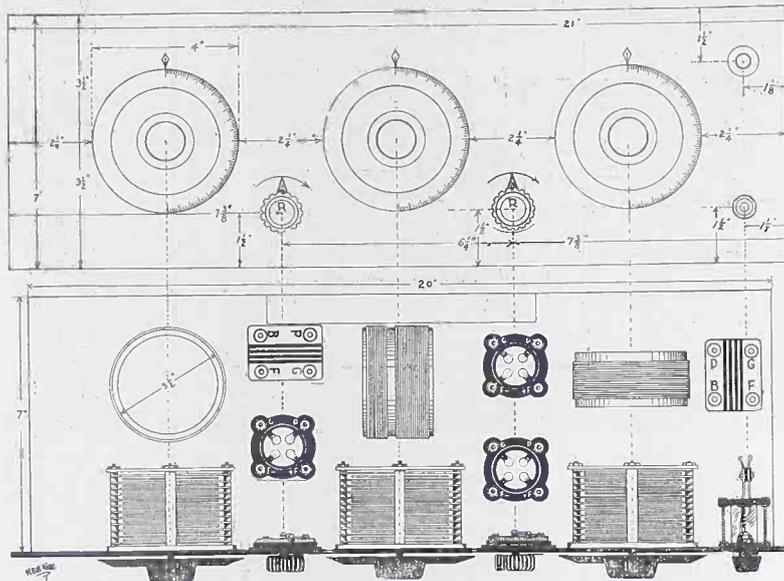


FIG. 2, the panel layout and assembly plan for Rofpatkin's 3-Tube Reflex for the Novice.

means that if the end of the primary goes to ground, the beginning of the secondary goes to negative A, and if the end of the primary goes to aerial, the beginning of the secondary goes to grid. Usually the top terminal of the primary is connected to the aerial, the end of the primary to ground, which means that the terminal next to the ground lead, that is, the beginning of the secondary, should go to negative A in this case. Some fans make the mistake of connecting the beginning of the secondary to the grid when the

beginning of the primary was connected to aerial.

The wiring is explicitly shown in picture form, Fig. 4, hence the novice should experience no trouble. One puzzler to some is the inclusion of the reflexed audio transformer in the circuit. Let us follow this wiring. One terminal of the coil L2 goes to the grid of the first RF tube, extreme left, Fig. 1. This lead also goes to the stator plates of the variable condenser C1. The other terminal of C1, i. e., rotor, goes to the remaining terminal of the Coil

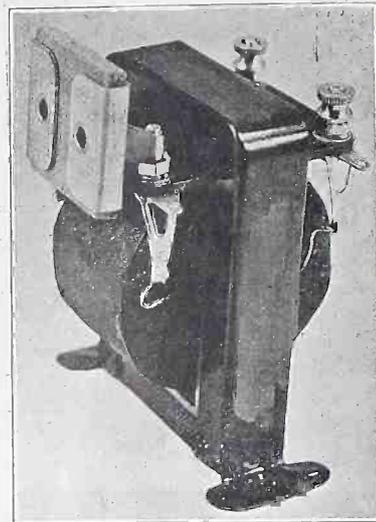


FIG. 5, showing fixed condenser C4 mounted on the secondary of AFT1.

L2, and also to the G post of the AFT1 and to one side of the fixed condenser C4. Make these connections before wiring the other terminals of AFT1. Now connect the F post of AFT1 to negative A battery and to one side of the rheostat of the first RF tube. The remaining unconnected side of C4, fixed condenser, goes to the F post of AFT1. One side of the crystal goes to the P post of AFT2, and the other primary terminal, B, goes to B plus and to one terminal of C3, which is also connected to the rotor plates of C3. Do not confuse P on the AFT with P on the socket.

The set will work best with storage battery tubes, but the 11 or 12 dry-cell tubes may be used very successfully, while the 99 type tubes also work well.

An outdoor aerial should be used for best results, the overall antenna system being from 80 to 100 feet. That includes the aerial proper and the other leads.

WEAF First in Adherence to Wave

WASHINGTON.

SIX broadcasting stations were found by the Bureau of Standards to maintain constant frequencies during the past month. Fans may use these stations to calibrate. The % variation is shown:

WEAF—New York, N. Y.	492	.0
WCAP—Washington, D. C.	469	.1
WRC—Washington, D. C.	469	.1
WSB—Atlanta, Ga.	428	.2
WGY—Schenectady, N. Y.	380	.1
WBZ—Springfield, Mass.	331	.1
KDKA—East Pittsburgh, Pa.	309	.1

Radio Patents Still First in Numbers

WASHINGTON.

EVER since radio first gave inventors something new to work with the lists of application for patents in the department of radiant energy and wave transmission of the Patent Office have grown tremendously. According to the Gazette just issued by the Patent Office the patents pending in this section number 2,247, more than in any other section. Despite the patents already granted there has been no noticeable falling off in the submission of new ideas.

French Plane Makes Bombing Trip, Nobody Aboard

PARIS.

WIRELESS controlled airplanes for flights of more than two kilometers will be held at Istres Military Airdrome this month.

The French Aviation Service expects to produce a machine capable of flying a given distance, releasing bombs and returning to the airdrome through radio control. The value of such machines in wartime, when flocks of small airplanes,

each weighted with giant bombs, might be dispatched to an enemy capital and sow death and destruction, even though many are lost through anti-aircraft gunnery, is incalculable.

Preliminary tests, with sealed controls and inspecting staff officers aboard, already have been held. One machine flew 200 kilometers and landed without a human hand touching the levers.

This evoked much praise.

List of Parts

- Two RF transformers, as described, L1L2 and L3L4.
- One plate coil, L5.
- Three .0005 mfd. variable condensers, normally 23 plates, C1, C2, C3.
- One Freshman crystal detector.
- One 7x21" panel.
- One 7x20" baseboard.
- Three 4" dials.
- Three dial pointers.
- Two audio-frequency transformers, AFT1 and AFT2. (If different ratios are used, place the higher ratio in the first stage.)
- Three fixed condensers, C4, .002 mfd.; C5 and C6, .001 each.
- Three standard sockets.
- Three 11 or 12 type tubes.
- One 6-ohm rheostat (first RF).
- One 3-ohm rheostat for the two other tubes, or another 6-ohm one will do.
- One double-circuit jack, J1 (optional).
- One single-circuit jack, J2.
- Aerial wire, leadin wire, internal connecting wire, three 1½-volt dry-cells, two 45-volt B batteries, three tubings, as described; ¼ lb. No. 22 DCC wire, hardware, cabinet.

The 1925 Model DX Wonder with Resistance AF

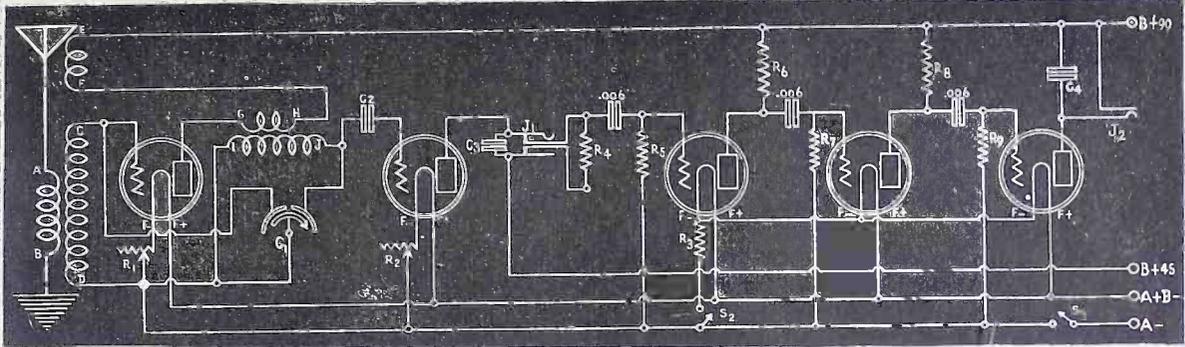


FIG. 1, circuit diagram of the 2-Control 1925 Model DX Wonder. Three stages of resistance-coupled audio-frequency amplification are used. The result is great DX with fine quality and volume.

By Herman Bernard

FOR combined distance-getting powers, quality and enjoyable volume the circuit shown in Fig. 1 offers no less than any other 5-tube circuit and much more than many of them. It includes all the radio-frequency amplification that it is safe to use, for to add another RF tube usually makes no improvement whatever and sometimes introduces sources of trouble. One of the distinguishing features of this 5-tube circuit, known as the 1925 Model DX Wonder, is its almost complete freedom from trouble, even when the set is built by a person who never before constructed one. Whereas this circuit formerly was shown with transformer-coupled audio-frequency amplification, this time it appears with resistance-coupled audio.



Why Resistance AF is Used

In this particular case the result is an improvement. Any signals intelligible in the earphones will be heard on the speaker. The detector output is very loud, anyway, hence you will always have as great volume as is necessary to fill a room, and the original purity of tone will be satisfactorily preserved. This form of audio amplification is sometimes called distortionless, but any consideration of distortion necessitates a common agreement as to the definition of the word. Actually, distortion is an alteration of the original emphasis of the harmonics. In general discussion distortion is regarded as such alteration of the original voice or music as to produce a noticeably harsh effect on the listener's ear. So that all persons would be of one mind as to the presence or absence of distortion, on that basis, their ears would have to be identically responsive, equally acute of hearing, and their musical discernment uniform. All these requirements constitute an absurdity. Therefore it is well to sum up with the statement that resistance-coupled AF produces no distortion that the normal ear can detect. Two transformer-coupled stages could produce almost equal quality, but, in my personal opinion, based on tests of 42 makes of transformers, about 15 per cent. of the transformers made are really good. With

resistances, leading firms make excellent and dependable ones. Two of these firms are Daven and Durham.

Radio in all its forms produces distortion, even the trusty crystal accounting for a trifle, and a modicum of distortion does not necessarily mean impairment of musical quality. When only a little is present the human ear cannot discover it, and radio is listened to by the human ear, and not by laboratory instruments.

Resistance-coupled audio requires three stages. The cost is about the same as for the usual two transformer-coupled stages, if cost of tubes is included. If the best audio transformers in two stages are compared with the resistance form in three, the cost of the resistance kind is about two-thirds of that of the other.

Circuit is Real Wonder

The circuit preceding the audio stages has done wonders, indeed. It is well tried and tested, hundreds of letters being on file proclaiming it to be the peak of excellence. It is selective, sensitive and powerful. Used with a good outdoor aerial, about 100 feet overall, including ground lead and leadin, its performance closely parallels that of the Super-Heterodyne when the 8-tube set is worked on a loop. However, nobody living within one mile of a powerful broadcast station should build the DX Wonder. The set for him is a Super-Heterodyne, using a loop. And even then no guarantees are given.

DX Results

With the 1925 Model DX Wonder, using all five tubes, WOC, Davenport, Ia.; WMBF, Miami, Fla., and several of the Chicago stations are received regularly in Brooklyn. KOA, Denver, is heard frequently, as are stations at Atlanta, Dallas, Zion City, and, infrequently, a Pacific Coast station, the coast-to-coast reception being muffled and distinguishable only on earphones in the audio output. The other stations were heard on the speaker.

There is a stage of regenerative radio-frequency amplification, a non-regenerative detector and the three audio stages. A double-circuit jack is provided, so that earphones may be used, the switch S2 cutting off the three audio tubes. The other switch, S1, turns the set on and off.

Only Two Controls Used

There are only two controls, the tickler or rotary coil of the variocoupler, designated EF in Fig. 1, and the variable condenser, C1. This condenser is of the multiple tuning type or double condenser. It has a common rotor and two separate stators. Each half of this instrument has

a capacity of .0005 mfd., the usual 22 or 23-plate condenser. By one motion two coils are tuned (CD and IJ), because the grids of the two tubes the coils are connected to go to respective stators of the condenser, the common grid return for both coils being to A battery minus. This negative lead goes to the common rotor of the condenser. The stators are shown on top in C1, Fig. 1, the rotor on bottom, designated by an arrow. The instrument used may be a Bruno No. 19, a Flewelling double condenser or a National Velvet Vernier, DX Model. If the National is used, only one extra vernier dial is needed.

Data on the Coils

The coils may be made by the home constructor or commercial types, specially suitable for this circuit, may be purchased. The following directions will serve those who already have forms of given diameters:

Using a 4" outside diameter tubing, 2" high, wind eight turns of No. 20 double cotton covered wire for the primary of the variocoupler, AB, terminate; then, leaving the least space possible, wind 31 turns of the same kind of wire in the same direction for the secondary CD. Terminate. The tickler EF should consist of 20 turns of No. 26 single silk covered wire on a 3" diameter, 2 1/4" high. This is wound in either direction: These directions are based on the assumption that an existing coupler is to be converted to the present use. Otherwise do not favor this large diameter. The RF transformer GHIJ consists of the same kind of windings as the primary of the coupler, except that the secondary, IJ, has one turn LESS, or 30 turns. This about makes up for the added capacity introduced by the plate of the RF tube.

If a 3" diameter tubing is handy, the coils may be wound with the same kind of wire heretofore specified, the turns being, primary 10 turns, secondary 40 turns. The tickler takes 30 turns of No. 26 single silk covered wire on a diameter that fits inside the stator, normally 2 1/4", the tubing being 2" high. The RFT windings are the same as those of the coupler stator, except for the one turn less on the secondary of the RFT.

Basket-weave coils may be used, but larger wire should be employed. Use No. 18 double cotton covered, winding 12 turns for primary, 50 turns for secondary, on a 3" mean diameter. Wind "over two, under two." The tickler may consist of a 26-turn spiderweb coil, made of No. 26 single silk wire, and small enough in outside diameter to fit inside the other wind-

5-Tube Set a Tone Marvel

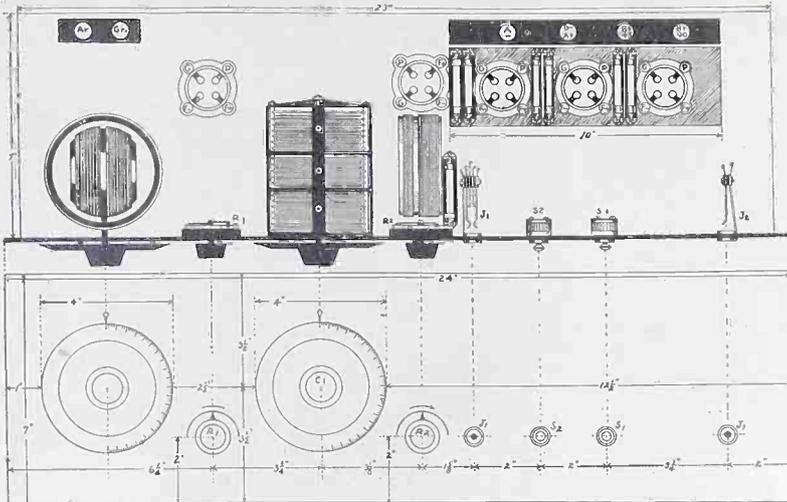


FIG. 2, panel layout; Fig. 3, assembly plan.

ings. Omit the usual one turn from the RFT secondary. Basket-weave coils using finer wire may be used successfully, but usually it requires factory facilities to produce a rigid coil with smaller-sized wire. The large wire is preferable for home constructors.

Those desiring to make their own coils according to windings based on the Bureau of Standards adaptation of formulas may use No. 20 double silk covered wire and a $3\frac{1}{2}$ " diameter tubing, even cardboard, winding ten turns for the primary and 41 turns for the secondary, except that IJ has 40 turns. The tickler prescribed for the 3" diameter may be used.

If commercial coils are to be used they may be the new Bruno 77 coupler and RFT, wound on quartzite rods, but be sure to get the .0005 type of each; Wallace basket-weave; Globe (broadcast type for both coils); Eastern pickle-bottle coils, or Arc.

Helps on Wiring

The circuit diagram, Fig. 1, does not show any grid leak in the detector tube hookup. None should be necessary. Also, the grid return of this tube is to negative battery, instead of to the usual positive. Both these facts are due to the use of the Sodian D21 as the detector tube.

The wiring of the radio-frequency side of the circuit is simple. The aerial is connected to the beginning of the primary, at point A; the ground to the end, at point B. The primary normally will be on top, as will the tickler. In that case the beginning of the primary is on top. If the coupler is mounted upside down, with primary on bottom, the beginning of the primary is nearer the baseboard. This would apply to the Wallace basket-weave coil particularly. The terminal of the secondary nearer the primary goes to negative A battery and to the rotor of the variable condenser C1. This is terminal

D. For simplicity of circuit diagram, Fig. 1 has the terminal D below that of terminal C, but schematic diagrams are not made so as to show polarities of coil terminal connections. The end of the secondary, point C, the only remaining unconnected lead on the coupler stator form, goes to the grid of the RF tube.

Tickler Connections

A good plan is to connect one end of the tickler, calling it E, to B plus 90 volts, and the other terminal of the tickler, point F, to one terminal of the RFT primary, say point H. The other end of the primary, G, is connected to the plate of the RF tube. Therefore when making the plate connections, join either terminal of the RFT primary to the plate, the other terminal of this primary to either terminal of the tickler and the remaining tickler terminal to the high-voltage B battery plus. E, F, G and H, therefore, are arbitrary designations of optional terminals.

Secondary Wiring

The remaining coil is the secondary of the RFT, lettered IJ, and in making the connections to the two terminals observe the following: As one side of the coil goes to one side of the grid condenser C2, make sure that this terminal is near the like potential terminal of the primary GH. This is easy to decide. Take the exterior terminal of the RFT primary (the left end of the primary as the coil is shown in Fig. 3 at top of this page). If that is connected to the RF tube plate, then the terminal of the secondary IJ that is nearer the primary winding goes to negative A battery. The low potentials (B+ and A-) are together. If the beginning or exterior terminal of the RFT primary goes to B plus, then the secondary terminal, the one nearer the primary, goes to the grid condenser. Like potentials are together (grid and plate) and both

List of Parts for the 1925 Model DX Wonder

- One certified coupler (ABCDEF).
- One certified matched radio-frequency transformer (GHIJ).
- One certified double condenser (C1).
- Five standard sockets.
- Four C301A or UV201A tubes.
- One D21 Sodian tube.
- One 10-ohm wire-wound rheostat (R1).
- One Bradleystat (R2).
- One D12 Amperite (R3).
- One .00025 mfd. fixed condenser (C2).
- Two .001 mfd. fixed by-pass condensers (C3, C4).
- One double-circuit jack (J1).
- One single-circuit jack (J2).
- Two 4" vernier dials.
- One 7x24" Radion panel.
- One 7x13" baseboard.
- Two $1\frac{1}{2}$ " diameter hard rubber bushings.
- One battery cable.
- Two push-pull battery switches (S1, S2).
- Two silver Eureka dial pointers.
- Resistance-coupled amplifier, three stages, composed of three sockets, three .006 mfd. fixed condensers and six fixed resistances as specified in text.
- One terminal block; aerial; 50 ft. No. 14 insulated leadin wire; ground clamp, lightning arrestor, storage A battery, B batteries, phones, speaker, wire for internal connections, screws, nuts, hardware.

are "high." The other secondary connection takes care of itself in either case. The terminal that goes to the grid condenser also goes to the remaining unconnected stator of the double condenser C1.

Mounting the RFT

As for mounting the RFT, I prefer to have its axis at right angles to that of the variable condenser, since the danger of intermingling fields is not quite so great between the variocoupler and the radio-frequency transformer as between the strong electro-static field of the proximate condenser and the magnetic field of the RFT, which is safely distant from the coupler.

Terminal Connections

The terminal block (binding post strip) may be mounted to the rear of the audio stages as a unit, or may be divided, so that the aerial-ground block makes a separate strip and shortens the leads. The remaining posts, at right, would be for battery connections. Use a battery cable in either case. If holes are drilled in cabinet, use $\frac{1}{2}$ " drill and insert bushings. If the aerial-ground strip is separate from the other, two holes will have to be drilled at the nearest points on the back of the cabinet to introduce the leads, one hole for the aerial and ground, the other for the battery cable. Otherwise only one hole is necessary. If B minus and A plus are joined at the batteries, one of the customary five battery cable leads may be ignored.

Fixed Condensers

C3 and C4 are by-pass condensers, C3 being highly advisable and C4 optional. The fixed condensers used to keep the plate voltage off the succeeding grids in
(Concluded on page 28)

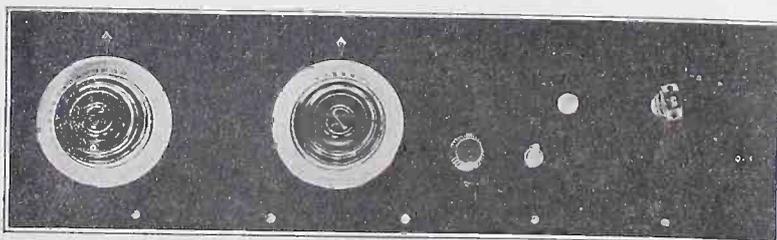


FIG. 4, showing how the panel looks when only one jack is employed. (RADIO WORLD Staff Photo).

BROADCAST PROGRAMS

(Wavelengths in meters; Eastern, Central, Mountain and Pacific Standard Time specified.)

Friday, March 27

WBAP, Fort Worth, Texas, 476 (C. S. T.)—12:05 to 12:30 P. M., "Frail Blazers," educational playing in their studio (W. E. B.) 4, educational lecture; weekly book review by Peter Molyneux; 7:30 to 8:30, Hood County Male Quartet of Granbury, Texas. (C. B. L.) 9:30 to 10:45, dance program by Fred Calhoun's orchestra. (The Hired Hand.)

WOS, Jefferson City, Mo., 440.9 (C. S. T.)—8 P. M., addresses: "Missionary Road Program," by B. H. Piepmeier, state highway engineer; "The Peculiarities of Handling Stock Hogs in Missouri," by Dr. Homer A. Wilson, state veterinarian; original poems by LeRoy H. Kelsey, secretary to Governor Sam A. Baker, called the "Edgar A. Guest of Missouri"; varied musical program by talent from Hannibal, Missouri.

WHO, Des Moines, 526 (C. S. T.)—7:30 P. M., Stewart Watson, American baritone, accomp. by Helen Birmingham; Sara Helen Eaton, violinist; Grace Haffner, accompanist; Emma Keller May, soprano; Dorothy Dyer Everett, accompanist; Williamson Brothers, mandolin, guitar and banjo artists.

WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., weather; news. 4:30, Sunshine Girl; markets. 6:30, dinner concert from William Penn hotel. 7:30, Uncle Kaybee. 8, police reports. 8:30, concert.

WEEL, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service. 1, society orch. 6:30, Big Brother. 7, 7.15, Eliot Daniel, pianist. 9, 9.15, program Whiting Milk Co.; 8, Neapolitan musical. 8:30, All Saints choir. 9:30, musicale.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio. 5:50, market, weather, time. 6, School of the Air; Tell-Me-A-Story Lady; Trioan Ensemble, Hotel Muehlebach. 11:45, nighthawk frolic, Plantation Players, Kansas City Club orch.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—10:45 A. M., weather and business reports. 11:55, time. 12:15 P. M., Ahaus Brunswick orch. 1:30, quotations.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—9 P. M., testimonial banquet to Samuel P. Leeds; speaker, Hon. George S. Silzer, governor of New Jersey. 11, Paul Whiteman's dance orch.

WEMC, Berrien Springs, Mich., 286 (E. S. T.)—9 P. M., Book talk by Mr. T. E. Unruh.

WJX Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, tonight's dinner, woman's editor. 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Stratler orch. 3, Detroit News orch. 3:50, weather. 3:55, market. 6, concert. 8, Detroit News orch. 9, Victor Recording orch.

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, stock and farm quotations. 10, wheat. 10:30, wheat and cable reports. 11, wheat, weather, dairy reports. 11:30, wheat, grain and livestock receipts. 11:55, wheat. 12, wheat, board of trade. 12:10 P. M., board of trade quotations, hog sales. 12:35, 1st Room orch. 1, wheat. 1:05, Tea Room orch. 1:35, readings. 1:40, Drake concert ensemble and Blackstone string quintet. 2:30, musical recital. 3, miscellaneous entertainment. 5, stock exchange and market. 5:30, Seckiz time for children. 5:57, time.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 to 5 P. M., Louisville Conservatory of Music; police bulletins; weather; readings; news. 4:55, livestock, produce and grain market reports. 5, time. 7:30 to 9, concert, Southern Baptist Theological Seminary and Training school; news; time at 9 o'clock.

WFAA, Dallas, Texas, 475.9 (C. S. T.)—12:30 P. M., Dr. Robert Stewart Hyer; Sunday school lesson. 4:30, woman's hour. 6:30, Paul Creten and his banjo quartet.

WOL, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., chimes; weather; markets; dairy production. 9:30, weather.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., home service talk, Betty Crocker. 6:30, Buffalo Trust hour. 8, "Physical Education of the Child," by Carl Burkhardt. 8:15, recital by Minnie Clemons Stem. 10, Larkin string orch.

WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M., Golden Pheasant orch. 8, Tadmor Shrine band; Mme. Yolanda Suarez, soloist; Tadmor male quartet.

WMAO, Chicago, Ill., 477.8 (C. S. T.)—12:25 P. M., Y. M. C. A. forum. 1, fashion, Jean Mowat. 4:30, Bush conservatory. 6, organ. 6:30, Hotel LaSalle orch. 8, Wide-Awake club. 8:30, musical geography. 9:15, musical program by Roy Long.

WEAO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.

WJZ, New York, N. Y., 455 (E. S. T.)—10 A. M., daily music, Mrs. Julian Heath. 10:20, "Books," Grace Isabel Colborn. 10:40, "Health and Beauty," Ruth Champenon. 10:40, arts and decorations. 10:50, Eleanor Gunn's fashion talk. 11, "Job for Daughter," Helen Hoerle. 12:15 P. M., music from Brick Church. 1, Hotel Ambassador Trio. 2:30, American Orch. 4, Dora

Herz, soprano. 4:30, Hotel Ambassador tea music. 5:30, agricultural reports; market quotations; news. 7, Friars Frolic. 7:10, Hotel Commodore concert. 8, journal review. 8:10, "Mans Place in Nature," Prof. Chas. L. Bristol. 8:40, Robert Juandt, violinist. 10, "Chimes Music," Harriette Cady. 10:30, Beaux Arts Orch.

WAW, Omaha, Neb., 500 (E. S. T.)—4 P. M., Seed & Nursery Co. program. 5:45, news. 6, story hour, by Doris Claire Conrad. 6:30, Muzzy's Orch. 7:15, sports, by Ivan L. Gaidis. 9, Union Pacific Railroad program; West Sisters' String Quartet; Hall Clovis, tenor; Hazel Smith Eldridge, mezzo-soprano; Mary Leonard Minger, soprano; "Yellowstone Park," Elmer S. T. 7 A. M.

WJW, New York, N. Y., 455 (E. S. T.)—7:30 P. M., Reunition Band. 8:15, "Work of the N. Y. Assembly," Julius S. Berg. 8:30, "New Discontents for Oil," by Glenn Frank. 9:30, Leon Carson, tenor. 10, Monte Carlo Virginia. 11, W.P. Philadelphia, Pa., 500 (E. S. T.)—7 A. M., exercise. 10, 10:15, Mrs. Anna B. Scott. 11, P. M., Gimlet Orch. 1:30, weather. 3, "Hints to Housewives," by Mrs. Anna B. Scott. 3:15, Blanche Haegle, soprano; Marion Gordon, soprano; Mildred Bruce, mezzo soprano. 4, "Health of Children," by Dr. Walter S. Cornell. 6, weather. 6:05, Harvey Marburger's Vaudeville Orch. 6:45, market reports. 7, Uncle Wip's bedtime story.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—10:45 A. M., weather, business reports. 11:55, time. 12:15 P. M., Ahaus Brunswick Orch. 1:30, business reports and quotations.

WCBS, New York, N. Y., 316 (E. S. T.)—10 A. M., Terese. 10:30, Lillian Price, Soprano. 10:40, Patricia Lee, modern marriage. 10:50, Lillian Price, soprano. 10:40, Mrs. Maybelle A. Burbridge, beauty talk. 10:50, Lillian Price, soprano. 1:30 P. M., scripture reading. 1:35, Jack Wheaton Orch. 3:20, interview with Adele Fletcher by Terese Nagel. 3:10, Ben Hyams, pianist. 3, interview with Mary McCormack. 3:30, Ben Hyams, pianist. 3:40, Dr. Alfred C. Robin, harmony and composition lessons. 3:50, Ben Hyams, pianist. 6, Uncle Geelce. 6:30, Larry Funk Orch. 7, Herman Bernard, "What's Your Radio Problem?" 7:10, Larry Funk Orch.

WFBH, New York, N. Y., 273 (E. S. T.)—2 P. M., University Brood orch. 3, Mrs. Owen Killare, Psychology of Personality. 4, Mrs. Lewis of Lena Coen. 4, Mother Stoner's Air Forum. 4:30, J. Scully's orch. 5:30, Doris Sheldon, contralto. Cameron Emalie piano. 5:45, Katharine Conolly, Irene DeFries, songs. 6, Melody Girls. 6:15, Huel Majestic String Ensemble. 6:25, Health talk. 6:30, Hotel Majestic String Ensemble. 11:30, Studio program. 12:30, Cotton Club.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—2 P. M., Music talk, "Health Hints," by Dr. C. W. Woodall. 6:30, Sunday School Lesson. 7, Albany Strand Theatre orch. 7:30, Health talk. 7:40, Remington Band; Elizabeth M. Daniels, soprano, soloist. 10:30, Remington Band.

WPC, Minneapolis, Minn., 417 (C. S. T.)—10:45 A. M., Betty Crocker, "The Day," 2 P. M., woman's hour. 4, Readers' Club. 5:30, children's hour. 6, sport talk. 6:15, St. Paul Hotel orch. 7:30, talk by John G. Ross. 7:45, health talk. 8, Bernard Street Choir. 9, "The F. & R. Family," 10, St. Paul Hotel orch.

WRC, Washington, D. C., 469 (E. S. T.)—4 P. M., fashion, Eleanor Gunn. 4:10, piano, Eleanor Glynn. 4:20, "Beauty and Personality," Elsie Pierce. 4:30, New Willard Hotel Trio. 6, children's hour, Peggy Albion.

WBZ, New England, 333.3 (E. S. T.)—11:55 A. M., time, weather market. 7 P. M., market. 7:05, bedtime story.

WEAF, New York, N. Y., 492 (E. S. T.)—11 A. M., Pan American trio. 4 P. M., Elizabeth Arden, beauty talk; Louise Andrus, soprano; children's stories, 6, music from Hotel Waldorf-Astoria; "Sir Hobgoblin Takes a Ride," Blanche Elizabeth Wade; Jocelyn Clarke, contralto; "The Happiness Candy Boys"; WEAF light opera quartette; Gladys Gavran orch.; Walter Haefliger, pianist. "Fresido," Lidio-Venice orch.

WQJ, Chicago, Ill., 448 (C. S. T.)—11 A. M., Fred Mann's menu. 3 P. M., Josephine Naylor, "Noah's Ark Party." Wynne Ferguson, "Bridge Lessons." Mrs. Harry T. Sanger, "Jasper National Park. 7, Rainbow Garden orch. Henrietta Nolan, violinist; Otis Pike Lester, soprano; Mary Thrash House, piano. 10, Rainbow Skylarks. Rogers Boys, West Brothers, steel guitar, Royal Male Quartette, Zeigler Sisters, Lauretta Giles, soprano; Nate Caldwell, monologues. 1 A. M., Hotsy Totsy Hour with Ralph Williams, and Little Skylarks.

WNYC, New York, N. Y., 526 (E. S. T.)—7:30 P. M., police alarms. 7:35, resume of Board of Estimate meeting. 8, Frank Mansfield, baritone. 8:30, Josef Wolman. 9, double male quartet; Hildegard Schisler, German airs; Max Montor, recitations. 10:10, "Vanity Fair," talk by Professor J. G. Carter. 10:30, police alarms; weather. 10:35, Ash's Canadian orch.

WHN, New York, N. Y., 360 (E. S. T.)—2:15 P. M., Richard B. Gilbert, Ruth Wimp, songs. 2:30, La Rogue orch. 3, Wilenski, pianist. 3:45, Larry Moon, Harold Flavin, piano. 3:55, Janesko Reo, violinist. 4:05, Jack Siegel, tenor. 4:15, Williams Radio trio. 4:30, Uncle Robert's chat to children. 5, Cole's Nelsonian orch. 6:30, violin, Olcott Vail; Stephen Balogh, pianist. 7, Richman entertainers, Eddie Elkins orch. 7:30, health talk by Dr. Landis. 7:35, Club Moritz review. 8:05, fashions, by Mme. Belle. 8:15, Estelle M. Cohen, songs. 8:50, Music Lovers Ass'n program. 9, "Amateur Photography." 9:10, Ruth Gallen, contralto. 9:20, Jimmy Flynn, tenor. 9:30, Crystal Palace orch. 10, White Way entertainers. 10:20, "Storage Batteries," by H. B. Shontz. 10:35, Roseland dance orch. 11:30, Club Alabam orch. 12, Parody Club revue and orch.

WOR, Newark, N. J., 405 (E. S. T.)—6:45 A. M., Bernarr MacFadden gym class. 2:30 P. M., contemporary chorus; "Women's Clubs," by Mrs.

W. H. Osborne. 3:15, Bell trio. 3:30, James Albert Wales, talk, "Flying Over Europe." 3:45, Bell trio. 6:15, Hotel Lorraine orch. 6:30, "Man in Moon" stories, by Josephine Lawrence and F. D. McNary. 7, Hotel Lorraine orch.

KHJ, Los Angeles, Cal., 485.2 (P. T.)—12:30 P. M., Piggly Wiggly Girls, Katharine Martin, soprano. 2:30, Russian Gypsies Trio, Grace Curry, harist. 4:30, Hickman's Concert Orch. 6:30, Prof. Walter Herzog, stores of American history; Richard Headrick, screen juvenile; bedtime story, Uncle John. 7:30, Gladys DeWitt, the Santa Fe Trail. 8, Hyatt program. 10, Hickman's Dance Orch.

KDW, Chicago, Ill., 536 (C. S. T.)—6:30 A. M., exercise. 9:30, markets. 11:35, table talk by Miss Anna J. Peterson. 6 P. M., news. 6:35, children's bedtime story. 7, Joska Delabary's orch. 7:10, Saunders Original Nighthawks. 7:20, Joska Delabary's orch. 9, midnight revue. 1 A. M., Innomia Club; Saunders Original Nighthawks orch.

KDKA, Pittsburgh, Pa., 328 (E. S. T.)—7 A. M., exercises. 8, exercises. 9:45, markets. 11:55, time. 12 M., markets, weather. 12:20 P. M., Sunday school lesson. 3:30, quotations. 6:15, Gaylord's orch. 7:15, markets. 7:30, radio rhymist. 7:45, interest, by Alexander Dunbar. 8:15, health talk. 8:30, concert. 9:55, time, weather.

KGW, Portland, Ore., 491.5 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., Rose City trio. 5, children's program. 6, concert. 7:15, market, weather and news, police reports. 8, lecture. 10:30, Hoot Owl.

KFNF, Sheuandah, Iowa, 266 (C. S. T.)—6:30 P. M., Radio & Electric Co., Bluckton, Iowa. 8:30, High School and Community Club, Elliot, Ia. 8:30, State College, W. M., 348.6 (E. M. T.)—7:30 P. M., Pupils Science Course, lesson No. 12, by Dr. D. S. Robbins; "Lincoln and Manzano National Forests," by Geo. H. Cook, Forest Service, U. S. D. A.; old time songs; music by children.

KOA, Denver, Col., 323 (Mt. T.)—12:20 to 12:50 P. M., rgan. 1, stock reports (2 o'clock quotations); livestock; fruit and vegetable report and weather. 3, matinee for housewives. 6, N. Y. stock reports; livestock; vegetable news. 6:40, book reports. 8, Knowledge program. 8, Schmitt Rialto orch. 8:10, studio concert, piano and violin solos; soprano and tenor solos; harp solos; a vocal duet and KOA orch. selections; Laddie Wood, 8 years old.

KTHS, Hot Springs, 374.8 (E. S. T.)—8:30 P. M., Little Rock artists. 9, Meyer Davis-New Arlington ensemble. 9:30, Little Rock artists.

KNX, Los Angeles, Cal., 337 (P. S. T.)—11:30 A. M., Estelle Linday's talk. 6:15 P. M., dinner hour. 7:30, Eastern Outfitting Co. program. 8, West Coast Theatres. 9, KNX features. 11, Coconut Grove orch. 12, Wurlitzer organ concert.

KFOA, Seattle, Wash., 455 (P. T.)—12:30 P. M., Seattle Chamber of Commerce. 4, Olympic Hotel Concert orch. 6:45, Sherman, Clay and Co. 8:15, weather. 8:30, Times program. 10, Eddie Harkness orch.

KPO, San Francisco, 423 (P. S. T.)—7 A. M., "Daily Dozen" by Bernard Drury, piano accompanist; interview by Mel Lyons, 10 chat or the housewives on "Home Making" by "Frustrance Penny" of the San Francisco Examiner. 10:30, "Ve Towne Crier" News bulletins. 10:40, "What is playing at the Local Theatres." 11:50, market report on eggs, butter, cheese and poultry. 12 noon, time signals from the Naval Observatory; reading of the scripture. 12:45 P. M., talks broadcast from the Commonwealth Club luncheon at the Palace Hotel. 1 to 2, Seiger's orch. 4:30 to 5:30, Seiger's orch. 10 orch., With Gundersen director.

KFAE, Pullman, Wash., 348.6 (P. S. T.)—8 P. M., Founder's Day, (all W. S. C. Alphas will be listening in), music by Men's and Women's Glee Clubs; string trio, violin, cello and piano, addresses by the four men of longest service on the faculty: Ex-President E. A. Bryan of the economics department, Vice-President O. L. Waller of the college of engineering, Dr. Solon Shedd of the geology department, and Dr. Sofus B. Nelson of the agricultural extension division.

KFI, Los Angeles, Cal., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiatorial period. 7, Examiner program. 8, pine organ. 9, Herald program. 10, Myra Belle Vickers and her artist pupils.

CKAC, Montreal, Can., 411 (E. S. T.)—1:45 P. M., Windsor Hotel luncheon trio. 4, weather and stock reports. 4:30, 110 lessons.

Saturday, March 28

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's radio orch. 5:50, market, weather, time. 6, School of the Air. 11:45, nighthawk frolic.

WBBR, Staten Island, N. Y., 272 (E. S. T.)—8 P. M., Dr. Hans Haug, violinist. 8:15, Bible questions and answers. 8:45, Dr. Hans Haug.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, tonight's dinner, woman's editor. 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 12:05, Hotel Stratler orch. 3, Detroit News orch. 3:50, weather. 3:55, markets.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—9 P. M., Hotel Traymore orch. 10, Paul Whiteman's Dance orch.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises. 10:45, weather and business reports. 11:55, time. 1:30 P. M., market quotations. 3, Marco Melody Boys, 6, concert.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—8:15 P. M., United States Marine band. 9:30, Phil Romano's orch.

WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 2:30, tea-dansant music

zither solos, Fred Gloy; Elizabeth Van Etten, mezzo-soprano, 10, Halstead's orch. and soloists.
KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, mezz. radiatorial. 7, Hills Bros. orch.; Betty Patrick; Hills Bros. quartet. 8, Los Angeles Examiner program. 9, Paul Reese. Oriental music. 10, Packard melody girls; Bess Rudisell and Rhue Gill; Merrill La Fontaine; The Varsity trio; Howard Coy; The Carlson Sisters.

KNX, Hollywood, Calif., 337 (P. S. T.)—6:15 P. M., Durant program. 7:30, styles, by Myer Siegel. 7:45, health by Dr. Robert T. Williams. 8, Peetles program. 10, Cocoonat Grove orch.
KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., exercises. 10, "Home Making," by Prudence Penny. 10:30, local theatres. 10:40, "Ye Towne Cryer," 11:50, market. 12 M., time; Scripture. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 6:20, garden hints. 6:30, local theatres. 7, Fairmont Hotel orch. 8, San Francisco conservatory of music. 10, Rose Room Bowl orch.

CNRA, Moncton, N. B., 313 (E. S. T.)—7:30 P. M., vocal and instrumental numbers. 8:30, artists from Bridgewater, N. S.
CNRR, Regina, Sask., 420 (E. S. T.)—8 P. M., bedtime tale: Frank Salk, tenor soloist.

Wednesday, April 1

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezix time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.
WEAO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.

WHO, Des Moines, Iowa, 526 (C. S. T.)—6:30 P. M., Reese-Hughes orch. 7:30, program of Grace Clark De Graff; Miss Kathryn Mason, pianist. 9, Des Moines Theatre symphonic orch. 9:45, Bankers life radio orch.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from the Louisville conservatory of music; Alamo Theatre organ; police bulletins; weather; readings; 4:55, market reports. 5, time. 5:30, Tropical Hawaiian sextette; "Billy and Jane" stories. James Speed. 8:30, concert of the Central Furniture Co. time.

WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 4:30, market; Uncle Kaybee. 6:30, concert from the William Penn Hotel. 7:30, The Sunshine Girl. 7:45, police reports. 8:30, Schubert male quartet; Schubert instrumental trio. 10:30, Nixon restaurant orch.

WEEL, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service; Avon orch. 6:30, Big Brother Club. Old-Time's Night. 7:15, U. S. Army band. 8, Traveler Shoe orch. 8:30, musicale. 9, Gillette orch.

WOAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's Radio Trio. 5:50, marketgram, weather, time. 6, School of the Air; piano tuning; Tell-Me-a-Story Lady; Trianon Ensemble. 8, Star's Radio orch. 11:45, "Merry Old Chief" Plantation Players.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises. 10:45, weather. 11:55, time. 12:15 P. M., piano, Irene Downing, Marjory Hebestreit. 1:30, business reports. 3, markets. 4, Dinning Benevolent musical service; Lillian Aldrich Thayer; settem. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

WFAA, Dallas, Texas, 475.9 (C. S. T.)—12:30 P. M., Alex Hughes, pianist.
WGB, Staten Island, N. Y., 348.6 (S. M. T.)—7:30 P. M., international code course.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "to-night's dinner." 9:45, public health service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News orch. 3:50, weather. 3:55, market reports. 6, concert. 8, Detroit News orch.; Annie Campbell, Detroit News orch.; Templeton Moore, 10, Jean Goldkette's Victor recording orch.

WFBH, New York, N. Y., 273 (E. S. T.)—2 P. M., Eddie Meyers' choir, 3, songs. 3:30, Daisy Synder, soprano. 4, services. Rev. I. A. Weyl. 4:30, Jack Niles, songs. 5, Green's Entertainers. 6, Hotel Maestric string ensemble. 6:25, health calls. 6:40, Hotel Maestric string ensemble. 7, Parody Club. 7:30, studio program. 11:30, Garden City Novelty orch. 12:30, Cotton Club.

WOL, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes; weather; markets. 9:30, weather.

WBAP, Fort Worth, Texas, 475.9 (C. S. T.)—12:05 P. M., music. 7:30, Panther Hawaiian trio. 9:30, Johnny Jackson's Texas Hotel orch. Midnight. Moore's. 11, Gold Serenade.
WKAQ, Porto Rico, 340.7 (P. R. T.)—8 P. M., municipal band of San Juan.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—1 P. M., luncheon of Association of Commerce. 4, child life stories. 4:30, pupils of McLean school. 6, organ. 6:30, Miss Georgene Faulkner, the Story Lady. 8, Northwestern university lecture. 8:25, piano by Carolyn Willard. 9, WMAQ Players.
WMH, Cincinnati, Ohio, 325.9 (C. S. T.)—8 P. M., soprano, Miss Lawrence Sims; Ernest C. Daulton, accomp.; Walter Heerman, mezzo-soprano; Carlo Merandolo, violin; Renato Mastrapaolo, cello; John Quincy, bass piano; piano, Mrs.

J. P. Broyles; songs, Ranger Five male quartet; piano, Ernest C. Daulton; baritone, Ralph Wither-WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., home service talk by Betty Crocker. 6:30 P. M., Philharmonia orchestra, Lester Erlenbach. 8, piano, Selma Bowman Witherby, accomp.

KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., exercises. 10:30, "Ye Towne Cryer," 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 7, Seiger's Fairmont Hotel orch. 7:30, Conn Band Instrument Co. program. 8, program by Atwater Kent artists. 9, piano, J. Winifred Curry; harmonica, Lee Roy Shepherd; contralto, Francis Levey; Home Town Syncretists.

KGO, Oakland, Cal., 361 (P. S. T.)—11:30 A. M., concert. 1:30 P. M., stock reports and weather. 3, music. 4, concert orch. of the Hotel St. Francis. 6:45, stock reports, weather and news.

KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiatorial. 7, Nick Harris, detective stories. 7:30, Goodwin, Klinger, MacKay program. 8, Herald program. 9, Examiner program. 10, Patrick-Marsh orch.

KKX, Chicago, Ill., 327 (P. S. T.)—6:15 P. M., diener hour program. 7, Ambassador concert orch. 8, KKX feature program. 10, Hollywoodland dance orch.

KTHS, Hot Springs, Ark., 374.8 (E. S. T.)—8:30 P. M., piano. Phil Wall. 9, Arlington Hotel orch. 10, Charles L. Fischer orch.

KFOA, Seattle, Wash., 454.3 (P. S. T.)—8:30 P. M., Times studio program.

KOA, Denver, Colo., 323 (M. S. T.)—12:20 P. M., Rialto organ. 1, quotations; weather. 6, stocks; news. 8, Rialto theatre orch. 8:10, vocal solos, KOA orch.; readings; talk on "Success"; violin solos. 10, Rainbow-Lane orch.

KFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30 P. M., Colfax orch.; soprano, Mrs. Wm. Cole; whistling, Juanita Morley; piano duo, Maxine and Juanita Morley; reading, Hele LaFollette; fiddling, Dr. E. L. Layton; bass; L. L. Osterhout; steel guitar, reading, Virgil Canutt; Mrs. W. P. Scarth, lyrics; piano, Earl Blew; resources of Whitman County, D. Millgard; orch.
PWX, Havana, Cuba, 400 (E. S. T.)—8:30 P. M., Municipal band.

Thursday, April 2

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezix time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.
WEAO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.

WHO, Des Moines, Iowa, 526 (C. S. T.)—7:30 P. M., Grinnell Women's Glee club. 11, Rubinson orch.

WBBR, Staten Island, N. Y., 272.6 (E. S. T.)—8 P. M., Mr. Frank Wood, fustist. 8:10, Herald male quartet. 8:20, Sunday school lesson. 8:40, Herald male quartet. 8:50, Mr. Frank Wood, fustist.

WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 4:30, market; The Sunshine Girl. 6:30, concert from the William Penn Hotel. 7:30, Uncle Kaybee. 7:45, police reports. 8, Moores radio review. 9, Atwater Kent radio artists.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from the Louisville conservatory; organ; police bulletins; weather; news. 4:55, market reports. 5, time. 7:30, Louisville conservatory of music; digest of Sunday school lesson; four-minute welfare talk; time.

WMAK, Lockport, N. Y., 265.5 (E. S. T.)—12 Midnight, Midnight Serenaders.

WCBD, Zion, Ill., 344.6 (C. S. T.)—8 P. M., saxophone quintet; Zion junior choir and soloists.

WEAO, Columbus, Ohio, 293.9 (C. S. T.)—8 P. M., Indian music, University Women's club.

WOL, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., chimes, weather, markets, Doctor H. E. Bemis, "Horses." 8:15, musical. 9:30, weather.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises. 10:45, weather, business reports. 11:55, 12:15 P. M., Mu Phi Epsilon Sorority; Dr. Carl A. Wilzbach, "Health." 1:30, business reports. 3, markets. 4, piano, Adelaide Anfel; French lessons by Madame Ida Timpidias. 6, State memory contest. 6:45, Secretary Hawkins; markets. 10, three minute message U. S. Civil Service Dept. 10:03, Cooper concert orch. male quartet; Senator Schultz. "Judge Yeatman's Court"; Dorothy Melody Boys; piano, accordion, Larry Grueter.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News. 3:50, weather. 3:55, markets. 6, concert. 8, concert.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—9 P. M., Penelle Sogn, pianist; Lillian Stratmoen, soprano; Lutz Theyssoon, mezzo-soprano; Siene Anderson, pianist; Kenzie Kildahl, base; WCAL mixed quartette; WCAL orch.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program. 5:45, news. 6,

child's story hour, by Grace Sorenson. 6:45, Fontenelle orch. 9, anniversary program.

WFAA, Dallas, Texas, 475.9 (C. S. T.)—12:30 P. M., DeWitt McMurray's philosophic dissertations; music. 6:30, Lone Star Five's orch. 8:30, Chamber of Commerce, Palestine, Tex. 11, Pete Pate and Bud Morgan, humor and music.

WDAF, Kansas City, Kan., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio. 5:50, marketgram, weather, time. 6, School of the Air; book talk by Louis Mecker; Tell-Me-a-Story Lady; Trianon Ensemble. 11:45, "Merry Old Chief"; plantation Players; Kansas City Club orch.

WEEL, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service. 1, Boston Chamber of Commerce luncheon. 3:15, Noah's Arkadians. 6:30, Big Brother Club, Dramatic Club. 7:15, Sager orch. 8, musicale. 9, Atwater-Kent musicale. 10, Silvertown Cord orch.

WBAP, Fort Worth, Texas, 475.9 (C. S. T.)—12:05 P. M., music. 7:30, artists of Texas Christian University. 9:30, Mrs. T. A. Couglin program.

WKAQ, Porto Rico, 340.7 (P. R. T.)—8:30 P. M., "WMACTera" concert.

WMACTera, Chicago, Ill., 447.5 (C. S. T.)—4 P. M., household hour. Mrs. Elizabeth O. Hiller. 4:30, Illinois Federation of Women's Clubs. 6, organ. 6:25, Hotel LaSalle orch. 6:50, "Daddy," 8, garden talk, James H. Burdett. 8:15, Boy Scout program. 8:50, University of Chicago lecture. 9:15, Ravenswood Methodist Church.

WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M., Hallpry string trio. 9, Atwater Kent program. 10, Silvertown Cord orch.

WVMA, Cincinnati, Ohio, 325.9 (C. S. T.)—8 P. M., piano, Clarence R. Reeves. 9, Rainbow orch.

KTHS, Hot Springs, Ark., 374.8 (E. S. T.)—12:30 P. M., concert, markets, weather. 8:30, Eastman Hotel orch. 9:45, Elliott orch. 12:15, Phil Baxter orch.

KOA, Denver, Colo., 323 (M. S. T.)—12:20 P. M., Rialto organ. 1, stocks, weather. 3, matinee. 6, stocks, news.

KFMQ, Fayetteville, Ark., 299.8 (E. S. T.)—7:30 P. M., "Cedars or Apples." H. R. Rosen; "The Riches in Our Attics," W. B. Hesselting; "Wood Using Industries of Arkansas," J. T. Buchholz.

KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., "Daily Dozen." 10:30, "Ye Towne Cryer." 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 6:30, local theatres. 7, Fairmont Hotel orch. 8, Theodore J. Irwin, organist; Charles J. Lamp, tenor. 9, W. W. Wright. 10, Rose Room Bowl orch.

KGO, Oakland, Calif., 361 (P. S. T.)—10:40 A. M., classroom instruction. 11:30, concert. 1:30, stock reports and weather. 4, orch. of Hotel St. Francis. 6:45, stock reports; weather; news items; 7:15, golf lesson, Joe Novak. 8, "Smilin' Thru" by the KGO Players. 10, Henry Halstead's orch.

KNX

JOIN THE A. B. C.

A. B. C. stands for the American Broadcast Club. Join it today. It involves no dues or payment of any kind, and no obligations. It was founded by Radio World simply to unite the broadcast listeners and radio fans in general in a common bond to promote their welfare as occasion requires. Send your name and address to A. B. C. Editor, Radio World, 1493 Broadway, New York City.

A. B. C. Editor, Radio World, 1493 Broadway, New York City.

Please enroll me as a member of the American Broadcast Club.
 Name
 Address
 City or Town
 State

weather, time. 6 School of the Air piano tuning)
 Tell-Me-a-Story Lark; Triphon Ensemble 11:45
 "Merry Old Chiel," Plantation Players
 WLW, Cincinnati, Ohio, 63 (C. S. T.)—10:45
 A. M. weather, business reports 11:55, time
 12:15 P. M. Abana Brunswick orch. 1:30, business
 reports, 2:45, markets
 WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M.,
 weather, 12:30 P. M. chimes, weather, markets,
 Doctor H. E. Bemis, "Hortus," 9:30, weather.
 WWJ, Detroit, Mich., 327 (E. S. T.)—A. M.,
 exercises, 9:30, "Tonight's Dinner," 9:45, Public
 Health Service, 10:25, weather, 11:55, time, 12:05
 P. M. Hotel Statler orch. 3, Detroit News orch.
 3:50, weather, 3:55, markets, concert, 6:30,
 Cleo Club; W. of Mich. 9, Victor Record-
 ing orch.
 WEEI, Boston, Mass., 303 (E. S. T.)—11:15
 P. M. Lenten service, 2 musicals, 6:30, 11-13
 Brother Club, Hammond, symphonists, 7:15,
 Wm. F. Sharp, pianist, 7:30, Whiting Milk Co.
 program, 8, Neapolitan Male quartet, 8:30,
 Luther A. Brock interviewed, 9, Hop News,
 8:30, Wm. F. Sharp, pianist, 9, choir of Triniton
 St. Baptist church, Lewis Vay, organist.
 WFAA, Dallas, Tex., 475 (C. S. T.)—12:30
 P. M., Dr. Robert Stewart Hyer, Sunday school
 lesson, 4:30, woman's hour, 6:30, Honey Boys
 orch. 8:30, Mrs. Albert Seales and assisting
 musicians.
 WCAL, Northfield, Minn., 336 (C. S. T.)—
 9:45 A. M., College chapel services, 9:30 P. M.,
 book talk, Dr. George W. Spohn.
 WDAF, Kansas City, Kan., 386 (C. S. T.)—
 3:30 P. M., Star's radio orch. 3:50, marketgram,
 weather, time, 6 School of the Air piano tuning-
 ing; Roger W. Babson; Tell-Me-a-Story Lady;
 Triphon ensemble, 11:45, "Merry Old Chiel,"
 Plantation Players; Kuhn's orch.; J. Campbell's
 orch.
 WCAL, Northfield, Minn., 336 (C. S. T.)—
 9:45 A. M., College chapel services, 12 M.
 music.
 WFAA, Dallas, Tex., 475 (C. S. T.)—12:30
 P. M., Cornfield Symphony orch. & music,
 3:30, Forest Avenue band, 11, Adolphus Hotel
 orch.
 WOAW, Omaha, Neb., 528 (C. S. T.)—10:30
 P. M., horticultural program, 5:45, news &
 dramatic hour, 6:45, Robinson orch. 7:30, weekly
 address, Omaha Chamber of Commerce, 9,
 Omaha Printing Co. program, 11, Nightingale
 orch. 11:30, Arthur Hay, organist.
 WWJ, Detroit, Mich., 327 (E. S. T.)—A. M.,
 exercises, 9:30, "Tonight's Dinner," 9:45, Public
 Health Service, 10:25, weather, 11:55, time,
 12:05 P. M., Hotel Statler orch. 3, Detroit News
 orch. 3:50, weather, 3:55, markets.
 WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M.,
 weather, 12:30 P. M., chimes, weather, markets,
 Doctor K. W. Stouder, "Pig Diseases," 9:30,
 weather.
 WBAP, Fort Worth, Tex., 475 (C. S. T.)—
 12:05 P. M., Ward's "Trail Blazers," 4, book re-
 view by Peter Molyneux, 7:30, Hi-Y Club of
 Fort Worth orch. quartet, 9:30, Negro quartet.
 WMAQ, Chicago, Ill., 475 (C. S. T.)—12:45
 P. M., Y. M. C. A. forum, 4, fashions, by Jean
 Morat, 4:30, pupils of Bush conservatory, 6,
 organ, 6:30, Hotel LaSalle orch. 6:50, Family
 Affair League, 8, Wide-Awake club, 8:30, musical
 Geography, 9, Christian Endeavor topics, 9:15,
 George Simons, tenor; Miss Lucille Pentecost,
 pianist.
 WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M.,
 home service talk by Betty Crocker, 6:30 P. M.,
 Buffalo Trust hour, 8:45, "Cut Flowers," by
 Harold B. Brookins, 9, Buffalo Ass'n for the Blind
 program, 10, Larkin string orch.
 WMH, Cincinnati, Ohio, 325 (C. S. T.)—
 10:45 P. M., Hotel Alms orch. 10:30, Ed. H. Shoel-
 ver, songs; Angela Devoto; Eugene Perazzo, so-
 pianist; songs; Gay Anderson, Ed. H. Schoel-
 ver, accompanist, 11:15, Hotel Alms orch.
 WGBS, New York City, 178 (E. S. T.)—4:15
 P. M., Herman Bernard, managing editor, RADIO
 WORLD, "Radio Hookups," Mr. Bernard is on
 the air every Friday at this station at 6:15 P. M.
 KGO, Oakland, Calif., 361 (P. S. T.)—11:30 A. M.,
 concert, 1:30 P. M., stock reports and weather, 3,
 music, 4, orch. of Hotel St. Francis, 6:45, stock
 reports; weather; news.
 KPO, San Francisco, Calif., 43 (P. S. T.)—7
 A. M., "Daily Dozen," 10, "Home Making," by
 Prudence Penny, 10:30, "Ye Towne Cryer," 10:40,
 local theatres, 11:30, market, 12 M., time; Scrip-
 tures, 12:45 P. M., Commonweal Club luncheon,
 1, Fairmont Hotel orch. 4:30, Fairmont Hotel
 orch. 6:30, local theatres, 8, "Cleveland Six"
 orch.
 KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M.,
 news, 5:30, news, 6:45, radioteletype, 7, Examiner
 program, 8, organ, Dan MacFarland, 9, Herald
 program, 10, Wilson trio.
 KNX, Hollywood, Calif., 17 (P. S. T.)—11:30
 A. M., Estelle Lawton Lindsay's talk to women,
 6:15 P. M., dinner program, 7:30, Eastern program,
 8, West Coast theatres, 9, KNX feature program,
 11, Cocanant Grove orch.
 KTHS, Hot Springs, Ark., 374 (E. S. T.)—
 8:30 P. M., Fischer orch. trio, 9, organ, Lawson
 Reid, 10, Jack O' Lantern orch.
 KOB, State College, N. M., 348 (S. M. T.)—
 7:30 P. M., Popular Science Course, Dr. D. S.
 Robbins; "Forest Functions and Farm," by Frank
 C. W. Pooler.
 KFOA, Seattle, Wash., 454 (P. S. T.)—8:30
 P. M., Times studio program.
 KOA, Denver, Col., 321 (M. S. T.)—12:20
 P. M., Rialto organ, 1, quotations, weather, 3,
 matinee, 6, stocks, news, 6:40, Book of Knowl-
 edge program, 8, Rialto theatre orch. 8:20,
 studio program, KOA orch.
 KFAE, Pullman, Wash., 348 (P. S. T.)—8:20
 P. M., Glenn Garrett, soprano; readings, Erna

Mr. Lyman F. Hill, 435 N. Hampden Ave.,
 Washington, D. C.
 Dave M. Black, Box 54, North Canton, Ohio.
 C. V. Shick, Box 51, Bridge Station P. O.,
 Niagara Falls, N. Y.
 John E. Lynch, 700 Ridge Blvd., Brooklyn,
 N. Y.
 Harold Keller, E. F. D. No 1, Lynden, Wash.
 E. S. Fletcher, 1103 N. 21 St., Richmond, Va.
 J. M. Tully, 513 1/2 E. 4th St., Troy, N. Y.
 C. T. Welch, Y. M. C. A., Portsmouth, Va.
 Dr. G. A. Sprout, Springfield, N. J.
 P. F. Le Veen, 325 1/2 11th Ave., N. Y. City.
 C. A. Barrow, 406 Fourth St., Jackson, Mich.
 M. Santantonio, 21 Glenside Ave., Jamaica, N. Y.
 Fred G. Clark, 123 Orange St., Camden, N. J.
 F. W. Winter, P. O. Box 101, West, Tex.
 Dr. M. L. Baker, Christopher, Ill.
 N. S. Goldstein, Christopher, Ill.
 E. H. Richards, 203 Fern Ct., Cleveland, Ohio.
 Abe Suher, 4 Waverly St., Springfield, Mass.
 R. J. McCutcheon, care Col. Post 1200 Ca.,
 Pueblo, Col.
 L. E. Turner, Photo Inn, Fort Snagg, N. C.
 Dr. C. Hensell, Greely, Ind.
 Merle D. Blaiser, Payson, Id.
 J. Dosterman, 105 5th St., Brooklyn, N. Y.
 A. E. Sumner, 414 Brooklyn Ave., Cleve-
 land, Ohio.
 Carl A. Zang, 476 Holmes St., Kansas City, Mo.
 Herman Adams, 507 E. 121st St., Cleveland,
 Ohio.
 Gerard D. Sullivan, 225 E. 9th St., N. Y. C.
 T. T. Street, Box 135, Tumbach, Ind., Canada.
 C. S. Gilbert, Box J, Hollywell, Pa.
 John E. Berberich, 325 Calhoun, Houston, Tex.
 John Wilson, 43 E. 11th St., N. Y. C.
 Howard Baker, R. F. 1, Smith, Mo.
 Geo. H. Muck, 1409 W. Bates St., Babo, N. D.
 Robert Rice, 72 Cleveland Ct., Raitz Creek,
 Mich.
 E. Nerbert, P. O. Box 21, Hamilton Garage
 Station, N. Y. C.
 Estley N. Rothchild, 68 W. 16th St., New
 York.
 John F. Oycos, 1635 N. E. Miami Court, Miami,
 Fla.
 D. E. Rankin, 820 Riverside Drive, N. Y. C.
 Leroy Andrews, 1351 W. Park Ave., Chicago,
 Ill.
 E. M. Cunningham, 756 Newark Ave., Elizabeth,
 N. J.
 Roland Hanks, 30 S. Perry St., Poughkeepsie,
 N. Y.
 Oliver Savotsky, 3804 Leopold Ave., Cleveland,
 Ohio.
 Ed. Hunter, 1541 Willow Ave., Niagara Falls,
 N. Y.
 A. Ties, 1003 N. James St., Rome, N. Y.
 Geo. J. Bensingor, 37 Eagle St., Springfield,
 Mass.
 C. M. Johnson, Jr., Whitehall, Mont.
 Louis H. Bryan, 642 McDougal St., Fostoria, O.
 W. L. Decker, Scary Point, N. J.
 Clifford Smith, Barre, Vt.
 A. B. Colton, P. O. Box 183, Okidale, Ia.
 Harold Bauer, 8 River St., Fort Jervis, N. Y.

Harold K. Glaser, Lakewood, N. Y.
 Robt. Henry, 90 Commercial St., Longport,
 Penn.
 John H. Bergwick, Fort Amherst, Canal Zone.
 T. H. Aquilino, Reading, Pa.
 Carl S. Martin, 20 W. Delaware St., Pottsville,
 Mich.
 W. C. Leodler, 100 Woodland Ave., Oakland,
 Mich.
 Gustave H. Ganser, Pontiac, Cal.
 Dr. Carlos Brandt, Fort, Virginia, Province
 De Santa Cruz.
 Dr. H. E. Wright, 3-4 Union Bldg., Seattle,
 Washington.
 Benjamin C. Lang, "N. C." Telegraph Office,
 Pennsylvania, S. Y. C.
 J. D. McCall, 215 W. Pine St., Florence, S. C.
 Frank Hensler, 10 E. 10th St., Columbus, O.
 George A. Hervey, Nursery Ave., Woonsocket,
 R. I.
 John Warren Coe, 1009 Edwards Ave., Roma,
 N. Y.
 Jack F. Walsh, 34 Graham Ave., Yonkers, N. Y.
 Kenneth Walker, 704 Jefferson Ave., Jersey
 City, N. J.
 James Clark, 23 Main St., Newark, N. J.
 Chas. H. Leight, 23 Grand Ave., Detroit,
 Mich.
 Wm. Horton, 306 Cedar Ave., Vanderburgh, Pa.
 F. C. Elliott, Box 100, Redwood, Ore., Canada.
 W. L. Drury, Vendome Hotel, Minneapolis,
 Minn.
 Wm. Heiberg, 126 Ave. A, N. Y. C.
 A. I. Schady, 63 North 10th St., Reading, Pa.
 E. J. Borch, 222 Locust St., Reading, Pa.
 Norman Bonfield, 38 Arsett Blvd., Rochester,
 N. Y.
 E. L. Caswell, Box 127, Chaska Co., Chaska,
 Wis.
 J. Sarna, 14 Mary St., Lawrenceburg, Ind.
 Harry F. Snyder, 27 West St., Lawrenceburg,
 Ind.
 Fred C. Clark, 103 Ontario St., Camden, N. J.
 E. C. Wilson, John Robinson Co., Edward, Ind.
 W. H. Horgan, 200 Metuchen, Pa., Pa.
 C. C. Colton, 100 Columbus, Reading, Ohio.
 Vincent J. Heiss, 327 N. Sawyer Ave., Chicago,
 Ill.
 W. J. Bryant, 8 Pomander Walk Ct., Rochester,
 N. Y.
 H. A. Keys, Commercial Union Assurance Co.,
 Kinder, La.
 W. B. Overstreet, 10-14 St., San Francisco,
 Cal.
 E. L. Caswell, Box 127, Chaska, Wis.
 C. F. Borch, 222 Locust St., Reading, D. C.
 Annie Frown, 1611 Hazel Ave., Detroit, Mich.
 Albert W. Thorne, 108 Bayview Ave., Jersey
 City, N. J.
 Victor Sahner, 49 W. Thomson, Akron, Ohio.
 La Verge De Mather, 40 W. Elm St., E-
 Rochester, N. Y.
 Frank Berg, 106 Charlton St., Newark, N. J.
 Jas. L. Pruitto, 329 W. St., Pittsfield, Mass.
 Clarence Barrett, E. F. D. 4, Box 125, Jack-
 sonville, Fla.
 Ed. Elliott, 110 3rd Ave., Beaver Falls, Pa.

Nelson; Home Talent trio; piano Helen Glenn
 violin, Lola Graham; "Auto Times," Dena B.
 V. Carpenter; "Growing Berries," M. D. Arm-
 strong; "The Spring Garden," Fred C. L. Vin-
 cent.
 KFOA, Seattle, Wash., 454 (P. S. T.)—8:30
 P. M., Times dance music.

Saturday, April 4

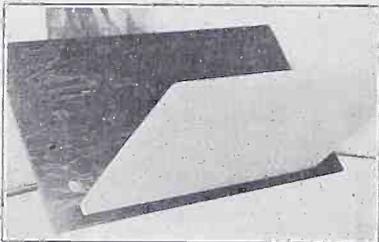
WGN, Chicago, Ill., 376 (C. S. T.)—7:31 A. M.,
 time, 9:35, quotations, 10, quotations, Liverpool
 cable, 11, quotations, weather, market, 11:30,
 quotations, 11:56, time, 12 M., quotations, 12:10
 P. M., quotations, 12:30, quotations, 11:40,
 Drake concert ensemble and Blackstone string
 quintet, 1, quotations, 1:25, quotations, 2:30,
 Lyon and Healy concert hall, 3, Strlin, humor,
 verse and topical entertainment, 3, quotations,
 5:30, Skeeter, line 5:57, time, 6, organ, Stanley
 Seder, 6:30, Drake concert ensemble and Black-
 stone string quintet, 8, vocal and instrumental
 music, 10, The Drake Hotel orch.
 WEAQ, Columbia, Ohio, 291 (E. S. T.)—9:45
 A. M., weather and market, agricultural bulletin,
 11, weather and market, 1 P. M., music and
 market.
 WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30
 P. M., news; weather, 2:30, music from the Nixon
 restaurant, 6:30, concert from William Penn Hotel
 7:30, Uncle Kaybee, 7:40, police reports, 8,
 motor topics, 8:30, concert by the Freedom, Pa.,
 mixed quartet.
 WOAW, Omaha, Neb., 528 (C. S. T.)—12:20 P. M.,
 horticultural program, 5:45, news & dramatic
 hour, 6:45, Robinson orch. 7:30, address of the
 Omaha Chamber of Commerce, 9, Omaha Co.
 program, 11, Nightingale orch. 11:30, Arthur
 Hays, organist.
 WBBR, Staten Island, N. Y., 272 (E. S. T.)—
 8 P. M., Mr. Malcolm Carment, clarinetist, 8:20

Mr. Carl Park, violinist, 8:15, Bible quotations and
 organ, 8:40, Mr. Carl Park, violinist, 8:10,
 Mr. Malcolm Carment, clarinetist.
 WHAS, Louisville, Ky., 399 (C. S. T.)—8 P. M.,
 concert from Louisville conservatory; time, Paul
 G. Chomson's, police bulletin; weather; news,
 6:30, market, 5, time, 7:30, Arthur Flindley,
 baritone; news; time.
 WBAP, Fort Worth, Tex., 475 (C. S. T.)—
 1 P. M., musical review, business report, 7
 Sunday school lesson review.
 WMAQ, Chicago, Ill., 475 (C. S. T.)—6 P. M.,
 New Trier high school program, 8, Harold Pratt,
 Prof. David, 8:30, "Nova Scotia," by Clarence
 Howard, 9, Babban & Kirs theatre revue.
 WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M.,
 History string trio.
 KNX, Los Angeles, Calif., 467 (P. S. T.)—10
 E. M., dinner hour program, 7:30, organ, 8, 10
 Examiner program, 9, features, 10, Cocanant Grove
 orch. 11, Hollywood Nine.
 KFI, Los Angeles, Calif., 467 (P. S. T.)—4 P. M.,
 news, 5:30, news, 6:45, radioteletype, 7, Lake Arrow-
 head orch. 7:45, book chat, 8, Examiner program,
 9, Dorothy Francis, soprano, 10, The Pickard
 radio club.
 KGO, Oakland, Calif., 361 (P. S. T.)—11:30 A. M.,
 concert, 12:30 P. M., stock reports and weather,
 4, orch. of Hotel St. Francis, 5, Leslie Larnal,
 mezzo-soprano, Audrey Bore, alto, pianist; Sam
 Belsky and Joseph Liguori, Lowdown, pianists;
 Sam Francisco, triple piano; Eva Garcia and Joyce
 McHenry, Barbitone; Albert Gillette, baritone;
 H. Halstead's orch.
 KPO, San Francisco, Calif., 43 (P. S. T.)—7
 A. M., "Daily Dozen," 10:30, "Ye Towne Cryer,"
 10:40, local theatre, 11:30, market, 12 M., time,
 1 P. M., Fairmont Hotel, 2:30, radio program,
 3:30, Royal Ransom Bowl orch. 4:30, radio News,
 6:20, local theatre, 8, Weidner's dance orch.

9,000 Miles!



WIRELESS spans vast seas, linking America with the Kangaroo Continent. Basil Cooke, Australian amateur, is pictured listening-in on a low-loss set to the special programs broadcast by KDKA—Pittsburgh. (International).



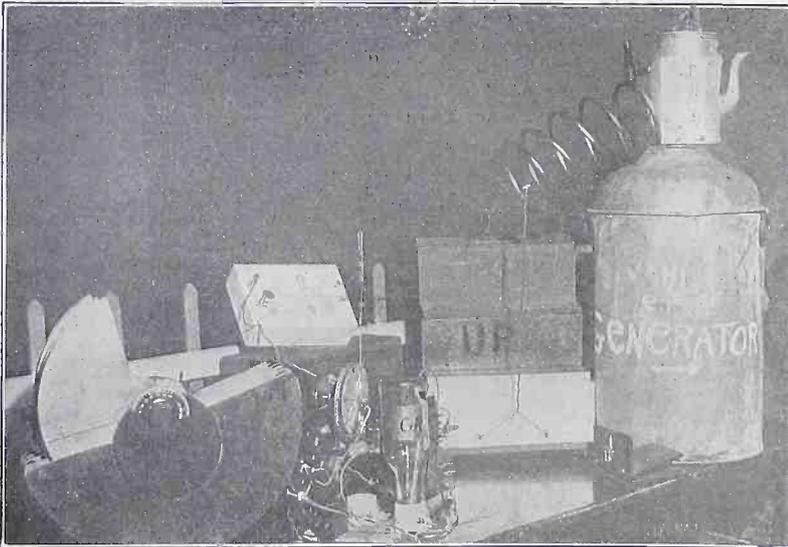
THE correct way of attaching the baseboard when the panel is to project below the flange of the cabinet is here depicted. Thus when the panel is to be fastened to the cabinet front the baseboard will slide in nicely. (Radio World Staff Photo).

Cure for Wrecked Nerves

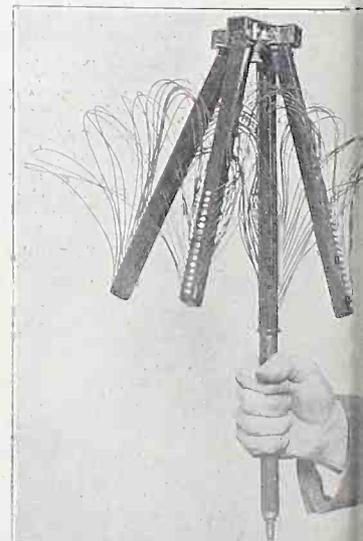


THE LATEST application of medicine to wireless telephony is a neurasthenia cure by music over the radio, a rehearsal of which before the WOR "mike" stirred considerable interest. Dr. Willard Edward Dentinger, originator of the treatment, directed the artists, who will assist him in his first broadcast lecture on the therapeutic value of music, to be given April 1 and on the first of the month for the twelve months following. He will demonstrate to listeners-in how to fake advantage of the radio concert to alleviate neurasthenia. The assisting artists are Illuminato Miserendino, violinist, who will play Vice-Presi-

dent Dawes' "Me who knows what as a captive of w mezzo-soprano, w during the war w health in France. (composer of "W proper way to list cline with the h pointing to the no



THE MOST "advanced" exhibit set of the amateur operator's convention in New York City. Note the "stop-up"; it speaks aloud for the "ham's" sense of humor. (Foto Topics).

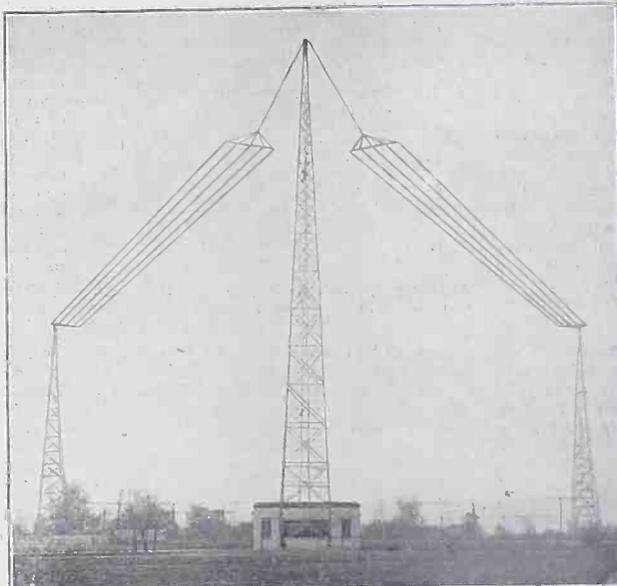


THIS is not a parlor duster but a folding aerial. (Kadel & Herbert)

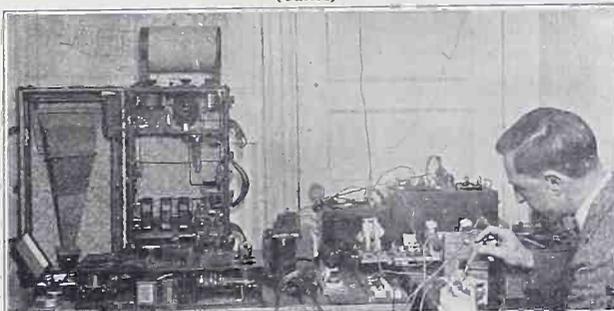
on Air

Ford Works by Radio

2LO



HENRY FORD maintains the largest private radio system in the country. The picture shows the antenna at the main plant in Dearborn, Michigan. (United).



A DAY'S WORK is not enough for this Bureau of Standards expert who also makes wireless telephony the hobby of his leisure hours. He is shown plugging in on a small set by means of which he communicates from room to room at his home.



THIS is the new antenna support of 2LO, London. Greater power will be used, DX hounds please note.

; Bruce Cameron, Canadian pianist, nerves are, having spent four years in prison camps; and Paul Ayers, led the "musical shell-shock doctor" and nerve-wrecked soldiers back to the front. (My Washington"), illustrates the music for its therapeutic effect, rather than the head and with the head (Underwood & Underwood).



ROXY and his gang, known to every radio enthusiast throughout the land, photographed at the Capitol where they took the city by storm. They played performances for charity. From left to right are Newel Chase, Betsy Ayres, Tasha Bunchuk, Douglas Standing, Maria Gambarelli, Caroline Andrews, S. L. Rothafel (Roxie), William Robyn, Marjorie Harcum, Dr. William Axt, Julia Glass and Mrs. Glass. (Underwood & Underwood.)

zither solos, Fred Gloy; Elizabeth Van Etten, mezzo-soprano. 10, Halstead's orch. and soloists
KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiotele. 7, Hills Bros. orch.; Betty Patrick; Hills Bros. quartet. 8, Los Angeles Examiner program. 9, Paul Reese, Oriental music. 10, Packard melody girls; Bess Rudisell and Rhue Gill; Merrill La Fontaine; The Varsity trio; Howard Coy; The Carlson Sisters.
KNX, Hollywood, Calif., 337 (P. S. T.)—6:15 P. M., Durant program. 7:30, styles by Alyn Siegel. 8:45, health by Dr. Robert T. Williams. 8, Peerless program. 10, Cocoanut Grove orch.
KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., exercises. 10:30, "Home Making," by Prudence Penny. 10:30, local theatres. 10:40, "Ye Towne Cryer." 11:50, market. 12 M., time; Scripture. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 6:20, garden hints. 6:30, local theatres. 7, Fairmont Hotel orch. 8, San Francisco conservatory of music. 10, Rose Room Bowl orch.
CNRA, Moncton, N. B., 313 (E. S. T.)—7:30 P. M., vocal and instrumental numbers. 8:30, artists from Bridgewater, N. S.
CNRR, Regina, Sask., 420 (E. S. T.)—8 P. M., bedtime tale: Frank Salter, tenor soloist.

Wednesday, April 1

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezix time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.
WEO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.
WHO, Des Moines, Iowa, 526 (C. S. T.)—6:30 P. M., Reese-Hughes orch. 7:30, program of Grace Clark De Graf; Miss Kathryn Mason, pianist. 9, Des Moines Theatre symphonic orch. 9:45, Bankers' orch.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from the Louisville conservatory of music; Alamo Theatre organ; police bulletins; weather; readings; news. 4:55, market reports. 5, time. 7:30, Tropical Hawaiian sextette; "Billy and Jane" stories. James Speed. 8:30, concert of the Central Furniture Co.; time.
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 4:30, market; Uncle Kaybee. 6:30, concert from the William Penn Hotel. 7:30, The Sunshine Girl. 7:45, police reports. 8:30, Schubert sextet quartet; Schubert instrumental trio. 10:30, Nixon restaurant orch.
WEEI, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service. 3, Avalon orch. 6:30, Big Brother Club. OldTimer's Night. 7:15, U. S. Army band. 8, Traveler Shoe orch. 8:30, musicale. 9, Gillette orch.
WDAF, Kansas City, Mo., 365.6 (C. S. T.)—3:30 P. M., piano. 4, Rose Room Bowl orch. 5:30, weather, time. 6, School of the Air; piano tuning; Tell-Me-a-Story Lady; Trianon Ensemble. 8, Star's Radio orch. 11:45, "Merry Old Chief" Plantation Players.
WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises. 10:45, weather. 11:55, time. 12:15 P. M., piano. Irene Downing, Marjory Hebestreit. 1:30, business reports. 3, markets. 4, Dunning Re-entrant musical service; Lillian Aldrich Thayer, settlement schools. 6, concert. 6:45, markets. 10, Edith MacDonald Taube trio; Coon Dog orch.; piano. Missouri Kinney; songs. Marion Early. 11, Milnor instrumental trio; Rainbow string orch.
WFAA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., Alex Hughes, pianist.
KOB, State College, N. M., 348.6 (S. M. T.)—7:30 P. M., international code course.
WVJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "to-night's dinner." 9:45, public health service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News orch. 3:50, weather. 3:55, market reports. 6, concert. 8, Detroit News orch.; Annie Campbell, Detroit News poet; Templeton Moore. 10, Jean Goldkette's Victor recording orch.
WFBH, New York, N. Y., 273 (E. S. T.)—2 P. M., Eddie Meyer's orch. 3, songs. 3:30, Daisy Synder, soprano. services. Rev. J. A. Weyl. 4:30, Jack Nipponi's songs. 5, Green's Entertainers. 6, Hotel Majestic string ensemble. 6:25, health talk. 6:30, Hotel Majestic string ensemble. 7, Parody Club. 7:30, studio program. 11:30, Garden City Novelty orch. 12:30, Cotton Club.
WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes; weather; markets. 9:30, weather.
WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—12:05 P. M., music. 7:30, Panther Hawaiian trio. 9:30, Johnny Jackson's Texas Hotel orch. Mid-night, Moore's Black and Gold Serenaders.
WKAQ, Porto Rico, 340.7 (P. R. T.)—8 P. M., municipal band of San Juan.
WMAQ, Chicago, Ill., 447.5 (C. S. T.)—1 P. M., luncheon of Association of Commerce. 4, child life stories. 4:30, pupils of McLean school. 6, organ. 6:30, Miss Georgene Faulkner, the Story Lady. 8, Northwestern university lecture. 8:25, piano by Carolyn Wilder. 9, WMAQ players.
WMH, Cincinnati, Ohio, 325.9 (C. S. T.)—8 P. M., soprano, Miss Laverne Sims; Ernest C. Daulton, accomp.; Walter Heermann instrumental trio; Carlo Mastrapalo, violin; Renato Mastrapalo, cello; John Quincy, bass piano; piano, Mrs.

J. P. Broyles; songs, Ranger Five male quartet; piano, Ernest C. Daulton; baritone, Ralph Withers.
WGR, Buffalo, N. Y., 312 (E. S. T.)—10:45 A. M., home service talk by Betty Crocker. 6:30 P. M., piano, Gertrude Hutchinson, Lester Erlenbach. 8, Philharmonic concert.
 by Selma Bowman Withery, accomp.
KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., exercises. 10:30, "Ye Towne Cryer." 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 7, Seiger's Fairmont Hotel orch. 7:30, Conn Band Instrument Co. program. 8, program by Atwater Kent artists. 9, piano, J. Vinified Curry; harmonica, Lee Roy Shepherd; contralto, Francis Levey; Home Town Syncopators.
KGO, Oakland, Cal., 381 (P. S. T.)—11:30 A. M., concert. 1:30 P. M., stock reports and weather. 3, music. 4, concert orch. of the Hotel St. Francis. 6:45, stock reports, weather and news.
KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiotele. 7, Nick Harris, detective stories. 7:30, Goodwin, Klingner, MacKay program. 8, Herald program. 9, Examiner program. 10, Patrick-Marsh orch.
KNX, Hollywood, Calif., 337 (P. S. T.)—6:15 P. M., dinner hour program. 7, Ambassador concert orch. 8, KNX feature program. 10, Hollywood land dance orch.
KTHS, Hot Springs, Ark., 374.8 (E. S. T.)—8:30 P. M., piano. Phil Wall. 9, Arlington Hotel orch. 10, Charles L. Fischer orch.
KFOA, Seattle, Wash., 454.3 (P. S. T.)—8:30 P. M., Times studio program.
KOA, Denver, Colo., 323 (M. S. T.)—12:20 P. M., Rialto organ. 1, quotations; weather. 6, stocks; news. 8, Rialto theatre orch. 8:10, vocal solos, KOA orch.; readings; talk on "Success"; violin solos. 10, Rainbow-Lane orch.
KFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30 P. M., Colfax orch.; soprano, Mrs. Wm. Cole; whistling, Juanita Morley; piano duo, Maxine and Juanita Morley; reading, LeLaFol; fiddling, Dr. R. J. Skaife; "Fiddling," by Brick Burford; Dr. E. L. Layton, bass; I. L. Osterhout, steel guitar; reading, Virgil Canutt; Mrs. W. P. Scarth, lyrics; piano, Earl Blew; resources of Whitman County. D. Millard; orch.
PWX, Havana, Cuba, 400 (E. S. T.)—8:30 P. M., Municipal band.

Thursday, April 2

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezix time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.
WEO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.
WHO, Des Moines, Iowa, 526 (C. S. T.)—7:30 P. M., Grinnell Women's Glee club. 11, Rubinson orch.
WBBR, Staten Island, N. Y., 272.6 (E. S. T.)—8 P. M., Mr. Frank Wood, flutist. 8:10, Herald male quartet. 8:20, Sunday school lesson. 8:40, Herald male quartet. 8:50, Mr. Frank Wood, flutist.
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 4:30, market; The Sunshine Girl. 6:30, concert from the William Penn Hotel. 7:30, Uncle Kaybee. 7:45, police reports. 8, Moores radio review. 9, Atwater Kent radio artists.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from the Louisville conservatory; organ; police bulletins; weather; news. 4:55, market reports. 5, time. 7:30, Louisville conservatory of music; digest of Sunday school lesson; four-minute welfare talk; time.
WMAK, Lockport, N. Y., 265.5 (E. S. T.)—12 Midnight, Midnight Serenaders.
WCBD, Zion, Ill., 444.6 (C. S. T.)—8 P. M., saxophone quintet; Zion junior choir and soloists.
WEO, Columbus, Ohio, 293.9 (C. S. T.)—8 P. M., Indianapolis music, University Women's club.
WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes; weather; markets. Doctor H. E. Bemis, "Horses." 8:15, musical. 9:30, weather.
WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises. 10:45, weather, business reports. 11:55, 12:15 P. M., Mt. Phi Epsilon Sorority; Dr. Carl A. Wilzhack, "Health." 1:30, business reports. 3, markets. 4, piano, Adelaide Apfel; French lessons by Madame Ida Teimpidis. 6, State memory contest. 6:45, Secretary Hawkins; markets. 10, three minute message U. S. Civil Service Dept. 10:03, Cooper concert orch. male quartet; Senator Schultz, "Judge Yeatman's Court"; Dolbert Melody Boys; piano, accordion, Larry Grueter.
WVJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News. 3:50, weather. 3:55, markets. 6, concert. 8, concert.
WCAL, Northfield, Minn., 336.9 (C. S. T.)—9 P. M., Penelle Soprano; pianist; Lillian Stratstrom, soprano; Luella Thygeson, mezzo-soprano; Signe Anderson, pianist; George Kildahl, base; WCAL mixed quartette; WCAL orch.
WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program. 5:45, news. 6,

child's story hour, by Grace Sorenson. 6:45, Fontenelle orch. 9, anniversary program.
WFAA, Dallas, Texas, 475.9 (C. S. T.)—12:30 P. M., DeWitt McMurray, philosophic dissertation; music. 6:30, Lone Star Five's orch. 8:30, Chamber of Commerce, Palestine, Tex. 11, Pete Pate and Bud Morgan, humor and music.
WDAF, Kansas City, Kan., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio. 5:50, marketgram, weather, time. 6, School of the Air; book talk by Louis Mecker; Tell-Me-a-Story Lady; Trianon Ensemble. 11:45, "Merry Old Chief"; plantation Players; Kansas City Club orch.
WEEI, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service. 1, Boston Chamber of Commerce luncheon. 3:15, Noah's Arkadians. 6:30, Big Brother Club, Dramatic Club. 7:15, Sager orch. 8, musicale. 9, Atwater-Kent musicale. 10, Silverton Cord orch.
WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—12:05 P. M., music. 7:30, artists of Texas Christian University. 9:30, Mrs. T. A. Coughlin program.
WKAQ, Porto Rico, 340.7 (P. R. T.)—8:30 P. M., "La Cafetera" concerto.
WMAQ, Chicago, Ill., 447.5 (C. S. T.)—4 P. M., household hour. Mrs. Elizabeth O. Hiller. 4:30, Illinois Federation of Women's Clubs. 6, organ. 6:25, Hotel LaSalle orch. 6:50, "Daddy." 8, garden talk, James H. Burdett. 8:15, Boy Scout program. 8:50, University of Chicago lecture. 9:15, Ravenswood Methodist Church.
WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M., Halpyrd string trio. 9, Atwater Kent program. 10, J. Irwin, Cord orch.
WMH, Cincinnati, Ohio, 325.9 (C. S. T.)—8 P. M., piano, Clarence R. Reeves. 9, Rainbow orch.
KTHS, Hot Springs, Ark., 374.8 (E. S. T.)—12:30 P. M., concert, markets, weather. 8:30, Eastman Hotel orch. 9:45, Elliott orch. 12:15, Phil Baxter orch.
KOA, Denver, Colo., 323 (M. S. T.)—12:20 P. M., Rialto organ. 1, stocks, weather. 3, matinee. 6, stocks.
KFMO, Fayetteville, Ark., 299.8 (E. S. T.)—7:30 P. M., "Cedars, Apples?" H. R. Rosen; "The Riches in Our Attics," W. B. Hesselting; "Wood Using Industries of Arkansas," J. T. Buchholz.
KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., "Daily Dozen." 10:30, "Ye Towne Cryer." 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour. 6:30, local theatres. 7, Fairmont Hotel orch. 8, Theodore J. Irwin, organist; Charles J. Lamp, tenor. 9, Welsh night. 10, Rose Room Bowl orch.
KGO, Oakland, Calif., 381 (P. S. T.)—10:40 A. M., classroom instruction. 11:30, concert. 1:30 P. M., stock reports and weather. 4, orch. of Hotel St. Francis. 6:45, stock reports; weather; news items. 7:15, golf lesson, Joe Novak. 8, "Smilin' Thru." by the KGO Players. 10, Henry Halsread's orch.
KNX, Hollywood, Calif., 337 (P. S. T.)—4 P. M., Estelle Lawton Lindsay's travel talk. 6:15, dinner program. 7:30, business talk, J. R. Douglas. 8, KNX feature program. 10, Cocoanut Grove orch.
KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiotele. Bon Ton orch. 7:20, Mr. W. H. Day, The Y. M. C. A. in Mining Towns. 7:30, popular ballads by Paul Reese. 8, music; Mr. Ray Wood; E. B. Rufner; Irma De Hart; Jean Sloan Diehl, and The Polar Bear orch. 9, The Melodious four. 10, Examiner program.

Friday, April 3

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezix time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.
WEO, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from Louisville conservatory; organ; police bulletins; weather; readings; news. 4:55, market reports. 5, time. 7:30, Wieseman's novelty orch.; time.
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., weather; news. 4:30, Sunshine Girl; market. 6:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:50, police reports. 8, orch. and minstrel show, assisted by male quartet.
WHO, Des Moines, Iowa, 526 (C. S. T.)—7:30 P. M., Mr. Stewart Wason, American baritone; Miss Helen Birmingham, accompanist; Mr. Arthur Cohen, violinist; Williamson Brothers, banjo, mandolin, and guitar; Emma Keller May soprano; Dorothy Over Everett, accompanist.
WOAW, Omaha, Neb., 526 (C. S. T.)—4 P. M., matinee program. 5:45, news. 6, story hour, by Doris Claire Secord. 6:30, Harry Brader, violinist, and Frank Strawn, pianist. 7:15, sports. Ivan L. Gaddis. 9, First Christian Church orch.; "The Burlington Route." Dr. G. E. Condra. 10:30, Robinson orch.
WEMC, Warren Springs, Mich., 786 (E. S. T.)—9 P. M., radio choir. 9:20, Mr. Robert Hodgins, cello. 9:35, Miss T. Kressin, soprano. 9:45, Mr. H. B. Taylor, Bible chat.
WDAF, Kansas City, Kan., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio. 5:50, marketgram,

JOIN THE A. B. C.

A. B. C. stands for the American Broadcast Club. Join it today. It involves no dues or payment of any kind, and no obligations. It was founded by RADIO WORLD simply to unite the broadcast listeners and radio fans in general in a common bond to promote their welfare as occasion requires. Send your name and address to A. B. C. Editor, RADIO WORLD, 1493 Broadway, New York City.

A. B. C. Editor, RADIO WORLD,
1493 Broadway, New York City.

Please enroll me as a member of the American Broadcast Club.

Name
Address
City or Town
State

weather, time. 6, School of the Air: piano tuning; Tell-Me-a-Story Ladk; Trianon Ensemble. 11:45, "Merry Old Chief," Plantation Players.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—10:45 A. M., weather, business reports. 11:45, time. 12:15 P. M., Alton Brunswick orch. 1:30, business reports, quotations.

WOL, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., chimes, weather, markets, Doctor H. E. Bemis, "Horses." 9:30, weather.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News orch. 3:50, weather. 3:55, markets. 6, concert. 8, Gladis Glee Club; W. of Mich. 9, Victor Recording orch.

WEEI, Boston, Mass., 303 (E. S. T.)—12:15 P. M., Lenten service. 2, musicale. 6:30, Big Brother Club, Hammond, symphonians. 7:15, Wm. F. Sharp, pianist. 7:30, Whiting Milk Co. program. 8, Neapolitan Male quartet. 8:30, Luther A. Breck interviewed by Hap Myers. 8:50, Wm. F. Sharp, pianist. 9, choir of Trenton St. Baptist church. 10, Lewis Weir, organist.

WFAA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., Dr. Robert Stewart Hyer, Sunday school lesson. 4:30, woman's hour. 6:30, Honey Boys orch. 8:30, Mrs. Albert Seales and assisting musicians.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—9:45 A. M., College chapel services. 8:30 P. M., book talk, Dr. George W. Spohn.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's radio orch. 5:50, marketgram, weather, time. 6, School of the Air: piano tuning; Roger W. Babson; Tell-Me-a-Story Lady; Trianon ensemble. 11:45, "Merry Old Chief," Plantation Players; Kuhn's orch.; J. Campbell's orch.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—9:45 A. M., College chapel services. 12 M., music.

WFAA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., Cornfield Symphony orch. 6, music. 8:30, Forest Avenue band. 11, Adolphus Hotel orch.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program. 5:45, news. 6, dramatic hour. 6:45, Robison orch. 7:30, weekly address, Omaha Chamber of Commerce. 9, Omaha Printing Co. program. 11, Nightingale orch. 11:30, Arthur Hays, organist.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 11:55, time. 12:05 P. M., Hotel Statler orch. 3, Detroit News orch. 3:50, weather. 3:55, markets.

WOL, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., chimes, weather, markets, Doctor K. W. Stouder, "Pig Diseases." 9:30, weather.

WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—12:05 P. M., Ward's "Trail Blazers," 4, book review by Peter Molyneux. 7:30, Hi-Y Club of Fort Worth orch, quartet. 9:30, Negro quartet.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—12:25 P. M., Y. M. C. A. forum. 4, fashions, by Jean Mowat. 4:30, pupils of Bush conservatory. 6, organ. 6:30, Hotel LaSalle orch. 6:50, Family Altar league. 8, Wake Awake club. 8:30, musical geography. 9, Christian Endeavor topics. 9:15, George Simons, tenor; Miss Lucille Pentecost, pianist.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., home service talk by Betty Crocker. 6:30 P. M., Buffalo Trust hour. 8:45, "Cut Flowers," by Harold B. Brookins. 9, Buffalo Ass'n for the Blind program. 10, Larkin string orch.

WFMH, Cincinnati, Ohio, 325.9 (C. S. T.)—10 P. M., Hotel Alma orch. 10:30, Ed. H. Schoelwer, songs; Angela Devoto; Eugene Perazzo, accompanist; songs, Gay Anderson; Ed. H. Schoelwer, accompanist. 11:15, Hotel Alma orch.

WGBS, New York City, 376 (E. S. T.)—6:35 P. M., Herman Bernard, managing editor, RADIO WORLD, "Radio Hookups." Mr. Bernard is on the air every Friday at this station at 6:35 P. M.

KGO, Oakland, Calif., 361 (P. S. T.)—11:30 A. M., concert. 1:30 P. M., stock reports and weather. 3, music. 4, orch. of Hotel St. Francis. 6:45, stock reports; weather; news.

KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., "Daily Dozen." 10, "Home Making" by Prudence Penny. 10:30, "Ye Towne Cryer." 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 12:45 P. M., Commonwealth Club luncheon. 1, Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 6:30, local theatres. 8, "Cleveland Six" orch.

KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiatorial. 7, Examiner program. 8, organ, Dan MacFarland. 9, Herald program. 10, Wilson trio.

KNX, Hollywood, Calif., 337 (P. S. T.)—11:30 A. M., Estelle Lawton Lindsay's talk to women. 6:15 P. M., dinner program. 7:30, Eastern program. 8, West Coast theatres. 9, KNX feature program. 11, Coconut Grove orch.

KTHS, Hot Springs, Ark., 374.8 (E. S. T.)—8:30 P. M., Fischer orch trio. 9, organ, Lawson Reid. 10, WCAnter program.

KOB, State College, N. M., 348.6 (S. M. T.)—7:30 P. M., Popular Science Course, Dr. D. S. Robbins; "Forest Functions and Farm," by Frank S. W. Pooler.

KFOA, Seattle, Wash., 454.3 (P. S. T.)—8:30 P. M., Times studio program.

KOA, Denver, Col., 323 (M. S. T.)—12:20 P. M., Rialto organ. 1, quotations, weather. 3, mt. time. 6, stocks, news. 6:40, Book of Knowledge program. 8, Rialto theatre orch. 8:10, studio program, RIA orch.

KFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30 P. M., Glenna Garrett, soprano; readings, Erna

Mr. Lyman F. Hill, 4125 N. Hampshire Ave., Washington, D. C.

Dave M. Beck, Box 54, North Cexello, Ohio.

C. V. Slack, No. 52, Bridge Station P. O., Niagara Falls, N. Y.

John E. Lynch, 7009 Ridge Blvd., Brooklyn, N. Y.

Harold Keller, R. F. D. No. 1, Lynden, Wash.

E. S. Fletcher, 1103 N. 21 St., Richmond, Va.

J. H. Tully, 513 5th Ave., Troy, N. Y.

C. T. Welsh, Y. M. C. A., Portsmouth, Va.

Dr. G. A. Sprout, Springhill, N. J.

M. F. Le Week, 2076 8th Ave., N. Y. City.

G. A. Borrow, 406 Fourth St., Jackson, Mich.

M. Santonocito, 15 Globe Ave., Jamaica, N. Y.

Fred G. Clark, 1275 Octagon St., E. Camden, N. J.

F. W. Winter, P. O. Box 383, West, Tex.

Dr. M. L. Baker, Christopher, Ill.

N. S. Goldstein, Christopher, Ill.

E. H. Richards, 2010 Fern Ct., Cleveland, Ohio.

Abe Suker, 8 Waverly St., Springfield, Mass.

R. J. McCutcheon, care Col. Fuel Iron Co., Pueblo, Col.

L. Turner, Photo Hut, Fort Bragg, N. C.

Dr. C. Hounold, Greely, Col.

Merle D. Blaiser, Payson, Ill.

J. Besterman, 565 50th St., Brooklyn, N. Y.

A. E. Sommer, 4514 Brooklyn Ave., Cleveland, Ohio.

Carl A. Zang, 4116 Holmes St., Kansas City, Mo.

Herman Altams, 3471 E. 121st St., Cleveland, Ohio.

Gerard D. Sullivan, 209 E. 69th St., N. Y. C.

S. T. Street, Box 145, Tusdale, Sask., Canada.

C. S. Gilbert, Box 3, Hollywood, Fla.

John E. Berberich, 3702 Calhoun, Houston, Tex.

John Wilson, 63 E. 115th St., N. Y. C.

Howard Bailey, R. F. 1, Senath, Mo.

Geo. H. Mack, 1408 W. Balto St., Balto, M. D.

Robert Rice, 72 Cleveland Ct., Battle Creek, Mich.

E. Norbert, P. O. Box 21, Hamilton Grange Station, N. Y. C.

Estley N. Rothschild, 638 W. 160th St., New York.

John F. Oyson, 1636 N. E. Miami Court, Miami, Fla.

L. E. Rankin, 820 Riverside Drive, N. Y. C.

Deroy Andrews, 1851 W. Park Ave., Chicago, Ill.

E. M. Cunningham, 758 Newark Ave., Elizabeth, N. J.

Roland Henke, 30 S. Perry St., Poughkeepsie, N. Y.

Oliver Savotsky, 3804 Leopold Ave., Cleveland, Ohio.

Ed. Hunter, 1541 Willow Ave., Niagara Falls, N. Y.

A. Ties, 1003 N. James St., Rome, N. Y.

Geo. J. Bensinger, 37 Eagle St., Springfield, Mass.

C. M. Johnson, Jr., Whitehall, Mont.

Louis H. Bryan, 642 McDougal St., Fostoria, O.

W. L. Decker, Stoney Point, N. J.

Clifford Smith, Barons, Alta.

A. B. Cullum, P. O. Box 183, Oakdale, La.

Harold Bauer, 8 River St., Port Jervis, N. Y.

Harold K. Olaber, Lakewood, N. Y.

Robt. Henry, 909 Commercial St., Emporia, Kans.

John H. Sedgwick, Fort Amador, Canal Zone.

T. F. Agdilot, Koscilare, Ill.

Carl S. Martin, 838 W. Sublette St., Pocatello, Idaho.

B. C. Loeffler, 1000 Woodland Ave., Oakland, Va.

Burdette H. Hansen, Merino, Col.

Dr. Carlos Framil Y. Font, Taguajao, Provincia De Santa Clara.

Dr. H. E. Wright, 3-4 Hewitt Bldg., Everett, Washington.

Eugene C. Lang, "N. C." Telegraph Office, Penn. Station, N. Y. C.

J. D. McCall, 512 W. Pine St., Florence, S. C.

Frank Boehmer, 143 E. 5th St., Chillicothe, O.

George A. Heroux, Nursery Ave., Woonsocket, R. I.

John Warren Cox, 1309 Edwards Ave., Bronx, N. Y.

Jack F. Walsh, 54 Graham Ave., Yonkers, N. Y.

Kenneth Weimer, 704 Jefferson Ave., Jersey, Pa.

James Carlin, 38 Mott St., Newark, N. J.

Chas. H. Lefgott, 212 Drexel Ave., Detroit, Mich.

Wm. Bartos, 306 Caster Ave., Vandergrift, Pa.

F. C. Elliott, Box 536, Goderich, Ont., Canada.

W. L. Druzy, Vendome Hotel, Minneapolis, Minn.

Wm. Heinke, 1356 Ave. A, N. Y. C.

A. I. Smuler, 623 North 12th St., Reading, Pa.

Robt. Klins, 732 Locust St., Reading, Pa.

Norman Reinhard, 548 Arnett Bvd., Rochester, N. Y.

E. L. Caswell, No. 127 Chelan Co., Chelan, Wash.

J. Storms, 14 Mary St., Lawrenceburg, Ind.

Harry P. Snyder, 373 Front St., Lawrenceburg, Ind.

Fred C. Clark, 1275 Octagon St., Camden, N. J.

E. C. Julian, Julian Rubber Co., Elwood, Ind.

D. Hagerman, 4648 Metetolane, Phila., Pa.

C. C. Cable, 109 Columbus, Kent, Ohio.

Vincent J. Hoier, 527 N. Sawyer Ave., Chicago, Ill.

W. J. Bryant, 6 Pomander Walk C., Rochester, N. Y.

H. A. Keys, Commercial Union Assurance Co., Kinder, La.

W. B. Overstreet, 86-4 St., San Francisco, Cal.

E. L. Caswell, Box 127 Chilean Wash.

C. F. Krial, 413 3rd St., N. W., Wash., D. C.

Annas Flynn, 11651 Nagel Ave., Detroit, Mich.

Robert W. Tieren, 108 Bayview Ave., Jersey City, N. J.

Victor Salner, 429 W. Thornton, Akron, Ohio.

La Vergne De Macker, 421 W. Elm St., E. Rochester, N. Y.

Frank Siegel, 136 Charlton St., Newark, N. J.

Jas. I. Prentiss, 309 W. St., Pittsfield, Mass.

Clarence Burnett, R. F. D. 4, Box 165, Jacksonville, Fla.

E. Elliott, 1517 3rd Ave., Beaver Falls, Pa.

Nelson; Home Talent trio; piano, Helen Glans; violin, Lola Graham; "Auto Tires." Dean H. V. Carpenter; "Growing Berries," M. D. Armstrong; "The Spring Garden," Prof. C. L. Vincent.

KFOA, Seattle, Wash., 454.3 (P. S. T.)—8:30 P. M., Times dance music.

Saturday, April 4

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations, Liverpool cable. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble and Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, fiction, humor, verse and topical entertainment. 5, quotations. 5:30, Skeezi time. 5:57, time. 6, organ, Stanley Seder. 6:30, Drake concert ensemble and Blackstone string quintet. 8, vocal and instrumental music. 10, The Drake Hotel orch.

WEOA, Columbus, Ohio, 293.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 11, weather and market. 1 P. M., music and market.

CAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news; weather. 2:30, music from the Nixon restaurant. 3:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:45, police reports. 8, motor topics. 8:30, concert by the Freedom, Pa. mixed quartet.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program. 5:45, news. 6, dramatic hour. 6:45, Robison orch. 7:30, address of the Omaha Chamber of Commerce. 9, Omaha Co. program. 11, Nightingale orch. 11:30, Arthur Hays, organist.

WBBR, Staten Island, N. Y., 272.6 (E. S. T.)—8 P. M., Mr. Malcolm Carment, clarinetist. 8:10

Mr. Carl Park, violinist. 8:15, Bible questions and answers. 8:40, Mr. Carl Park, violinist. 8:50, Mr. Malcolm Carment, clarinetist.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from Louisville conservatory; tenor, Paul G. Clemmons; police bulletins; weather; news. 4:55, market. 5, time. 7:30, Arthur Findling, baritone; news; time.

WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—1 P. M., financial reviews, business report. 7 Sunday School lesson review.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—6 P. M., New Trier high school program. 8, Russell Pratt, Fred Daw. 8:30, "Nova Scotia," by Clarence Hough. 9, Balaban & Katz theatre rev.

WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M., Halpryd string trio.

KNW, Los Angeles, Calif., 337 (P. S. T.)—6:15 P. M., dinner hour program. 7:30, organ. 8, El Encanto program. 9, features. 10, Coconut Grove orch. 11, Hollywood Nite.

KFI, Los Angeles, Calif., 467 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiatorial. 7, Lake Arrowhead orch. 7:45, book chat. 8, Examiner program. 9, Dorothy Francis, soprano. 10, The Packard radio club.

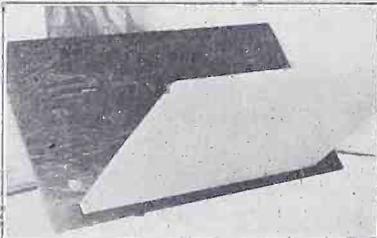
KGO, Oakland, Calif., 363 (P. S. T.)—11:30 A. M., concert. 12:30 P. M., stock reports and weather. 4, orch. of Hotel St. Francis. 8, Emilie Lancel, mezzo-soprano; Audrey Beer, Sorel, pianist; Sam Rodetsky and Joseph George Jacobson, pianists; San Francisco trio; piano, Eva Garcia and Joyce Holloway Barthelson; Albert Gillette, baritone. 10, Halstead's orch.

KPO, San Francisco, Calif., 423 (P. S. T.)—7 A. M., "Daily Dozen." 10:30, "Ye Towne Cryer." 10:40, local theatre. 11:50, market. 12 M., time. 1 P. M., Fairmont Hotel. 2:30, matinee program. 3:30, Rose Room Bowl orch. 6:20, garden hints. 6:30, local theatres. 8, Weidner's dance orch.

9,000 Miles!



WIRELESS spans vast seas, linking America with the Kangaroo Continent. Basil Cooke, Australian amateur, is pictured listening-in on a low-loss set to the special programs broadcast by KDKA—Pittsburgh. (International).



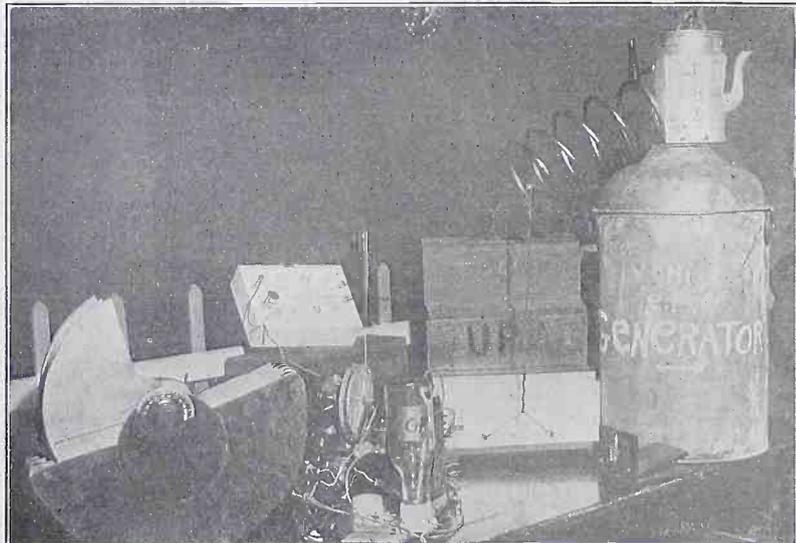
THE correct way of attaching the baseboard when the panel is to project below the flange of the cabinet is here depicted. Thus when the panel is to be fastened to the cabinet front the baseboard will slide in nicely. (Radio World Staff Photo).

Cure for Wrecked Nerves

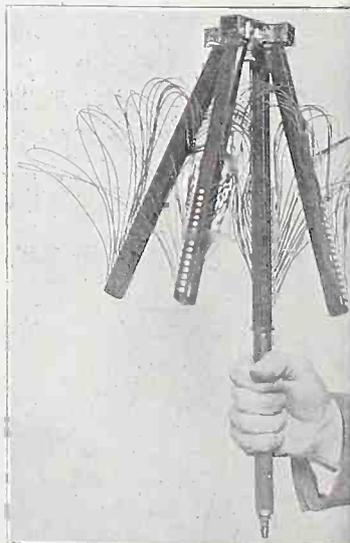


THE LATEST application of medicine to wireless telephony is a neurasthenia cure by music over the radio, a rehearsal of which before the WOR "mike" stirred considerable interest. Dr. Willard Edward Dentinger, originator of the treatment, directed the artists, who will assist him in his first broadcast lecture on the therapeutic value of music, to be given April 1 and on the first of the month for the twelve months following. He will demonstrate to listeners-in how to take advantage of the radio concert to alleviate neurasthenia. The assisting artists are Illuminato Miserendino, violinist, who will play Vice-Presi-

dent Dawes' "Me who knows what as a captive of w mezzo-soprano, w during the war w health in France (composer of "W proper way to lis cline with the h pointing to the no



THE MOST "advanced" exhibit set of the amateur operator's convention in New York City. Note the "stop-up"; it speaks aloud for the "ham's" sense of humor. (Foto Topics).



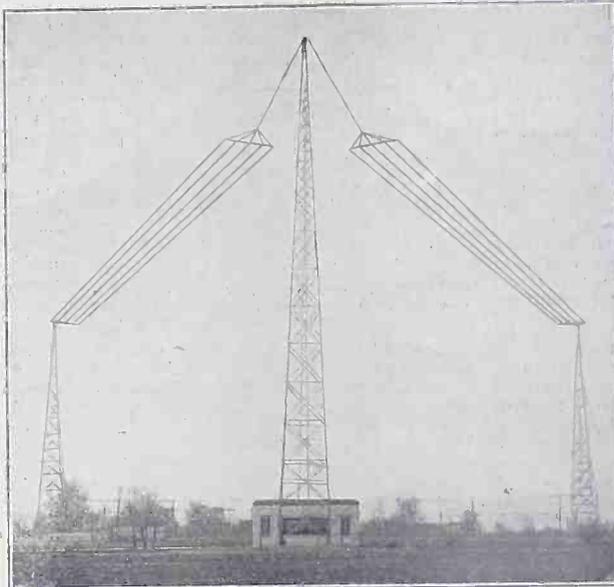
THIS is not a parlor duster but a folding aerial. (Kadel & Herbert)

t on Air

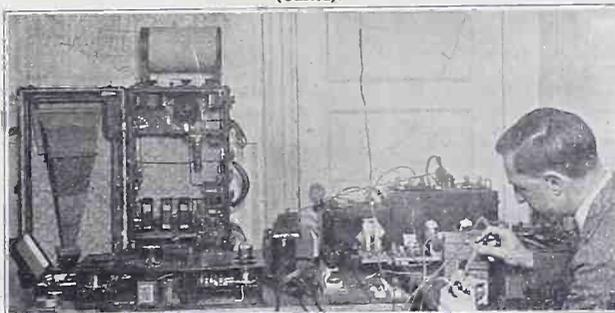


...; Bruce Cameron, Canadian pianist, nerves are, having spent four years in prison camps; and Paul Ayers, called the "musical shell-shock doctor" sang nerve-wrecked soldiers back to Byrd Mock, author and song-writer ("My Washington"), illustrates the music for its therapeutic effect, refer than the head and with the head Underwood & Underwood).

Ford Works by Radio



HENRY FORD maintains the largest private radio system in the country. The picture shows the antenna at the main plant in Dearborn, Michigan. (United).



A DAY'S WORK is not enough for this Bureau of Standards expert who also makes wireless telephony the hobby of his leisure hours. He is shown plugging in on a small set by means of which he communicates from room to room at his home.

2LO



THIS is the new antenna support of 2LO, London. Greater power will be used, DX hounds please note.



ROXY and his gang, known to every radio enthusiast throughout the land, photographed at the Capitol where they took the city by storm. They played performances for charity. From left to right are Newel Chase, Betsy Ayres, Tasha Bunchuk, Douglas Standing, Maria Gambarelli, Caroline Andrews, S. L. Rothafel (Roxie), William Robyn, Marjorie Harcum, Dr. William Axt, Julia Glass and Mrs. Glass. (Underwood & Underwood.)

The Significance of Tuning-In

By Dr. Frederick W. Grover

Department of Electrical Engineering, Union College, Schenectady.

EVERY radio fan knows what is meant by tuning in. You turn a dial on the receiving set until the sound is loudest. Without tuning, only the local stations come in, and it is impossible to separate one station from another. We tune our sets as a matter of course and naturally give little thought to the actual significance of what may be regarded as perhaps the most basic of radio adjustments.

When we liken an electric oscillation of current to vibration of a sounding body, or an electromotive force to a mechanical force, it must be remembered that they are not identical things. We must use our imaginations subject to common sense, and make some allowance for points of difference.

Tuning a String

A string instrument is tuned by carefully tightening a string until, when it is sounded, it gives off the desired pitch. The pitch of the sound is, however, the same whether it is struck, plucked, or bowed. We say that the string vibrates in its natural period. The same is true of any sounding body. Sound waves go off from it through the air and the pitch of the sound determines the wavelength, that is, the distance by which one pulse travels ahead of the next. Likewise a radio circuit may be set into oscillation by various means, but gives off electrical waves whose wavelength bears no relation to the method by which the oscillation is produced. The transmitting circuit has a natural period just as in the case of the string. Whereas the pitch of the sound given by the string (so many vibrations per second) depends upon its length and tension, so the pitch of the electrical wave (so many kilocycles per second) depends upon the amount of inductance in its coil and the capacity of its condenser.

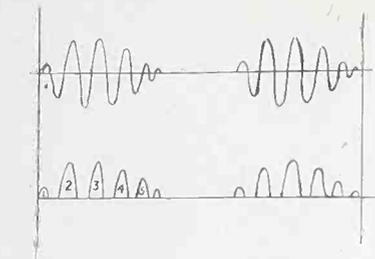
Trying It Out on the Piano

The analogy between a sounding body and an oscillating electrical circuit, used for broadcasting, may be extended to the case of receiving circuit also. If you sing a single note forcibly into the top of a piano, you will observe that one of the strings faintly sings the same note after you. Investigation shows that the single string involved, if struck in the usual way, gives out this note and no other. Of the multitude of strings in the piano all are practically unaffected, except the single strings whose natural period of vibration agrees with the period of the sound vibrations sung. Shout another musical note and another string responds, while the previous one joins the throng of silent strings. Evidently the sound waves of your voice have beat upon all of the strings of the piano, but are powerless to produce a noticeable vibration except in the case of the string which is tuned to the incoming sound waves.

Likewise, the electrical waves passing out from a broadcasting station produce no appreciable oscillations in a receiving circuit, unless its natural period of oscillation is the same as that of the incoming electrical waves. When we tune a circuit to the electrical waves it is just the same as if in the piano experiment we had worked upon a single string, by tightening it or loosening it, until it responded with greatest loudness to the note sung against it.

The Steel Spring Test

To get a clear idea of the actions involved in the vibrations of a sounding body let us consider the simple case of a thin strip of steel, say a foot long, clamped



GRAPHICAL representation of the wave you tune in. Both phases of the cycle on top; half cycles below.

at one end in a vise. If the free end is pulled aside, we feel an elastic force resisting us, and this gets greater, the farther we pull it from the original position. If now, we let the spring go, the elastic force causes it to return toward the undisturbed position, and we observe that it will vibrate for a short time, sending out pulses into the air. If we try a much shorter and stiffer spring, suitable for a harmonica, the vibrations are more rapid and we hear a musical sound.

An explanation of the vibrations of the spring is briefly, as follows:—The spring is bent aside at the start, and when released, the elastic force causes it to move. As it returns, the elastic force diminishes, and by the time the spring has reached the original undisturbed position has become zero. However, the spring keeps on moving, because of its momentum, and, as it passes, the undisturbed position begins to bend the spring in a direction opposite to the first, thus setting up an elastic force which works against the motion of the spring, slowing it down more and more until it comes to rest. The spring then moves back, and the sequence of events is repeated. If there were no friction, the spring would make equal excursions on both sides of the undisturbed position, and once started, the vibrations would never cease. Of course this is never the case; the vibrations die down gradually, and the spring comes to rest, since, with each excursion, the effect of friction is to reduce the distance travelled from the central position.

When Motion Stops

The original work, done on the spring in bending it aside, is the sole source of energy the spring possesses, and when this has been dissipated in overcoming the frictional resistances, the motion of the spring is at an end, just as truly as the independent activities of a spendthrift must cease when he has squandered all his capital.

To connect this discussion with the oscillating circuit, we have only to substitute the idea of current for the speed of motion of the spring; for elastic force, the voltage between the plates of the condenser; and for the inertia of the spring the inductance of the coil. If there be a certain charge given to the condenser, it is strained by an electrical force, and the electromotive force between its plates starts a current flowing when the circuit is closed. The electromotive force diminishes until it is zero, but the coil has inductance and the inertia thus given to the current makes it impossible for it to stop flowing at the instant when the electromotive force has become zero. As it continues to flow, this charges up the condenser with an electromotive force in the

opposite direction to the original, that is, in such a direction as to oppose the flow of current, and thus reduces the current finally to zero. The current then starts in the opposite direction and the action is repeated. If it were not for the electrical resistance of the circuit, these oscillations of current would continue indefinitely unabated in intensity. The energy originally given the circuit in the charge of the condenser is, however, gradually expended in heating the wire and the oscillations of current grow progressively smaller until they cease. To maintain continuous vibrations of the spring and continuous oscillations of current in the radio circuit, both require a steady supply of energy to make up for what is lost.

Effect of Tuning

There still remains to explain why exact tuning so marvellously increases the effectiveness of a weak train of waves in setting up vibrations in a body or electrical oscillations in a radio circuit. Perhaps one of the most impressive illustrations bearing on this is furnished by a suspension bridge. As some of you know from personal experience, it is possible by teetering up and down on a short suspension bridge to set up in it vibrations of really astonishing violence. Random impulses given to it accomplish nothing. The same is true if the impulses be regularly repeated, but are too slow or too fast. They must be timed to just the right frequency. Every impulse must aid the natural vibration of the bridge and none oppose it. Under such circumstances a company of soldiers keeping in step and treading upon the bridge with just the right frequency has been known to actually break a bridge. It is manifest that in such a case the bridge is not broken by any single impulse. The applied force is altogether too small. Vastly greater forces are involved in the bending or breaking of the bridge. When it is vibrating, the elastic forces set up when it is bent set its mass into motion, and when it moves its mass gives it such momentum that the motion bends it. The energy of vibration is at one moment all energy of bending and at the next all energy of motion. The effect of the impulses is cumulative. Each increases the energy of vibration by a little, until finally the vibration is large enough to set up frictional resistances which use up all the further impulses. Thus the small impulses give rise to enormous forces, but these are actually supplied by the elasticity and mass of the bridge. The bridge in a sense breaks itself.

Effecting Steady Oscillation

In a similar manner the weak waves coming to a receiving antenna set up in its circuit only a tiny electromotive force, far too small in fact to pass the necessary current for an audible signal through either condenser or coil alone. If, however, the circuit is properly tuned, each wave adds to the charge on the condenser, and thus to the current which flows in the circuit, until at length it is so great as to requisition all the weak electromotive force induced in the circuit by the waves, and for forcing the current through the resistance the current stops increasing. The circuit then oscillates steadily, but with vastly greater electromotive forces upon the coil and the condenser than the tiny voltage directly induced by the waves. It is these relatively large electromotive forces which are analogous to the large bending force and the force associated with the momentum

(Concluded on page 23)

The Radio University



A QUESTION and Answer Department conducted by RADIO WORLD for its Readers by its Staff of Experts. Address Letters to The Radio University, RADIO WORLD, 1493 Broadway, New York City.

I DESIRE to operate my regenerative Neutrodyne on a loop. Will the present five tube suffice?—William Boyd, Milford, Pa.
No, an extra tube is usually necessary for sat-

connecting a coil in parallel with a variable condenser. For the broadcast wave band the coil should consist of approximately 55 turns of No. 22 DCC wire on a 3" diameter tubing. A .0005

one can do in a case of this kind is to examine the coils with the utmost care, noting particularly that there are not short circuited turns and also make sure that positive connections are made to the ends of the coils.

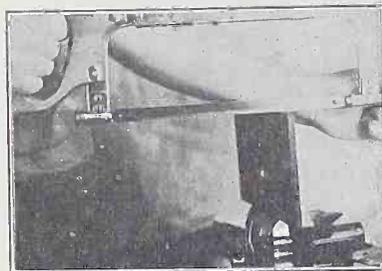


FIG 126, how to saw a panel on a vise.

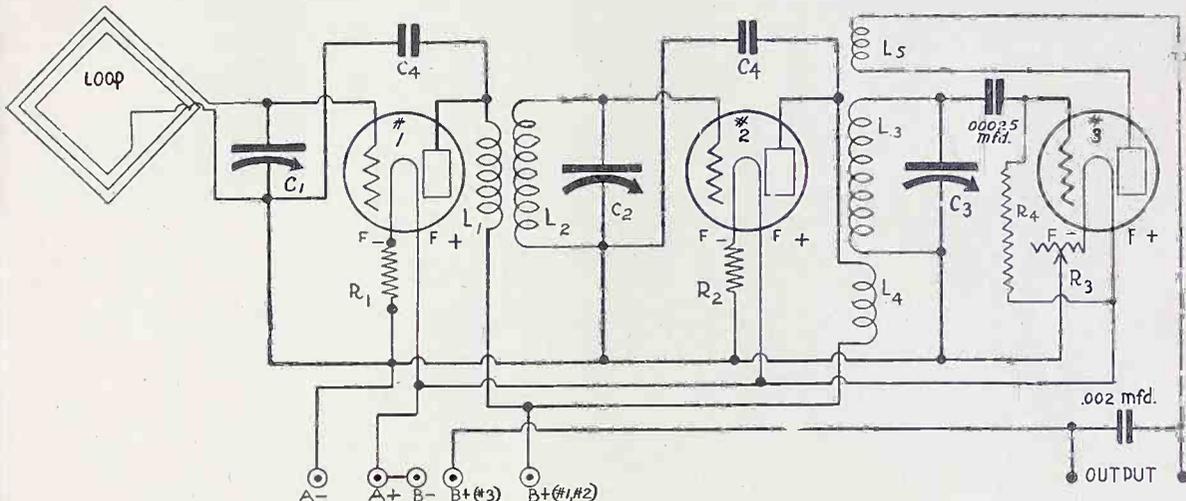


FIG. 125, a regenerative Neutrodyne, with an extra RF tube added for satisfactory loop operation. C1, C2 and C3 are .0005 mfd. variable condensers. The loop should be of an inductance valued suited to that capacity condenser. L122 is an RFT consisting of a 10-turn primary, 1/4" space and a 43-turn secondary. The wire is No. 22 DCC. L3L4 is wound the same as L1L2. The tickler L5 rotates inside the stator on which L3L4 are wound and consists of 26 turns of No. 24 SSC wire. The stator tubings are 3 1/2" diameter, 4" high; the rotor form is 2 1/4" diameter. The neutralization as shown here is between plate and grid of a tube. Midget or Chelton capacitors are used for C4, the neutralizing capacities, and may be panel mounted. If your set is wired the conventional Neutrodyne way, the tap for the neutralizing condenser would be at the 18th turn from the grid end (of L2 and L3). R1 and R2 may be amperities. R3 is a rheostat for the type of tube used. The audio stages are not shown.

satisfactory loop operation. The wiring is shown in Fig. 125.

IF two audio-frequency transformers of different ratios are available, namely 5:1 and 3 1/2:1, which should be used in the first stage?—Arthur Rice, 682 Fort George Ave., New York City.

The highest ratio audio-frequency transformer should be employed in the first stage and the lower ratio transformer in the second stage. This is done chiefly to prevent overloading the second tube.

HOW can I run 199 tubes from a 6-volt 120-ampere-hour storage battery?—Wm. Romaine, 153 West Forty-sixth street, New York City.

You can use a 50-ohm rheostat to cut down the voltage. Put it in the negative leg. Then include the usual rheostats at the side of the lead opposite the battery connection. Another way is to use a lamp. Since the 199 tube requires .06 ampere at 3 volts a large resistance will be necessary. With the ordinary wire wound rheostat this is not always easy. However, an electric light bulb does the trick nicely. For one tube a 50 watt 110 volt lamp supplies the correct resistance. It is placed in the negative lead. If it is desired a rheostat can be connected in series with the light bulb to provide a slight variation of the voltage. This rheostat may be from 5 to 30 ohms. If the supply voltage is 8 volts a 40 watt light with a 30 ohm rheostat will be required.

WHAT is a condenser? How is it used in a radio set? How does it operate?—Howard Morton, 190 Claremont Ave., New York City.

A condenser in a receiving set is designed to have a large capacity in a small space. It consists essentially of metal plates which are insulated from each other by a dielectric or insulating material. It is used in a radio-frequency circuit to tune an inductance coil to a certain wavelength, and is known in this connection as a variable condenser. It is used also to stop the flow of direct current and pass alternating current, and in this connection its capacity is fixed, and it is known as a by-pass condenser.

PLEASE give details for the construction of a simple wavetrap or wavemeter.—Dr. Adolph Baron, 1346 Lexington Ave., New York City.

A simple wavemeter may be constructed by

mfd. variable condenser may be connected in shunt with the above described coil. The antenna is connected to one of the two common terminals of the condenser and coil and the aerial post of the receiving set goes to the other. In other words, the device is connected in series with the antenna.

MY 3-circuit tuner does not operate satisfactorily. What is the remedy?—Chas. Aaronson, 8 Vermilyea Ave., Inwood, N. Y.

If the wiring is correct and the tube oscillates the fault is in one of the parts. The first thing to note is whether the set oscillates. If not, the trouble may be in either the grid leak or condenser. The condenser may be tested by shunting a small battery in series with a pair of phones across it. If no sound is heard, the condenser is not short circuited, but if a click is heard each time the battery is connected, the condenser is shorted and should be replaced. If this fails to show the trouble, it is probably in some other instrument in the receiver. The next things to examine are the coils and condensers. The variable condensers should be tested in the same manner as the grid condenser. It would require a lot of expensive apparatus, which is not usually available to the average radio experimenter, to test coils. The only thing

HOW may I best saw a panel straight?—Adolph Tishler, Jacksonville, Fla.

Use a vise to hold the panel in place. The line on which the saw is to travel should be perfectly straight and ruled with a tri-square. Fig. 126 shows the hacksaw poised, ready to begin the cutting of the panel. If the panel is not cut straight it will not fit against the cabinet flange.

WOULD the use of a C battery on the detector tube grid be better than the grid condenser-leak system?—J. J. Cunningham, 713 President St., Brooklyn, N. Y. No. 10,936.

No Nameplate Distribution

THE nameplates intended for distribution to fans building a circuit published in RADIO WORLD are not being distributed, due to the suggestion of a manufacturer that such distribution might interfere with his interests. A desire to be eminently fair necessitates disappointing all who applied for this nameplate.

Join RADIO WORLD'S University Club

and we will enter your name on our subscription and University lists by special number. Put this number on the outside of the forwarding envelope (not the enclosed return envelope) and also put it on your queries and the questions will be answered the same day as received.

And Get Free 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, and a number indicating my membership.

Name

Street

City and State

A THOUGHT FOR THE WEEK

RADIO has taken its place as the ninth wonder of the world—and is crowding the other eight pretty hard for position of honor.

RADIO WORLD

Radio World's Slogan: "A radio set for every home."

TELEPHONES: LACKAWANNA 6976 and 3083
PUBLISHED EVERY WEDNESDAY
 (Dated Saturday of same week)
FROM PUBLICATION OFFICE
HENNESSY RADIO PUBLICATIONS CORPORATION
ROLAND BURKE HENNESSY, President
M. B. HENNESSY, Vice-President
FRED S. CLARK, Secretary and Manager
 149 1/2 BROADWAY, NEW YORK, N. Y.
 (Putnam Bldg., Times Square and 43rd Street)
 European Representatives: The International News Co.,
 1100s Bldg., Chancery Lane, London, Eng., Paris,
 France, Brantano's 28 Avenue de l'Opera.

EDITOR, Roland Burke Hennessy
MANAGING EDITOR, Herman Bernard

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.
 Receipts by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order. Changes of address should be received at this office two weeks before date of publication. Always give old address also. State whether subscription is new or a renewal.

ADVERTISING RATES

General Advertising		
1 Page, 7 1/2" x 11"	452 lines	\$300.00
1/2 Page, 7 1/2" x 5 1/2"	221 lines	150.00
1/4 Page, 4 1/2" x 11"	113 lines	75.00
1 Column, 3 1/2" x 11"	154 lines	100.00
1 Inch		10.00
Per space line		.75
Times Discounts		
25 consecutive issues		20%
26 times consecutively or E. O. W. one year		15%
4 consecutive issues		10%

WEEKLY, dated each Saturday, published Wednesday.
 Advertising forms close Tuesday, eleven days in advance of date of issue.

CLASSIFIED ADVERTISEMENTS

Ten cents per word. Minimum, 10 words. Cash with order. Business Opportunities, 50 cents a line; minimum, \$1.00.

Mailed as second-class matter, March 28, 1925, at the Post Office at New York, New York, under the act of March 8, 1879.

MARCH 28, 1925

No Comeback!



"I SHOT a joke into the air,
 It fell to earth I know not where;
 But when I'd sown my meagre chaff,
 I listened close, nor heard a laugh,
 And felt that pang which all must know
 Who've jested through the radio."

THE hearing of the monopoly charges against eight large radio and allied companies was postponed two months, until May 18. The Federal Trade Commission preferred the charges.

The Political Microphone

WNYC, the municipal broadcasting station of the City of New York, supported exclusively by the public treasury, is still being used for political purposes by the city administration. A group of men and women who had the temporality to discuss putting some one other than John F. Hylan in the City Hall met with instantaneous abuse, shouted into the WYNC microphone by Francis P. Bent, a former alderman, personal friend of and office-holder under Mayor Hylan. The abuse was not only political but very personal. Br. Bent derided the Mayor's opponents, naming them categorically, and venting spleen on each. The opposition, however, had no opportunity to make reply before this political microphone.

It is a shame that the public is thus forced against its will to contribute to political campaign funds, as such abuse of the microphone entails. To call the offense an example of bad taste is a soft impeachment indeed. Fans take delight in tuning out a station when the microphone is cluttered up with such diatribes.

The Jury Retires

THE SERIES of seven fortnightly programs by artists of the Victor Talking Machine Company being over, the analysis of the result is being made, and the radio public eagerly awaits the partisan jury's finding. Resumption of such broadcasting depends on the verdict. Starting with John McCormack and Lucrezia Bori as the star singers on New Year's Night, the series wound up with a popular program, evidencing a desire by the Victor Company to test the response to varied sports of programs.

The whole experiment was decidedly beneficial to radio, although probably in a decrescendo manner, due to the appearance of the artists in chronological order proportionate to their fame. Unfortunately for radio, the Victor Company is not interested in the effect upon radio but upon the sale of phonographs and records, a business that suffered sinking spells due to radio's preferred position in an ever increasing number of homes. But the world is large and radioists are not precluded from an appreciation of a phonograph. Many the music and radio industries both prosper, and let us have more broadcasting of these great voices. Radioists do not begrudge the Victor Company the publicity it got as the result of its intelligent experiment.

More Portable Sets

WTH spring here, the radioist's fancy lightly turns to thoughts of portable sets, particularly those that can be operated on a loop. An added advantage of loop reception is its lessor tendency to bring in static, as compared with an outdoor antenna. This spring and summer undoubtedly will see more portable sets in automobiles and water craft than any previous season because of the present-day efficiency of the portable and loop sets.

Radio Betters Quality of Sermons, Says Ex-Pastor, at 84

New Deal to Be Given in Test to Discover Best Announcer

THE Rev. Dr. James M. Ludlow, Pastor Emeritus of the Munn Avenue Presbyterian Church, celebrated his eighty-fourth birthday by preaching the morning sermon, his first in the fifteen years since his retirement. Dr. Ludlow predicted that radio, "a scientific gain to humanity and a genuine pleasure to all mankind," would elevate the standard of sermons among the ministers of the country. He said that clergymen knew that their church members would remain at home to hear a good sermon being broadcast, rather than go to church "to hear the usual line which so often is given out from the pulpit on a Sunday."

Ministers throughout the country, he said, would improve the quality of their sermons, to hold their congregations. This in turn, he went on, would result in an increased church attendance and a growing popularity for religion.

BECAUSE of the large amount of public interest manifest in the findings of the Radio Voice Technique Committee at the recent meeting, Station WJZ has requested that the committee hold another meeting for the purpose of comparing the announcers of all stations in and near New York City. The committee recently listened to wax records of a representative number of announcers and voted Herbert B. Glover, of WJZ, as the best of those announcers.

Great public interest has been shown in regard to that decision, and Station WJZ feels that the term "Best Announcer" should be applied only to the winner of research in which every announcer has been examined.

REFLEXING THE 3-CIRCUIT TUNER YOU CAN LOG, described by Herman Bernard in the March 14 issue of RADIO WORLD. A 3-tube reflex of great DX power, volume and quality. Send 15c for copy of March 14 issue to Radio World, 1493 Broadway, New York City.

Hot Fight in New York for Place on the Air

THREE stations may open in New York soon to divide a new wave of 341 meters among them and seven organizations are fighting for the privilege, it became known when details of a meeting at the Customs House were revealed. Five stations are petitioning for Class B licenses, with the privilege of using higher power of 1,000 watts, in spite of the local tangle of waves, and some lively arguments developed.

S. B. Davis, Department of Commerce,

Many British Workmen Prefer Radio to Whiskey

LONDON.

THE British workman of today prefers wireless to whiskey and Bunyan to Barleycorn, Captain Charles Nicholson of the Salvation Army told the Finsbury justices at their meeting to consider liquor license renewals.

"Drunkenness has been reduced by one-half during the last few years," said the Captain, "and many public drinking houses are often empty on Sunday evenings. Radio has helped."

opened the conference by stating that there were more applications for licenses and wavelengths for Class B stations than

at any period since the inception of broadcasting.

FREE BOOKLET FOR INVENTORS
IF YOUR INVENTION is new and useful it is patentable. Send me your sketch. Z. H. POLADHEK, 70 Wall St., New York.
Reg. Patent Attorney-Engineer

LITTLE WONDER SOLDERLESS LUG
Holds Bus Wire Like Old!
Disconnect or Disconnect Wires Without Disturbing Terminal!
Price 10 for 5c. Ask your dealer.
Distributors Wanted.
Mfd. by PAUL GLAMZO
203 Lafayette St. New York

PANELS
FOR ANY KNOWN CIRCUIT
CUT, DRILLED AND ENGRAVED
PRICES ON REQUEST
Corlandt Panel Engraving Co.
81 Corlandt St. New York City

A \$5 HOME-MADE LOUDSPEAKER, by Herbert E. Hayden, in Feb. 7 issue. Send 15c for copy, RADIO WORLD, 1493 Broadway, New York City.

Bankrupt Stock Cunningham Regenerative one tube long range sets, \$10.50 each Formerly sold at \$32.50

No Circulators. Order from This Ad.
Hurry before they are all gone.
Prepaid while they last.

S. A. TWITCHELL

1930 Western Av., Minneapolis, Minn.

"Morsing Bus-Bar Union"

Assemble Round or Square Bus Bar and Solder Three Wires at a time.



Quick Assembling. Repairs Can Be Made Without Taking Set Apart.

Enough for one set, 25c
No. 1 for 14; No. 2 for 12 wire.
Ten dozen for \$1.00.

Newark Watch Case Material Co.
15 Ward Street Newark, N. J.
DISTRIBUTORS WANTED

RADIO WORLD'S

1925 Model 4-Tube
DX Superdyne

WONDER



Complete Parts for Resistance Coupled, Amplified Superdyne Circuit as Checked Specified and Certified by Herman Bernard, in this issue

\$45.00

These parts have been tested and approved by
RADIO WORLD

Herman Bernard
Managing Editor.

We are Expert-Specialists on BERNARD'S WONDER and have helped hundreds of fans to success with this great set. Let us help you.

Complete Parts for Superdyne Circuit as Specified and Checked by Herman Bernard	
One Wallace Coupler for Superdyne Circuit	\$7.50
One Double Flewelling Condenser	9.00
Two 4" Black Accurate Dials	2.95
One Federal No. 65 Audio-Frequency Transformer	4.95
One Federal No. 65A Audio-Frequency Transformer	4.95
Four Federal Sockets	.90
One .0025 Mfd. Doubler Grid Condenser	.85
One Variable Bradlyleak	\$1.85
One Bradlystat	1.00
One Bradley Push-Pull Battery Switch	.60
One 7x24" Black Radio Panel	2.85
One Tri-Jack	.90
Two Silver Eureka Dial Pointers	.20
Two Lengths of Spaghetti	\$0.20
One Terminal Block	.50
Wire, Screws, etc.	1.00
	\$42.50

The Flewelling Condenser

A Low-Loss Instrument of Precision Mechanically Superior—Rugged

THE CONDENSER DE LUXE
100% Perfect for Bernard's 1925 Model DX Wonder. Price, Complete \$9.00

As Certified and Indorsed by Herman Bernard

The Famous Wallace Coil

FOR SUPERDYNE CIRCUIT

A new, low-loss product correctly wound to cover entire broadcast range. A laboratory development by our skilled engineers, guarantees you real satisfaction for Bernard's 1925 Hookup. Price, complete, with blue print

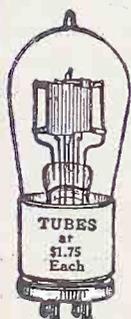
As Certified and Indorsed by Herman Bernard

COILS FOR HAYDEN'S 1925 PORTABLE IN STOCK
WALLACE RADIO COMPANY, Inc.

135 LIBERTY STREET, NEW YORK CITY

ADVICE ON SUPERDYNE CIRCUIT FREE IF NOT LISTED ABOVE, WRITE FOR IT

RESULTS GUARANTEED—MAIL ORDERS SOLICITED



SAVE \$1.25
ON COST OF NEW TUBES BY HAVING YOUR OLD TUBES REBUILT AT \$1.75 EACH.

Guaranteed equal to new. Send us your tubes by parcel post. We return them parcel post, C.O.D., and try to maintain 24-hour service.

400 Old Colony Ave.
Boston, Mass.

HARVARD RADIO LABORATORIES

A GREAT ISSUE—OUT NEXT WEEK RADIO WORLD'S THIRD ANNIVERSARY NUMBER

DATED APRIL 4

Why you should be represented in important space in RADIO WORLD'S THIRD ANNIVERSARY NUMBER—increased sales, as this issue will be advertised in other papers to 5,000,000 potential buyers of radio sets and parts. Will have special articles by authorities, and other special text and pictorial features.

Regular rates in force as follows:

1 Page, \$300.00; 1/2 Page, \$150.00; 1/4 Page, \$75.00; 1 Column, \$100.00; 1 inch, \$10.00; Per Agate Line, 75c.

Full page ads, the copy is received on or before March 23, will be run in two colors without extra cost, on request.

A really great sales medium.

Dated April 4. Published April 1.

Last form closes Tuesday, March 24.

RADIO WORLD, 1493 BROADWAY, NEW YORK CITY

MR. DX HOUND

A Character Created
By RADIO WORLD Artist

By HAL SINCLAIR



Literature Wanted

THE names of readers of RADIO WORLD who desire literature from radio jobbers and dealers are published in RADIO WORLD on request of the reader. The blank below may be used, or a post card or letter will do instead.

Trade Service Editor,
Radio World,
1493 Broadway, New York City.

I desire to receive radio literature.

Name

City or town

State

Are you a dealer?

If not who is your dealer?

His Name

His Address

THE RADIO TRADE

Five Radio Concerns Consolidate

PLANS for the consolidation of five radio companies into a holding company to be known as the Federated Radio Corporation were announced. The companies in which the new company will acquire a controlling interest are the Kova Radio Corporation, the Equitable Radio Corporation, Voluma Products, Inc., Eureka Battery Company and a cabinet company.

The holding company will have 500,000 shares of no par value common stock, of which 200,000 shares will be presently outstanding. L. T. McFadden, president of the new corporation, said yesterday that neither it nor any of the controlled companies has any funded debt or preferred stock. It will start business with \$400,000, he said, and no liabilities.

Coming Events

[Readers are requested to send in dates and places of future events not scheduled in this department.]

APRIL 19 TO 25—International Radio Exposition, Steel Pier, Atlantic City, N. J.

AUG. 22 TO 28—Third Annual Pacific Radio Exposition, Civic Auditorium, San Francisco. Address 905 Mission St., San Francisco.

SEPT. 12 TO 19—Fourth Annual National Radio Exposition, by American Radio Exposition Co., 522 Fifth Ave., N. Y. C., to be held in Grand Central Palace.

SUMMER—N. Y. City show, date not fixed; direction J. C. Johnson, American Exposition Co.

SEPT. 14 TO 19—Second Radio World's Fair, 258th Field Artillery Armory, Kingsbridge Rd. and Jerome Ave., New York City.

SEPT. 14 TO 19—Pittsburgh Radio Show, Motor Square Garden.

SEPT. 15 TO 19—Washington (D. C.) Radio Show. Address, Homer Bldg., Washington, D. C.

OCT. 17 TO 24—Brooklyn (N. Y.) Radio Show, 23d Regt. Armory. Address Jos. O'Malley, 1157 Atlantic Ave., Brooklyn, N. Y.

SEPT. 23 TO OCT. 4—International Wireless Exhibition, Geneva, Switzerland.

NOV. 9 TO 15—Milwaukee Radio Exposition, Civic Auditorium.

NOV. 17 TO 22—Fourth Annual Chicago Radio Exposition, Coliseum.

DEC. 1 TO 6—Boston Radio Show, Mechanic's Hall.

Date not set yet for exposition, also to be held in Chicago, direction of Harold Bolster.

1925 Washington Show Under Discussion

WASHINGTON. A COMMITTEE of the Radio Merchants' Association is scheduled to meet at Harley's restaurant this city to discuss the next annual Washington Radio Exposition.

Radio Called Aid to Music Trade

THAT the radio has brought about a marked increase in the demand for and sale of musical instruments, rather than the decrease that was predicted by many dealers and manufacturers, is the statement made by Rudolph H. Wurlitzer, of New York City, internationally known manufacturer of musical instruments, in a letter to Halsey, Stuart & Co., Inc., bankers for the company which bears his name.

- Claude R. Harper, Box 211 Elbert, West Va.
Dealer James Corbett Electric Co., Welch, West Va.
- James Carlen, 38 Mott St., Newark, N. J.
Finley Supply Co., Dalton, Ga.
- W. O. Sechser, 6450 Carleton Ave., Seattle Wash.
John A. Dollison, Quaker City, Ohio.
Win. F. Launder, 312 Stockbridge Ave., Buffalo, N. Y.
- L. R. McIntyre, Detroit, Mich.
S. E. Aiguire, Mansfield, Conn.
Melvin Youngman, Box 425, Eureka, Ill.
J. F. Shelar, 1623 Denison Ave., Cleveland, O.
E. J. Kaleschke, 5461 Lawton Ave., Oakland, Cal.
- Mike Yatsko, Box 447, Mt. Olive, Ill.
Floyd Hewlett, Grand River, Iowa.
Vincent J. Hoier, 527 No. Sawyer Ave., Chicago, Ill.
- C. F. Krisel, 413.3 North West Washington, D. C.
Carl L. Stevenson, Kiowa, Kansas.
Louis Rost, 12 Frederic Terrace, Orvington, N. Y.
- H. F. Falck, 4056.4 Ave. S., Minneapolis.
Oscar Scholpe, Larned, Kansas.
Alan Anderson, 1913 Portland, Louisville, Ky.
R. Simpson, cor. Dasston and Central Ave., Route 2, St. Petersburg, Fla.
Vergne De Mocker, 421 W. Elm St., E. Rochester, N. Y.
- David E. Ratcliffe, P. O. Box 846, Raleigh, N. C.
Raymond F. Young, Macon, Ill.
Miss Reva Coleman, Camp Point, Ill.
Dealer A. E. Cantrell, Camp Point, Ill.
Harry Snyder, Laurenceburg, Indiana.
Dealer C. Barrett & Son, Laurenceburg, Indiana.
Millard Wyes, Wayland, Iowa.
Dealer Boshart Bros., Wayland, Iowa.
W. E. Kinser, McComb, Ohio.
Hewaight Everett, Washington.
Elliott's Auto Repair Shop, E. C. Elliot, Beaver Falls, Pa.
- Robt. J. Snyder, 341 W 2nd St., Reading, Pa.
Dealer Bearman, R. S., Penn St., Reading, Pa.
E. J. Hansen, Magna, Utah.
M. A. Teed, Jetmore, Kansas.
J. F. Shelar, 1623 Denison Ave., Cleveland, O.
Oscar Perry, 524 1/2 Thayer St., Rhinelander, Wis.
Harvey Klein, 1415 Union Ave., McKeesport, Pa.
- Don L. Bickstead, Rivelstoke, B. C.
H. E. Wright, 34 Hewitt Bldg., Everett, Wash.
O. Peterson, 871 Brewster St., Bridgeport, Conn.
- L. H. St. Louis, Bureau of Motor Vehicles, Albany, N. Y.
Walter N. Mann, 747 Lexington Ave., Indianapolis, Ind.
Paul Burns, Park Pl., Oregon.
Emil Krulish, Ellis Island, N. Y.
Herman Schub, 132-73 Metropolitan Ave., Richmond Hill, L. I.
Bert Aldridge, 895 Grand St., Brooklyn, N. Y.
Justin R. Colby, Detroit, Mich., General Delivery.
- Maurice A. Teed, Jetmore, Kansas.
John S. Pascal, Weston, Nebr.
Clarence T. Jones, Chattanooga, Tenn.

LATEST PATENTS

- PATENTS on radio inventions granted by the U. S. Patent Office include:
- TUNING UNIT** of Radiophone Apparatus (No. 1,528,686), invented by Joseph Neumann, of St. Louis, Mo. Provides in combination with a loose coupler tuning coil a means for controlling the position of the coil while it is enclosed within a cabinet where it is protected from dust, dirt and the like.
- WIRELESS Telephone System** (No. 1,528,017), invented by Frank Conrad, of Pittsburgh, Pa., and assigned to Westinghouse Electric and Mfg. Company. Provides a modulating system adaptable to high power wireless telephone systems.
- SELECTIVE Signaling System** (No. 1,528,032), invented by Stephen A. Staeger, of Pittsburgh, Pa., and assigned to Westinghouse Electric and Mfg. Co. A secret and selective sending and receiving system whereby the carrier wave frequency is caused to vary through a predetermined cycle within certain limits.
- RADIO Signaling System** (No. 1,528,011), invented by Charles S. Demarest, of Ridgewood, N. J., and Milton L. Almquist, of Brooklyn, N. Y., and assigned to American Tel. and Tel. Company. A means for selectivity signaling a particular station.
- RADIO Signaling System** (No. 1,528,010), invented by Charles S. Demarest, of Ridgewood, N. J., and Milton L. Almquist, of Brooklyn, N. Y., and assigned to American Tel. and Tel. Company. Provides improvements in communication systems comprising a combined radio and wire system.

New Broadcasters

NEW class A stations were licensed by the Department of Commerce as follows:

Call	Stations	Meters	Watts
WHMB	C. L. Carroll, Portable Station, 1506 N. Amer. Bldg., Chicago	233	20
WHBN	First Ave. Methodist Church, 1st Ave. and 5th St., St. Petersburg, Fla.	258	10
WHBO	Y. M. C. A., Summer St., Pawtucket, Rhode Island.	231	50
WHBP	Johnstown Automobile Co., 101 Main St., Johnstown, Pa.	256	10

Business Opportunities Radio and Electrical

Rates: 50c a line; Minimum, \$1.00

WILL PURCHASE retail radio store; must be well established, bear strict investigation; state price, location etc., first letter; city preferred. "R. S.," 585 West 181st St., N. Y. C.

RADIO TUBE manufacturing plant for sale; will sacrifice. Box XI, Radio World.

RADIO STORE, wholesale and retail, well established; good trade; low rent; good location; no competition; owner interested in other business. Box XII, Radio World.

Professor Analyses DX Fan

(Concluded from page 18)

of the bridge vibration. It is these large electromotive forces which overcome the large oppositions of condenser and coil to the passage of the current. Taken around the circuit they are nearly equal and opposite, their small difference being the electromotive force induced by the waves, but the detector circuit is connected to receive their full effect.

It follows from these considerations that, if we could make the resistance of our receiving circuits small enough, waves however weak, could produce appreciable voltages upon the detector. On the other hand, the effect of waves for which the receiving circuit is not in tune is to alternately aid and oppose the natural oscillations of the receiving circuit, with the net result that very little current flows, and the detector is practically unaffected.

A circuit may be tuned either by varying the capacity of its condenser (elasticity of the circuit) or by varying its inductance (electrical mass of the circuit), and it is immaterial which, just as it is possible for a violinist to tune a string either by changing its tension or the length of the vibrating portion. The increase of electromotive force obtained by tuning is, however, greater (with a given current flowing) the greater the inductance and the smaller the capacity, just as the forces involved in the vibration of the bridge are greater the greater the mass and the smaller the yielding of the bridge to a given force. For each wavelength, however, the product of inductance and capacity must have a definite value depending upon that wavelength.

In conclusion, then, when you see your long distance radio friend silently turning a dial with a distraught air, you may feel sure that his anxious face does not indicate that he is afraid of losing a single word of the speaker. He is merely absorbed by the delicate task of so adjusting the electrical stiffness or electrical mass of his receiving circuits that they will allow the maximum current to flow and thus set up the greatest possible voltage across condenser, coil and grid.

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.



Cushion your Set!

Stop tube vibration! Prevent set from marring furniture! Used under set or tube shelf. Made of pure wool felt.

Set of 4 Radiofeet, including attaching screws or washers sent postpaid anywhere in the United States or Canada for \$1.00. Do not send stamps. Specify dark red (mahogany) or brown (oak) color.

NEODYNE ASSOCIATES

3121 Beenson Building
165 BROADWAY, NEW YORK

SOLVED!

—THE "B" BATTERY PROBLEM

Throw away your "B" Batteries and install a Kellogg Trans-B-Former. It gives you "B" Battery current direct from your electric light socket at the trifling cost of one-fifth of a cent per hour. Gives better reception—no interference. Write for details.

Kellogg Switchboard & Supply Co.
Trans-B-Former
1066 West Adams Street Chicago, Ill.

Tower's Scientific
\$2.95
ONLY 8 1/4 OUNCES

Everyone Interested in RADIO Should Write for this FREE Radio Book

Guarantee: Every product is made with the understanding that it is subject to the usual wear and tear of use. If in any case you are not satisfied, we will refund your money.

Bernard's Radio World's 1925 Model 5-Tube DX Wonder. Complete Parts as Specified and Indorsed by *Herman Serravallo*



\$44.50

- List of parts for the 1925 Model Superdyne DX Wonder, with Resistance Coupled Amplification:
- One low-loss WRS certified coupler
 - One WRS certified matched radio-frequency transformer
 - One flowelling double condenser
 - Five standard sockets
 - One 10-ohm wire-wound rheostat
 - One Bradlystat
 - One D12 Amprite
 - One .00025 mfd. fixed grid condenser
 - Two .001 mfd. fixed condensers
 - One double-circuit jack
 - One single-circuit jack
 - Two 4" vernier dials
 - One 7x24" radion panel
 - One 7x23" baseboard
 - Two 1/2" diameter hard rubber bushings
 - Two push-pull battery switches
 - Two silver Eureka dial pointers
 - Parts for resistance-coupled amplifier, consisting of three .005 mfd. fixed condensers, with three resistance couplers, 100,000 ohms each, and grid leaks, 1 megohm, .5 megohm and .25 megohm
 - One terminal block (binding posts engraved)
 - One box of assorted screws
 - Angle brackets for terminal block
 - 30 feet of bus bar wire
- 2 Fada Neutrodyns
1 7x26" drilled and engraved panel
1 baseboard
3 3/4" Fada type dials (bakelite)
1 Patent double filament control jack
1 Patent single-circuit filament control jack
2 single "WRS" bakelite double-contact panel mounting sockets
1 triple "WRS" bakelite double-contact mounting socket
1 Amco 8 ohm rheostat
1 Amco 20 ohm rheostat
2 Jefferson shielded audio transformers
1 baseboard
1 metal shield
30 ft. of tinned bus bar wire
1 Dubilier .00025 mica grid condenser
1 tubular certified grid leak
1 drilled and engraved bakelite terminal block
7 Fada binding posts
1 Dubilier by-pass condenser
1 Box of assorted screws, lugs, terminals, etc.
1 Fada book of instructions and schematic diagram prints

1 Fada Neutrodyno kit, consisting of 3 Fada new type Neutrodyns mounted on a new type Fada low-loss condenser

5-Tube Neutrodyno Set with Genuine Fada Neutrodyns and Complete High Grade Parts, \$39.50



OUR KIT PRICE, POSTPAID

\$39.50

This Receiver built in solid mahogany cabinet, completely wired ready for use without tubes or batteries

POSTPAID, \$62.50

YOU take no risk whatever in sending us your order. If you so instruct us, we will ship you any article by express subject to examination so you may examine it before acceptance or payment. If you order our Knock-Down sets, you will find every part exactly as specified. Our Kits contain complete parts for each circuit, down to last screw, nut and wire, packed in sealed cartons that eliminate all difficulty and doubt in the purchase and assembling of proper material. No more hunting for this or that missing part—everything is there! Our kits are endorsed by Mr. L. Cockaday, Radio Engineers and other eminent authorities.

WHOLESALE RADIO SERVICE
9 CHURCH STREET Dept. RW NEW YORK CITY

CLEARATONE
Radio Tubes
Types 11-12, 19B-200-201A
Built to the Most Rigid Specifications
\$1.50
METER TESTED
100 with Standard Base
Satisfaction Guaranteed
Mail Orders Carefully Filled
RADIO TUBE LABORATORIES
206 Broadway, New York City

EVEREADY
Radio Batteries
—they last longer

HOW TO MAKE A STORAGE B BATTERY described by Herbert E. Hayden in March 7 issue. Copy, 15c. RADIO WORLD, 1493 Broadway, New York City.

8 Weeks' Trial Subscription, \$1.00

TEAR OFF AND MAIL TODAY

KEEP ABEAST OF THE LATEST RADIO DEVELOPMENTS
RADIO WORLD
1493 BROADWAY NEW YORK CITY

Broadcast "Ads" Denounced by De Forest as Outrage

DR. LEE DE FOREST, inventor of the audion tube, rebuked broadcasting corporations which rent the air to advertisers, and urged the public to register its protests against this interruption

of an evening's entertainment by writing letters to the companies. He made his attack in a talk at a dinner of the Harvard Business School Club at the Harvard Club.

"In my opinion, it is nothing less than vandalism to turn this marvelous new instrument into the channels of advertising," he said. "The radio's chief function is to entertain and to educate, and, it seems to me, the radio is too fine a thing to be used for advertising purposes. Yet, this tendency to utilize the air for that purpose is rapidly growing. I have just heard that one station is charging almost \$1,800 an hour."

Dr. De Forest excused from his criticism the broadcasting of Victor and Brunswick record stars. The use of their names and the fact, expressed through the microphones, that records of artists' songs that can be purchased are legitimate, in the speaker's opinion. He added, however, that "some of the stuff" broadcast by the offending companies "is nauseating and vulgar."

Although out-and-out advertising over the radio is banned by the Federal Government, no action has yet been taken by the authorities to stop the practice. Dr. De Forest said that if it continues "to outrage the public sentiment" he felt sure the Government would step in.

After his speech Dr. De Forest predicted a decline in radio popularity if advertising broadcasting continues. It will then be found, he said, that the stations that do not "sell" the air will be in demand.



\$3.50
RADIO Storage "B" Battery
Lasts Indefinitely—Pays for Itself

22 Cells
24 Volts
Economy and performance unheard of before. Recharged at a negligible cost. Approved and listed as Standard by leading Radio Authorities, including Pop. Radio Laboratories, Pop. Set. Inst. Sta. cards, Radio News Lab., Lafax, Inc. and other important institutions. Equipped with Solid Rubber Case, an insurance against acid and leakage. Extra heavy glass jars. Heavy rugged plates. Order yours today! Just state number of batteries **SEND NO MONEY** wanted and we will ship day order received. Extra Offer: 4 batteries in series (36 volts), \$13. Pay expressman after examining batteries. 5 per cent discount for cash with order. Mail your order now!

WORLD BATTERY COMPANY
1219 So. Wabash Ave., Dept. 82, Chicago, Ill.
Makers of the Famous World Radio "A" Storage Battery.
Prices: 6-volt, 100 Amp. \$12.50; 150 Amp. \$14.50; 100 Amp. 216.00.
All equipped with Solid Rubber Case.

World FOR STORAGE BATTERIES RADIO
RKKA WEAF WGN WIS KHJ KGO KFAP WJY KOP

INDEPENDENT

NEW TUBES EACH \$1.59
ALL TYPES OF HIGH CONDUCTANCE AND LOW IMPEDANCE, ALL MATCHED VOLUME

3 for Four Dollars
5 for Seven Dollars
Matched Characteristics

REPAIRED OR EXCHANGED \$1.39
5 FOR \$8.00
Matched Characteristics

QUICK DELIVERIES
EVERY TUBE CARRIES A MONEY BACK GUARANTEE

Dealers—Agents—Wanted Everywhere

RADIO TUBE OUTLET
207 Market St. Newark, N. J.
Exclusive Distributors for Associated Manufacturers

Farmers Use Radio to Cash In on Grain Prices

HOW the farmers of the Northwest are cashing-in on their radio market reports is indicated by a letter received recently by WCCO, St. Paul, Minn., from a North Dakota grain elevator manager.

He stated that it is the custom for the farmers to bring their wheat in and take a ticket for it. They then watch the market until they believe the time right to sell. For instance, if they hear over the radio that there has been a big drop, they immediately telephone the elevator company to sell at once. The elevator manager stated that usually the farmers re-

ceived their radio market reports about a half hour before he received them by other means, with the result that if there was a drop and he received orders to sell, he sold at the old price until he received his corrected figures. Thus the elevator took the loss instead of the farmer.

"It will be necessary for the elevators to install radio receiving sets," he says, "judging from the way the farmers have taken to them in the past six months."

ACME POWR-BEE

Better Than "B" Battery

NO HUM NO NOISE
Reduces the cost of radio. At your dealer's or write,
THE ACME ENGINEERING CO.
Dept. 2 LOUISVILLE, KY.
Dealers write for big sales proposition

NEUTRODYNE KIT \$19.75

Complete kit of licensed Neutrodyne parts including panel, tube sockets, rheostats, jack, fixed condensers and grid leak. Neutroformers complete with variable condensers and neutrodons. Every part included even to screws and wire. Easy road plans.

Send No Money Order by Postcard
Pay the Postman

RADIO SURPLUS STORES
HELENA MONTANA

Famous for Quality and Service Amplatron Tubes

Banded to Give Service \$4.
List Price

Send in your old and burnt out Tubes—We will send you new **AMPLATRON**—any model—at \$2.50
Dealers and Jobbers—Write for Discounts.

Pennant Radio Laboratories
Dept. R.W., 23 Central Ave., Newark, N.J.

HERCULES AERIAL MAST

20 Ft. Mast \$10
40 Ft. Mast \$21
60 Ft. Mast \$45

All steel construction complete with guy wires and masthead pulley. We pay the freight.

A. W. HULL & Co., Dept. 83
2042 E. 79th St., Cleveland, O.

Write for literature and **FREE** Blueprint

RADIO MAILING LISTS

16870 Radio Dealers	Per M \$7.50
970 Radio Dealers in Mexico	Per List 10.00
1808 Radio Mfrs.	Per List 15.00
2324 Radio Jobbers	Per List 20.00
1125 Radio Jobbers, rated \$5,000 and up	Per List 15.00
714 Radio Jobbers, rated \$50,000 and up	Per List 10.00
597 Radio Mfrs. making complete sets	5.00
128 Radio Battery Mfrs.	2.50
125 Radio Cabinet Mfrs.	2.50
60 Crystal mounters for Wireless apparatus	2.50
25000 Radio Amateurs	Per M 2.50
325 Phonograph and Music Radio Dealers	5.00
7400 Radio owners	Per M 7.50

Guaranteed 88% correct. Ask for Price List and all other lists.

A. F. Williams, Mgr., List Dept.
Established 1880
166 W. Adams St. Chicago, Ill.

Two-For-Price-of-One Subscription Blank

For NEW RADIO WORLD Subscribers Ordering NOW

RADIO World has made arrangements

—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 JOURNAL** or
—**RADIO (San Francisco)** or
—**BOYS' LIFE**

—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
—eight publications for twelve months.

This is the way to get two publications

—Add \$1.00 a year extra for
—Canadian or Foreign postage.
—Present **RADIO WORLD** subscribers
—can take advantage of this offer by
—extending subscriptions one year
—if they send renewals NOW.

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 Journal**, or \$10.00 for two yearly subscriptions.

Indicate if renewal. Offer Good Until April 20, 1925

Name _____
Street Address _____
City and State _____

RESULTS

RESULTS EDITOR:

MY first interest or attention to radio commenced with a purchase of your issue of Nov. 29 last, and I have been a regular student of your interesting weekly since.

A week ago I completed the 1-tube set, by Lt. Peter V. O'Rourke, described in your issue of Dec. 6 last. During the past week have had the pleasantest experience of receiving from the principal broadcasting stations, but had not received from any coast stations, until late last night, when a musical program from the Boston Herald Studio, came in clear, through station WBZ, then at 1:20 this morning, tuned in station KGO, broadcasting a program from the St. Francis Hotel, San Francisco.

C. N. RUNYAN,
Attorney at Law,
Vermillion, S. D.

RESULTS EDITOR:

I HAVE tried many of the circuits published in RADIO WORLD. I never have been so fully satisfied as with "The 3-tube Superflex." It is perfectly true, as you say, that it certainly comes up to any one's expectations.

I get splendid reception both local and DX, and I can assure you I am more than satisfied because no one could wish a more selective circuit and I am sure it would satisfy the biggest critic. If one takes a little trouble with the coils the results are certain. I had to put an .002 across the primary of the 1st AFT.

FRANK LE COURSE,
444 East 146th St.,
New York City.

ONLY THREE TUBES

and it is the equal of any five-tube set ever built. It has selectivity and volume equal to any Super-heterodyne or Neutrodyne.

It has the purity and quality of tone of the crystal set.

It has the simplicity of control of the single-circuit set.

It has brought in Honolulu, Paris, London and other foreign stations on a loud speaker.

It gets distant stations with a 500-watt station only three blocks away in broadcasting.

It has only two controls and can be logged.

It is set a reflex; it is the result of years of careful and scientific research and experiment.

Any novice can build one successfully from our diagrams with complete instructions and special coil.

PRICES

Diagram, instructions and coil . . . \$5.00

Three-tube instrument ready to use . . . 60.00

One-tube instrument ready to use . . . 18.50

Build or buy one of these wonderful sensitive instruments and you will want no other.

All goods shipped prepaid.

S. A. TWITCHELL CO.

1828 WESTERN AVE. MINNEAPOLIS, MINN.



Light Your Tubes
Right from Lamp Socket

SUPER-A-UNIT

replaces the "A" battery, furnishes 6 volts for the filaments direct from 110 v. lamp socket.

CLEAN — ECONOMICAL — CONVENIENT

Price for A.C. \$48, for D.C. \$32

Send no money. Pay expressman. If not satisfied return in ten days; money will be refunded.

DEALERS—Write for proposition
U. S. RADIO EXCHANGE

925 BROADWAY NEW YORK, N. Y.

Waves Under 3/4 of a Meter Opened to Amateurs

THROWING open wavelengths between .7477 and .7496 of a meter for experimental use of amateurs, Secretary of Commerce Hoover opened what is expected to be an epochal period in wireless communication. Low wavelengths or high frequencies have been employed by radio experts for long distance transmission from various points

in the United States to Australia and other far removed countries.

Experts declared that the opening of low wavelengths will mean a vast widening of transmission bands and eventual solution of the interference problem. It will give amateurs and experimentators an opportunity to try out the Marconi Beam System.

THE ASTON CARD INDEX RECORD YOUR RADIO STATIONS

Copyright
1924 by
S. T. Aston
& Son



\$3.00

Complete
Postpaid

Telephone
Franklin
2159

100 Cards, Mahogany Finish or Oak Cabinet, and Index Dividers. A Useful Accessory to Any Set. Give Name of Set and Sketch of Dial Arrangement. Postpaid on Receipt of Cash or Money Order. Dealers Write for Terms.

S. T. ASTON & SON

114 WORTH STREET NEW YORK CITY

MAHOGANITE and BLACK RADION PANELS

DIALS, KNOBS, TUBING, SOCKETS
RADION LOUD SPEAKER HORNS, ETC.

"THAT SPECIAL SIZE" FOR YOUR
PHONOGRAPH, PORTABLE OR SUPER

ALL STOCK SIZES

WHOLESALE

RETAIL

Send for Complete Price List

New York Hard Rubber Turning Co.

111 Centre Street

New York City



Hook-ups!

All the latest and
best 'kits' in our new

RADIO CATALOG

FREE

NO other Radio Catalog includes such a complete assortment of the best and latest Knock-Down Kits, Parts, and Accessories. You need this book—write for your FREE copy today!

An Unequaled "Kit" Service

All parts for each "KIT" have been carefully selected and tested by our staff of graduate Radio Engineers—satisfactory results are guaranteed.

Dealers!
Jobbers!
Manufacturers!
ATTENTION!

We will pay you spot cash for your surplus stocks—brand-new apparatus only! Write and tell us what you have.

Completely drilled and engraved panel included with each "KIT". Makes set building easy and sure. No other concern gives this FREE service. Easy to understand instruction Book and Blue-Prints included with each Outfit. No technical knowledge required to build your radio set.

Save Money On GUARANTEED APPARATUS

Our business is to buy up manufacturers' and government surplus stocks, jobber and dealer bankrupt stocks—but only brand-new, fully guaranteed, nationally advertised apparatus. Our enormous buying power permits us to pay spot cash and get rock-bottom prices—even way below manufacturers' costs. That's why our catalog is crammed with thousands of wonderful Radio Bargains.

Remember our motto: **Salvage means—
SAVE, SERVICE, SATISFACTION**



N. Y. Hotel Has Sets in Suites

RADIO has won its way into one of the great American hotels. Announcement was made by John McEntee Bowman, president of the Bowman Biltmore Hotels Corporation, that he had installed radio receiving apparatus in the suites of the Biltmore, New York City. Each is equipped with an individual radio set of the radio-frequency circuit type. This innovation in hotel service marks a long stride forward for radio in its progress from the status of toy and novelty to its present position as a potent entertainment and educational factor.

It is believed that Mr. Bowman is the

glowing with pride over the radio programs of the "old home town."

STAGE DOESN'T ATTACK RADIO IN THIS CASE
LEE AND JACOB SHUBERT, theatrical producers, will build a hotel at 227-239 West Forty-fifth Street, New York City, with built-in radios in every room. It will be a 15-story apartment hotel.

The Weekly Rebus

WHAT does this Rebus represent? Send answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City.

The names of those sending the solution will be published.

first actually to install individual receivers in hotel suites. The innovation is an experiment, and if it works out as planned it is the intention to install similar sets in each of the rooms not only of the Biltmore but all the hotels in the Bowman chain.

Lots of Fun for Guests

The inclusion of radio in the service of the modern hotel tends to cause the guest to realize that he can travel today without sacrificing in the least the homey atmosphere and comfort he has been accustomed to.

The value of radio service as a phase of personal attention accorded to hotel patrons is believed to be worth while. In addition to enabling the guest to listen in on the multitude of entertainments being broadcast daily and nightly from stations in New York City and the metropolitan district, the sojourner at the Biltmore is able to tune in his home city, providing the distance is not too great, and to enjoy the unique pleasure of

S. HAMMER RADIO CO.
 303 Atkins Avenue, Brooklyn, N. Y.
 Please send me FREE, Your NEW
RADIO CATALOG

Name
 Address
 City State

FILL OUT AND MAIL

"A THING OF BEAUTY AND A JOY FOREVER."

5-TUBE TYPE 5A \$50

183 Greenwich St., N. Y. C.

LOG YOUR SET WITH "MY RADIO RECORD"

Broadcasting stations alphabetically arranged on forms for logging. Improved radio map. New device for locating stations on map and measuring distance.

A new pleasure and a real help in radio. Read about it in March 21st Radio World, page 15. Send Check or Money Order for 50 Cents.

A. W. WAITE, Inc. Rosabank, N. Y.
 23 Sea Avenue

5-Tube Tuned Radio Frequency Set \$59, Liberal discount allowed
 Thousands of satisfied owners
AMEREX ELECTRIC CORP.
 232-E GREENWICH STREET NEW YORK

Clear-O-Dyne
 Four and Five Tube Sets
 No set of an equal number of tubes will do more, yet the price is very moderate.

The Cleartone Radio Co.
 466 East McMillan St.
 CINCINNATI, OHIO

Free Mailing Lists
 Will help you increase sales. Send for FREE catalog giving countless prices on classified names of your best prospective customers—National, State, Local—Individuals, Professions, Business Firms.

99% Guaranteed by refund of 5¢ each

ROSS-Gould Co. 35 N. 10th St. St. Louis

BELL TONE RADIO TUBES

TYPE 201-A \$1.75 TYPE 199 12

199 With Standard Base
 Life, Tone and Volume
 With Money-Back Guarantee
 Mail Orders Promptly Filled

Manhattan Lamp Works
 Room 411, 324 West 42nd Street, New York City

"SELECTODYNE COILS"

COPYRIGHT APPLIED FOR

SELECTIVITY—FOR THE ROBERTS CIRCUIT ALL THAT THE TONE—POWER THE NAME IMPLIES

A low loss winding that is self-neutralizing. The neutralizing condenser and bucking winding are eliminated with their loss of selectivity and volume. A new development in radio frequency amplification setting a much higher standard of efficiency.

GUARANTEED WITHOUT RESERVATION **PRICE, \$7.50 PER SET**

"When Better Coils Are Made They'll Be Selectodynes."

AT YOUR DEALERS OR DIRECT BY MAIL

SOME TERRITORY STILL OPEN TO JOBBERS—WRITE OR WIRE

DAST DUPLER COMPANY
 MANUFACTURERS AND DISTRIBUTORS
 245 East Seventh Street, Long Beach California

WHY NOT SAVE 20% FROM LIST PRICE ON EVERYTHING? NO EXCEPTION— ALL STANDARD RADIO MERCHANDISE OF EVERY TYPE AND MANUFACTURE

from complete sets to parts, tubes, and loud speakers, such as:

Atwater-Kent	Elseman Magneto	Kennedy
A. C. Dayton	Federal	Malone-Lemmon
Baldie	Freshman	Magnavox
Cunningham	Grebe	Paragon
		Radio Corp.
		Western Electric
		Workite
		Zenith, etc.

MAIL ORDERS FILLED; 10% DEPOSIT WITH ORDER. 25% ON ORDERS OVER \$25
 YOU PAY US ONLY AFTER DEDUCTING 20% OFF LIST PRICE

ECONOMY RADIO SALES CO., P. O. Box 99, Station O, Dept. 10, New Yo

Radio World's
Classified Ads.

Pay Advertisers.
 10c a Word. \$1 Minimum.

Is there anything you want to

**BUY?
 SELL?
 EXCHANGE?**

Use Radio World's Quick-Action Classified Ads.

RADIO WORLD
 1493 Broadway New York City

New Corporations

Whiteland Radio & Electric Corp., apparatus, \$15,000.00. Samuel C. Wood, Raymond J. Germain, Harry C. Hand, New York. (United States Corporation Co.)

Selko Radio Corp., \$3,000. L. E. & S. Selikowitz, E. Feinson. (Atty. J. Feinson, 299 Broadway, New York City).

All Service Electric Co., N. J., \$125,000. A. Lawrie Young, Francis Zeliff, Totowa; Otto F. Lutoff, Paterson; Florence Eathorn, Hillburn. (Attys. Young & Randall, Paterson).

Atlas Colonial Corp., apparatus, Hackensack, N. J., \$5,950,000. (Registrar & Transfer Co.)

Modulo Tube Corp., apparatus, 1,000 common, no par. L. C. Haggerty, E. Vogel, R. W. Carillo. (Attys. Smith, Haggerty, King & Corcoran, 17 E. 42d St., New York City).

Arc Radio Sales Corp., Newark, N. J., 1,500 shares, no par. John G. Herbst, Fred Brown, Belleville; Eugene H. Smith, Newark. (Atty. Harry Griffinger, Newark).

Bear Radio Products Corp., Newark, N. J., \$25,000. Mark B. Wagner, Isidore Bayer, Harry Citret, Newark. (Atty. Harry Citret, Newark).

Gold Medal Radio Corp., \$25,000. H. Klein, T. West, Jr., W. Griffith. (Attys. R. & R. W. Griffith, 104 W. 61st St., New York City).

Acer Radio Products, \$250,000. William Sloan Simons, Edward C. Wells, Rockville Center, L. I.; Wendell H. Garrison, Bayside, L. I. (Leonard E. Wales, Wilmington, Del.)

Wallington Radio Cabinet Work, Wallington, \$25,000. Gustave Baur, Louis Walter, Edward Bauer, Wallington; Edward Lofquist, E. Ruthenford. (Atty. Thomas J. Kennedy, Passaic, N. J.)

California Amateur Gets 1924 Hoover Cup

HARTFORD, CONN.

THE highest honor in amateur radio, the 1924 Hoover Cup, has been awarded to a California radio man, B. Molinari, of 653 Union Street, San Francisco. The cup is given annually by Secretary Hoover to the operator of the best amateur radio

station in the United States in which the bulk of the apparatus is the handiwork of the operator himself. The 1924 cup is the last of the Department of Commerce trophies now authorized.

THOUSANDS OF BARGAINS
FACTORY GUARANTEED HOSE, BY MAIL
 Genuine New Radiotron or Cunningham Tubes
 UV-193—300—201A—WD-11—12..... **\$2.39**
 C299—300—301A—C11—12.....
 Fresh Burgess or Eveready Batteries
 22½ Volt large size \$1.68—45 Volt \$5.00 size \$3.85
 Write for Free new Complete Catalog on
 Sets and Parts
STONE ELECTRIC CO., 714 Pine St., St. Louis, Mo.
 All Mds. F.O.B. St. Louis, Mo. Dept. W

WRITE FOR NEW CATALOGUE
 Home of Semi-Assembled Kits
THE RADIO SHACK
 55 Vesey Street Dept. C-154 New York

Tested and approved by Radio World

"TRI-TUNER"



Build Your Own Set!
 Use Arc Rad Products.
 A Three-Circuit Coil, all Litz wound on natural bakelite.
 SENT PREPAID **\$3.00**
 Panel shield and hook-ups included. Fahnestock clips used.
 Eliminates Soldering

ARC RAD PRODUCTS
 48 South 7th Street Newark, N. J.
 EVERY PRODUCT GUARANTEED

COMPLETE 1924 INDEX OF RADIO WORLD, appeared in RADIO WORLD, dated Oct. 18, 1924, and Jan. 10, 1925. 15c per copy.

818 APPLY FOR LICENSE TO HEAR PROGRAMS AS JAPAN STARTS IN WASHINGTON.

BROADCASTING with temporary equipment has started in Japan. A total of 818 applications for receiving sets had been received up to February 20, 1925. Sales of radio sets and apparatus continue to be encouraging, cables Acting Commercial Attache Frank Rhea, Tokio, to the Department of Commerce.

\$ ONE-FIFTY \$ WHY PAY MORE?

W. H. Bryant's

\$1.50

BESTONE TUBES



are sold DIRECT. That's why you can save the jobber profit.

State type desired when ordering. Just pay the postman.

\$1.50 plus postage

W. H. BRYANT

453 Washington St., Boston, Mass.

DEALERS:—Write for our agency proposition.

The Broadcast Listener

A SMALL PAPER WITH LARGE POSSIBILITIES FOR THE WELFARE OF THE B. C. L.

Vol. 1

MARCH 28, 1925

No. 2

EDITORIAL

WITH this week's issue we desire to announce a new departure in our endeavor to satisfy our many customers—present and prospective.

Each week we will here list a number of SPECIALS with prices for the ensuing week only. This gives you one whole week to take advantage of quoted prices.

We will handle standard parts of reputable manufacturers only and the prices will be the lowest consistent with good merchandising and a "square deal" to our steadily growing family of satisfied customers.

We aim to please, to satisfy you and hope to have your good will back of our efforts.

Cordially yours,

B. C. L. RADIO SERVICE CO.



B.C.L. RADIO SERVICE CO.

Our Catalog of 1,000 Bargains FREE! Ask for it.

!! THIS WEEK'S SPECIALS !!

"Bruno" "66" ALL BAKELITE
 THREE CIRCUIT TUNER—ALL LITZ ALL BAKELITE 10-20-30 Ohms
RHEOSTAT
 PARTS **\$2.50 59c**

GENERAL INSTRUMENT PARTS

PYREX VARIABLE CONDENSERS	FIXED MICA CONDENSERS
ALL CAPACITIES	ALL CAPACITIES
\$3.75	25c

BRANDES 'PHONES	HAMMARLUND "B"
\$3.75	VARIABLE CONDENSERS .001-44 PLATES
	\$4.50

BRUNO 3 Tube Kit for DX

A complete set of parts of the best quality to build the Famous BRUNO "66"

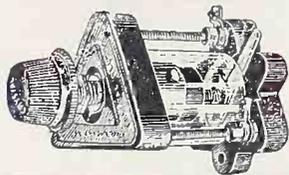
The complete Kit with engraved and drilled Panel **\$21.50**

FREE With this Kit one 7 x 18. MAHOGANY CABINET

B. C. L. Radio Service Co. 218 FULTON ST. NEW YORK

Mail Orders Promptly Filled. Add Postage.

FRESHMAN DOUBLE ADJUSTABLE CRYSTAL DETECTOR



World's Best For Crystal or Reflex Sets

No more searching for the sensitive spot—merely turn the knob as you would a dial.

Loop-end contact!

Non-metallic housing!

Stays set when adjusted!

Withstands high voltages!

For Base or Panel mounting, complete with crystal **\$1.50**

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

Chas. Freshman Co. Inc.
 Radio Condenser Products
FRESHMAN BUILDING
 240-248 W. 40th Street, New York

THE DX WONDER

(Concluded from page 10)

the resistance-coupled audio stages should be .006 mfd. or higher capacity. In each of the three AF stages, to the left of the .006 fixed condensers in Fig. 1, is a fixed resistance connected from B battery plus to plate of the preceding tube. This is

If Your Neut's Gone Back on You—

Rebuild it to this Kladag Coast to Coast Circuit, using same old panel, almost same parts, but no Nightmare of Neutralization. Twenty-two feet of gold sheathed wire, with only extra part and simple, complete instructions—\$6.00, prepaid anywhere. Nothing more to buy. Over a thousand "converted" Neuts are daily bringing in clean, resonant volume from Coast to Coast. Details—10c. 48 page master catalog of PARTS ONLY—10c.

KLADAG RADIO LABORATORIES, Kent, Ohio



CUT OUT THIS AD

Send it to us with \$1.50 and receive a perfect tube—any type.

Mastertone Radio Co.
903 Broad St. Newark, N. J.

Regular \$30 Value
3 TUBE SET \$18.50

8 Circuit Tuner Guaranteed to give as good results as sets selling at \$60. Fine mahogany cabinet. Engraved Panel and dials to match. We pay transportation. Send Post Office or Express Money Order. Gives satisfaction or money refunded.

JULIUS HOWARD, Dept. R.W.
217 West 125th Street, New York, N. Y.

Make \$100 Weekly—sell RADIO

Demonstrate Once — Results Mean Sure Sale Coast to coast, lowest prices, attractive four-tube instrument \$39.50. Big commission to you. Exclusive territory to proven salesmen. Territory going fast, write today for large illustrated book No. 100. Don't fail to name your county.

OZARK, Inc.
809 Washington Blvd., Chicago, Ill.



Easy Sales Big Profits



the coupling or plate resistance and is of the same value, .1 megohm (one-tenth of 1,000,000 ohms, i. e., 100,000 ohms) in all three cases, R4, R6, R8. The resistances to the right of the .006 condensers are grid leaks, the resistance of which is progressively smaller as the stages increase. They vary inversely. The grid leak R5 has a resistance of 1 megohm (1,000,000 ohms); the second grid leak, R7, is .5 megohm (500,000 ohms) and the remaining grid leak, R9, is .25 megohm (250,000 ohms). These values have proven successful and are the ones used in the 3-stage resistance amplifier unit produced by Daven, already wired. But if you are going to construct the resistance amplifier you may use grid leaks of the proper values for all the resistances in the audio stages. Be sure that you use dependable products, as it is difficult to make resistances that really have the rated resistance.

The voltages to use depend on the tubes. The tubes should be C301A or UV201A tubes for the four amplifiers. The resistance values given for the audio stages were computed with that idea in mind.

The plate voltage in the RF stage should be about 90, and the same voltage will give satisfaction in the audio stages. Those desiring still greater volume may benefit by adding an extra B battery, bringing the voltages to 135 for the audio tube plates. The RF tube voltage remains at 90, however, and the detector plate voltage at 45. If different voltages are to be used, such as 90 on the RF tube and 135 on the audio tubes, it is well to connect the B minus and A plus from battery post to battery post, and use the extra cable for the 135-volt lead.

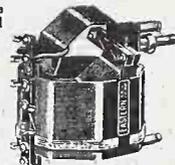
The by-pass condensers C3 and C4 may be soldered to jacks, in the case of C3, between outside right angle and outside spring. The inside spring of J1 that makes contact with the outside hooked spring goes to the grid blocking condenser, .006, at left in Fig. 1, and to one side of the resistance R4, .1 megohm. The remaining spring, making contact with the right angle of the double-circuit jack, goes to the other end of R4. The right angle goes to B+, the hooked outside spring to plates. Thus when the jack is closed the inside springs respectively make contact with plate and B plus 45 volts. When the plug is inserted these connections are cut out.

In wiring the set, except to affix a condenser to a jack, and the like, it is not necessary or advisable to solder. Bare No. 14 wire may be used, eyelets being

made with round-nosed pliers or busbar benders, so that binding posts screws may be tightened onto these loops. The electrical connection is just as good as a soldered one and the danger of impairing the efficiency of the set by accumulation of flux is safely absent. I always use No. 18 double cotton covered wire for internal connections, and while it does not make as pretty a job as busbar or even the bare No. 14, sets never work better, often worse, under the busbar system.

LOW-LOSS COILS

in the Famous Pickle bottle form designed by M. B. Sleeper



Certified by HERMAN BERNARD

for use in the Radio World's 1925 Model

DX SUPERDYNE

Guaranteed for best results in this wonder circuit

Price \$8.00 per set

At your Dealers or direct postpaid.

EASTERN COIL CORP.

Dept. R.W., 22 Warren St., New York, N. Y.

Now \$3.50 C.O.D.



Direct from factory to you

THE RABAT SENIOR
4200 MIL. AMPS. CAPACITY

FOR A LIMITED TIME ONLY

You can purchase for \$3.50 a 12 cell 44 volt RABAT SENIOR battery. Saving \$6.00 through direct buying. The Jobber and Dealer profit now is yours. 24 cell 48 volt size \$7.00.

Rabat Senior Batteries

are neat, powerful, noiseless and will harmonize with any Radio Set. Separate cells and patented rubber cork prevent current leakage and clear glass tubes give vision of the condition of battery. Heavy duty plates 1 1/2" x 2 1/2" with staggered ribbed grid form the backbone of this sturdy battery. Shipped completely charged ready for instant use. And you can save \$6.10 by ordering now.

RABAT JUNIOR BATTERY \$2.15 c. o. d.

(12 cells 24 volts 1200 M.A. CAPACITY) Incomparable in price and performance. Designed to satisfactorily operate sets equipped with 3 tubes or less. Constructed of the same high grade materials as used in our Senior battery. Shipped dry, uncharged. Order today and save \$1.80. Rabat batteries can be recharged at home at a very low cost.

Rabat Super-Charger \$3.00 c. o. d.

is specially designed to satisfactorily recharge any make of storage "B" battery. Shipped complete ready to use, including jump locker, attachment plug and cord. You save \$1.80 by ordering direct.

SEND NO MONEY

But write us today, advising quantity and type wanted. After examining and approving these wonderful batteries then pay the Expressman the small C.O.D. charges.

The Rabat guarantee is back of all our products. DON'T WAIT. ORDER TODAY and save the middleman's profit.

THE RADIO RABAT COMPANY

1768 St. Clair Avenue Cleveland, Ohio

THE Summit TOROIDAL

RADIO FREQUENCY TRANSFORMER

USED in exactly the same manner as the open radio frequency coils—they are self balanced and self neutralized. They have no stray fields nor leakage, nor can they feed back, thus assuring the radio set builder of correct operation without howling or squealing.

One builder using these Transformers in the SUMMIT circuit received 54 stations in two nights, traveling West to Denver and South to Mexico City. This circuit with instructions for building enclosed with each set of Transformers.

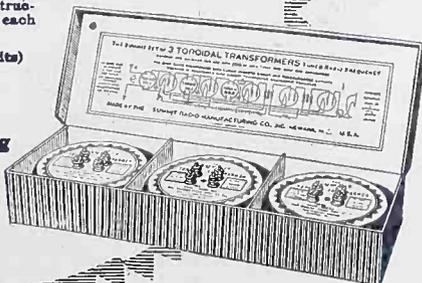
List Price (Set of 3 mated units) \$10.00

Distributors and Jobbers Wanted

Summit Radio M'fg Co., Inc.

Dept. 27

481 Broad Street Newark, N. J.



Pat. Applied For



New York's newest and most beautifully furnished hotel—accommodating 1034 guests
Broadway at 63rd Street.
ROOM WITH PRIVATE TOILET \$250
ROOM WITH PRIVATE BATH \$350
ALL OUTSIDE ROOMS

N. Y. University to Broadcast

NEW YORK UNIVERSITY is planning to erect a radio broadcasting station on the campus on University Heights, New York City, using as a support for the antenna the mast of Sir Thomas Lipton's yacht, the Shamrock IV. The University Council announced that the mast of the yacht with which Sir Thomas attempted to lift America's Cup in 1920 had been accepted from him for a flagpole as well as an aerial support.

Although the plans for the broadcasting station have not yet been completed, experiments carried on in the Sage Laboratories of the Engineering School are expected to enable the university authorities to establish the station in a short time. The use to which it would be put was not given, but it was said that a good share of the programs to be sent on the air would consist of college lectures now being broadcast over WJZ each week by members of the university teaching staff.

The mast of the Shamrock IV. will be placed on Battery Hill, an old English stronghold in the Revolution, and will be formally presented during the commencement exercises, at which Sir Thomas is expected to speak. It is in two sections, one of steel 113 feet long and a topmast of wood 56 feet. A strong masthead light will stand at the top, where as a night beacon it will be visible for many miles.

11,000 CRYSTAL SETS SOLD IN MONTH IN ONE SWEDISH CITY WASHINGTON.

IT is reported that in Gothenburg, Sweden, alone there were sold during January about 11,000 crystal receiving sets, 30,000 headsets, together with a large quantity of other parts of all kinds, the total sales amounting to almost 1,000,000



For Battery, Antenna and Ground Leads—

Jones MULTI-PLUG

THE STANDARD SET CONNECTOR

HOWARD B. JONES

618 S. CANAL STREET CHICAGO



Write Today For Descriptive Folder of

THE HOWARD 5-TUBE NEUTRODYNE

This Remarkable Set Has Created a Sensation Among Radio Enthusiasts.

Beautiful Walnut Cabinet with Special Howard Neuroformers, Tube Sockets and Rheostats.



HOWARD MFG. COMPANY
461-469 E. Ohio St. Chicago, Ill.

crowns, Trade Commissioner T. O. Klath informs the Department of Commerce. About 4,000 radio licenses have been taken out.

BUTTS DUPLEX PHONE CLIPS



A handy little device for fastening two or more sets of phones to binding post.

10c

Manufactured by C. W. BUTTS, Inc.
42 Hedden Place East Orange, N. J.

Apex Super 5

This highly efficient tuned radio frequency receiver is the most advanced in design and construction. It is an instrument that meets every critical expectation of the seasoned radio enthusiast.

Buy the Apex Super 5. You will have a radio receiver that brings in distant stations clear and distinct. Select the station you desire in your log-station book, turn the marvelous Apex Vernier Dials to that number, and there you are—perfect reception. No greater selectivity can be had than is easily obtained with the Apex Super Five.

Housed in a highly finished walnut cabinet, complete with Jones Multi-plug Battery Cable. All settings highly gold plated. Sells for \$95 complete excepting accessories.

At All Good Dealers
Apex Elec. Mfg. Co.
1410 W. 59th St.
Dept. 323
Chicago

on the dot

THE "GOODE" TWO-O-ONE



Le Ton d'argent



Guaranteed

BY MAIL ONLY

\$2.00

Postpaid

QUARTER AMPERE AMPLIFIER-DETECTOR RADIO TUBE

GUARANTEED SATISFACTORY

All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits

- ONE—"Goode" Detector-Amplifier \$2.00
- THREE—"Goode" Detector-Amplifiers \$5.50

(All Postage Prepaid)

The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, five volts, standard base, silvered tube.

Send express or postal money order, New York draft, or personal check to

The Goode Tube Corporation
Incorporated Dept. B
OWENSBORO KENTUCKY

FILL OUT AND MAIL NOW

SUBSCRIPTION BLANK

RADIO WORLD

RADIO WORLD

Please send me RADIO WORLD for months, for which please find enclosed \$.....

1493 Broadway, New York City

SUBSCRIPTION RATES:

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

Harbord on a Trip to South America

GENERAL J. G. HARBORD, president of the Radio Corporation of America, sailed from New York City with Mrs. Harbord on the Western World of the Munson Line for Rio de Janeiro. The couple will proceed to Buenos Aires.

The General said that he would make the trip across the Andes to Santiago, the capital of Chile, and Valparaiso. He ex-

"EAGLE" ALL-METAL RADIO TOWERS

Adjustable to Fit Any Type of Aerial

Get better reception with a good outside Aerial. Long distance sets, including ships at sea use the best possible Aerial. Eagle Radio Towers are handsome and sturdy. We ship on a money-back guarantee. Ask your dealer or write us for literature.

J. R. Burrell Co., 356 Folsom Pl., Milwaukee, Wis. Dept. 15



Ask an Owner He Knows

WHY PAY \$50 to \$150 FOR A 5 TUBE SET?

\$17.50 Buys Complete Parts to Build the Famous **CLARO D. X. SPECIAL**

3 TUBE SET

PARTS INCLUDE ENGRAVED AND DRILLED PANEL:

2 23 Pl. Cond. L.L.	2 Transformers
1 Coil, L.L.	2 Dials
2 Rheostats	1 Filament Switch
2 Jacks	1 Set B Post
3 Sockets	

Bus Bar—Down to the Last Screw, etc. For Volume and Distance It's a Knockout!

DIAGRAM FREE!

Special Cabinet for Above \$3.50

Send Money Order. We Pay Expressage. Satisfaction Guaranteed or Money cheerfully Refunded.

TUBES Type 201A Every One Guaranteed **\$1.35**

N & A RADIO CO.

261 Washington St. Brooklyn, N. Y.

His Bills in Peril, Smith Broadcasts Direct Appeal

GOVERNOR SMITH of New York made an appeal from station WGY, Schenectady, for public support of the program for which he is seeking the approval of the Legislature.

The Governor and the Legislature locked horns from the beginning of his term. With the date of adjournment less than two weeks away, Governor Smith found his two major measures—a reduction in the State income tax and the issue of \$300,000,000 bonds to eliminate railroad grade crossings—slated for defeat. He then decided to broadcast a direct appeal to the voters.

pects to arrive in New York about April 20. During his tour of South America General Harbord will investigate radio conditions.

RIO DE JANEIRO.

GENERAL J. G. HARBORD, retired, president of the Radio Corporation of America, arrived here and announced that a highpowered radio station would be constructed at Rio de Janeiro jointly by his company and English, French and German interests. The new station, he said, probably would be in operation in November.

Extradition Attempted in Tube Inquiry

THE investigation of bootleg radio bulbs led to extradition proceedings against John Bradley, of Mossmere, N. J., under arrest in Newark on a charge of having been partner in a conspiracy to sell through ten New York City dealers \$200,000 worth of bulbs, fraudulently stamped with the trade-mark of the Radio Corporation of America.

Jacob Gelbman, a radio horn manufacturer, who failed to obey a decree enjoining him from patent infringement on a plastic radio horn, was fined \$250 by Judge Mack and remanded to the custody until payment.

Atlantic Coast Silent Due to an S. O. S.

RADIO broadcasting in New York and all along the coast was suspended one recent Friday night at 6:15 when an S. O. S. call was picked up by the Naval Communications Station and the station of the Independent Wireless Telegraph Company at Easthampton, L. I.

Ships at sea, including some as far as 1,800 miles, were queried without success until the United States liner Leviathan, bound for New York, reported at 6:45 o'clock that the radio operator at Gibraltar had sent a message saying the ship in distress was somewhere near that station. When it was found that the ship was so far away, local broadcasting was resumed. Herman Bernard, managing editor of RADIO WORLD, who broadcasts from WGBS every Friday, at 6:30 P. M., went on the air instead at 6:47 that night.

FILKO LIGHTNING ARRESTER

SCIENTIFICALLY CORRECT RADIO LIGHTNING ARRESTER with the 100% Guarantee



\$1.50
\$2.10 in
Canada

Protects your set from lightning or we repair or replace the set. Send 2c stamp for literature on improved reception. Dept. R.W.-328.

DX Instrument Company
Harrisburg, Pa.



Tunes straight through the locals, gets distance. Brings in more stations—clearly and with volume—in a given length of time than any other set. Direct comparisons invited. Zenith receiving sets cost more, but they do more.—The exclusive choice of MacMillan for his North Polar Expedition.

Zenith Radio Corporation
332 S. Michigan Avenue, Chicago

WANTED: RADIO WORLD ISSUES OF OCT. 4, 1924, and Nov. 8, 1924. If you have these copies, mail them to us, and we will send you copies of current issues. RADIO WORLD, 1493 Broadway, New York City.

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS.

10 CENTS A WORD. 10 WORDS MINIMUM

GUARANTEED RECTIFIERS

110 volt 60 cycle 6V, \$10.00; 12 V, \$12.50. 10% discount for cash, Banner Electrical Co., Urbana, Ohio.

NEW SPECIALS, CARDWELL type lo-loss condensers, 17 plate, \$2.15; 23 plate, \$2.95; Pioneer Variometers, couplers, \$2.50; Arco audio transformers, 3/2-1 warranted, \$1.85. Prompt delivery. American Radio Co., 225-7 N. Frederick St., Baltimore, Md.

DON'T BUY A RADIO ANYWHERE until you get our lowest money-saving prices on Radiolas, Zenith or any other standard make you want. State make wanted. Write to-day. Address, G. W. Simms, Lake, New York.

FREE-COMplete RADIO-RUSH

Your name today for FREE PLAN. This offer is sweeping the country. ABSOLUTELY FREE. Guaranteed 300 miles. Don't delay. F. KIRSCH, 428 Calvin Ave., Baltimore, Md.

PATENTS—Write for free Guide Books and "Record of Invention Blank" before disclosing inventions. Send model or sketch of your invention for our inspection and instructions free. Terms reasonable. Radio, Chemical, Mechanical, Electrical and Trademark experts. Victor J. Evans & So., 924 Ninth, Washington, D. C.

RADIO TUBES RE-SENSITIZED. Tubes that light but are weak or paralyzed, made like new by new process. Satisfaction guaranteed. Wrap carefully and mail. Tubes returned P. P. C. O. D. Real proposition to dealers. Weidenbach Electric Co., 505 N. Main, Mitchell, S. Dak.

SET OWNERS USING any 201-A tubes send \$1.00 for valuable information with explanatory diagram. Address T. W. Fernon, 3447 N. 18th St., Philadelphia, Penn.

RADIO HOSPITAL. Specialists in Neutrodynes and Superhetrodynes. Radio Central, Abilene, Kansas.

AGENTS—Write for free samples. Sell Madison "Better-Made" Shirts for large Manufacturer direct to wearer. No capital or experience required. Many earn \$100 weekly and bonus. Madison Mfrs., 501 Broadway, New York.

DINING AND SLEEPING CAR CONDUCTORS (White) Exp. unnecessary. We train you. Send for book of rules and application. Supt. Railway Exchange, Sta. C, Los Angeles.

BIG DISCOUNTS—Standard nationally known Radio Sets, Parts, Prepaid. Write for lists. Wood's Radio Service, 533-50th Street, Brooklyn, N. Y.

BE RADIO MAN of your county. I show you how. Send \$2.00 for samples. Money back guaranteed. James H. Konkle, 192 Market Street, Newark, N. J.

WANTED—A thoroughly experienced man for manufacturing and repairing VACUUM TUBES in small plant out of New York. Must be capable of personally performing all operations, including taking care of system and doing necessary glass work, also handling help efficiently. Answer, giving full particulars, experience and references. BOX 101, RADIO WORLD.

A \$5 HOME-MADE LOUDSPEAKER, by Herbert E. Hayden, in Feb. 7 issue. Send 15c for copy, RADIO WORLD, 1493 Broadway, New York City.

LOUDSPEAKER ON TWO TUBES accomplished by the Bluebird Reflex, described by Lieut. Peter V. O'Rourke in the Feb. 7 issue of RADIO WORLD. Picture diagram, also schematic diagram, panel and assembly plans. An inexpensive set to make and operate. One stage of tuned RF, crystal detector, one reflexed audio stage and one free audio stage. Selective and good for DX. Send 15c for a copy or start your subscription with the February 7 issue. RADIO WORLD, 1493 Broadway, New York City.

**PLANES 5 MILES APART
HOLD PHONE TALK**

ACCORDING to reports to the War Department two army aviators at Dayton, Ohio, talked to each other by radiophone while in the air and more than five miles apart. The two ships were equipped with broadcasting and receiving apparatus for test purposes. It is the hope of the War Department eventually to equip all planes so that the pilot may carry on conversations while in the air.

T. R. F. COILS

low loss type, requiring no angle mounting, per set of 3 **\$4.50**

Manufacturers write for discounts.

NOLTE MFG. COMPANY

61-C Gautier Ave. Jersey City, N. J.

Time Finder Invented

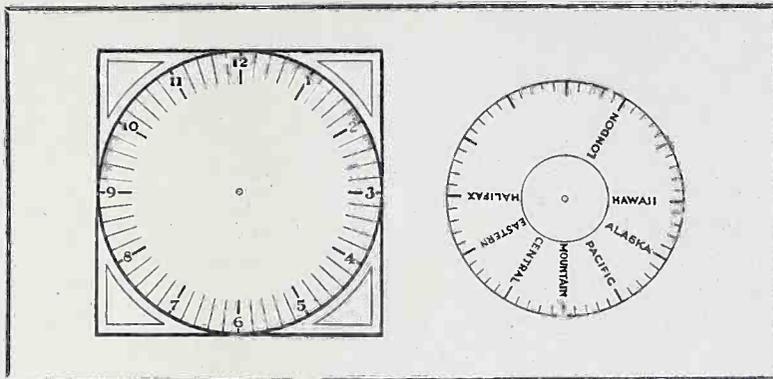


FIG. 1, detail of the Time Finder invented by Geo. B. Gardner.

DX fans need no longer guess the correct time to tune in for distant stations, nor worry their brains in figuring out the difference in time between the different broadcasting stations when you want to listen to the program of some distant station, or demonstrate to your friends the superiority of your set by bringing in some far-off station.

George B. Gardner, a printer living at 923 Hutchinson Court, Brooklyn, N. Y., has evolved a dial for a clock which automatically gives the correct Standard Time in all the time zones west of Greenwich (London) to the Island of Hawaii in the Pacific Ocean. The dial is a simple thing and any one can see the exact time in all places. By attaching the center dial to the post which turns the hour hand on a clock or watch, setting the dial so the hour hand will show local time in any zone, you have a revolving dial that turns with the hour hand. The minute hand is correct in all zones, all time changes being one even hour. Starting from Greenwich (London) time is measured east and west, 15 degrees of longitude equaling an hour. Thus it is a simple matter to show correct time one-half way around the world. In this clock some zones are omitted, to avoid confusion as to where to start. Between London and Halifax there are three omitted—Canary Islands, Azores and Rio de Janeiro. After Hawaii is one—the Island of Samoa. After that one hour is the 180th meridian, the meeting place of west longitude and east longitude time—where you lose a day in traveling in one direction and gain a day in the other, in the Pacific Ocean.

Mr. Gardner has also made a Radio Time Finder, which gets exactly the same results, but has to be set by hand. Its two super-imposed parts are shown separately in Fig. 1. The dial is identical, it is connected with a binding post and by setting it to the correct time by your clock or watch you automatically get the correct time in all zones. The Time Finder is on a heavy card in black and white, and presents a good appearance.

The clocks are intended to either be set in the cabinet, as a dial would be, or can be had in either black or mahogany bakelite frame.

For Maximum Amplification Without Distortion and Tube Noises

use the well known

Como Duplex Transformers

Push-Pull
Send for Literature

COMO APPARATUS COMPANY
448 Tremont Street Boston, Mass.

BILTMORE RECEIVERS

Combines all the essentials of fine radio reception to the highest degree at lowest prices. Write for descriptive circular. Dept. X.

BILTMORE RADIO Co.
BOSTON 30 MASS.

KITS

To Build Your Own Receiver

- Roberts—2 tube, Parts.....\$31.44
- Roberts—4 tube, Parts..... 48.35
- Rasla—1 tube, Parts..... 23.78
- Rasla—2 tube, Parts..... 31.43

GENUINE ERLA KITS IN FACTORY SEALED CONTAINERS

Write for Our 100-Page Catalog

LIBERTY MAIL ORDER HOUSE

682, 106 Liberty St., New York, N. Y.

The New Type 54

Sleeper MONOTROL

Reg. U. S. Pat. Off.

Grimes Inverse Duplex System

The only set that has 3 stages of tuned radio frequency ON ONE TUNING DIAL.

23 Other Important Improvements

Write for booklet "W." It's FREE.

SLEEPER RADIO CORPORATION

434 Washington Street Long Island City, N. Y.

NEW REFLEX TUBES

\$1.50

CANADA 35c EXTRA

All Tubes Guaranteed.

Mail Orders Solicited.

DENNING RADIO MFG.

455 SPRINGFIELD AVE.

NEWARK, N. J.



**THE GENUINE LOUDSPEAKER
\$1.50 Vacuum Tubes \$1.50**

C. O. D., JUST PAY POSTMAN

MONEY BACK GUARANTEE

JAMES H. KONKLE

192 Market Street Newark, N. J.

A \$5 HOME-MADE LOUDSPEAKER, by Herbert E. Hayden, in Feb. 7 issue. Send 15c for copy, RADIO WORLD, 1493 Broadway, New York City.

**NEW — NEW — NEW
FRESHMAN MASTERPIECE**

KNOCKED DOWN KIT
Everything complete to build this wonderful receiver..... **\$39.50**

No cabinet included.....

Send order with cash to-day.

WIRE or phone; we will send C. O. D.

Regular discounts to dealers.

THE BOWER RADIO SHOP

Wholesale Radio READING, MICHIGAN

"HOW TO MAKE—"

The following constructional articles have appeared in recent issues of RADIO WORLD:

- Sept. 6, 1924—A simplified Neutrodyne with Grid-Biased Detector, by J. E. Anderson.
- A Low-Loss Wave Trap, by Brewster Lee.
- Nov. 15—A Sturdy Low-Loss Coll, by Lieut. P. V. O'Rourke. An Ultra 2-Tube Receiver, by Byrt C. Caldwell.
- Dec. 6—A 6-Tube Super-Heterodyne Using a Variometer, by J. E. Anderson. A \$1 Coil Winder, by Herbert E. Hayden.
- Dec. 13—The World's Simplest Tube Set, by Lieut. P. V. O'Rourke.
- Dec. 20—A 1-Tube DX Wonder, Rich in Tone, by Herman Bernard. An Interchangeable Detector, by Chas. M. White.
- Dec. 27—A 2-Tube Variometer Set, by Lieut. P. V. O'Rourke.
- Jan. 3, 1925—A 3-Tube Portable That Needs No Outdoor Aerial, by Abner J. Gelula.
- Jan. 10—A Low-Loss DX Inductance, by Herbert E. Hayden.
- Jan. 17—A \$25 1-Tube DX Wonder, by Abner J. Gelula.
- Jan. 24—A Selective \$15 Crystal Set, by Brewster Lee. A Variometer-Tuned Reflex, by Abner J. Gelula. An \$18 1-Tube DX Circuit for the Beginner, by Feodor Rofpatrick.
- Jan. 31—A Transcontinental 2-Tube Set, by H. E. Wright. An Experimental Reflex, by Lieut. P. V. O'Rourke.
- Feb. 7—The Bluebird Reflex, by Lieut. P. V. O'Rourke. A \$5 Home-Made Loudspeaker, by Herbert E. Hayden.
- Feb. 14—A Super-Sensitive Receiver, by Chas. H. M. White. A Honeycomb RFT for DX, by Herbert E. Hayden.
- Feb. 21—A 1-Tube Reflex for the Novice, by Feodor Rofpatrick. A Set for Professional Folk, by Lieut. P. V. O'Rourke. A Honeycomb Crystal Receiver, by Raymond B. Wallis.
- Feb. 28—A Set That Does the Most Possible With 6-Tubes, by Thomas W. Benson. Three Resistance Stages of AF on the 3-Circuit Tuner, by Albert Edwin Sorn.
- March 7—Storage B Battery, by Herbert E. Hayden. Benson's Super-Heterodyne.
- March 14—The Reflexed 3-Circuit Tuner That You Can Log, by Herman Bernard.
- March 21—A Variable Leak, by Herbert E. Hayden. A 4-Tube, 3-Control Set That Gets the Most DX, by Lieut. P. V. O'Rourke.

Any copy, 15c. Any 7 copies, \$1.00. The whole 13 copies \$2.50, or start subscription with any issue. Radio World, 1493 Broadway, N. Y. City.



GUARANTEED 6 MONTHS against BLOW-OUT!!

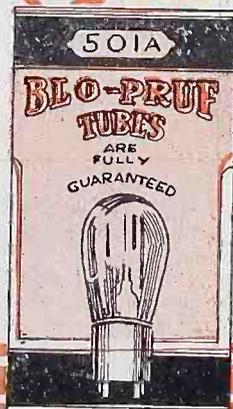
CAN BE RELEASED NOW

SOLD ONLY BY MAIL

Blo-Pruf 501A—the perfect detector, the perfect radio frequency amplifier, the perfect audio frequency amplifier—guaranteed for six months against blow-outs, and needs no rheostat!

Think what this new tube means to YOU as a Radio user. Think of the millions of blown-out tubes, and their wasted cost! Realize that here is a new invention that absolutely protects the delicate filament of the tube, and enables us to issue a bond guaranteeing Blo-Pruf for six months against blow-outs.

Blo-Pruf tubes are sold only direct by mail, and are the same price as ordinary tubes. When you install Blo-Pruf tubes in your set you are guaranteed against the great loss of blown-out tubes. Fill out the coupon now! Secure enough Blo-Prufs for your set. If they are not entirely up to your expectation return them and your money will be immediately refunded. If a tube blows out inside of six months from any cause, it will be immediately exchanged. Distributed by the oldest exclusive Radio house in New England, its name is YOUR guarantee of satisfaction. Don't put off securing these wonder tubes. Act at once! Mail the coupon NOW!



RADIO EQUIPMENT COMPANY.

NEW ENGLAND'S OLDEST
EXCLUSIVE RADIO HOUSE.
20 Stuart Street..
BOSTON, MASS.

RADIO EQUIPMENT COMPANY,
18 Stuart Street, Boston, Mass.

Gentlemen:
Enclosed find \$ Send at once, postpaid,
..... 501A Blo-Pruf Tubes. It is understood
that these tubes are guaranteed for six months
against blow-out from any cause.

NAME
ADDRESS