

RADIO WORLD

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A 4-TUBE DX LOOP SET

"The Diamond of the Air"

By Herman Bernard

What the New Sodian Tube Is

By Sidney E. Finkelstein

Sets for the DX Devotee

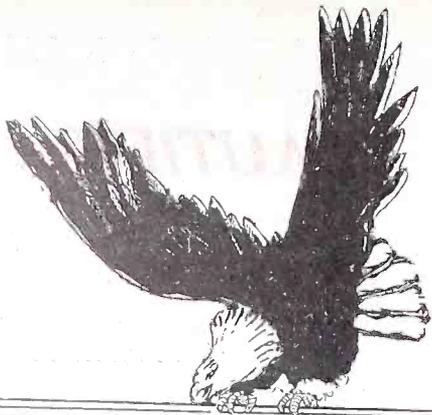
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Herman Bernard

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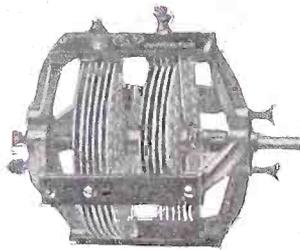
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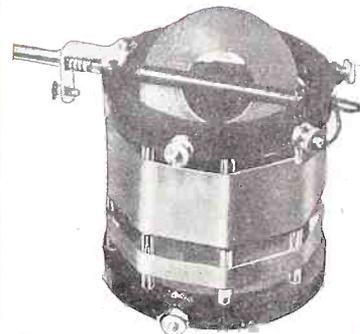


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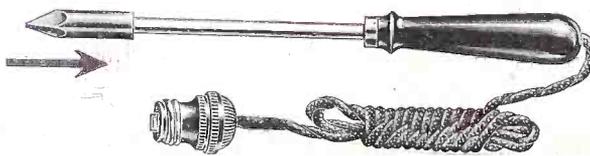
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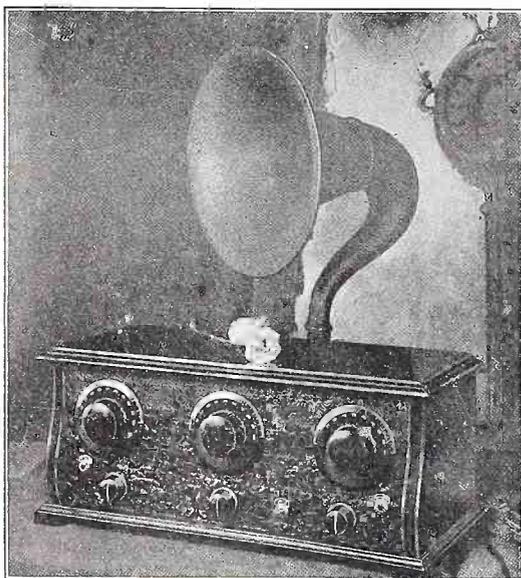
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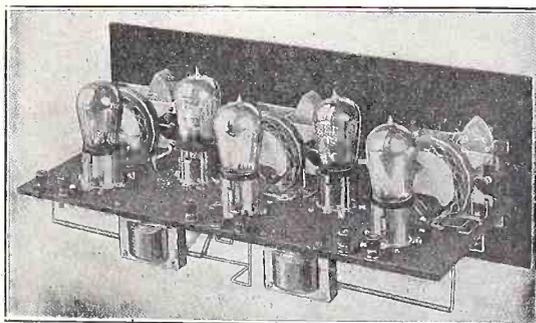
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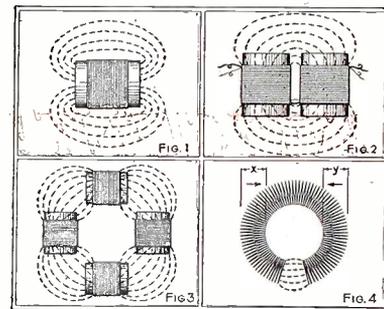
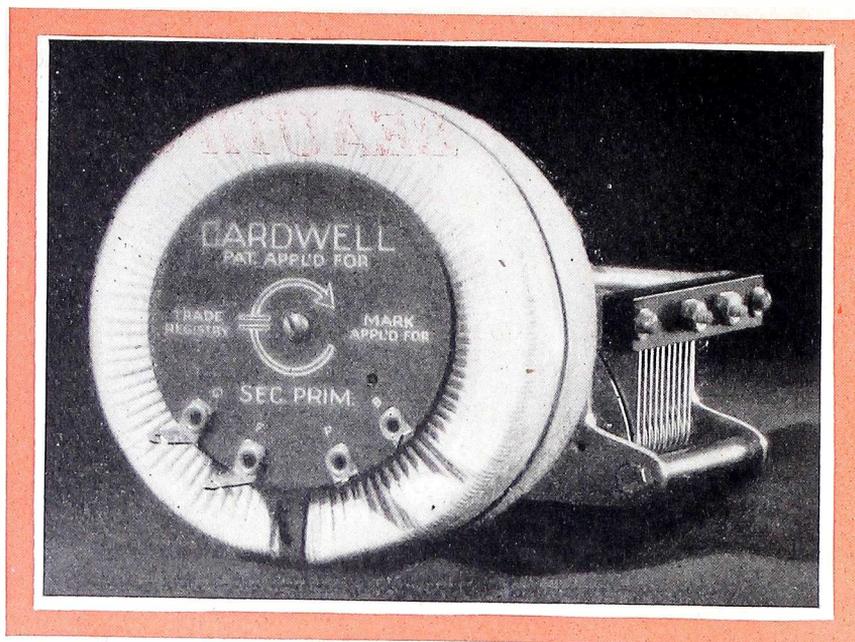
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General Theory of the Toro-Tran

Figure 1 shows how the field of the ordinary coil extends into space and increases losses due to stray field. Figure 2 shows a "double series" winding, which restricts the field somewhat. Figure 3 shows a "four series" winding and the field almost enclosed. In Figure 4 (the Toro-Tran) the field is entirely enclosed and the losses due to stray fields are eliminated.

Note that a stray signal passing through the coil at "X"—not introduced from the aerial or the tube—is balanced out at "Y" by the reversed polarity of the winding. This rejects undesirable signals, while the concentrated internal field builds up the tuned signal. Hence maximum distance and selectivity.

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The Toro-Tran eliminates signal energy picked up by ordinary coils from nearby stations. It eliminates magnetic feed-back in multi-stage radio frequency circuits, thus removing the most active factor in causing howling and distortion, and thereby increasing selectivity and distance. It rejects almost entirely the interference effects caused by electrical power

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2. Permit exact nullification for tube and stray capacity without guesswork or tedious testing.
3. Closed magnetic field eliminates magnetic feed-back in tuned radio frequency amplifiers.

4. Low distributed capacity, due to air spacing of each winding and to low voltage-drop per turn of small diameter wire.
5. Maximum coupling and high ratio of voltage increase, due to concentrated field with zero leakage.
6. Absence of all supporting insulation in the field of the coil. This is one of the

greatest loss factors in the ordinary circuit and is not remedied by "skeleton" or so-called "low-loss" windings.

7. Ease of neutralizing oscillation, due to tube capacity, by means of rotating control, which any one can "balance."

8. Low capacity between primary and secondary, affording maximum transfer of energy to succeeding grid circuit.

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RADIO WORLD

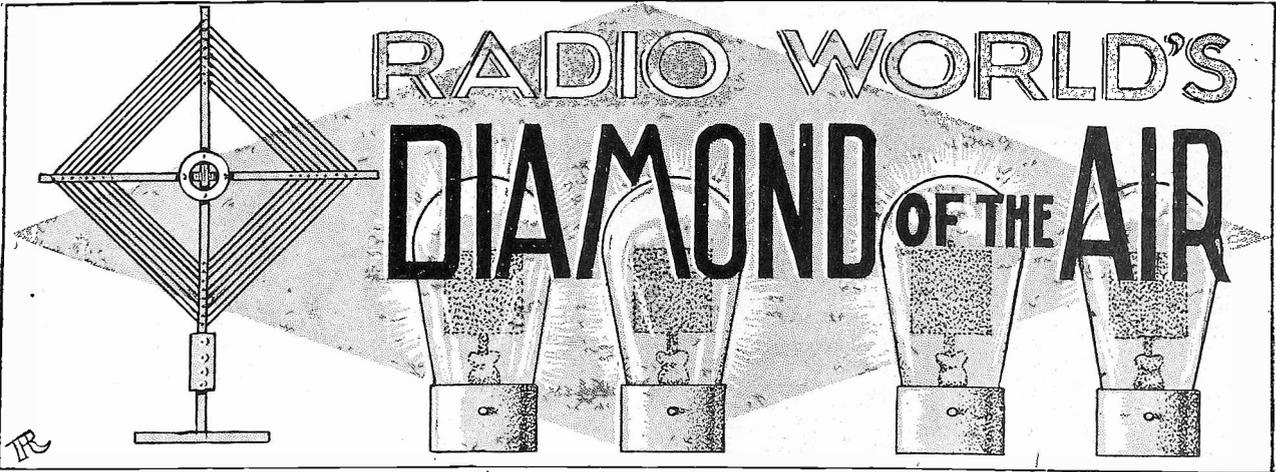
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By Herman Bernard

LOOP operation is greatly to be desired under certain circumstances, for instance, in Summer, when every possible defense against the ravages of static is helpful, and also when opportunity does not present itself to utilize an outdoor antenna, as with many apartment house dwellers. Moreover, a loop set, if properly designed, is highly selective, the Super-Heterodyne having a close contender in such a hook-up. Therefore, anybody who is suffering from the annoying effects of broad tuning may avail himself of the loop remedy without constructing a set that requires a prohibitive number of tubes. Out of considerations of economy arise many decisions to limit one's self to no more than five tubes, yet four are plenty to afford reception all-sufficient to many radio fans.



It is commonly supposed that a set that will operate a loop requires at least six tubes, or the equivalent value of six tubes obtained

from reflexing, but Fig. 1 shows a circuit that will bring in stations 300 miles away with gratifying volume and regularity, on only four tubes.

The disadvantage from which radio experimenters often suffer is the excessive voltage step-up in a circuit. A fitting comparison between radio and an automobile may be made. Regardless of how fast the motor theoretically may be able to propel an automobile, one may not drive the car at a rate of speed exceeding the capability of the car for holding the road. The radio set may be likened to the motor and the tube to the car. You may reach a certain speed limit in the set, but if the tube does not "hold the road" your efforts are lost. Being ditched by too much voltage step-up is the fate of many experimenters. Distortion is one penalty.

"I Haven't Tried It"

Few circuits have appeared showing how loop operation is obtainable from only four tubes, without reflexing. A common rejoinder to the question as to whether it is possible is "I don't know. I haven't tried it." There seems to be a prevailing scepticism regarding loop sets unless they run into multi-tube affairs or embody reflexing. The reflex is a fascinating subject of experiment, but

on the whole the safest course for the home constructor is not to use much of it. Factory facilities and great expertness produce wonderful reflexes, but many of the complicated reflex sets, such as the inverse duplex embodying three reflexed stages, are beyond reasonable expectations of success when the set is constructed at home.

The Diamond of the Air is a tested and successful loop set. Strange as it may seem, it even brought in distant stations, some 800 miles away, with fair volume on the speaker. Fig. 1 shows the circuit to embody a stage of impedance radio-frequency amplification where the loop serves as the impedance coil, a regenerative detector and two stages of transformer-coupled audio-frequency amplification.

The quality of reception from this loop set is excellent, indeed. The loop brings in less noise than an aerial, in fact, hardly any at all. Moreover, even those living close to a powerful broadcasting station will be able to tune it out.

The Controls in the Set

An analysis of the circuit shows that there are three panel controls, the variable condenser CI that tunes the loop L, the tickler coil L3, which is varied for best regeneration results, and the variable condenser C2

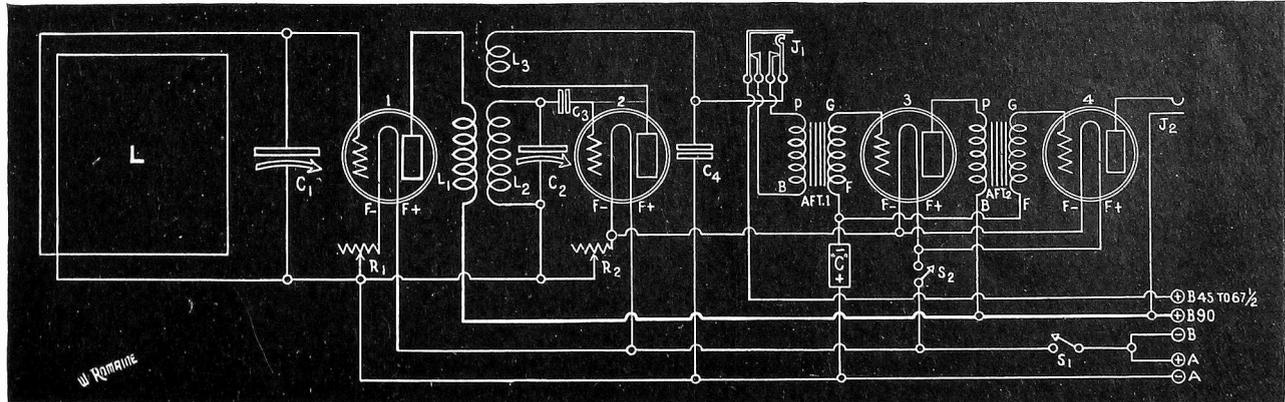


FIG. 1—Schematic diagram of wiring The Diamond of the Air, Radio World's 4-tube set that is exceedingly selective. A double-circuit jack, shown in the diagram, should be included if earphone service is desired. If only speaker reception is the aim, omit this jack, and embody only single-circuit jack, J2, in the circuit. In the case of exclusive speaker operation being preferred, also omit battery switch S2, making the lead that now interrupts a continuous one. This circuit will bring in stations regularly up to 300 miles away, although much greater distances may be expected occasionally. The quality is superb.

Analysis of Loop Circuit

Our Unqualified Indorsement of Herman Bernard's Set

A MARVELOUS set indeed is RADIO WORLD'S Diamond of the Air. It is hard to imagine a 4-tube set that will accomplish more. Satisfactory loop reception is a certainty, if the constructor follows the directions given by Herman Bernard, America's most lucid radio writer. The set will do even more than

Mr. Bernard claims for it. As with all the circuits he describes, everything about the receiver has been carefully tested and nothing is left to theory or chance. If you want a 4-tube set build this one and play safe. It is unqualifiedly indorsed by RADIO WORLD as a real marvel.—EDITOR.

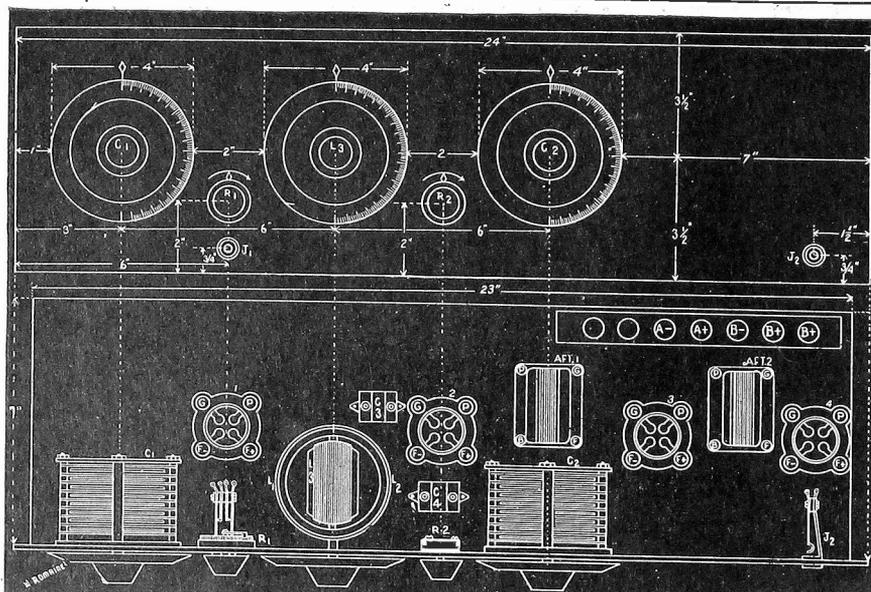


FIG. 2 (top)—The panel layout and Fig. 3, the assembly plan. The double-circuit jack for the detector stage is not shown, since some will not desire to include it. However, it may be placed below the rheostat R2. The double-circuit jack in the assembly plan (left) is for connecting the loop. How to include optional use of an aerial is discussed in this week's article, and the undesignated double jack plays an important part in that part of the hookup.

tuning the secondary of the coupler, L2. Besides, the directional effect of the loop is utilized, thus affording a fine means of obtaining the utmost selectivity without loss of quality by attenuated harmonics. The plug may be inserted at the detector stage output, jack J1, or at the second audio output, jack J2, where speaker operation is obtained (Fig. 1). The set works the best speakers to the Queen's taste, including the cone speakers, which under other circumstances often reveal distortion. A popular misconception exists regarding the cone type speakers. As they are faithful reproducers they often bring to the ear the full import of the set's qualitative performance. This leads some owners of distorting sets to suppose that the speaker is no good, whereas the trouble lies in the set. Either cone or horn type speaker may be used with excellent results.

Set May Be Logged

The tuning being sharp indeed, attention must be paid to manipulation of the dials. So far as the loop and the two variable condensers are concerned the set may be logged, but the setting of the dial that controls the tickler may not always be the same for reception of the same station, due to atmospheric and tube conditions.

Sodion D21 the Detector

The detector stage shows that a grid condenser is used, C3, but that there is no grid leak. None is needed, as the detector tube for this circuit is the D21 Sodion, which functions well without a leak. If a UV200 or C300 tube is used, then a leak should be connected, one side to the grid post of the detector tube socket, the other side to the filament plus, either on that socket or at any other convenient point of the positive filament or battery lead. The UV201A and the

C301A are not recommended as detectors for best results from this circuit.

Why the Loop Works

The fact that loop operation is possible from a 2-tube set (discounting the audio stages) may need some explanation. The manner of constructing the circuit, the excellence of the coils and condensers used, as well as the great sensitivity of the D21 tube, make possible some remarkable results. For instance, without even a loop local stations were received in New York City, including WEAf, WNYC, WJZ, WOR, WGBS and WAHG. Thus the set is a phantom circuit, as hookups are called when they operate without aerial, ground or loop. Naturally, if the only coil used in the circuit (the coupler, L1L2L3) picked up enough energy to give some local reception, if a loop were embodied in the circuit the energy received would be greater and the successful reception commensurate.

As if phantom operation on two tubes were not enough (or four tubes, if speaker operation be the goal), the radio-frequency tube, No. 1, was taken out of the socket, and local signals still were audible. Thus a 1-tube regenerative set actually will operate without aerial or ground, if properly made, although the signals are not as loud as desired. All these facts tend to corroborate the efficacy of loop reception. Now let us see how great a distance can be traversed.

Distances Received

The Diamond of the Air actually brought in Miami, Fla., on a loop, using four tubes, when the point of reception was in the heart of New York City and local stations were going full blast. WGY, Schenectady, was off the air. This station operates on a wave length separated from that of WMBF, Miami, by only a few meters, and reception

of Miami in New York City is very uncertain when the other station is broadcasting.

Chicago, Cincinnati, St. Louis and other distant stations were received on the speaker with fair volume. However, the set should be regarded as having a constant range of about 300 miles under good conditions, with rather uncertain possibilities for distances in excess of that. Loop reception is eminently satisfactory on this set, yet for the fans whose chief delight is distance, facilities for cutting in an aerial may be provided, as will be explained. Thus the set would contain the necessary radio-frequency transformer for working the aerial, while the loop adjunct is ever present, and the set may be moved to any part of the house for loop operation, or carried in an automobile or on water craft, so that it is a portable set free from aerial troubles. The portability value is enhanced, of course, by the use of dry cells, three No. 6 type being connected in series to feed the Sodion detector tube filament, while the three other tubes may be WD11, WD12 or the 99 type, with suitable filament heating facilities. It is out of the question to regard four storage-battery tubes as feasible in a portable set.

"A Gem, a Jewel and a Joy"

The set is quiet in tuning, steady and stable, and presents no difficulties that should baffle the fan. Besides the circuit diagram being shown in schematic form, Fig. 1, it is repeated in picture form, for the special benefit of novices (Fig. 4), while the panel and assembly are clearly set forth in Figs. 2 and 3. The set is indeed a gem, a jewel and a joy and will prove a surprise to many who have been looking for a loop set that does not require a multitude of tubes or necessitate multiple reflexing.

The loop and the condenser tuning it may be matched. Many loops are designed with the proper inductance for tuning with a .0005 mfd. variable condenser, normally 23 plates. As the same capacity condenser is used in the detector stage, it is well to have a loop of commensurate inductance, for then the set not only may be logged but may be tuned almost in step, as to the dials at extreme left and extreme right.

Due regard should be paid to the coil connections. One terminal of the loop goes to grid of the first tube; the RF amplifier, designated No. 1 in the diagrams. The other loop terminal connects to negative A battery. Be sure this connection is made to the negative battery lead, not to the negative filament, for the rheostat R1 interrupts the battery lead, and to connect to the filament would constitute an inclusion of the rheostat's resistance in the radio circuit.

For general use storage battery tubes should be used. The amplifiers may be the 201A or C301A tubes.

Use of an Aerial

With the set so constructed that aerial operation is optional, one has the advantage of being able to tune in stations thousands of miles away, with good quality and volume on the speaker. But when the aerial and its accompanying coil are used the voltage step-up is again brought into play at its maximum. It is necessary to force the voltage up as high as possible if one desires to

(Continued on page 32)

Picture Diagram of Wiring Bernard's Loop Set

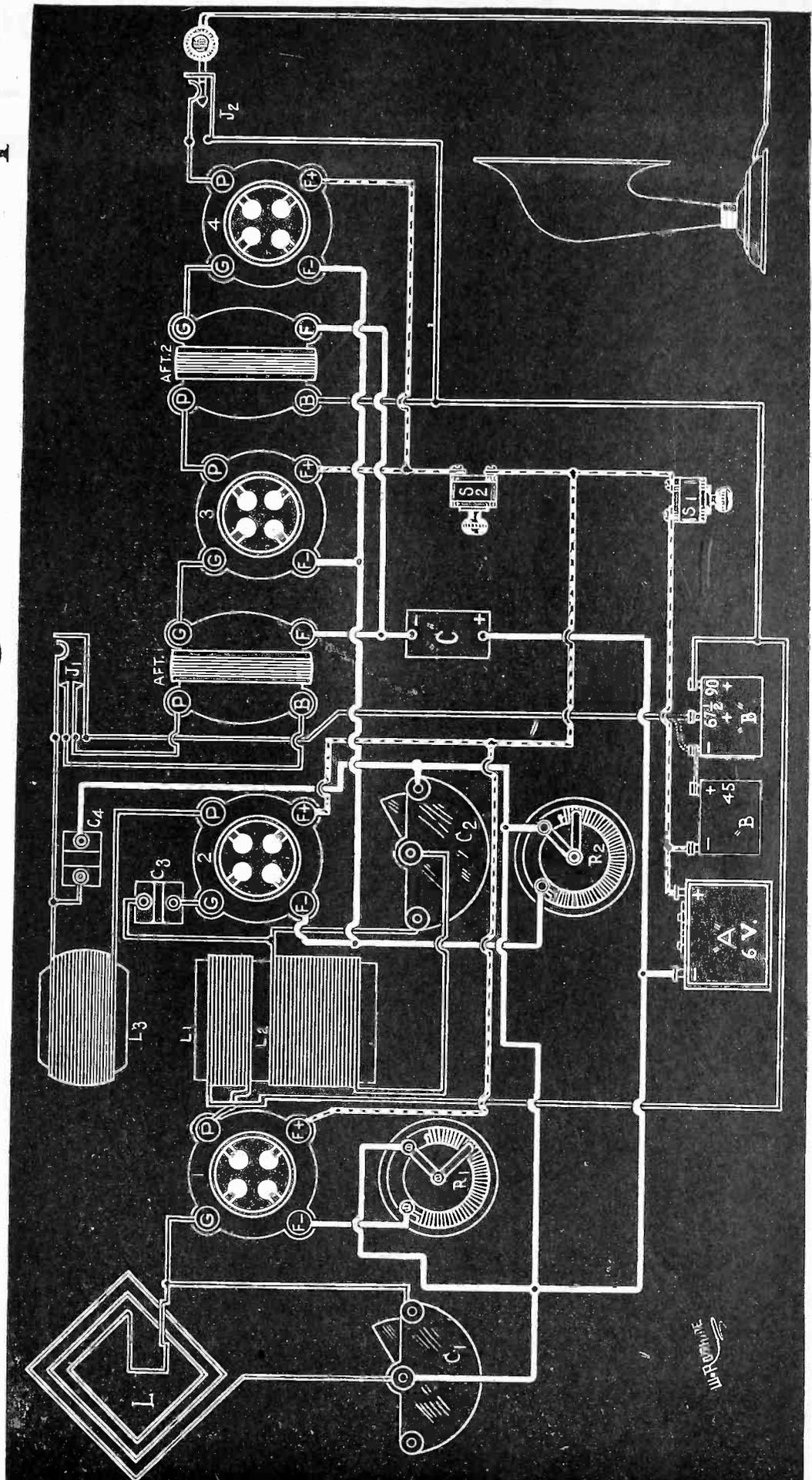


FIG. 4. The wiring of the Diamond of the Air, shown in picture form. The C battery connections, C plus going to A minus and C minus to the secondary terminals of AFT1 and AFT2. In the picture and schematic diagrams J1 is the detector output; in the panel layout J1 refers to the loop jack.

UPRUMINE

What the New Sodian Tube Is



THE new Sodian tube, known as the D21.

The original Sodian tube, product of the Connecticut Telephone & Telegraph Co., was non-oscillating, hence could not be used in regenerative sets. This of course gave no satisfaction to DX hounds who preferred sets with very few tubes in them. The new Sodian tube, however, is of the oscillating kind.

By Sidney E. Finkelstein

Associate, Institute of Radio Engineers

THE NEW Sodian tube, known as the D21, unlike its predecessor, is an oscillating tube, therefore functions in a regenerative circuit. It may be used only as a detector. Its chief advantages, from the results basis, are greater sensitivity as a detector than the UV200 and C300, which have been regarded as the acme of sensitivity, current consumption of only .25 ampere, and smooth regeneration control. Unlike the two other tubes mentioned, the Sodian will permit signals being heard over a wide variation of the tickler dial or other regeneration control. On strong stations the signal is audible over the entire variation of the tickler or impedance tuning element. Thus, if one is so minded and is satisfied with some sacrifice of distant-getting, the conventional 2-control regenerative set, the 3-circuit tuner for instance, may be used as a single-control set. The tickler position is compromisingly set at that angle that gives no trouble on the low waves, then the variable condenser dial is tuned as usual, without disturbing the tickler, however. For local stations this works pretty well, hence the radiation nuisance is abated in this respect. But as between stations widely separated on the wavelength dial much better volume will be obtainable with the feedback exactly controlled.

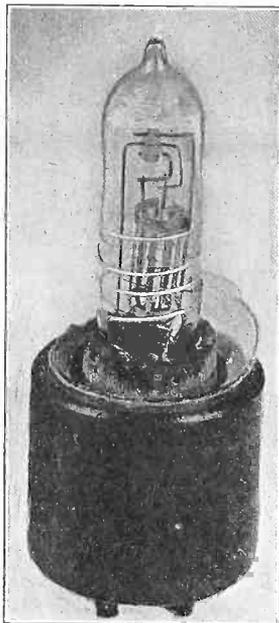
The D21 is a great companion tube to the S13 (the original and non-oscillating and Sodian tube). The new tube can be substituted as detector in any standard receiving set using storage battery for filament supply, whether the circuit be regenerative, radio-frequency before the detector or a Super-Heterodyne.

The new tube is quite different from the old one, both in construction and in electrical characteristics. It can be made to oscillate easily and smoothly and will fit a standard socket.

The new tube has an outer frosted glass shell which is provided simply to facilitate handling of the tube. Inside the large glass case, which is not airtight, is the tube proper, an airtight glass envelope around which a special resistance coil is wound.

Inside this glass tube are the filament, grid and

(Concluded on page 36)

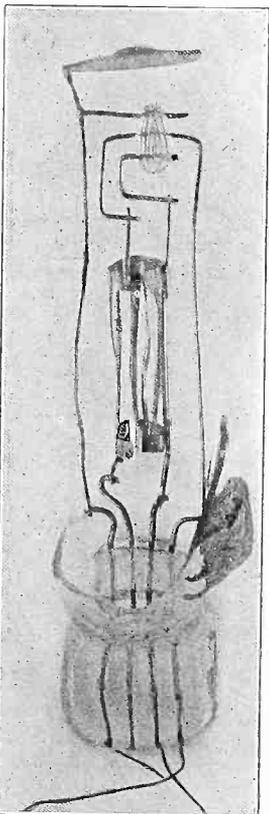


(Radio World Staff Photo)

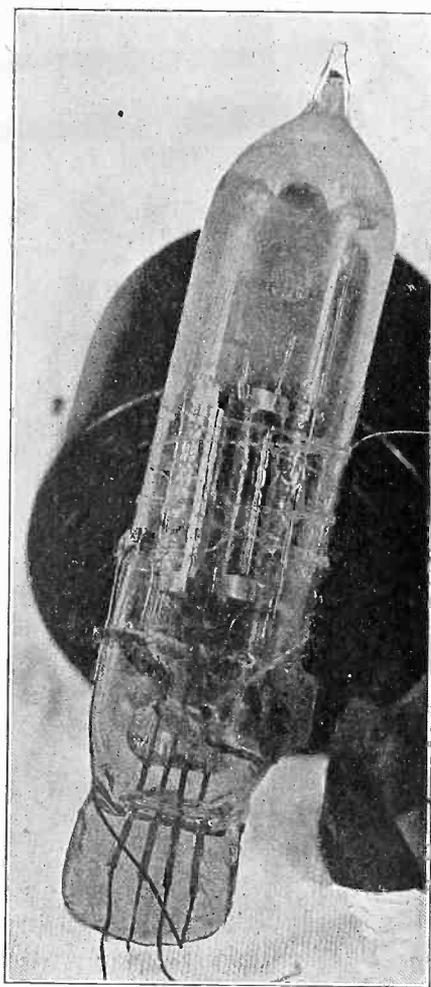
THE TUBE with the frosted glass outer shell or envelope removed. The outer envelope is not airtight, but the internal envelope, here shown exposed to view, is hermetically sealed. Note the extra filament wire or heating apparatus wound outside the "inner tube."



(Radio World Staff Photo) A CLOSEUP, showing the shape of the grid to be cylindrical. The plate is in plain view, too.

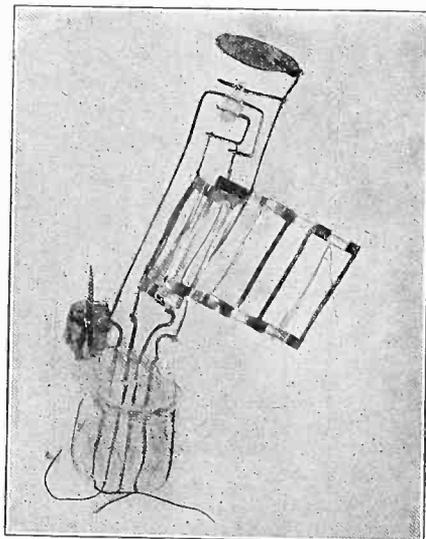


(Radio World Staff Photo) THE INSIDE of the tube exposed. Note the cylindrical grid, with the plate atop. The leads are separated from one another by a seal. The four leads are brought down through the base of the tube, as usual, to tips. In this photo the leads are shown severed from the tips. Also, the extra filament wrapping has been removed. The A battery heats both the extra resistance wire and the filament. The object of the special resistance is to keep the tube at correct temperature for highest efficiency.



(Radio World Staff Photo)

THE TUBE TORN from its base. The cylindrical grid is again plainly visible, as is the extra heating wire or special resistance, although this looks a bit ragged, due to the proximity of the lens to the tube. Note the "lamp shade." The filament is straight and is suspended inside the tube. The other connections are to a disc that serves a secret purpose.



(Radio World Staff Photo)

UNFOLDING the plate we see the nature of its parallel construction. The filament leads are in the center. The lead at left goes to grid and the one at right to plate. Plate, filament and grid leads find a common capacitative rendezvous in the seal under the "lamp shade," which may partly account for the smooth regeneration control, not forgetting the use of sodium. The filament is tungsten.

Trouble-Shooting Advice for Benson's Super-Heterodyne

By Thomas W. Benson

JUDGING from the correspondence the writer has received since the publication of the reflexed Super-Heterodyne circuit the greatest source of trouble seems to be oscillator. Unless this is a good tube with a high amplification factor it will drop out of oscillation when the oscillator condenser is turned towards maximum capacity. This is prone to occur in all oscillators working at short wavelengths because the increased capacity across the grid coil reduces the applied grid potentials and the repeating or feedback action in the tube is not sufficient to retain the oscillating condition. Since broadcast range intermediate transformers are used in this receiver some signals will get through without the heterodyne in action but with greatly reduced volume and little selectivity.

Tests for the Oscillator

Therefore if trouble is experienced in the oscillator dial not tuning, determine if the oscillator is working. The simplest test is to touch the grid of the tube with the wet finger. A "pop" will be heard in the receiver or loud talker when the finger touches the grid terminal and if another pop is heard when the finger is withdrawn it indicates the tube is oscillating. If only a very faint click is heard when the finger is withdrawn the tube is not oscillating. When the finger is touched to the grid of an oscillating tube the filament will be noted to increase slightly in brilliancy and drop back again when the finger is taken away. These tests should be applied to the tube with the oscillator condenser at several different settings to make sure it is oscillating throughout the entire tuning range of the condenser.

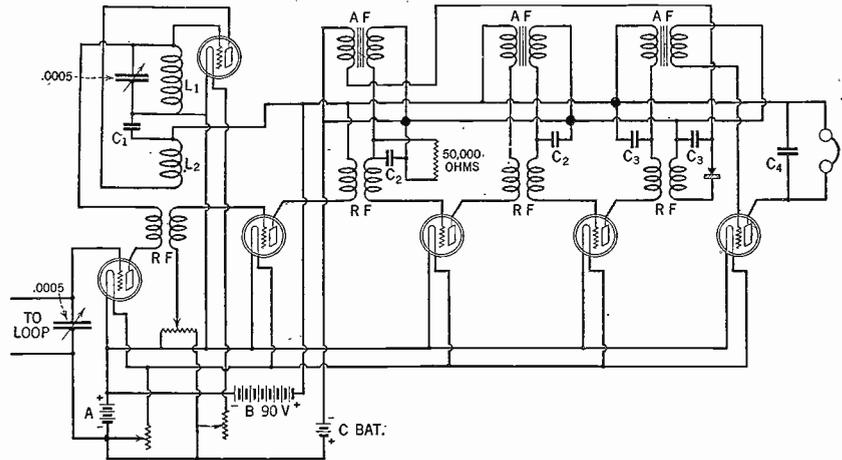
Should it be found that the tube does drop out of oscillation the first thing to try is the shifting of tubes, trying each in turn in the oscillator socket and apply the test to see if any of them will operate over the whole range. This is a procedure that ought to be gone through with every multi-tube set to select the tube most suitable for each type of function.

If it is found that no tube will oscillate satisfactorily the best oscillator should be left in the socket and a negative bias applied to the grid of the oscillator by connecting the grid return of the oscillator to a tap on the C battery in the set. This connection will be shown in a diagram in next week's issue, April 11. With a slight negative bias the tube may go over into steady oscillation and the set function properly.

How to Increase Feedback

In any case we have a final method, that of increasing the feedback from the plate to the grid circuit. This is made possible by winding ten more turns on the plate coil of the oscillator winding, winding them directly over the plate coil if there is not sufficient room on the end of the tube to accommodate them. This coil is wound in the same direction as the plate or tickler winding and connected in series. This increases the feedback to a point where the reduction of grid potential by the variable condenser and other absorption losses is readily overcome.

There is another point that may come up in certain localities, that of selectivity;



THOSE having trouble making Benson's Super-Heterodyne oscillate may add more turns to the plate coil L2. The grid return of the oscillator (tube at top, left) may be connected to the C battery minus, instead of to A+ (as shown) or instead of to A-. The same C battery is used as shown in lower part of diagram.

the circuit as given is very selective but to meet extreme conditions where super-selectivity is demanded it is well to incorporate a filter into the set. This filter is to take the place of the first intermediate or radio frequency transformer and its construction will be diagrammed next week.

For the secondary of the filter use a 75-turn honeycomb or duo lateral coil while next to it is strapped or tied a 35-turn coil (primary). These inductances were selected for there is less chance of erring by their use than to attempt to wind a filter that when loaded with condensers would be unsuitable for the set and require much experimenting to get properly tuned. To load these coils to the proper wavelength a .001 mfd. condenser is connected across the primary and a .0002 across the secondary. The fixed condensers vary slightly and if the set tunes in two places close together or the tuning is broad it indicates that the filter is not properly tuned and condensers of the same registered rating should be tried till proper operation is obtained.

Voltage For Filament

There are the usual difficulties present in this circuit that confront all reflex set builders. Do not expect results by simply throwing the rheostats on full and then tuning them in. Here, as well as in all receivers, a reliable filament voltmeter connected across the filament terminals of the tube sockets will prove a valuable

guide in adjusting the set to its maximum sensitivity.

With the average tube the receiver will be found to operate best between four and five volts on the filament. This makes the receiver easy on the A battery and conserves the life of the tube. The best functioning is arrived at by balancing the filament brilliancy against the potentiometer. That is, adjust the potentiometer for changes in filament brilliancy till best results are obtained.

Furthermore it will be found that a slight decrease in plate voltage may often assist in improving the operation of the receiver. If distortion creeps in or the set is difficult to keep from oscillation reduce the voltage applied to the amplifying tubes by small steps till the oscillations are under perfect control of the filament rheostats and potentiometer. When the proper values are obtained the potentiometer is not extremely critical and the volume is controlled smoothly.

A test for correct balance of filament current, plate voltage and potentiometer setting is to raise the contact of the crystal detector. If the signals still come through with a fair degree of loudness the three factors above mentioned must be experimented with till raising the cat-whiskers of the detector practically cuts out the signals entirely.

[The 6-Tube Reflexed Super-Heterodyne, by Thomas W. Benson, was published in the February 28 and March 7 issues.]

Kodel Buys Station WMH; Will Greatly Improve It

THE Kodel Radio Corporation has just completed the purchase of broadcasting station WMH, Cincinnati, from the Ainsworth-Gates Radio Company. The station, which has been operating on wavelengths of 325.9 meters and 422.3 meters, alternating each month with stations WSAI and WLW, will continue this arrangement. However, the 500-watt power will be increased to 1,000 watts, and additional equipment will be obtained from the Western Electric Company, which will make this station one of the best. Pro-

grams will be among the most interesting in the country.

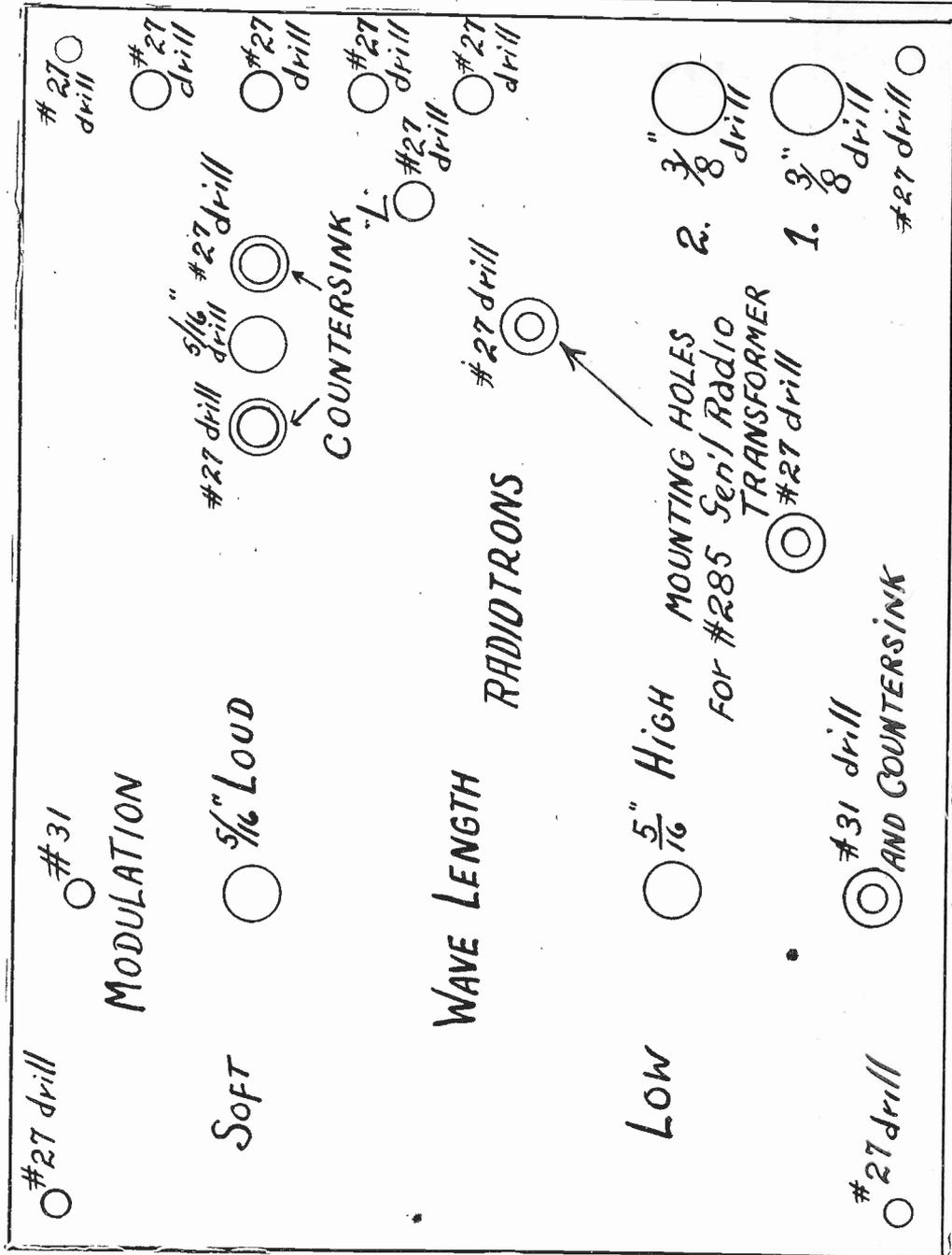
The studio, located on the first floor of the Hotel Alms, will be entirely changed.

The Kodel Radio Corporation will take over the station early this month in its improved condition.

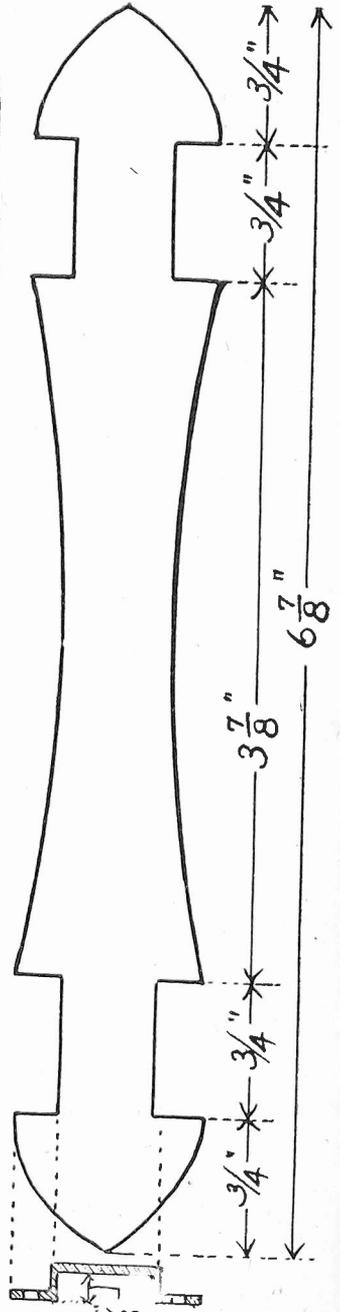
RECENT BACK NUMBERS of Radio World, 15 cents each. Address Circulation Manager, Radio World, 1493 Broadway, New York City.

Templates for Panel of Portable and Handle Also

Actual Size Drawing Facilitate Construction of "The Best 2 Tube DX and Volume Set"



THE FULL SIZE of the panel (Fig. 15) for the 1925 Spring Model 1-A Portable, the great DX set patterned after the Radiola III, is shown at right. The drilling dimensions are given, including those for mounting the General Radio audio-frequency transformer, one stage of audio being embodied in the circuit, just as in the Radio Corporation's original. The panel was shown photographically last week, issue of March 28, and this template corresponds with the photograph in all respects. The plate tuning inductance is mounted under the word "modulation," while the aerial tuning inductance goes under the word "wavelength." The set has only these two controls, not reckoning the aerial switching arrangement whereby fixed condensers of various capacities may be cut in for accommodation of all antennas. This is probably the greatest 1-tube DX set possible to build, the other tube simply making signals louder, so that with this single audio stage some locals may be heard on a speaker and all DX reception be good and loud.



AT LEFT (Fig. 16) is the template for the handle. The small detail shows a brass strip, about 5/8" or a little less in width and 1 1/4" long when flat. It is bent in U-shape so the handle, which it holds, fits under it and has sliding room, so the handle may lie flat when the set is not being carried, but will "hump" when the set is lifted, so the knuckles fit under the handle. Two such strips are used, one for each end of the handle, the same as on valises, suitcases and other portable objects. The strip is 1/8" thick, as marked. Also, the leather handle is of the dimensions given. The template may be traced on thin paper which is then pasted on a piece of leather 7x1 1/2". With a sharp knife cut the leather to the pattern and you have the finished handle. Be sure not to cut too far in, as that will constitute a starting place for the leather to rip when you lift the portable.

Coil Forms for 1-A Portable

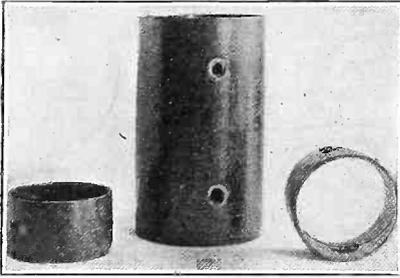


FIG. 17, the forms used for coil winding. At left and right are the rotor forms and in center the stator, with the two shaft holes for the rotor rods. The stator form is a cardboard tubing of $3\frac{1}{4}$ " outside diameter, $5\frac{1}{2}$ " high.

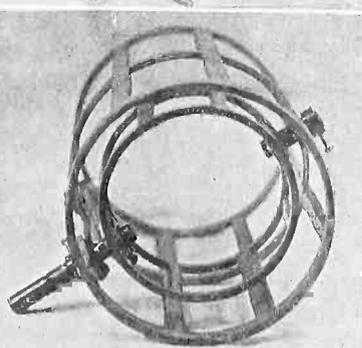
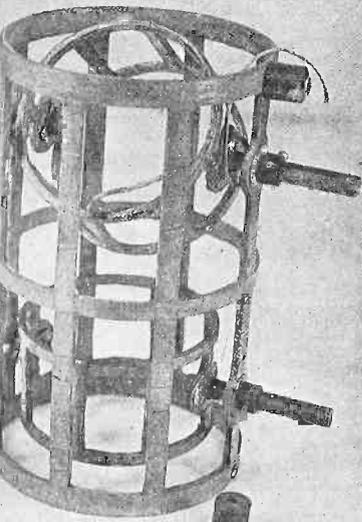
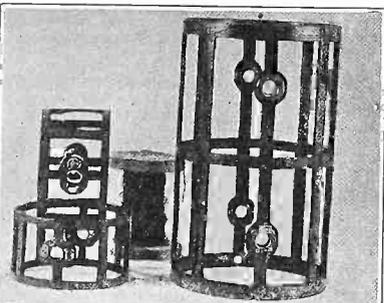


FIG. 18, top, shows the three forms, after the tubing has been cut away to leave only enough insulation for substantial support of the coils. One rotor is inside another. Fig. 19, center, shows bushings, shaft and panel mounting holes. Fig. 20 depicts the clearance of the stator by one rotor and the bushings secured by pins.

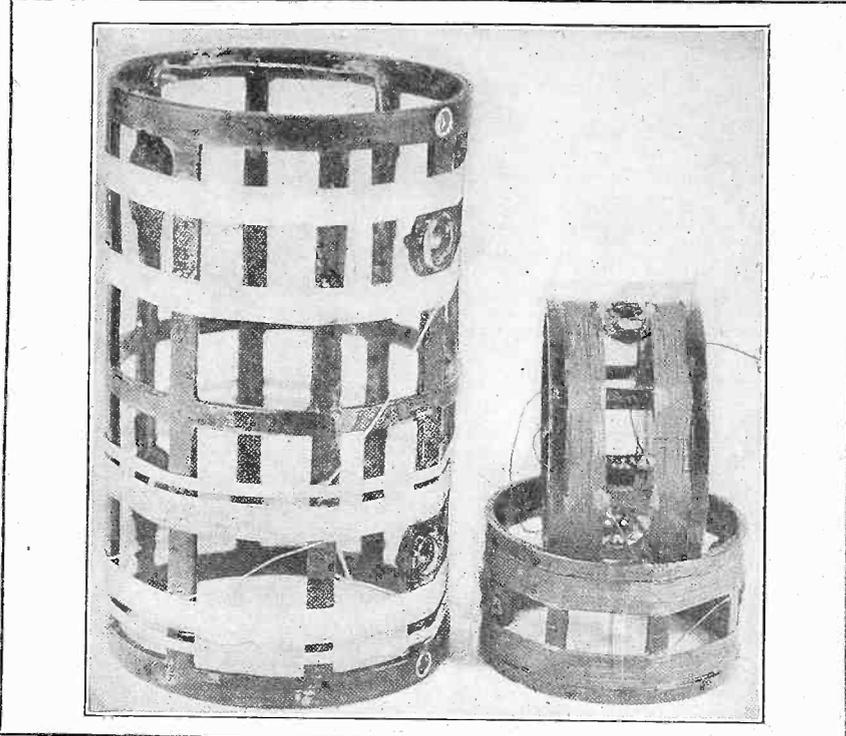


FIG. 21, the stator and rotor forms with windings on them. The rotors are $1\frac{1}{8}$ " diameter, $2\frac{1}{2}$ " high.

[Part I of this article was published last week, issue of March 28, and Part III, the conclusion, will be printed next week.]

By Herbert E. Hayden

Illustrations by the Author

PART II

THE forms on which the coils are wound for the Model 1-A Portable, 1925 Spring Model, the best 2-tube set for distance-getting and volume that I know of, are three in number. First there is the stator form, consisting of a cardboard tubing $3\frac{1}{4}$ " in diameter and $5\frac{1}{2}$ " high, and then there are the two rotor forms, $1\frac{1}{8}$ " in diameter and $2\frac{1}{2}$ " high. By drawing a circle the size of the diameter of each, and drawing two diameters at right angles, and the circumferences divided equally again in the same manner, eight equally-spaced points are provided. On the tubing draw the design shown in the accompanying illustrations, a central circumference, two terminal circumferences, top and bottom, and the eight perpendicular supports. About $\frac{3}{8}$ " width is sufficient. Shaft holes and mounting holes are provided. The rest of the form is cut away, for low-loss effects, and the forms are steeped in beeswax, obtainable in the drug store. Note, however, that at two points on the stator form, centered $2\frac{3}{8}$ " from top and again from bottom, the shaft holes are provided with an extra rim of the cardboard form about $\frac{3}{8}$ " wide for greater mechanical security. The corresponding upright support diametrically behind these two shaft holes is similarly provided with anchorage for the rear supporting shafts. It is well to make these shaft holes first, Fig. 17. Each rotor



HERBERT E. HAYDEN

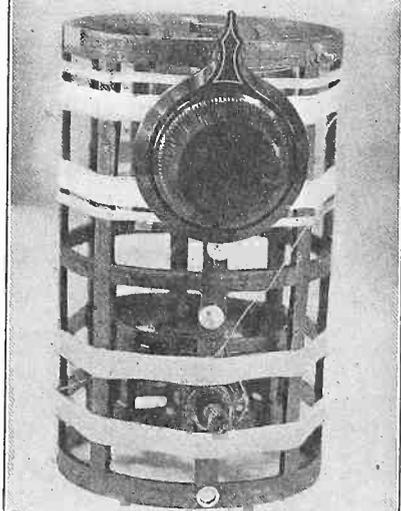
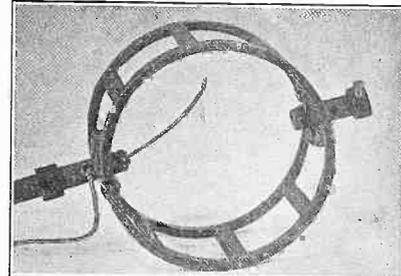


FIG. 22, top, a close-up of a pigtail connection from stator to rotor, showing the pigtail as it is threaded. Fig. 23, lower, shows the completed coil arrangement, with a dial on the modulator rotor shaft.

has only one set of shaft holes, front and rear diametrically opposite, instead of two. Bushings are inserted in the stator shaft holes, Fig. 19, and a pigtail connection is
(Concluded on page 27)

Official List of Stations

Complete, Accurate and Up-to-Date. Revised and Corrected Up to March 25

FOLLOWING is a list of broadcasting stations in the United States:

Station	Owner	Location	Meters	Station	Owner and Location	Meters	Station	Owner and Location	Meters
KDKA	Westinghouse E. & M. Co.	E. Pittsburgh, Pa.	309	KFMB	Christian Churches of Little Rock, Little Rock, Ark.	254	KSAC	Kansas State Agricultural College, Manhattan, Kansas	341
KDLR	Radio Elec. Co.	Devils Lake, N. D.	231	KFMF	University of Ark., Fayetteville, Ark.	275	KTHS	New Arlington Hotel, Hot Springs, Ark.	375
KDPM	Westinghouse E. & M. Co.	Cleveland, Ohio	250	KFMR	Morningside College, Sioux City, Ia.	261	KUOM	State University of Montana, Missoula, Mont.	245
KDPT	Southern Elec. Co.	San Diego, Calif.	244	KFMT	Dr. G. W. Young, Minneapolis, Minn.	263	KZKZ	Electric Supply Co., Manila, P. I.	222
KDYL	Newhouse Hotel	Salt Lake City, Utah	306	KFMW	M. G. Saraten, Houghton, Mich.	266	KZRQ	Far Eastern Radio, Inc., Manila, P. I.	222
KDYM	Savoy Theatre	San Diego, Calif.	280	KFNC	Carleton College, Northfield, Minn.	237	KFI	E. C. Anthony, Inc., Los Angeles, Cal.	469
KDZB	F. E. Stefert	Bakersfield, Calif.	240	KFNF	Henry Field Seed Co., Shenandoah, Ia.	266	KGB	The Ledger, Tacoma, Wash.	250
KDZE	Rhodes Company	Seattle, Wash.	270	KFNG	Wooten Radio Shop, Coldwater, Miss.	254	KGO	General Electric Company, Oakland, Calif.	361
KFAD	McArthur Bros. Merc. Co.	Phoenix, Ariz.	360	KFNJ	Teachers College, Warrensburg, Mo.	234	KGU	M. A. Mulrony, Honolulu, Hawaii	360
KSAB	Nebraska Buick Auto Co.	Lincoln, Neb.	240	KFNL	Radio Broadcast Ass'n, Paso Robles, Calif.	240	KGW	The Oregonian, Portland, Ore.	492
KFAE	State College	Pullman, Wash.	330	KFNV	L. A. Drae, Santa Rosa, Calif.	227	KGY	St. Martin's College, Lacey, Wash.	246
KFAJ	Western Radio Corp.	Denver, Colo.	278	KFNY	V. Kemp Roberts, Helena, Mont.	248	KHJ	The Times, Los Angeles, Calif.	405
KFAU	University of Colorado	Boulder, Colo.	261	KFON	Royal Radio Co., Burlingame, Calif.	231	KHQ	Louis Wasmer, Seattle, Wash.	273
KFAN	University of Idaho	Moscow, Idaho	230	KFOA	Rhodes Company, Seattle, Wash.	450	KJQ	C. O. Gould, Stockton, Calif.	273
KFAR	Studio Lighting Co.	Hollywood, Calif.	227	KFOC	1st Christian Church, Whittier, Calif.	236	KJR	Northwest Radio Co., Seattle, Wash.	384
KFAU	Boise High School	Boise, Idaho	227	KFOD	Radio Shop, Wallace, Idaho	224	KJS	Bible Institute of Los Angeles, Los Angeles, Calif.	294
KFAW	Radio Den	Santa Ana, Calif.	280	KFOJ	Moberly High School, Moberly, Mo.	246	KLS	Warner Bros. Radio Co., Oakland, Cal.	242
KFBB	F. A. Buttery Co.	Havre, Mont.	275	KFOL	L. M. Schafbuch, Marengo, Iowa	234	KLX	The Tribune, Oakland, Calif.	508
KFBC	W. K. Azbill	San Diego, Calif.	278	KFON	Echophone Radio Shop, Long Beach, Calif.	234	KLZ	Reynolds Radio Co., Denver, Colo.	283
KFBE	Horn & Wilson	San Luis Obispo, Calif.	216	KFOO	Latter Day Saints University, Salt Lake City, Utah	261	KMJ	San Joaquin L. & P. Corp., Fresno, Calif.	248
KFBG	First Presbyterian Church	Tacoma, Wash.	250	KFOR	David City Tire & Elec. Co., David City, Neb.	226	KMO	Love. Elec. Co., Tacoma, Wash.	250
KFBB	Kimball Upson Co.	Sacramento, Calif.	283	KFOT	College Hill Radio Club, Wichita, Kan.	231	KNT	Walter Hemrich, Kukak Bay, Alaska	263
KFBL	Leese Bros.	Everett, Wash.	224	KFOU	Hommel Mfg. Co., Richmond, Calif.	254	KNX	The Express, Los Angeles, Calif.	337
KFBU	Bishop N. S. Thomas	Laramie, Wyo.	270	KFOX	Technical High School, Omaha, Neb.	248	KOA	General Electric Co., Denver, Colo.	322
KFCB	Nielson Radio Co.	Phoenix, Ariz.	238	KFOY	Beacon Radio Service, St. Paul, Minn.	252	KOB	College of Agri. & Mech. Arts, State College, N. M.	349
KFCG	1st Congregational Church	Helena, Mont.	248	KFPF	Oliver S. Garretson, Los Angeles, Cal.	238	KOP	Detroit Police Department, Detroit, Mich.	278
KFCF	F. A. Moore	Walla Walla, Wash.	256	KFPH	H. C. Mailander Co., Salt Lake City, Utah	242	KPO	Hale Brothers, San Francisco, Calif.	429
KFCI	L. E. Rice	Los Angeles, Calif.	236	KFPL	C. C. Baxter, Dublin, Texas	252	KPY	Doubleday Hill Elec. Co., Pittsburgh, Pa.	275
KFCP	R. W. Flygare	Ogden, Utah	360	KFPM	New Furniture Co., Greenville, Texas	242	KQW	C. D. Herrold, San Jose, Calif.	240
KFCY	Western Union College	Lemars, Iowa	252	KFPR	Forestry Department, Los Angeles, Calif.	231	KRE	The Gazette, Berkeley, Calif.	275
KFCZ	Central High School	Omaha, Neb.	258	KFPT	Radio Ser. Corp. of Utah, Salt Lake City, Utah	261	KSD	The Post Dispatch, St. Louis, Mo.	545
KFDD	St. Michaels Cathedral	Boise, Idaho	275	KFVV	Heintz & Kohlmoos, San Francisco, Calif.	236	KTW	1st Presbyterian Church, Seattle, Wash.	360
KFDH	University of Arizona	Tucson, Ariz.	258	KFPW	St. John's Church, Cartersville, Mo.	248	KUO	Examiner Printing Co., San Francisco, Calif.	246
KFDJ	Oregon Agricultural College	Corvallis, Ore.	254	KFPX	1st Presbyterian Church, Pine Bluff, Ark.	262	KWG	Portable Wireless Tel. Co., Stockton, Calif.	250
KFDM	Magnolia Petroleum Co.	Beaumont, Texas	316	KFPY	Symonds Investment Co., Spokane, Wash.	266	KYO	The Electric Shop, Honolulu, Hawaii	270
KFDY	1st Baptist Church	Shreveport, La.	250	KFQA	The Principia, St. Louis, Mo.	261	KYW	Westinghouse E. & M. Co., Chicago, Ill.	535
KFDZ	H. O. Iverson	Minneapolis, Minn.	231	KFQB	Searchlight Publishing Co., Ft. Worth, Tex.	254	WAAB	V. Jensen, New Orleans, La.	268
KFEC	Meier & Frank Co.	Portland, Ore.	248	KFQC	Kidd Bros., Taft, Calif.	231	WAAC	Tulane University, New Orleans, La.	275
KFEL	Winner Radio Corp.	Denver, Colo.	254	KFQD	Southern Calif. Radio Ass'n, Los Angeles, Calif.	229	WAAD	Ohio Mech. Institute, Cincinnati, Ohio	258
KFER	J. L. Scroggin	Oak, Neb.	268	KFQF	Radio Service Co., Burlingame, Calif.	231	WAAF	Drovers Journal, Chicago, Ill.	278
KFES	Auto Elec. Service Co.	Ft. Dodge, Ia.	231	KFQG	Texas Highway Bulletin, Austin, Tex.	268	WAAM	I. R. Nelson Co., Newark, N. J.	263
KFEZ	Augsbury Seminary	Minneapolis, Minn.	261	KFQH	3rd Baptist Church, Portland, Ore.	283	WAAN	University of Missouri, Columbia, Mo.	254
KFEY	Bunker Hill - Sullivan	Kellog, Idaho	233	KFQI	G. S. Carson, Jr., Iowa City, Ia.	224	WAAP	Omaha Grain Exchange, Omaha, Neb.	278
KFFF	1st Baptist Church	Moberly, Mo.	266	KFQJ	W. L. Ellis, Oklahoma City, Okla.	210	WABA	Lake Forest University, Lake Forest, Ill.	227
KFFR	State Journal	Sparks, Nevada	226	KFQK	National Guard, Denison, Tex.	252	WABB	Harrisburg Sporting Goods Co., Harrisburg, Pa.	266
KFFV	Graceland College	Lamoni, Iowa	250	KFQL	W. C. Riker, Holy City, Calif.	234	WABH	Lake Shore Tire Co., Sandusky, Ohio	240
KFFY	Louisiana College	Alexandria, La.	275	KFQM	F. C. Krieger, North Bend, Wash.	216	WABI	Bangor Ry. & Elec. Co., Bangor, Maine	240
KFGC	Louisiana State University	Baton Rouge, La.	268	KFQN	Alfred H. Hubbard, Seattle, Wash.	233	WABL	Agricultural College, Storrs, Conn.	275
KFGD	College for Women	Chickasha, Okla.	252	KFQO	Farmers State Bank, Belden, Neb.	273	WABM	F. E. Doherty Radio Service Co., Saginaw, Mich.	261
KFGH	Leland Stanford Junior University	Stanford University, Calif.	273	KFQP	Taft Radio Co., Hollywood, Calif.	240	WABN	Ott Radio, Inc., La Crosse, Wisc.	244
KFGI	Crary Co.	Boone, Iowa	226	KFQR	Northwest Radio, Seattle, Wash.	384.4	WABO	Lake Avenue Baptist Church, Rochester, N. Y.	278
KFGJ	1st Presbyterian Church	Orange, Texas	250	KFRB	Hall Bros., Beville, Texas	248	WABQ	Haverford College Radio Club, Haverford, Pa.	261
KFHA	Western State College	Gunnison, Colo.	252	KFRD	Radioart Studio, San Francisco, Calif.	270	WABR	Scott High School, Toledo, Ohio	263
KFHJ	Fallon & Co.	Santa Barbara, Calif.	360	KFRE	W. R. Brown, Alexandria, La.	242	WABU	Victor Talking Machine Co., Camden, N. J.	226
KFHL	Penn College	Oskaloosa, Iowa	240	KFRH	The Radio Shop, Grafton, N. D.	268	WABW	College of Wooster, Wooster, Ohio	207
KFHR	Star Elec. and Radio Co.	Seattle, Wash.	263	KFRJ	Guy Simmons, Jr., Conway, Ark.	250	WABX	H. B. Joy, Mt. Clemens, Mich.	254
KFIF	Benson Institute	Portland, Oregon	248	KFRK	Men's Club, Grand Forks, N. D.	240	WABY	John Magaldi, Philadelphia, Pa.	242
KFIO	North Central High School	Spokane, Wash.	266	KFRM	J. F. Boland, Ft. Sill, Okla.	263	WABZ	Coliseum Place Baptist Church, New Orleans, La.	263
KFIQ	First Methodist Church	Yakima, Wash.	256	KFRN	M. L. Short, Hanford, Calif.	224	WAHG	A. H. Grebe Co., Richmond Hill, N. Y.	316
KFIU	Alaska Elec. Co.	Juneau, Alaska	226	KFRP	Curtis Print Co., Ft. Worth, Texas	246	WAFD	Albert B. Parfet Co., Port Huron, Mich.	233
KFIZ	Daily Commonwealth	Fond du Lac, Wisc.	273	KFRQ	Trinity Church, Redlands, Calif.	211	WAIT	A. H. Waite & Co., Taunton, Mass.	229
KFJB	Marshall Elec. Co.	Marshalltown, Ia.	248	KFRS	Radio Service Co., Portland, Oregon	213	WAMD	Hubbard & Co., Minneapolis, Minn.	244
KFJC	National Radio Co.	Oklahoma City, Okla.	261	KFRU	Ethical Studio, Bristow, Okla.	394.5	WBS	D. W. May, Inc., Newark, N. J.	360
KFJD	Liberty Theatre	Astoria, Oregon	252	KFRV	United Churches, Olympia, Wash.	220	WBT	Southern Radio Co., Charlotte, N. C.	275
KFJM	University of N. D.	Grand Forks, N. D.	278	KFRX	J. G. Klemgard, Pullman, Wash.	217	WBZ	Westinghouse E. & M. Co., Springfield, Mass.	331
KFJR	Ashley C. Dixon & Son	Portland, Ore.	263	KFRY	College of Agriculture, State College, N. M.	266	WBAA	Purdue University, West Lafayette, Ind.	273
KFJX	State Teachers College	Cedar Falls, Ia.	258	KFRZ	The Electric Shop, Hartington, Neb.	222	WBAN	Wireless Phone Corp., Paterson, N. J.	240
KFJY	Tunwall Radio Co.	Ft. Dodge, Iowa	246	KFSG	Echo Park Evangelistic Ass'n, Los Angeles, Calif.	278	WBAO	James Millikin University, Decatur, Ill.	275
KFJZ	Texas National Guard	112th Calvary, Ft. Worth, Texas	254	KFSY	The Van Blaricom Co., Helena, Mont.	248	WBAP	STAR TELEGRAM, FORT WORTH, TEX.	476
KFKA	State Teachers College	Greeley, Colo.	273	KFJW	Hoppert P. and H. Co., Breckenridge, Minn.	242	WBAV	ERNER HOPKINS CO., COLUMBUS, O.	294
KFKB	Brinkley Jones Hospital Ass'n	Millford, Kans.	273	KFJX	T. Goggan & Bro., Galveston, Texas	258	WBAX	J. H. Stenger, Jr., Wilkes-Barre, Pa.	256
KFKC	University of Kansas	Lawrence, Kans.	275	KFJY	Concordia Theo. Seminary, St. Louis, Mo.	545	WBBA	Plymouth Congregational Church, Newark, Ohio	226
KFKV	F. F. Gray	Butte, Mont.	283	KFJZ	Fitzsimmons General Hospital, Denver, Colo.	234	WBBG	I. Vermilya, Mattapoisett, Mass.	248
KFKX	Westinghouse E. & M. Co.	Hastings, Neb.	288	KFUO	Julius Brunton & Sons Co., San Francisco, Calif.	234	WBHJ	J. Irving Bell, Port Huron, Mich.	205
KFLA	A. R. Wilson	Butte, Mont.	288	KFUR	H. W. Peery and C. Redfield, Ogden, Utah	234	WBBL	Grace Covenant Presbyterian Church, Richmond, Va.	229
KFLB	Signal Elec. Mfg. Co.	Menominee, Mich.	248	KFUS	Louis L. Sherman, Oakland, Calif.	233	WBBM	H. L. Atlas, Chicago, Ill.	226
KFLE	National Educational Service	Denver, Colo.	268	KFUT	University of Utah, Salt Lake City, Utah	261	WBPP	Petoskey High School, Petoskey, Mich.	214
KLFP	Everette M. Foster	Cedar Rapids, Ia.	256	KFUV	Colburn Radio Laboratories, San Leandro, Calif.	224			
KFLR	University of N. M.	Albuquerque, N. M.	254	KFVW	G. P. Ward, Springfield, Mo.	252			
KFLU	San Benito Radio Co.	San Benito, Texas	236	KFVX	E. P. Lewis, Moberly, Mo.	233			
KFLV	Swedish Evangelist Church	Rockford, Ill.	229	KFVY	Irvine H. Bouchard, Butte, Mont.	254			
KFLX	George R. Clough	Galveston, Texas	240	KFVZ	Y. M. C. A., Virginia, Minn.	248			
KFLZ	Atlantic Auto Co.	Atlantic, Iowa	273	KFVC	Bensburg's Music Co., Camden, Ark.	242			
				KFVD	McWhinnie Elec. Co., San Pedro, Calif.	205.4			
				KFVF	Clarence B. Juneau, Hollywood, Cal.	208			
				KFWA	Browning Bros. Co., Ogden, Utah	214			
				KFWB	Warner Bros. Pictures, Inc., Hollywood, Calif.	252			
				KFWC	L. E. Wall & C. S. Myers, Upland, Calif.	211			
				KLDS	Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo.	268			
				KPPC	Pasadena Presbyterian Church, Pasadena, Calif.	229			

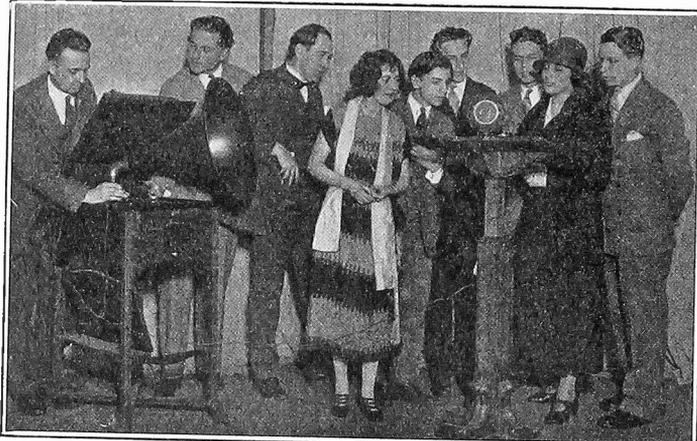
Station	Owner and Location	Meters
WBRR	Peoples Pulpit Ass'n, Rossville, N. Y.	273
WBBS	1st Baptist Church, New Orleans, La.	252
WBBU	Jenks Motor Sales Co., Monmouth, Ill.	224
WBBW	Ruffner City High School, Norfolk, Ill.	222
WBBY	Washington Light Infantry, Charleston, S. C.	268
WBBZ	N. B. Watson, Indianapolis, Ind.	238
WBCN	Foster & McDonnell, Chicago, Ill.	266
WBDC	Baxter Laundry Co., Grand Rapids, Mich.	255
WBES	Bliss Electrical School, Takoma Park, Md.	220
WBHA	Shaffer Music House, Oil City, Pa.	252
WBRE	L. G. Baltimore, Wilkes-Barre, Pa.	231
WCK	Stix Baer & Fuller Co., St. Louis, Mo.	273
WCM	Texas Market Department, Austin, Texas	268
WCX	Detroit Free Press, Detroit, Mich.	517
WCAD	St. Lawrence University, Canton, N. Y.	263
WCAE	Kaufman & Baer, Pittsburgh, Pa.	461
WCAE	C. R. Randall, New Orleans, La.	268
WCAH	Entrekin Electric Co., Columbus, Ohio	266
WCAJ	Nebraska Wesleyan University, University Place, Neb.	275
WCAL	St. Olaf College, Northfield, Minn.	337
WCAP	Sanders & Stayman, Baltimore, Md.	275
WCAP	C. & P. Tel. Co., Washington, D. C.	469
WCAR	Southern Radio Corp., San Antonio, Texas	263
WCAT	School of Mines, Rapids City, S. D.	240
WCAU	Durham & Co., Philadelphia, Pa.	278
WCAV	Dice Elec. Co., Little Rock, Ark.	263
WCAX	University of Vermont, Burlington, Vt.	250
WCAY	Civic Broadcasting Ass'n, Milwaukee, Wisc.	266
WCAZ	Carthage College, Carthage, Ill.	266
WCBA	C. W. Heimback, Allentown, Pa.	254
WCBC	University of Michigan, Ann Arbor, Mich.	229
WCBD	W. G. Voliva, Zion, Ill.	345
WCBE	Unalt Radio Co., New Orleans, La.	263
WCBG	H. S. Williams, Pascagoula, Miss.	268
WCBH	University of Mississippi, Oxford, Miss.	242
WCBJ	Nicol, Duncan & Rush, Bemis Tenn.	240
WCBJ	C. Mans, Jennings, La.	244
WCBL	Northern Radio Mfg. Co., Houlton, Maine	266
WCBM	Radio Shop, Inc., Memphis, Tenn.	250
WCBP	1st Baptist Church, Nashville, Tenn.	236
WCCR	C. H. Messter (Portable)	205
WCBT	Clark University, Worcester, Mass.	238
WCBU	Arnold Wireless Co., Arnold, Pa.	220
WCBV	Tulahoma Radio Club, Tulahoma, Tenn.	252
WCBW	G. P. Rankin, Jr., Macon, Ga.	226
WCBY	Forks Electrical Shop, Buck Hill Falls, Pa.	268
WCBZ	Coppotelli Bros., Chicago Heights, Ill.	248
WCCO	Washburn Crosby Co., Minneapolis, Minn.	416
WCEE	C. E. Erbstein, Elgin, Ill.	278
WCTS	C. T. Sherer Co., Worcester, Mass.	268
WDM	Church of the Covenant, Washington, D. C.	234
WDZ	J. L. Bush, Tuscola, Ill.	278
WDAA	Tampa Daily News, Tampa, Fla.	273
WDAG	Kansas City Star, Kansas City, Mo.	276
WDAG	J. L. Martin, Amarillo, Texas	263
WDAH	Trinity Methodist Church, El Paso, Texas	268
WDAY	Radio Equipment Corp., Fargo, N. D.	244
WDBC	Kirk, Johnson & Co., Lancaster, Pa.	258
WDBD	H. E. Burns, Martinsburg, W. Va.	254
WDBE	Gilham-Schoen Elec. Co., Atlanta, Ga.	278
WDBF	R. G. Phillips, Youngtown, Ohio	222
WDBI	Radio Spec. Co., St. Petersburg, Fla.	226
WDBJ	Richardson Wayland Elec. Co., Roanoke, Va.	229
WDBO	Rollins College, Winter Park, Fla.	240
WDBP	State Normal School, Superior, Wis.	261
WDBQ	Morton Radio Supply Co., Salem, N. J.	234
WDBR	Tremont Temple Baptist Church, Boston, Mass.	256
WDBS	S. M. K. Radio Corp., Dayton, Ohio	275
WDBT	Taylor's Book Store, Hattiesburg, Miss.	236
WDBW	Radio Den, Columbia, Tenn.	268
WDBX	Otto Baur, New York, N. Y.	233
WDBY	North Side Congregational Church, Chicago, Ill.	258
WDBZ	Boy Scouts of America, Kingston, N. Y.	233
WDWF	D. W. Flint, Cranston, R. I.	441
WEW	St. Louis University, St. Louis, Mo.	248
WEAA	F. D. Fallain, Flint, Mich.	234
WEAF	A. T. & T. Co., New York, N. Y.	492
WEAH	Wichita Board of Trade, Wichita, Kan.	268
WEAI	Cornell University, Ithaca, N. Y.	254
WEAJ	University of South Dakota, Vermillion, S. D.	278
WEAM	Borough of North Plainfield, N. J.	261
WEAN	Shepard Co., Providence, R. I.	270
WEAO	Ohio State University, Columbus, Ohio	294
WEAP	Mobile Radio Co., Mobile, Ala.	263
WEAR	Goodyear T. and R. Co., Cleveland, Ohio	289
WEAU	Davidson Bros. Co., Sioux City, Ia.	375
WEAV	Iris Theatre, Houston, Texas	360
WEBA	The Electric Shop, Highland Park,	

Station	Owner and Location	Meters
WBEB	W. C. Bridges, Superior, Wis.	242
WEBC	Elec. Equipment & Service Co., Anderson, Ind.	246
WEBE	Roy W. Waller, Cambridge, Ohio	234
WEBB	Edgewater Beach Hotel, Chicago, Ill.	370
WEBJ	Third Avenue R. R. Co., New York, N. Y.	273
WEBK	Grand Rapids Radio Co., Grand Rapids, Mich.	242
WEBL	Radio Corp. of Am., (Portable)	226
WEBM	Radio Corp. of Am., Portable Mobile Station	226
WEBQ	Tate Radio Co., Harrisburg, Ill.	226
WEBR	H. H. Howell, Buffalo, N. Y.	244
WEBS	Dayton High School, Dayton, Ohio	256
WEBW	Beloit College, Beloit, Wis.	268
WEBX	John E. Cain, Jr., Nashville, Tenn.	268
WEBY	Hobart Radio Co., Rosindale, Mass.	226
WEBZ	Savannah Radio Corp., Savannah, Ga.	234
WEEL	Edison Electric Illuminating Co., Boston, Mass.	476
WEMC	Emm. Missionary College, Berrien Springs, Mich.	286
WFI	Strawbridge & Clothier, Philadelphia, Pa.	395
WFAA	Dallas News & Journal, Dallas, Texas	476
WFAM	The Times, St. Cloud, Minn.	273
WFAV	University of Neb., Lincoln, Neb.	275
WFBB	Eureka College, Eureka, Ill.	240
WFBC	1st Baptist Church, Knoxville, Tenn.	250
WFBD	Gethsemane Baptist Church, Philadelphia, Pa.	234
WFBE	J. V. De Walle, Seymour, Ind.	226
WFBG	W. F. Gable Co., Altoona, Pa.	278
WFBH	Concourse Radio Corp., New York, N. Y.	273
WFBJ	Galvin Radio Supply Co., Camden, N. J.	236
WFBK	St. Johns University, Collegeville, Minn.	236
WFBK	Dartmouth College, Hanover, N. H.	256
WFBM	Onondaga Hotel, Syracuse, N. Y.	252
WFBM	Merchants Lighting Co., Indianapolis, Ind.	268
WFBN	Radio Sales & Service Co., Bridge-water, Mass.	226
WFBP	Wynne Radio Co., Raleigh, N. C.	252
WFBR	Maryland Nat'l Guard, Baltimore, Md.	254
WFBT	Civic League, Pitman, N. J.	231
WFBY	Signal Corps, Ft. Ben Harrison, Ind.	258
WFBZ	Knox College, Galesburg, Ill.	254
WGI	American Radio Res. Corp., Medford Hillside, Mass.	261
WGN	The Tribune, Chicago, Ill.	370
WGR	Federal Telephone Mfg. Co., Buffalo, N. Y.	319
WGY	General Elec. Co., Schenectady, N. Y.	380
WGAL	Lancaster Elec. Supply Co., Lancaster, Pa.	248
WGAQ	W. G. Patterson, Shreveport, La.	263
WGAZ	The Tribune, South Bend, Ind.	275
WGAB	Jones Elec. & Radio Co., Baltimore, Md.	254
WGBB	H. H. Carman, Freeport, N. Y.	244
WGBC	1st Baptist Church, Memphis, Tenn.	266
WGBF	The Finke Furniture Co., Evansville, Ind.	217
WGBG	Breitenbach's Radio Shop, Thripton, Va.	226
WGBH	Fall River Herald Pub. Co. (New England States Portable)	210
WGBI	Frank S. Megargee, Scranton, Pa.	284
WGBK	L. W. Campbell, Johnstown, Pa.	284
WGBL	Radio Assn., Elyria, O.	227
WGBM	T. N. Stry, Providence, R. I.	234
WGBN	Hub Radio Shop, Salt Lake, U. S.	256
WGBO	Dr. Roses Artisan, San Juan, P. R.	275
WGBQ	Stout Institute, Menomonie, Wis.	234
WGBR	Marshfield Broadcasting Association, Marshfield, Wis.	229
WGBS	Gimbel Brothers, New York, N. Y.	316
WGBT	Furman University, Greenville, S. C.	236
WGBW	Valley Theatre, Spring Valley, Ill.	212
WGBX	University of Maine, Orono, Maine	252
WGST	Ga. School of Tech., Atlanta, Ga.	270
WHA	University of Wisconsin, Madison, Wis.	535
WHB	Sweeney School Co., Kansas City, Mo.	366
WHBN	First Ave. Meth. Church, St. Petersburg, Fla.	258
WHBO	Y. M. C. A., Pawtucket, R. I.	231
WHBP	Auto Co., Johnstown, Pa.	256
WHBQ	St. John's M. E. Church, Memphis, Tenn.	233
WHBS	E. W. Loche, Mechanicsburg, O.	208.2
WHK	Radiovox Company, Cleveland, Ohio	273
WHMB	C. L. Carroll, Portable, Chicago	233
WHN	George Schubel, New York, N. Y.	361
WHO	Bankers Life Co., Des Moines, Iowa	526
WHAD	Marquette University, Milwaukee, Wis.	275
WHAG	University of Cincinnati, Cincinnati, Ohio	233
WHAM	University of Rochester, Rochester, N. Y.	278
WHAP	H. A. Simmons, 290 Flatbush Ave., Brooklyn, N. Y.	240
WHAR	Seaside Hotel, Atlantic City, N. J.	275
WHAS	The Courier Journal-Times, Louisville, Ky.	400
WHAV	Wilmington Elec. Spec. Co., Wilmington, Del.	266
WHAZ	Rensselaer Polytechnic Institute, Troy, N. Y.	380
WHBA	Shaffer Music House, Oil City, Pa.	250
WHBB	Hebal's Store, Steven Point, Wis.	240
WHBC	Rev. E. P. Graham, Canton, Ohio	254
WHBD	Charles W. Howard, Bellefontaine, Ohio	222
WHBF	Beardsley Specialty Co., Rock Island,	

Station	Owner and Location	Meters
WHBG	John S. Skane, Harrisburg, Pa.	231
WHBH	Culver Military Academy, Culver, Ind.	222
WHBI	Chesaning Electric Co., Chesaning, Mich.	227
WHBJ	Lauer Auto Co., Ft. Wayne, Ind.	234
WHBK	Franklin Garage, Ellsworth, Me.	231
WHBL	J. H. Slusser, Logansport, Ind.	220
WHBR	Scientific Elec. Co., Cincinnati, O.	215.7
WHDI	Wm. Hood Dunwoody Ind. Inst., Minneapolis, Minn.	278
WHEC	Hickson Elec. Co., Rochester, N. Y.	258
WIK	K. & L. Elec. Supply Co., McKeesport, Pa.	234
WIL	Benson Radio Co., St. Louis, Mo.	273
WIP	Gimbel Brothers, Philadelphia, Pa.	508
WIAD	H. R. Miller, Philadelphia, Pa.	250
WIAK	Journal Stockton Co., Omaha, Neb.	278
WIAS	Home Elec. Co., Burlington, Iowa	254
WJD	Dennison University, Granville, Ohio	217.3
WJY	Radio Corp. of Am., New York, N. Y.	405
WJZ	Radio Corp. of Am., New York, N. Y.	454
WJAB	American Elec. Co., Lincoln, Neb.	229
WJAD	Jackson's Radio Elec. Co., Waco, Texas	353
WJAG	Norfolk Daily News, Norfolk, Neb.	270
WJAK	Rev. C. L. White, Greentown, Ind.	254
WJAM	D. M. Perham, Cedar Rapids, Ia.	268
WJAN	The Star, Peoria, Ill.	273
WJAR	The Outlet Co., Providence, R. I.	306
WJAS	Pittsburgh Radio Supply House, Pittsburgh, Pa.	275
WJAZ	Zenith Radio Corp., Chicago, Ill.	268
WJJD	Loyal Order of Moose, Mooseheart, Ill.	303
WKY	WKY Radio Shop, Oklahoma City, Okla.	275
WKAA	H. F. Paar, Cedar Rapids, Ia.	278
WKAD	Chas. Loeff, E. Providence, R. I.	240
WKAN	United Battery Service Co., Montgomery, Ala.	226
WKAP	D. W. Flint, Cranston, R. I.	234
WKAQ	Radio Corp. of Porto Rico, San Juan, P. R.	341
WKAR	Mich. Agricultural College, Lansing, Mich.	285
WKAU	Laconia Radio Club, Laconia, N. H.	254
WKBE	K. & B. Electric Co., Webster, Mass.	231
WLAL	1st Christian Church, Tulsa, Okla.	250
WLB	University of Minneapolis, Minneapolis, Minn.	278
WLS	Sears Roebuck Co., Chicago, Ill.	348
WLW	Crosley Radio Corp., Cincinnati, Ohio	422
WLAP	W. V. Jordan, Louisville, Ky.	275
WLAX	Greencastle Commun. Broad. Sta., Greencastle, Ind.	231
WLBL	Wisconsin Department of Markets, Stevens Point, Wisc.	278
WLIT	Lit Brothers, Philadelphia, Pa.	395
WMC	The Commercial Appeal, Memphis, Tenn.	500
WMH	Ainsworth-Gates Radio Co., Cincinnati, Ohio	422
WMU	Doubleday Hill Elec. Co., Washington, D. C.	261
WMAC	C. B. Meredith, Cazenovia, N. Y.	275
WMAF	Round Hills Radio Corp., Dartmouth, Mass.	360
WMAH	General Supply Co., Lincoln, Neb.	254
WMAK	Norton Laboratory, Lockport, N. Y.	266
WMAN	1st Baptist Church, Columbus, Ohio	278
WMAQ	Chicago Daily News, Chicago, Ill.	448
WMAU	Kings Highway Presbyterian Church, St. Louis, Mo.	248
WMAZ	Mercer University, Macon, Ga.	261
WMBF	Fleetwood Hotel, Miami Beach, Fla.	384
WNB	Radio Shop, Newark, N. J.	233
WNAO	Shepard Stores, Boston, Mass.	280
WNAD	University of Okla., Norman, Okla.	254
WNAL	Omaha Central High School, Omaha, Neb.	258
WNAP	Wittenberg College, Springfield, Ohio	248
WNAR	1st Christian Church, Butler, Mo.	231
WNAT	Lenning Bros. Co., Philadelphia, Pa.	250
WNAX	Dakota Radio App. Co., Yankton, S. D.	244
WNYC	Municipal Station, New York, N. Y.	526
WOAN	J. D. Vaughan, Lawrenceburg, Tenn.	282.8
WOC	Palmer School of Chiro, Davenport, Iowa	484
WOI	Iowa State College, Ames, Iowa	270
WOO	John Wanamaker, Philadelphia, Pa.	508
WOQ	Unity School of Christianity, Kansas City, Mo.	278
WOR	L. Bamberger & Co., Newark, N. J.	405
WOS	Mo. State Marketing Bureau, Jefferson City, Mo.	441
WOAC	Page Organ Co., Lima, Ohio	266
WOAF	Tyler Commercial College, Tyler, Texas	360
WOAI	South East Equipment Co., San Antonio, Texas	395
WOAN	Vaughan Con. of Music, Lawrenceburg, Tenn.	283
WOAW	Woodmen of the World, Omaha, Neb.	526
WOAX	F. J. Wolff, Trenton, N. J.	240
WOCL	Hotel Jamestown, Jamestown, N. Y.	275
WORD	Peoples Pulpit Ass'n, Batavia, Ill.	278
WPG	Municipality of Atlantic City, Atlantic City, N. J.	300
WPAG	Doolittle Radio Corp., New Haven, Conn.	268
WPAK	N. D. Agricultural College, Agricultural College, N. D.	275
WPAU	Concordia College, Moorhead, Minn.	258
WPAZ	Dr. John R. Koch, Charleston, W. Va.	268
WPSC	Penn State College, State College, Pa.	261
WQJ	Calumet Rambo Broadcasting Co., Chicago, Ill.	448
WQAA	H. A. Beale, Jr., Parkersburg, Pa.	220
WQAC	Gish Radio Service, Amarillo, Texas	234

(Concluded on next page)

Much Learnt On Radio



THE Washington Square College Players of N. Y. University take a test to see whether their voices qualify them for radio announcing. R. C. Borden and A. C. Bushe operate the set, while (next to them) Randolph Somerville, Director of Dramatics, supervises the proceedings. (Kadel & Herbert)



BERNARR MacFADDEN, at the microphone of station WOR, directs a gym class of over a million radio fans. The MacFadden children, who join him in the exercises before the microphone, are shown with him. At 6:45 each morning this popular program is broadcast. (Kadel & Herbert).

LIST OF STATIONS

(Continued from preceding page)

Station	Owner	Location	Meters
WQAE	Moore Radio News Station	Springfield, Vermont	246
WQAM	Electric Equipment Co.	Miami, Fla.	268
WQAN	The Scranton Times	Scranton, Pa.	250
WQAO	Calvary Baptist Church	New York, N. Y.	360
WQAS	Prince Walter Co.	Lowell, Mass.	252
WRC	Radio Corp. of Am.	Washington, D. C.	469
WRK	Doron Bros. Elec. Co.	Hamilton, Ohio	270
WRL	Union College	Schenectady, N. Y.	360
WRM	University of Illinois	Urbana, Ill.	273
WRR	Dallas Police & Fire Dept.	Dallas, Texas	261
WRW	Tarrytown Research Laboratory	Tarrytown, N. Y.	273
WRAA	Rice Institute	Houston, Texas	256
WRAF	Radio Club, Inc.	Laporte, Ind.	224
WRAK	Economy Light Co.	Escanaba, Mich.	256
WRAL	Northern States Power Co.	St. Croix Falls, Wis.	248
WRAM	Lombard College	Galesburg, Ill.	244
WRAN	Black Hawk Elec. Co.	Waterloo, Ia.	236
WRAO	St. Louis Radio Ser. Co.	St. Louis, Mo.	227
WRAW	Antioch College	Yellow Springs, O.	263
WRAW	Avenue Radio Shop	Reading, Pa.	238
WRAX	Flexon's Garage	Gloucester City, N. J.	268
WRBC	Immanuel Lutheran Church	Valparaiso, Ind.	278
WREO	Reo Motor Company	Lansing, Mich.	286
WRHF	Radio Hospital Fund	Washington, D. C.	256
WSB	The Atlanta Journal	Atlanta, Ga.	428
WSL	J. & M. Elec. Co.	Utica, N. Y.	273
WSMH	Shattuck Music House	Owosso, O.	240
WSY	Alabama Polytechnic Institute	Auburn, Ala.	250
WSAB	S. E. Mo. State Teachers College	Cape Girardeau, Mo.	275

Station	Owner	Location	Meters
WSAC	Clemson Agricultural College	Clemson College, S. C.	337
WSAD	J. A. Foster Co.	Providence, R. I.	256
WSAG	Gospel Tabernacle	St. Petersburg, Fla.	266
WSAI	U. S. Playing Card Co.	Cincinnati, Ohio	*326
WSAJ	Grove City College	Grove City, Pa.	229
WSAN	Allentown Call	Allentown, Pa.	229
WSAP	City Temple	New York, N. Y.	263
WSAR	Doughty & Welch Elec. Co.	Fall River, Mass.	254
WSAU	Camp Marienfeld	Chesham, N. H.	229
WSAV	Clifford W. Vick Radio Con. Co.	Houston, Texas	360
WSAX	Chicago Radio Laboratory	Chicago, Ill.	268
WSAZ	Chase Electric Shop	Pomeroy, Ohio	244
WSOE	School of Engineering	Milwaukee, Wis.	246
WSRF	Harden Sales and Service Co.	Broadlands, Ill.	233
WSRO	Radio Co.	Hamilton, Ohio	252
WSUI	State University of Iowa	Iowa City, Iowa	484
WTC	Kansas State Agricultural College	Manhattan, Kan.	273
WTAB	Fall River Daily Herald	Fall River, Mass.	266
WTAC	Penna. Traffic Co.	Johnstown, Pa.	210
WTAF	L. J. Gallo	New Orleans, La.	268
WTAL	Toledo Radio & Elec. Co.	Toledo, Ohio	252
WTAM	Willard Storage Battery Co.	Cleveland, Ohio	389
WTAP	Cambridge Radio Elec. Co.	Cambridge, Ill.	242
WTAQ	S. Van Gordon & Son	Osseo, Wis.	254
WTAR	Reliance Radio & Elec. Co.	Norfolk, Va.	260
WTAS	Charles E. Erbstein	Elgin, Ill.	303
WTAT	Edison Elec. Ill. Co. (Portable)	Boston, Mass.	244
WTAU	Ruegg Battery & Elec. Co.	Tecumseh, Neb.	242

RESULTS

What Results Have You Obtained from Circuits Described in RADIO WORLD? State name of Article and Date of Issue. Address Results Editor, RADIO WORLD, 1493 Broadway, New York City.

RESULTS EDITOR:

HAVING the parts on hand, I assembled the "\$25.00 1-Tube DX Set" described in your January 17-issue. I tried it out first as a 1-tube set, and as it behaved very well I added two stages of audio amplification. The set certainly does great work. I am using a C301A tube as detector, as well as the same type for amplifiers. Most of the material used in the set is not first class, being old parts resurrected from the "junk box." The variometer is a good one. One audio transformer is a cheap commercial type and the other is home-made, from a Ford coil. The detector and two stages of audio are wedged into 11½x6" panel space.

The following is a list of stations received on the loud speaker with good volume during two nights:

- All Pacific Stations
- WGN.....Chicago
- WJW.....Chicago
- WGY..Schenectady
- WOC....Davenport
- WTAM..Cleveland
- KOA.....Denver
- WCCO, KFRU,
- St. Paul-Minneapolis, Bristow, Okla.
- WHB..Kansas City
- WFDF.Kansas City
- CFCN.....Calgary
- KDYI,
- WMC.....Memphis
- Salt Lake City
- WEBH....Chicago
- WFAA.....Dallas
- WBAP..Ft. Worth

The set is very steady; there is no body capacity, and the stations can be logged. If all high class parts were used, even this good performance should be bettered.

C. M. HARELSON,
Delevan, Calif.

* * *

RESULTS EDITOR:

I BUILT the 1-tube set described by Lieut. O'Rourke in the Dec. 6 issue. I was delighted with the results from this 1-dial set. I cover the entire wavelength belt from 200 meters to 550 very easily, and surely appreciate the help RADIO WORLD has given me up to date. I am sort of an experimenter in radio hook-ups and have great fun. I have a 5-tube Neurodyne and enough material to build another 5-tube set, but I use all this for experimenting. O'Rourke's set can't be beat, with the exception of the plate-tuned Neurodyne. I have heard WFAF, New York; PWX, Havana; CYL, Mexico City, on O'Rourke's set with loud speaker (adding two AF stages) and stations numbering to 327 in United States. I have heard all States except Maine, Vermont, North Carolina and West Virginia. I have heard Saskatoon, Canada, at 4 P. M.; WLW and KYW at dawn. Stations will come in much better by using aerials with leadin pointing to station.

RADIO WORLD is the best radio magazine published.

ALBERT FRANZEN,
Cedar Rapids, Neb.

Station	Owner	Location	Meters
WTAW	Agricultural & Mech. College	College Station, Texas	270
WTAX	Williams Hardware Mfg. Co.	Streator, Ill.	231
WTAY	Oak Leaves Broadcasting Ass'n	Park, Ill.	250
WTAZ	T. J. McGuire	Lambertville, N. J.	261
WTIC	Travelers Insurance Co.	Hartford, Conn.	349
WWI	Ford Motor Co.	Dearborn, Mich.	266
WWJ	The Detroit News	Detroit, Mich.	353
WWL	Loyola University	New Orleans, La.	275
WWAD	Wright & Wright, Inc.	Philadelphia, Pa.	250
WWAE	College of Mines	Houghton, Mich.	242
WWAO	College of Mines	Houghton, Mich.	244

The Radio University



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.

for the reception of these signals. There are, however, a number of code stations operating on these bands, and if one is interested in the reception of such signals it is well worth the while.

IS an indoor antenna as good as an outdoor antenna for local reception?—Thos. Burke, Wichita, Kan.

In most cases it will be found that an indoor antenna will give as good results as an outdoor aerial for local reception. If properly constructed distant stations may be heard.

ALTHOUGH I have already decreased my tickler inductance I cannot satisfactorily control the oscillations in the Anderson 4-tube set. The tickler spills too easily. How can I remedy this?—W. Hoffman, 353 Hanover St., Bethlehem, Pa.
Decrease the tickler inductance still more.

I HAVE a loop set but get a humming or buzzing noise all the time. The set works well

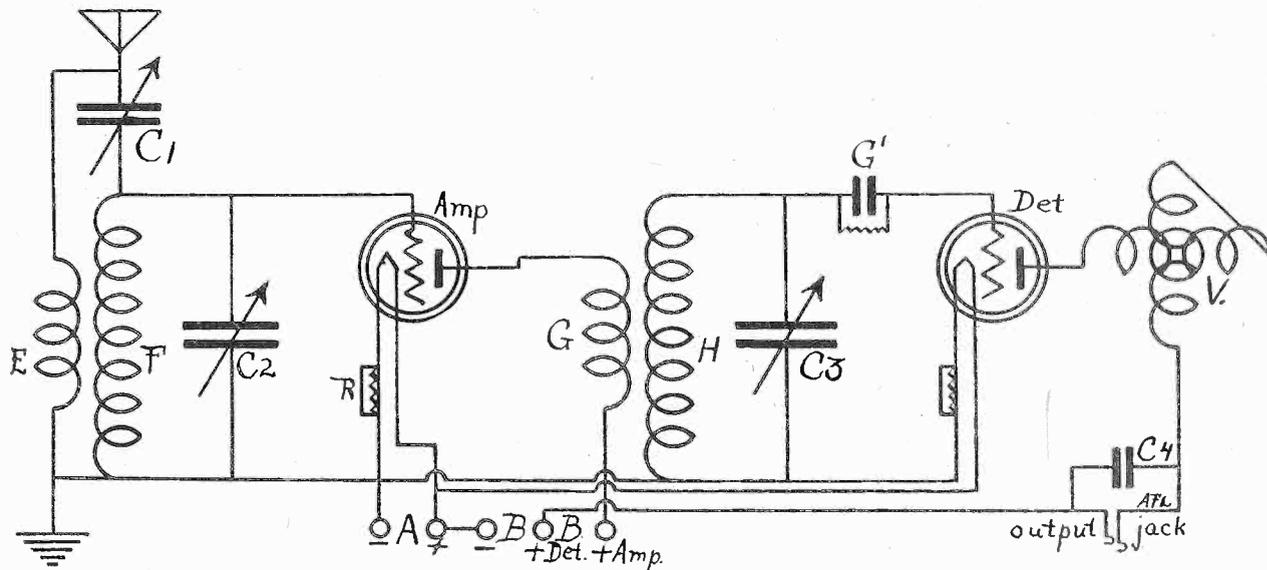


FIG. 126, a 2-tube set, consisting of a stage of tuned RF and a regenerative detector. It is very selective and gets great DX. The variable condensers C1, C2 and C3 are .005 mfd., normally 23 plates. E should have 10 turns of No. 22 DSC wire on a 3 1/2" diameter tubing. F is 43 turns of the same wire. G and H are 10 and 43 turns respectively, also. The variometer V is in the detector plate circuit. The tube at left is the RF amplifier, the one at right the detector, R and its mate are amperites, C4 is .002 mfd., C1, .00025. Add two stages of transformer AF for speaker operation.

I HAVE three 23-plate variable condensers and a variometer. Please show a selective DX hookup embodying these parts.—Phillips Stern, 523 West 187th St., New York City.

See Fig. 126, showing a stage of tuned RF and a regenerative detector, with a condenser in the aerial circuit to facilitate reception on lower waves.

IN the March 28 issue the diagram of Lieut. O'Rourke's 4-tube DX set showed no ground connection but the textual explanation referred to where the ground goes.—Peter A. Dolan, 380 Sackett St., Brooklyn, N. Y.

The set works well without ground, but if one is desired it should be connected as explained in the text. The wiring diagram was correct.

IS a C battery as effective in a set as it is supposed to be? I have read several folders printed by battery manufacturers, in which it is stated that by using a C battery of the proper size in an amplifier the life of the B batteries will be doubled and even tripled.—F. Bernert, 367 Seventy-fifth St., Brooklyn, N. Y.

A C battery does reduce the drain on B batteries considerably. It should be connected in the audio amplifier circuit, where it can be used without trouble. The connections are very simple. First disconnect all wires now fastened to the F posts of the two audio transformers. Then join the two F posts together, and run another wire from them to the negative side of the C battery. Connect the positive post of the C battery to the negative side of the A battery.

PLEASE explain the electronic action involved in a tube whereby a C battery improves operation.—Warren Frost, Ardmore, Pa.

The heated filament of a vacuum tube is a source of electrons, which are liberated as soon as the filament is lighted. A strong tendency to drift to the plate is created through the connection of a high voltage B battery between the plate and the filament, which causes a continuous flow of plate current. En route from the filament to the plate, the electrons which constitute this current flow, pass through the meshes of the grid. The charge on the grid varies in accordance with the signals impressed upon it by the antenna system. When the grid is positive, it supplements the plate potential in attracting electrons to it, causing increased plate current. When the grid is negative, the charge opposes the flow of electrons

toward the plate. Consequently, the plate current varies in accordance with the voltage impressed upon the grid. Indeed, this element of the tube may be considered as a sieve, the meshes of which vary in accordance with an incoming signal. The addition of the C battery simply causes these meshes to reduce their size by a definite proportion, resulting in smaller plate current and B battery economy. Incoming signals serve to reduce and increase their size to the same degree as before, except that the fluctuations in plate current thus produced are impressed upon a smaller plate current. Thus we have no sacrifice in the amplitude of fluctuations, which produce the all essential signal, but we do secure them at less expense of plate current.

WHICH terminal of a C battery is connected to the transformer and which to the filament?—D. J. Austin, Joplin, Mo.
The negative to the grid and the positive to the filament.

I READ in RADIO WORLD of four prominent radio stations operating on wavelengths below 100 meters. Is there any advantage in building a receiver especially for the reception of such stations?—Jas. Ferguson, Dubuque, Ia.

Since these stations broadcast the same program on their regular assigned wavelength there is no advantage yet in building a set particularly

otherwise.—Francis J. Tietsort, 520 West 124th Street, New York City.

If the loop is near electric lights, electric light wires or any electrical appliance the loop will pick up a humming noise. This noise will be persistent and even-toned and often its source baffles those who are not familiar with the characteristic noise of alternating currents.

HOW may the noise which occurs in an audio-frequency amplifier be reduced? The writer finds it very annoying when trying to receive distant stations.—Jackson Everett, Austin, Texas.

There are three possible ways in which such noises may be reduced. First is by connecting a small by-pass condenser across the secondary winding of the second step transformer. The second is by connecting a small condenser across the primary of the second audio transformer. And third, by connecting a small resistance across the primary of the second transformer. In all probability the condenser across the primary of the second AFT will be found best, as it does not tend to reduce the overtones which are essential to good reproduction.

IS No. 16 or 18 enameled wire as good for internal wiring of Benson's Super-Heterodyne as No. 14 bus bar?—J. E. Evans, 433 W. 21st Pl., Chicago, Ill.
Yes.

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Name
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City and State

BROADCAST PROGRAMS

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

Friday, April 3

- 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.
- WHAS, Louisville, Ky., 399.8 (C. S. T.)**—4 P. M., concert from Louisville conservatory; organ; police bulletins; weather; readings; news. 4:55, market. 5, time. 7:30, Wieseman's novelty orch.; news; 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 Dyer Everett, accompanist.
- WEMC, Berren Springs, Mich., 786 (E. S. T.)**—9 P. M., radio choir. 9:20, Mr. Robert Hodgins, cellist. 9:35, Miss T. Kressin, soprano. 9:45, Mr. H. B. Taylor, Bible chat.
- WLW, Cincinnati, Ohio, 423 (C. S. T.)**—10:45 A. M., weather, business reports. 11:45, time. 12:15 P. M., Ahaus Brunswick orch. 1:30, business reports, quotations.
- WEEI, Boston, Mass., 303 (E. S. T.)**—12:15 P. M., Lenten service. 2, musicale. 6:30, Big Brother Club, Hammond, symphonators. 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.
- 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-in; Roger W. Babson; Tell-Me-a-Story Lady; Trianon ensemble. 11:45, "Merry Old Chief," Plantation Players; Kuhn's orch.; J. Campbell's orch.
- 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.
- 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., 475.9 (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, 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, 325.9 (C. S. T.)**—10 P. M., Hotel Alms orch. 10:30, Ed. H. Shoelwer, songs; Angela Devoto; Eugene Perazzo, accompanist; songs, Gay Anderson; Ed. H. Schoelwer, accompanist. 11:15, Hotel Alms orch.
- WGN, Chicago, Ill., 370 (C. S. T.)**—9:31 A. M., time. 9:35, quotations. 10, quotations. 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. Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.
- WEAR, Cleveland, Ohio, 390 (E. S. T.)**—7 P. M., Vocalian Recording orch. 8, Kahola Trio, Larry Kenneth and Kent Brothers; Mrs. Mary Prayner Walsh, Hungarian soprano; Leonard W. Siegel, basso; Painesville Kiwanis Club.
- WBZ, New England, 333.3 (E. S. T.)**—11:55 A. M., time, weather, markets 7 P. M., markets. 7:05, bedtime story.
- WOC, Davenport, Iowa, 484 (C. S. T.)**—12:57 P. M., time. 1, Radio Farm School. 2, quotations. 3, "Home Management" schedule, by "Aunt Jane." 4, St. Ambrose College orch. 5:45, chimes. 6, police reports, miscellaneous bulletins. 6:30, sandman's visit. 6:50, educational lecture, "Relation of Birds to Agriculture," by J. H. Paarmann. 8, Troy Laundry Machinery Co. band; weather.
- WIP, Philadelphia, Pa., 509 (E. S. T.)**—7 A. M., exercises. 10, talk to housewives, Mrs. Anna B. Scott. 1 P. M., Gimbel Tea Room orch. 1:30, weather. 3, hints to housewives, Mrs. Anna B. Scott. 3:15, Erminio Ialacci, tenor; C. F. Hill, mellophones; Iris Virginia Gruber, contralto; Charles Hobson, Jr., violinist. 4, "The Individual History," Dr. Wm. E. Lingebach. 6, weather. 6:05, Harold Knight's singing orch. 6:45, markets. 7, Uncle Wip's bedtime story.
- WJZ, New York, N. Y., 455 (E. S. T.)**—10 A. M., daily menu, Mrs. Julian Heath. 10:20, books, Grace Isobel Colbron. 10:30, health and beauty, Ruth Champenois. 10:40, arts and decorations. 10:50, Eleanor Gunn's fashion. 11, "Right Job for Your Daughter," Helen Hoerle. 12:15 P. M., music from Brick church. 1, Hotel Ambassador trio. 4:15, Abe F. Barbute, tenor. 4:30, Hotel Ambassador trio. 5:30, agricultural reports, markets, quotations. 7, Hotel Commodore orch. 8, Wall Street Journal review. 8:10, "Man's Place in Nature," Prof. C. L. Bristol. 8:40, Alveric Bellenoit tenor. 9, "The New York Assembly," Julius S. Benz. 9:15, Alveric Bellenoit, tenor. 9:25, Gene Fossick's orch. 10, Orpheus Masonic quartet. 10:15, Louis Burkow, violinist. 10:30, Beaux Arts orch.
- WJY, New York, N. Y., 405 (E. S. T.)**—7:30 P. M., Monterey orch. 8:15, "Adam and Eve," comedy. 10:15, Fourteen Virginians.
- WGY, Schenectady, N. Y., 379.5 (E. S. T.)**—2 P. M., music; "Pictures," Harold Treichel. 6:30, Sunday school lesson. 7, Albany Strand theatre orch. 7:30, health talk. 7:40, WGY orch. 8:15, Henrik Ibsen's "The Wild Duck," WGY players. 10:30, WGY orch.
- WOO, Philadelphia, Pa., 508.2 (C. S. T.)**—11 A. M., organ. 11:30, weather. 11:55, time. 12 M., Golden's crystal tea room orch. 4:40 P. M., police reports. 4:45, organ, trumpets. 7:30, Hotel Adelphi orch. 8, Mary Louise Poth, violinist; Mrs. Fred Reber, accompanist; Warren M. Robbins, baritone. 8:15, Artisan's band. 9, WOO orch.; Carmen Sabo, soprano; A. Mariotti, tenor; Harriette G. Ridley, accompanist. 9:55, time. 10:02, weather. 10:03, organ, Mary E. Vogt. 10:30, Hotel Sylvania orch.
- WCCO, Minneapolis, Minn., 417 (C. S. T.)**—10:45 A. M., Betty Crocker, "For the Easter Breakfast." 2 P. M., woman's hour. 4, Readers' club. 5:30, children's hour. 6:15, concert. 7:30, lecture. 7:45, Nankin cafe orch.; Tommie Malie, Sammie Stept, singing team.
- WRC, Washington, D. C., 469 (E. S. T.)**—4 P. M., fashions. 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 Albton.
- WLIT, Philadelphia, Pa., 395 (E. S. T.)**—10:02 P. M., daily almanac. 12:05, organ; Arcadia concert orch.; Lenten service. 2, Arcadia concert orch.; playlet, School of Elocution and Oratory. 4:30, Peekin cafe orch. 7:30, Dream Daddy. 8, "The New Books," Allyn C. Saurer. 8:15, "Digest of Magazine Articles," Walter F. Gruening; recital. 10, Arcadia dance orch.
- WQJ, Chicago, Ill., 448 (C. S. T.)**—11 A. M., Fred Mann's menu. 3 P. M., Josephine Naylor, "An Announcement Shower"; Wynn Ferguson, "Bridge Lessons"; Mrs. Harry T. Sanger, "Yellowstone National Park." 7, Rainbo Gardens orch.; Agatha Karlan, reader; Henrietta Nolan, violinist; Otis Pike Jester, soprano; Mary Thrash House, pianist. 10, Rainbo Skylarks; West Brothers, Hawaiian steel guitar duets; Zeigler Sisters; Lauretta Giles, soprano; Nate Caldwell, monologues. 11 A. M., Ralph Williams, the Ginnerman; the Little Skylarks.
- WGBS, New York, N. Y., 316 (E. S. T.)**—10 A. M., timely talks with Terese. 10:10, Straub and Lambrecht, Hawaiian guitar. 10:20, Patricia Lee, "Modern Marriage." 10:30, Straub and Lambrecht. 10:40, Mrs. Maybelle A. Burbridge, beauty talk. 10:50, Straub and Lambrecht. 1:30 P. M., Scripture reading. 1:35, Merle Johnston, saxophone; Lew Cobey, pianist, with William J. Rietz, composer. 3, Peggy Wood, actress, and John Weaver. 3:10, Florence Milligan, soprano. 3:20, Robert Leavitt, landscape architecture. 3:30, Florence Milligan. 3:40, Dr. Alfred G. Robyn, harmony and composition lessons. 3:50, Florence Milligan. 6, Uncle GeeBee. 6:30, Herman Bernard, "What's Your Radio Problem." 6:40, Larry Funk orch.
- WAHG, Long Island, N. Y., 316 (E. S. T.)**—8 P. M., Betty and Helen Lasner, piano. 8:15, Fred Ehrenberg, musical saw. 8:30, Constance Menkel, soprano. 8:45, Jean Sala, pianist. 9, Michael Lambert, cellist. 9:30, Constance Menkel, soprano. 9:45, time, weather. 10:05, Wm. F. Diehl, "The Radio Question Box." 10:20, Fred Ehrenberg, musical saw. 10:35, music.
- WEAF, New York, N. Y., 492 (E. S. T.)**—6:45 A. M., exercises. 11, "English Style Houses," Henry B. Humphrey; Edna Marioni, "Development of Personality"; markets; weather; Lenten services. 4 P. M., Elsie Nocolai, lyric soprano; West End ladies trio; Museum of Natural History talk to children. 6, music from the Hotel Waldorf-Astoria; "Sir Hobgoblin," by Blanche Elizabeth Wade; Maud Lutz, mezzo soprano; Newell Chase, pianist; "Happiness Candy Boys"; Spear Co. home entertainers; Boris Popovitsky, pianist; New York University glee club; Meyer Davis' Lido-Venice orch.
- WFBH, New York, N. Y., 272.6 (E. S. T.)**—2 P. M., Sunny Brook Society orch. 3:30, World Neighborhood News. 4, Howard's Musical Aces. 5, Dick and Flo Bernard, songs. 5:15, James
- Egan, songs. 5:30, health talk. 5:35, Edward Dies, piano. 6, Augusta Price, soprano. 6:15, Paul Eppes' revelers. 11:30, Club Frontenac orch. 12:30, Cotton Club revue.
- WOR, Newark, N. J., 405 (E. S. T.)**—6:45 A. M., gym. 2:30 P. M., Contemporary Club of Newark, N. J., program. 3:15, Angelo Patricolo, pianist. 3:30, "Sweden," James Albert Wales. 3:45, Angelo Patricolo, pianist. 6:15, Hotel Lorraine orch. 6:30, "Man in Moon" stories, Josephine Lawrence and William F. B. McNeary. 7, Hotel Lorraine orch.
- WNYC, New York, N. Y., 526 (E. S. T.)**—3:15 P. M., "Growth of New York City," Dr. Roy W. Miner. 7:30, police alarms. 7:35, resume of Board of Estimate meeting. 8, Bernadette Carey, soprano, accompanied by Richard S. Byrne. 8:30, Harmonica band. 9, Margarete Henke, soprano; Adolf Henke, tenor; Aloys C. Kremer, piano; Dr. Wm. Braeskerlein, accompanist. 10:10, Professor J. G. Carter Troop, "Adam Bede." 10:30, police alarms; weather.
- WHN, New York, N. Y., 361 (E. S. T.)**—2:15 P. M., Thos. Silver, tenor. 2:25, Con Hughes, piano. 2:35, Gerhard orch. 3, Morris L. Sheff, violin and piano. 3:45, Larry Moen and Harold Flavin, pianologue. 3:55, Aves D. Edgar, tenor; Bill Frasher, pianist. 4, poems by NTG. 4:15, James Brockman, Sam Williams, singing. 4:30, Uncle Robert's chat to children. 5, Nebraska orch. 6:30, violin, Olcott Vail; Stephen Balogh, pianist. 7, Hotel Alamac dance orch. 7:30, health talk, Dr. Landis. 7:35, Club Moritz orch. 8, Cantor A. Sukenig. 8:15, Alex Aranyossy, violinist. 8:30, concert by Music Lovers' Ass'n. 9:15, Marconi Brothers, accordion. 9:30, Crystal Palace orch. 10, White Way entertainers. 10:25, "Storage Batteries," H. B. Shontz. 10:30, Roseland dance orch. 11, Ray D. O'Flynn Air Pals. 11:15, Harry Hock entertainers. 11:30, Club Alabama orch. 12, Parody Club orch.
- WAAM, Newark, N. J., 263 (E. S. T.)**—11 A. M., Happy Hour, Rev. Haines and Scott. 11:15, Miss Ada Swann, cooking school. 11:30, Happy Hour, Rev. Haines and Scott. 7 P. M., sports, Major Tate. 7:15, Jolly Bill Steinke's Dutch night. 8, home and heart problems, the Ledger Lady. 8:15, Dick Finch and Ben Friedman. 8:30, Jimmy Lassell, tenor. 8:45, Hilda White Kiernan, 9, Vivi trio. 9:30, Philip W. Oliver, baritone. 9:45, Egyptian Six orch. 10:30, Elizabeth Town Players club.
- WPG, Atlantic City, N. J., 299.8 (E. S. T.)**—7 P. M., dinner dance, Hotel Ambassador. 9, Wildwood string band. 10:15, Hotel Traymore dance orch.
- 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 Crier." 10:40, local theatres. 11:50, market. 12 M., time; Scriptures. 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, 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, Jack O'Lantern orch.
- 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 C. W. Pooler.
- KOA, Denver, Col., 323 (M. S. T.)**—12:20 P. M., Rialto organ. 1, quotations, weather. 3, matinee. 6, stocks, news. 6:40, Book of Knowledge program. 8, Rialto theatre orch. 8:10, studio program, KOA orch.
- KFAE, Pullman, Wash., 348.6 (P. S. T.)**—7:30 P. M., Glenna Garrett, soprano; readings, Erna 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.
- 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, news, police reports. 8, lecture from University of Oregon. 10:30, Hoot Owls.
- KSD, St. Louis, Mo., 545.1 (C. S. T.)**—9 P. M., Mrs. Robert Burnett and Mrs. Frank A. Habig, piano. 10:30, E. A. Taussig program.
- KFOA, Seattle, Wash., 455 (P. S. T.)**—12:30 P. M., Seattle Chamber of Commerce program. 4, Olympic Hotel concert orch. 6:45, Sherman, Clay Co. program; weather. 8:30, Miss Peggy Sullivan. 10, Harkness orch.
- KDKA, Pittsburgh, Pa., 326 (E. S. T.)**—7 A. M., exercises. 8, exercises. 9:45, markets. 11:55, time. 12 M., weather, markets. 12:20 P. M., Sunday school lesson. 3:30, quotations. 6:15, Charlie Gaylord's orch. 7:15, markets. 7:30, Radio Rhythmer. 7:45, "How the Banks Serve Us," by Walter O. Phillips. 8:15, "The University of Pittsburgh," by Stewart Hamilton. 8:30, Reick-McJunkin Co. program. 9:55, time, weather.
- KYW, Chicago, Ill., 536 (C. S. T.)**—6:30 A. M., exercises. 9:30, markets. 11:35, table talk. Mrs. Anna J. Peterson. 6 P. M., markets. 6:35, bedtime story, "Uncle Bob." 7, Joska DeBabary's orch. 7:10, Coon-Sanders Original Nighthawks. 7:20, Joska DeBabary's orch. 9, midnight revue. 1 A. M., Coon-Sanders Original Nighthawks.
- KHJ, Los Angeles, Calif., 405.2 (P. S. T.)**—7 A. M., exercises. 12:30 P. M., Majestic Six orch.

2:30, matinee. 6, Art Hickman's concert orch. 6:30, Prof. Walter Sylvester Hertzig, a story of American history; Richard Headrick, screen juvenile. 7:30, Gladys De Witt, "The Santa Fe Trail." 8, Western Auto Supply Co. program. 10, Art Hickman's dance orch.
 KFDM, Beaumont, Texas, 315.6 (C. S. T.)—9 P. M., Refinery band.
 CNRE, Edmonton, Alta, 516.9 (M. T.)—7:30 P. M., bedtime story. 8:30, studio program.
 CNRM, Montreal, Que., 411 (E. S. T.)—8:30 P. M., Miss D. Matthews, soprano; Mr. H. Barnes, violinist; Mr. A. F. Stillman, tenor; Mr. C. E. Simpson, clarinet; Miss E. DeWitt, soprano; Mr. J. T. Livinstone, Hawaiian guitar; Mr. W. C. Muir; pianoforte, Mr. H. Stott; male quartet; violin, Master K. Schofield.
 CNRT, Toronto, Ont., 358 (E. S. T.)—6:30 P. M., King Edward Hotel concert orch. 8:30, Sandy Macdonald, Scotch comedian, with his Lads and Lassies. 9, address. 10:30, King Edward Hotel dance orch.
 CNRA, Moncton, N. B., 313 (A. S. T.)—7:30 P. M., bedtime stories, Uncle Alf. 8, markets. 8:30, musical program by Moncton Artists; CNRA orch.

Saturday, April 4

WEAO, Columbus, Ohio, 233.9 (E. S. T.)—9:45 A. M., weather and market, agricultural bulletins. 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. 7:45, 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. 9:30, "Nova Scotia," by Clarence Hough. 9, Balaban & Katz theatre review.
 WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M., Halprin string trio.
 WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations. 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, Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.
 WOC, Davenport, Iowa, 484 (C. S. T.)—12:57 P. M., time. 1, weather, quotations. 5:45, chimes. 6, police reports, miscellaneous bulletins. 6:30, sandman's visit, by Vel McLaughlin. 6:50, Sunday school lesson. 9, Davenport Chapter of De Molay; weather. 11, LeClaire Hotel orch.; Peter McArthur, baritone.
 WGBS, New York, N. Y., 316 (E. S. T.)—10 A. M., time. 10:15, talks with Terese. 10:10, Eleanor Schorer, her Kiddie Klub. 10:40, Bessie Gray, soprano. 1:30 P. M., Scripture reading. 1:35, Amphions orch. 3, interview with Mrs. Mary Hamilton & Elizabeth J. Munro by Terese Rose Nagel. 3:10, Anna T. Wiener, soprano. 3:20, Prof. Perez de Vegas, Spanish lessons. 3:30, Anna T. Wiener. 3:40, Lee Brown, "Public Speaking." 3:50, Anna T. Wiener. 6, Uncle Gee Bee. 6:30, Comeo Collegians. 7:30, Vescey orch. 8:30, Bob Emmerich, pianist. 8:45, Bayonne Military band. 9:30, Sam Comly, "Movie Chats." 9:45, Filipino Sextette. 10, Christine Church, soprano. 10:15, Filipino Sextette. 10:30, Albert Mesrop, tenor.
 WLIT, Philadelphia, Pa., 395 (E. S. T.)—12:02 P. M., daily almanac. 12:05, organ; Arcadia concert orch.; Lenten service. 2, Arcadia concert orch.; Frances Smith Gibson, soprano; Charles Silverthorne, baritone; Calvin Trivits, pianist; Marcella North, accompanist. 4:30, dance program. 7:30, Arcadia concert orch.
 WGY, Schenectady, N. Y., 379.5 (E. S. T.)—9:30 P. M., Phil Romano's orch.
 KHL, Los Angeles, Cal., 405.2 (P. S. T.)—7 A. M., exercises. 12:30 P. M., Pigly Wiggly Girls. 2:30, matinee musicale. 6, Art Hickman's concert orch. 6:30, Prof. Walter Sylvester Hertzig, "A Story of American History"; pupils of Kathryn Montreville Cole; Dolly Wright, 7-year-old reader. 7, Al Malaikah band and chanters. 8, "Mission Bell." 11, Art Hickman's dance orch. 11:30, Lost Angels of KHL, the Majestic Six. KHL string quartet, White's Californians.
 WJJD, Mooseheart, Ill., 278 (C. S. T.)—3:30 P. M., concert; Mr. M. P. Adams; Mooseheart concert band. 6:30, Albert F. Brown. 7:15, Mooseheart Theatre orch. 8:30, studio numbers from the Gerod Studio; Charles Straight orch.
 WAHG, Long Island, N. Y., 316 (E. S. T.)—12 M., Glen C. Smith's Paramount orch.
 WCCO, Minneapolis, Minn., 417 (C. S. T.)—10:45 A. M., Betty Crocker, Gold Medal Girls' Club.

2:30, P. M., Winnebago Kid concert band; Tommie Malie and Sammie Stept, singing. 6, Community Amusement Assoc. 8, "Fireside Philosophies." Rev. Roy L. Smith. 8:30, Tommie Malie and Sammie Stept, singing. 10, Minneapolis Athletic Club orch.; Tommie Malie and Sammie Stept, singing.
 WOO, Philadelphia, Pa., 508.2 (C. S. T.)—11 A. M., organ. 11:30, weather. 11:55, time. 12 M., Golden's Crystal Tea Room orch. 4:40 P. M., police reports. 4:45, organ, trumpets. 9:55, time. 10:02, weather.
 WEA, New York, N. Y., 492 (E. S. T.)—6:45 A. M., exercises. 4 P. M., Hamilton College Musicist Clubs; Madelin Miller, pianist. 6, music from Hotel Waldorf-Astoria; Sybil Sanderson Fagen, whistler; William Hyatt, tenor; Maria Leverone and Benedict Fitzgerald, pianists; "Trips and Adventures," by Fred J. Turner; Huyler's Foremost Four; Waldorf-Astoria orch; Catarina Gobbi, soprano; Pallavicini Sisters Trio; Robert Yap Hawaiian Ensemble; Vincent Lopez orch.
 WRC, Washington, D. C., 469 (C. S. T.)—6:45 P. M., children's hour, Madge Tucker. 7, Hotel Washington-Irving orch. 8, Bible talk. 9, Elizabeth Winston, soprano. 9:15, "Chemical Warfare," Brigadier Gen. Amos A. Fries. 10, Hotel Mayflower orch. 10:30, Crandall's Saturday Nighters. 12, Seidenman's orch.
 WJZ, New England, 333.3 (E. S. T.)—11:55 A. M., time, weather. 6 P. M., Hotel Lenox ensemble. 7, markets. 7:05, bedtime story. 7:15, sketches from the U. S. naval history by E. S. R. Brandt. 7:30, Hotel Kimball Trio. 8, "Happy Hawkins" dance. 8:20, radio checker game talks by Mr. A. McCullough. 9, William L. Spittal, tenor; Dorothy Birchard Mulrone, pianist. 9:30, Panetti Bros. 9:45, William L. Spittal, tenor; Dorothy Birchard Mulrone, pianist. 9:55, time. 10:05, Hotel Brunswick orch.
 WJY, New York, N. Y., 455 (E. S. T.)—1 P. M., Eridoy's Park Lane orch. 4:30 Sherry's Tea orch. 5:30, agricultural reports, markets, quotations. 7, Hotel Astor dance orch. 8, Jewish History and Literature, Dr. Lewis Finkelstein. 8:30, Liederkranz Society concert. 10:30, Waldorf-Astoria dance orch.
 WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., exercises. 10, talk to housewives, Mrs. Anna B. Scott. 1 P. M., organ, Karl Bonawitz. 1:60, weather. 3, Germantown Court Mandolin club. 4:15, landscape gardening, John R. Brackin. 6, weather. 6:05, Charles Higgins and Billy McKee. 6:15, Hotel St. James orch. 6:45, markets. 7, Uncle Wip's bedtime story. 8, Chemicals, Prof. Frank Moerk. 8:15, Church of the Advocate chorus. 9, Lenten meditations, E. A. E. Palmquist. 9:15, get-together-rally of the Executive Radio Council, Third District, Inc. 10:05, Benjamin Franklin dance orch. 11:05, organ, Karl Bonawitz.
 WFBH, New York, N. Y., 272.8 (E. S. T.)—12 M., Club Frontenac orch. 2 P. M., Morgan Sunlite Serenaders. 2:45, Sidney Corey, tenor. 3, Montana Ramblers' orch. 4, Club Le Bois orch. 4:45, Catherine Conolly, soprano; Irene DeFries, piano. 5, Polka Dot orch. 5:30, piano talk. 5:35, Polka Dot orch. 6, Xavier Cugat, violin; Eva Stern, piano. 6:30, Helen Muller, soprano; Gertrude Muller, piano. 6:40, beauty talk by Sadie McDonald. 6:45, Arthur Hand, baritone; Herbert Frick. 7, Parody Club orch.; Cosme McMoon, piano. 11:30, Nest Club orch. 12, Club Kentucky revue.
 WNYC, New York, N. Y., 526 (E. S. T.)—6:30 P. M., Club Alabam orch. 7:30, police alarms. 7:35, Chateau Four. 8, Henry M. Goldfogle. 8:15, Chateau Four. 8:30, police quartet. 9, Postal employees' program; Hon. M. Clyde Kelly; Hon. Royal S. Copeland; Ferdinand L. Douglas. 10, "Czecho-Slovakia," Josephine Heisel. 10:30, police alarms; weather.
 WHN, New York, N. Y., 361 (E. S. T.)—2:15 P. M., "Radio Twins" Miller and Griffin. 2:25, Florence Hynes, singer. 2:35, Ayy La Skere, vocalist. 2:45, Plaza Club orch. 3:45, Samuel Shankman, pianist. 4, Kenneth E. Burdick, pianist. 4:15, Florence K. Crumley, soprano. 4:30, Milton Yorkman, tenor. 4:45, Broadway Melody Boys. 6:30, violin, Olcott Vail. 7, Hotel Alamac orch. 7:30, health talk, Dr. Landis. 7:35, Hotel Carlton Terrace orch. 8, Ben Lippin, baritone. 8:15, Gertrude St. Clair, soprano. 8:30, Strand Roof orch. 9, Northminster service, Dr. George Walton King; Charley trumpeters, Northminster quartet, chorus.
 WOR, Newark, N. J., 405 (E. S. T.)—6:45 A. M., gym class. 2:30 P. M., chorus contest of N. J. Fed. of Women's Clubs. 6:15, Clifford Lodge orch. 7:30, "The Commanders." 8, "Beautiful Lawns." Alexander Forbes. 8:15, Billy MacWilliams, baritone; Avery D. Smith, piano. 8:30, Richard Duffy, "O'Henry." 8:45, Billy MacWilliams, baritone; Avery D. Smith, piano. 9, Michigan program. 10, "Vitagraph Stars." Elsie Ferguson, Frank Mayo, Mildred Harris, Count Morner, Peggy Kelly, Victor Hugo Halperin. 11, Ciro orch.
 WPG, Atlantic City, N. J., 299.8 (E. S. T.)—9 P. M., Chelsea Radio Co. night. 10, Hotel Traymore dance orch.
 WCAL, Northfield, Minn., 336.9 (C. S. T.)—9:45 A. M., St. Olaf College chapel services. 12 M., program, Herbert Haug.
 KNX, Los Angeles, Calif., 337 (P. S. T.)—6:15 P. M., dinner hour program. 7:30, organ. 8, El Encanto program. 9, features. 10, Cocoonat Grove orch. 11, Hollywood Nite.
 KFI, Los Angeles, Calif., 487 (P. S. T.)—5 P. M., news. 5:30, news. 6:45, radiotutorial. 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 Barthelsohn; 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.
 KGW, Portland, Ore., 491.5 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., Rose City Trio. 10, Colburn's Melody Men.
 KDKA, Pittsburgh, Pa., 326 (E. S. T.)—9:45 A. M., markets. 11:55, time. 12 M., weather, markets. 12:20 P. M., Lenten services. 3:30, quotations. 6, Westinghouse band. 7:30, Wimple the Wanderer. 7:45, helps to the Bible school teachers, Carman Cover Johnson. 8, Sphinx Club, Richard the Riddler, presiding. 8:15, "America's Glory Land," Dr. C. A. Payhe. 8:30, Westinghouse band; Woodlawn Glee Club. 9:55, time, weather.
 KWY, Chicago, Ill., 536 (C. S. T.)—6:30 A. M., exercises. 9:30, markets. 10:30, farm and home service. 11:30, table talks by Mrs. Anna J. Peterson. 6:02 P. M., markets. 6:35, bedtime story, "Uncle Bob." 7, Joska DeBarby's orch. 7:10, oon-Sanders Original Nighthawks. 7:20, Joska DeBarby's orch. 8, Jessie Mandeville, soprano; E. L. King, baritone; Raymond Sikes, tenor; Francis J. Valentine, pianist; Stephenson & Heather, vocal duo. 9:05, Youth's Companion. 9:35, "Congress Classics." 12, "Congress Carnival." 1 A. M., Coon-Sanders Original Nighthawks.
 KSD, St. Louis, Mo., 545.1 (C. S. T.)—7 P. M., music from City Club.
 KFOA, Seattle, Wash., 455 (P. S. T.)—4 to 5:15 P. M., The Times, Wm. F. Hoffman's Olympic Hotel concert orch. 6:45 to 8:15, studio program by the Moran School for Boys. 8:30 to 10, The Times program; dance program. 10 to 11, Eddie Harkness and his orch. playing from the Marine Room of the Olympic Hotel.
 PWX, Cuba, 400 (E. S. T.)—8:30 P. M., piano, Jose Campos Julian; Antonio Plana, baritone; Maria Perovani, soprano; Fausto Alvarez, tenor; Miss Isabel Zapata, songs; La Reina de Carnival.
 CNRO, Ottawa, Ont., 453 (E. S. T.)—7:30 P. M., bedtime story, Aunt Agnes. 8, Chateau Laurier concert orch. 8:30, vocal solo, Miss Clara Baxter; pianoforte, Miss Irene Woodburn; Scotch comedian, Mr. Tom Hamilton; vocal solo, Miss Irene Grison; accordion, Mr. Tony Paladino; "Dangerous Insect Invaders," Mr. L. S. McLaine; vocal solo, Mr. L. Roach; Chateau Laurier dance orch.

Sunday, April 5

WRAP, Yellow Springs, O., 263 (E. S. T.)—9 P. M., impromptu.
 WDAF, Kansas City, Kans., 365.6 (C. S. T.)—4 P. M., St. Mark's Lutheran choir. 5, Sunday school lesson, Dr. Walter L. Wilson.
 WOAW, Omaha, Nebraska, 526 (C. S. T.)—9 A. M., radio chapel service by Rev. R. R. Brown. 2:15 P. M., St. Mary Magdalene church choir. 6, Bible study period. 9, musical chapel service, Rev. F. K. Hargrove, pastor.
 WCAE, Pittsburgh, Pa., 462 (E. S. T.)—10:45 A. M., Rodef Shalom Temple services. 3 P. M., People's Radio church services. 4, piano, Prof. Otto Kaites. 6:30, concert from William Penn Hotel.
 WMAK, Lockport, N. Y., 265.5 (E. S. T.)—10:30 P. M., First Methodist Episcopal Church, Rev. Paul Burr.
 WFAA, Dallas, Tex., 475.9 (C. S. T.)—6 P. M., Radio Bible class, Dr. William M. Anderson, pastor. 7:30, First Baptist Church services, Dr. George W. Truett. 9:30, Davis orch.
 WEEI, Boston, Mass., 303 (E. S. T.)—3:45 P. M., Men's Conference Y. M. C. A. 7:20, "Roxy and His Gang." 9:15, organ.
 WJWJ, Detroit, Mich., 352.7 (E. S. T.)—11 A. M., St. Paul's Episcopal Cathedral services. 2 P. M., Detroit News orch. 7:20, "Roxy and His Gang."
 WCBZ, Zion, Ill., 345 (C. S. T.)—8 P. M., Celestial Bell Quartet; mixed quartet; brass quartet; Mrs. Mayfield, Mrs. Faassen, soprano and contralto; Mr. R. F. Reil, baritone; Mrs. John Marshall, reader; Miss Eleanor Pihl, piano.
 WJJD, Mooseheart, Ill., 278 (C. S. T.)—7:45 A. M., Catholic services. 9:40, Protestant services. 3 P. M., concert. 12, Charley Straight's orch.
 WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—10 A. M., Kiddies' hour; Uncle Billy. 11 services M. E. Church, Rev. C. D. Meade, pastor. 4 P. M., Right Theatre concert. 11, Crazy Hotel orch.
 WGN, Chicago, Ill., 370 (C. S. T.)—11 A. M., Uncle Walt reads the funnies. 11:45, Balaban & Katz Theatre concert. 2 P. M., Edwin Stanley Seder. 2:30, Tribune concert. 3:30, recital of Chicago Musical College. 9, W. G. N. singers; Drake concert ensemble.
 WLW, Cincinnati, Ohio, 423 (C. S. T.)—9:30 A. M., school of Methodist Book Concern. 11, Church of the Covenant service, Dr. Frank Stevenson, minister; organist, J. Warren Ritchey; mixed quartet; soprano, Charlotte Sandman Angert; contralto, Louise Koetter; tenor, Erwin Meyer; bass, Edwin Weidinger. 7:30 P. M., First Presbyterian Church service, Dr. Frederick McMillan, minister. 8:30, Western and Southern orch. Joseph Vito, harpist.
 WHAS, Louisville, Ky., 399.8 (C. S. T.)—9:57 A. M., organ. 10, Fourth Avenue Presbyterian Church service, Rev. Dr. Charles W. Welch, pastor; William E. Conen, organist; Miss Esther Metz, soprano; Mrs. Virginia S. Herrick, contralto; Williams Layne Vick, tenor; William G. Meyer, baritone. 4:30 P. M., choral evensong service; men's and boys' choir of 60 voices.
 WEMC, Berrien Springs, Mich., 286 (E. S. T.)—11 A. M., Radio Lighthouse Quartet; Miss Opal Hoover, saxophonist; Mrs. H. B. Taylor, soprano. 11:45, sermon, Pastor W. R. French. 8:15 P. M., Radio Lighthouse choir; Miss Martha

Hutchinson, soprano; Mrs. Lela Beuchell, contralto; Mr. Ernest Hurd, tenor, 9, sermon.

WBBR, New York, N. Y., 272.6 (E. S. T.)—10 A. M., Watchtower orch. 10:15, Watchtower orch. 10:30, "The Comforter," Judge Rutherford, 11:10, Watchtower orch. 11:20, Watchtower orch. 9 P. M., I. B. S. A. Choral Singers, 9:10, Instrumental Trio, 9:20, I. B. S. A. Choral Singers, 9:30, "Who Shall Live Happily Forever," Judge Rutherford 10:10, I. B. S. A. Choral Singers; Instrumental Trio, 10:25, I. B. S. A. Choral Singers.

WOO, Philadelphia, Pa., 508.2 (C. S. T.)—2:30 P. M., musical of Bethany Sunday school, 6, organ, Clarence K. Bawden, 7:30, Bethany Presbyterian Church services; Miss Caroline Quigg, organ; sermon by Rev. Dr. A. Gordon McLennan.

WIP, Philadelphia, Pa., 509 (E. S. T.)—10:45 A. M., morning service from Holy Trinity church, 3:30 P. M., Aldine theatre concert, Fortnightly club.

WFBH, New York, N. Y., 272.6 (E. S. T.)—11:30 A. M., Unity Church Service, Rev. Richard Lynch, 5 P. M., Krauss orch. 5:30, health talk, 5:35, Krauss orch. 6, World Neighborhood News, 6:30, Bossert Lumber Jacks, 7, Parody Club orch. 7:30, Woodmansten Inn orch. 11:30, Club Bamville orch.

WBZ, New England, 333.3 (E. S. T.)—10:55 A. M., Church of the Unity services, Rev. Charles A. Wing, pastor; Philharmonic male quartet, 7 P. M., Copley-Plaza orch. 8, musical saw, Mr. R. T. Kellom, 8:15, baritone, Aiden Redmond, 8:30, Carl Malley, organist.

WOAI, San Antonio, Tex., 394.5 (C. S. T.)—11 A. M., First Presbyterian Church services, Dr. P. B. Hill, pastor, 7:30 P. M., Central Christian Church services, Dr. Hugh McLellan, pastor, 9:30, WOAI entertainers.

WGR, Buffalo, N. Y., 319 (E. S. T.)—3 P. M., Vesper services, Rev. Chas. D. Broughton, 4, organ, Robert Demming, 7:15, Wm. Wall Whiddit, organist, 7:30, evening service, Rev. R. J. McAlpine, D.D.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—3:15 P. M., Arthur Scott Brook city organist; Ethel Dobson, soprano, 4:15, Community service; St. James Episcopal Church, Rev. Wm. Blatchford, pastor; Dr. Wm. Stansfield, organist, 10, "Oratorio of St. Paul," Community Church choir.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—8:30 P. M., sermon, Rev. Nils Kleven; Ruby Jacobson, piano; Lawrence Halvorson, flute; Arvid Romstad, tenor; Gertrude Boe Overby, soprano.

WEAR, Cleveland, Ohio, 390 (E. S. T.)—2:15 P. M., Allen Theatre orch. 3:30, Hotel Cleveland orch. 9, "Fireside Hour."

KPO, San Francisco, Calif., 423 (P. S. T.)—10:30 A. M., local theatres, 11, non-sectarian church services, Dr. C. O. Linqvist; soloist, Mrs. Gynn Jones Tebault, contralto; violin, Fernin Cardena; organ, Theodore J. Irwin, 6:30 P. M., local theatres, 8:30, Fairmont Hotel orch.

KGW, Portland, Ore., 491.5 (P. S. T.)—10:30 A. M., First Presbyterian Church service, Dr. Harold Leonard Bowman, pastor, 3 P. M., Municipal concert, 6, church services, by Rev. W. G. Eliot, Jr., 7, Colburn concert orch. 8, St. Mary's Cathedral Pre-Easter concert.

KFDM, Beaumont, Tex., 315.6 (C. S. T.)—9 P. M., sacred program.

KOA, Denver, Col., 323 (M. T.)—11:30 A. M., Palm Sunday service, Lutheran church, Rev. E. G. Knock, pastor, 4 P. M., music from Augustana Lutheran church, 7:30, Lutheran church service, Rev. E. G. Knock.

KNX, Los Angeles, Cal., 337 (P. S. T.)—10 A. M., First Presbyterian Church service, 5 P. M., radio sunset service, by Rev. Charles F. Asked, Rev. Frank Dyer, D. D., 8, Ambassador concert orch.

KGO, Oakland, Cal., 361 (P. S. T.)—10:15 A. M., breakfast, Knights of Columbus, speakers, Archbishop E. J. Hanna, Rev. John W. Sullivan, Hon. Thomas P. White, Rev. Charles Carroll, F. J. 3:30 P. M., KGO Little Symphony orch.; Gwyn Jones, tenor; Cecil Hollis Stone, pianist, 7:30, First Congregational Church service, Rev. James L. Gordon, D. D., pastor.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—11 A. M., services Central Methodist Church, Rev. J. A. Stowe, D.D., pastor, 8:30 P. M., New Arlington Hotel orch. 10 to 11:45, Phil Baxter's singing orch.

Monday, April 6

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time, 9:35, quotations, 10, quotations, 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, Blackstone string quintet, 1, quotations, 1:25, quotations, 2:30, Lyon and Healy concert hall, 3, Rocking Chair Time, 5, quotations, 5:30, Skeezix Time for Children, 5:57, time, 6, organ, Edwin Stanley Seder, 6:30, Drake concert ensemble, Blackstone string quintet, 8, classic hour, 10, Drake hotel orch.

WMAK, Lockport, N. Y., 265.5 (E. S. T.)—8 P. M., Miss Jessamine Crane.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises, 10:45, weather, business reports, 11:55, time, 12:15 P. M., Lenten service, Rev. G. H. Kase, 1:30, business reports, 3, markets, 4, Babson reports; pupils of Helen Abercherle, 6, concert, 6:45, markets, 10, Sinfonian male quartet; violin, Raymond Baumgartner; piano, Wilbert Little, Gus Riberd, Deikman orch.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—9:45 A. M., Olaf chapel services, 11 P. M., organ.

WEMC, Berrien Springs, Mich., 286 (E. S. T.)—8:15 P. M., Radio Light House Music Makers.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Newman and Royal Theatres, 5, Boy Scout program, 5:50, marketgram, weather, time, road report, 6, School of the Air; piano tuning in; reading, Miss Cecile Burton; Tell-Me-a-Story

Lady; Trianon ensemble, 8, "Around the Town With WDAF," 11:45, "Merry Old Chief," Plantation Players.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises, 9:30, "Tonight's Dinner," Woman's editor, 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, Detroit News orch. 9, concert.

WJJD, Mooseheart, Ill., 278 (C. S. T.)—3:30 P. M., concert; talk by Mr. M. P. Adams; Mooseheart band, 6:30, Albert F. Brown, organ, 7:15, Mooseheart Novelty orch.; "Child Care," by Mr. M. P. Adams, 10:30, studio numbers from Garod Studio; Charley Straight orch.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., Louisville Conservatory of Music; organ; weather; readings; news, 4:55, markets, 5, time.

WFFA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., Dr. J. D. Boon, 6:30, Buddy's Blue Melody Boys' orch. 8:30, Magnolia Petroleum Co. band.

WCAC, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., news, weather, library news, 3, Holy Week sermon, 4:30, markets; Sunshine Girl, 6:30, concert from William Penn Hotel, 7:30, Uncle Kaybee, 7:45, police reports, 8, music chats, Mrs. Ethel Davis, 8:30, Eleanor Olive-Edstrom, contralto; Miss Cunningham, soprano; Mrs. Ethel Davis, accompanist, 9, A. & P. Gypsy string ensemble, 11, The Press-Kaybee; Blackstone Theatre orch.

WBBR, New York, N. Y., 272.6 (E. S. T.)—3 P. M., Syrian Oriental music, Mr. Toufic Moubaid, Miss Elizabeth Awad, 8:10, Miss Ruth de Boer, contralto, 8:20, world news digest, 8:40, Miss Ruth de Boer, 8:50, Syrian Oriental music.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., Fontenelle orch. 5:45, news, 6, Arthur Hays, organist, 6:30, dinner program, 9, Hannan-Van Brunt Co. program.

WGST, Atlanta, Ga., 270 (E. S. T.)—9 P. M., "Talk Back Home," Georgia Tech students.

WFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30 P. M., Mrs. Herbert Kimbrough, contralto; Miss Lusina Barakian, soprano; violin, Dorothy Sage; Carl M. Brewster, "Venice," "Mental Defectives," Prof. F. Clower; "Tou Nu Kappa 'Boilermakers,'" "Crops in 1925," Prof. E. G. Schafer; Farm Outlook," R. M. Turner.

WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—12:05 P. M., music, 7:30, "Ten Million Dollar" square dance, 9:30, Montgomery Ward, orch.

WFBH, New York, N. Y., 272.6 (E. S. T.)—2 P. M., Arthur M. Krauss' orch. 3, Fagan's Radio Frolic, 3:30, Muriel Anderson, contralto, 4, Susanne Hackett, soprano; Virginia Holms, pianist, 4:30, Frederick Cromweid, piano, 5, Lou Henry's Creole Syncopators, 6, Rita Minton, soprano, 6:15, Hotel Majestic string ensemble, 11:30, Club Frontenac orch. 12, Parody Club revue, 12:30, Cotton Club revue.

WBZ, New England, 333.3 (E. S. T.)—11:55 A. M., time; weather; markets, 6 P. M., Westinghouse Philharmonic trio, 7, markets, 7:05, bedtime story, 7:15, "Bringing the World to America"; news, 7:30, "John Galsworthy," Professor Robert Emmons Rogers, 8, Westinghouse Philharmonic trio, 8:15, Regent mixed quartet, 8:45, Mrs. Dora Boedeker Gottsche, mezzo-soprano; accompanied by Mrs. Marcus Gottsche, 9, Aleppo drum corps or Shriner's band, 9:30, Jean Stimmel, rotogravure editor, 9:55, time; weather, 11:30, McEnelly's singing orch.

WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M., music from Loew's State Theatre.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—9 P. M., Music Clubs of Brown University.

WCAC, Northfield, Minn., 336.9 (C. S. T.)—11 P. M., Elinor Overland, organist; Marc Harkins, tenor.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., home service talk, Betty Crocker, 6:30 P. M., M. A. Schmidt program, 8, recital, Danny Engel and Charles Sellers, 8:35, Francis Bush, Margaret Pierce program, 9, recital, Margaret Blakesley, Mildred Gracer, Wm. Kam, Leo Considine, 10, piano, Jenny G. Kendall.

KOB, State College, N. M., 348.6 (M. T.)—7:30 P. M., radio talk, "Superstitions in Medicines," Dr. McBride.

KOA, Denver, Col., 323 (M. T.)—12:20 P. M., organ, 1, quotations, weather, 6, stocks, news, 8, Rialto Theatre orch. 8:10, Arion chorus, Pueblo male octette, Pueblo ladies' octette, Slovenian double male quartet; "Out Where the West Begins," by Frank S. Hoag.

KPO, San Francisco, Calif., 423 (P. S. T.)—10:30 A. M., "Ye Towne Cryer," 10:40, ocal theatres, 12 M., time; Scripture reading, 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour; piano, Janet Blum, 7, Fairmont Hotel orch. 8, Theodore J. Irwin, organist; Victor Vogel, bass, 9, Conservatory of Music program.

KNX, Los Angeles, Cal., 337 (P. S. T.)—6:15 P. M., dinner program, 28, feature program, 10, Silvertown orch.; Lillian May Challenger, soloist, 11, Cocoonut Grove orch.

KGO, Oakland, Cal., 361 (P. S. T.)—9 A. M., musical lectures, State Dept. of Education, 10:30, classroom instruction, Oakland public schools, 11:30, concert, 1:30 P. M., stocks, 1:40, stocks, 1:45, weather, 3, music, 4, Halstead dance orch. 5:30, Aunt Betty stories, 6:45, stocks, 7, weather, 7:05, produce news, 7:15, news, 8, Arion Trio; "The Origin, Formation, Development of Soil," C. F. Shaw; Wilda Wilson Church, English; piano, Joyce Holloway Barthelsson; "How to Get Out of a Rut," Albertine Richards Nash; cello, Margaret Avery; "New Books," Joseph Henry Jackson, 10, Henry Halstead's orch.

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; organ, F. W. Goodrich, 7, Pre-Easter address, 7:15, markets, weather news, police reports.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—12:30 P. M., weather, markets, orch. 8:30, W. C. Brown, concert, 9, New Arlington ensemble, 10,

Eastman Hotel orch. 11:30, New Arlington Hotel orch.

Tuesday, April 7

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time, 9:35, quotations, 10, quotations, 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, Blackstone string quintet, 1, quotations, 1:25, quotations, 2:30, Lyon and Healy concert hall, 3, Rocking Chair Time, 5, quotations, 5:30, Skeezix Time for Children, 5:57, time, 6, organ, Edwin Stanley Seder, 6:30, Drake concert ensemble, Blackstone string quintet, 8, classic hour, 10, Drake hotel orch.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program, 5:45, news, 6, "Advice to Lovelorn," by Cynthia Grey, 6:25, dinner program, 9, Frank Mach, violinist.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., exercises, 9:30, "Tonight's Dinner," by the Woman's editor, 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, concert.

WFFA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., health talk, Charles E. Osborne, 6:30, Haualea School of Hawaiian Music, 8:30, music, G. Hayden Jones and choir of First Presbyterian Church, 11, Dwight Brown, organist.

WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M., exercises, 10:45, weather, business reports, 11:55, time, 12:15 P. M., Delta Omicron Sorority; pianist, Clifford Lang, 1:30, business reports, 3, markets, 4, pupils of Leo Stoffregen and Wm. Kyle; "Auction Bridge," Lucy Blackburn; Cincinnati Federation of Mother Clubs program, 6, concert, 6:45, markets, 8, Instrumental Trio, special features; Ned Jackman, baritone; Hobart Schock, piano, 8:30, dialogue, Louis C. George, Harry J. Plogstedt; Ruth Crumrine, songs; accompaniments, Ruth Crawford, 9, Formica concert orch.; close harmony, Messrs. R. A. Groenke and Mischler.

WJJD, Mooseheart, Ill., 278 (C. S. T.)—3:30 P. M., concert; Mr. M. P. Adams; Mooseheart concert band, 6:30, Albert F. Brown, organ, 7:15, Mooseheart concert band; "Child Care," by Mr. M. P. Adams, 10:30, concert from Garod Studio; Charley Straight's orch.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio, 5, child talent program, pupils of Miss Aurelia Ryan, 5:50, marketgram, weather, time, road report, 6, School of the Air, piano tuning in, Tell-Me-a-Story Lady, radio piano lesson, Miss Maudellen Littlefield, Trianon ensemble, 11:45, Newman Nightwatches.

WCAC, Pittsburgh, Pa., 462 (E. S. T.)—12:30 P. M., weather, 3, Holy week sermon, 4:30, stocks, Sunshine Girl, 6:30, concert from William Penn Hotel, 7:30, Uncle Kaybee, 7:45, police reports, 8, program from New York, 8:30, "Gold Dust Twins," 9, "Eveready Hour," 10, Goodrich Silvertown Cord orch.

WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M., concert from Louisville Conservatory, organ, police bulletins, weather, readings, 4:55, markets, 5, time, 7:30, Carl Zeller's Melodists, news, time.

WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—12:05 P. M., Ward's "Trail Blazers," 7:30, Miss Ruby Wilson, voice and piano, 9:30, concert, by Mrs. Pearl Calhoun Davis.

WFBH, New York, N. Y., 272.6 (E. S. T.)—12 M., Club Frontenac orch. 2 P. M., Strand Danceland orch. 3, Sam Shankman, piano, 3:30, Harold Davis, violin; Anthony R. Livia, piano, 4, Bob Sage, orch. 5, Lillian Sanger, songs, 5:15, Nat Broffman, baritone; Shirley Edelson, piano, 5:35, Joel Stern, violin; Sidney Teicholz, piano, 6, John R. Thomas, tenor; Margarite Hamil, piano, 6:15, Bill Schudt, Jr., Radio Talk, 6:30, Bossert Lumber Jacks, 11:30, Nest Club, 12, Club Bamville.

WBZ, New England, 333.3 (E. S. T.)—11:55 A. M., time; weather; markets, 6:45 P. M., songs, Violet Gridley, accompanied by Don Ramsay, 7, markets, 7:05, bedtime story, 7:15, world markets, 7:45, St. James Theatre orch. 8:15, Georgina B. Such, "Kabilia," Mrs. E. B. Heywood, soprano; Vincenzo Spolizio, tenor, accompanied by Doris Morrison, 9, music, 9:55, time; weather.

WOAI, San Antonio, Tex., 394.5 (C. S. T.)—8:30 P. M., WOAI entertainers, 9:30, Jimmie Joy's orch.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—7 P. M., dinner dance, Hotel Ambassador, 8:30, Philadelphia and Reading Railroad band, 10, Hotel Hotel Traymore dance orch.

WGR, Buffalo, N. Y., 319 (E. S. T.)—11 A. M., Mrs. Katherine Norton Britt, 6 P. M., Hallpryd string trio, 8, Gold Dust Twins.

WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M., organ, Vincent H. Percy, 8, WEAF program relayed through WEAR.

KGW, Portland, Ore., 491.5 (P. S. T.)—11:30 A. M., weather, 12:30 P. M., Rose City Trio, 5, children's program; Uncle Dave, 6, Pre-Easter service, 7:15, markets, weather, news, police reports, 8, Oregon Agricultural College lecture, 8:30, concert, 10, Multnomah Hotel Strollers.

KOA, Denver, Col., 323 (M. T.)—12:20 P. M., organ, 1, quotations, weather, 3, matinee, 6, music, 6:30, stocks, news.

KFDM, Beaumont, Tex., 315.6 (C. S. T.)—9 P. M., Pierce Goodell Co.

KGO, Oakland, Cal., 361 (P. S. T.)—11:30 A. M., concert, 1:30 P. M., stocks, 1:40, stocks, 1:45, weather, 4, orch. of Hotel St. Francis, 6:45, stocks, 7, weather, 7:05, produce news, 7:15, news, 8, KGO Little Symphony orch.; Mrs. Clarence W. Page, contralto; Miriam Gubb, pianist; musical discussion; Arthur S. Barbett, 10, Halstead's orch.

KNX, Los Angeles, Cal., 337 (P. S. T.)—6:15 P. M., dinner program, 7:30, styles, Myer Siegel, Jr. 7:45, "Health," Dr. Robert T. Williams, 8,

feature program. 9, Independent Furniture Mfg. Co. 10, Coconut Grove orch.
KPO, San Francisco, Cal., 423 (P. S. T.)—
 A. M., "Daily Dozen." 10:30, "Ye Towne Crier."
 "Prudence Penny." 10:30, local theatres. 11:50, markets. 12 M., time, Scripture reading. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's, hour, local theatres. 7, Fairmont Hotel orch. 8, U. S. Army Band.
KFMQ, Fayetteville, Ark., 299.8 (E. S. T.)—
 9 P. M., Student orch.
KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—12:30
 P. M., weather, markets, orch. 8:30, Eastman Hotel orch. 9:45, New Arlington Hotel orch.
CNRA, Moncton, N. B., 313 (A. S. T.)—8:30
 P. M., Miss Josephine Lynch, violin; Miss Nellie Lynch, cello; Mrs. M. A. Quinlan, piano; Mrs. L. M. Curran, soprano; Mrs. F. G. Spencer, soprano; Miss Blenda Thompson, contralto; Miss Constance Lewis, contralto; Mrs. J. M. Barnes, pianiste; Mr. A. C. Smith, tenor; Mr. Wm. McGowan, bass; Dr. P. J. Bonnell, baritone—Schubert trio; accompanists, Mrs. J. M. Barnes, Mrs. M. A. Quinlan and Mr. T. C. Cochrane.
CNRK, Regina, Sask., 420 (M. T.)—8 P. M.,
 bedtime travel tale; Regina Rover Scout band.

Wednesday, April 8

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M.,
 time. 9:35, quotations. 10, quotations. 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, Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.
WDAF, Kansas City, Kans., 365.6 (C. S. T.)—
 3:30 P. M., Star's radio trio. 5:50, marketgram, weather, time, road report. 6, (School of the Air) piano tuning. 7, Tell-Me-a-Story. Lady, Triaxon ensemble. 8, Star's radio trio. Mrs. de Voll-Fell, violinist, Ann Meservey, pianist, Olive De Garmo-Peck, vocal soloist. 11:45, "Merry Old Chief," Plantation Players.
WRAV, Yellow Springs, O., 263 (E. S. T.)—8
 P. M., impromptu.
WFFA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M.,
 Alex Hughes, pianist.
WEAO, Columbus, Ohio, 293.9 (C. S. T.)—8
 P. M., program by Student Social Center.
WEMC, Berrien Springs, Mich., 286 (E. S. T.)—
 8:15 P. M., Miss Cloude James, pianist. 8:25, A. S. A. Fellows, soprano. 8:45, Host-Owl quartet. 9, "Archeology of Michigan," Mr. D. P. Smith. 9:20, Mr. Thomas Johnson, baritone.
WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M.,
 exercises. 9:30, "Tonight's Dinner," Woman's Editor. 10:25, weather. 11:35, time. 12:05 P. M., Hotel Stetler orch. 3, Detroit News orch. 3:50, weather. 3:55, markets. 6, concert. 8, Detroit News orch., Anna Campbell, Detroit News poet, Templeton Moore. 9, concert from New York. 10, Victor Recording orch.
WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M.,
 exercises. 9:45, weather, business reports. 11:55, time. 12:15 P. M., piano, Irene Downing, Marjory Hebestreit. 1:30, business reports. 3, markets. 4, Dunning Benevolent and Musical Service. 6, concert. 6:45, markets. 10, Advertisers' Club; Roseland dance orch.; R. T. Kline, introductory remarks; soprano solo, Mrs. K. Theobald; violin, piano; Smith B. Quale; Roseland dance orch.; monologue by Dr. Wolfram; Grand Hotel orch.; cello solo, violin, piano. 10:45, Hillsboro Hill Billy orch.
WJJD, Mooseheart, Ill., 278 (C. S. T.)—3:30
 P. M., talk by Mr. N. F. Adams. 6:30, Mooseheart Concert band. Albert F. Brown, organ. 7:15, Mooseheart Philharmonic orch. 10:30 P. M., concert from Garod studio, Charley Straight orch.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4 P. M.,
 concert from Louisville Conservatory, organ, police bulletins, weather, readings, news. 4:55, markets. 5, time. 7:30, K & L Railroad orch., K. & L Terminal Railroad orch. 8:30, Samuel Insull.
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30
 P. M., news, weather, Holy week sermon. 4:30, stocks, Uncle Kay Bee. 6:30, concert from William Penn Hotel. 7:30, Sunshine Girl. 7:45, police reports. 8:30 Mrs. E. C. Sheets, contralto. 9, Atwater-Kent Radio artists. 10:30, Nixon Restaurant orch.
WOAW, Omaha, Neb., 526 (C. S. T.)—12:30
 P. M., horticultural program. 5:45, news. 6, story hour. Grace Sorenson. 6:45, Fontenelle orch. 9, WOAW's remote control studio. 10:30, Nightingale orch.
WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—
 12:05 P. M., music. 1:30, Junior Euterpean Club concert. 9, W. C. McKee, Texas Hotel orch. 12 M., Moore's Black and Gold Serenaders.
WFBH, New York, N. Y., 272.6 (E. S. T.)—
 2 P. M., Eddie Meyers' orch. 3, Adele Frances, soprano. 3:30, Merle Johnstone, saxophone; Lew Cobey, piano. 4, the Piano Movers. 5, Banjo Eddie's Entertainers. 5:35, Edward Dies, piano. 6, Bella Walzer, soprano; Pearl Kramer, piano. 6:15, Billy Burton's orch. 7, Parody Club orch. 7:30, Muriel Dae, violin; Mary Keegan, piano. 7:45, Irma Sachs, soprano. 7:55, Beauty Talk, Sadie McDonald. 11:30, studio program. 12:30, Cotton Club revue.
WBZ, New England, 333.3 (E. S. T.)—11:55 A. M.,
 time; weather; markets. 6 P. M., Hotel Lenox ensemble. 7, markets. 7:05, Nature story, Thornton W. Burgess. 7:30, lecture, Professor Andre Morize. 8, "Uncle Bill," by Rip. 8:15, Mrs. Margaret MacFarlane, mezzo-soprano; Angus Macdonald, baritone; Mrs. Jessie Downie, accompanist. 8:30, Boston University Jazz band. 9,

Mrs. Margaret MacFarlane, soprano; Angus Macdonald, baritone; Mrs. Jessie Downie, accompanist. 9:15, McEnelly's singing orch. 9:45, Yvonne Crosby program. 9:55, time; weather.
WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45
 A. M., home service talk, Betty Crocker. 6:30 P. M., Gertrude Hutchinson Lester, Erlenbach piano. 8, Hutchinson Playrs. 9, Atwater Kent radio artists. 10, Joseph O. Kesseling, tenor. 10:30, "house plants," Harold B. Brookings.
WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M.,
 Hotel Cleveland orch.
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, Hotel Portland concert. 7:15, markets, weather, news, police reports. 8, Seventh U. S. Infantry Band.
KOA, Denver, Col., 323 (M. T.)—12:20 P. M.,
 organ. 1, quotations, weather. 6, stocks, news. 8, Rialto Theatre orch. 8:10, "Legends of the West," Joseph Emerson Smith, incidental Indian music by native tribesmen. 10, Rainbow-Lane orch.
KOB, State College, N. M., 348.6 (M. T.)—7:30
 P. M., International Code Course, Dean R. W. Goddard.
KPO, San Francisco, Cal., 423 (P. S. T.)—7
 A. M., "Daily Dozen." 10:30, "Ye Towne Crier." 10:40, local theatres. 11:50, markets. 12, time, Scripture reading. 1 P. M., Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, children's hour stories, local theatres. 7, Conn Band Instrument Co. program, Atwater Kent artists. 9, Merrill & Merrill program.
KNX, Los Angeles, Cal., 337 (P. S. T.)—6:15
 P. M., dinner hour program. 7, Ambassador Concert orch. 8, Security Trust & Savings Bank program. 9, feature program. 10, Hollywoodland dance orch.
KGO, Oakland, Cal., 361 (P. S. T.)—11:30 A. M.,
 concert. 1:30 P. M., stocks. 1:40, stocks. 1:45, weather. 8, musical. Clara L. Williams Institute, speaker. 4, orch. of Hotel St. Francis. 6:45, stocks. 7, weather. 7:05, produce news. 7:15, news.
KFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30
 P. M., soprano, Florence Lester, piano, Thelma Johnson; marimbaphone duets and readings, Cooper Sisters; radio frequency amplifiers, Dean H. V. Carpenter; Life in a College Hall, Mrs. Constance Hoig; seedlings, B. F. Dana; marketing dairy products, Don G. Magruder; farm women's camps, Miss Inaud Wilson.
KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—8:30
 P. M., Sousaphone; Al Kuzne, piano; Phil Wall. 9, New Arlington Hotel orch. 10, Eastman Hotel orch.
CNRO, Ottawa, Ont., 435 (E. S. T.)—7 P. M.,
 talk for boys and girls, Uncle Dick. 7:30, markets. 7:45, Lawrence Burbee's radio book talk. 8, Seven Last Words of Christ, St. Joseph's choir; Chateau Laurier dance orch.

Thursday, April 9

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M.,
 time. 9:35, quotations. 10, quotations. 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, Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.
WCST, Atlanta, Ga., 270 (E. S. T.)—7 P. M.,
 Mrs. Eunice Curry Prescott, contralto; Professor D. L. Stamy, "Facts About the Universe."
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4
 P. M., concert from Louisville Conservatory, police bulletins, weather, readings. 4:55, markets. 5, time. 7:30, concert, digest of Sunday school lesson, welfare talk, news, time.
WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M.,
 horticultural program. 5:45, news. 6, story hour. Grace Sorenson. 6:45, Fontenelle orch. 9, WOAW's remote control studio. 10:30, Nightingale orch.
WLW, Cincinnati, Ohio, 423 (C. S. T.)—8 A. M.,
 exercises. 10:45, weather, business reports. 11:55, time. 12:15 P. M., Mu Phi Epsilon Sorority. 1:30, business reports. 3, markets. 4, French lesson, Madam Ida Teimpidis. 6, concert, State memory contest, Burnet C. Tuthill. 6:45, Secretary Hawkins; markets. 10, message from Civil Service Dept. of U. S. Govt. 10:30, Cooper Corporation orch. and male quartet. 11, "Mertes-Master" old fiddler" contest.
WFFA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M.,
 DeWitt McMurray, "a medley of humor, paths and wisdom." 6:30, Lone Star Five's orch. 8:30, opening of East Dallas Christian Church. 11, Edward Cramer, violinist. 12, Hunt's Imperial orch.
WBRR, New York, N. Y., 272.6 (E. S. T.)—
 8 P. M., Watchtower instrumental trio. 8:20, Sunday school lesson. 8:40, instrumental trio.
WDAF, Kansas City, Kans., 365.6 (C. S. T.)—
 3:30 P. M., Star's radio trio. 5:50, marketgram, weather, time, road report. 6, (School of the Air), piano tuning, box talk by Louis Meeker, Tell-Me-a-Story Lady, Triaxon ensemble. 11:45, "Merry Old Chief," Plantation Players; Eddie Kuhn's orch. Johnnie Campbell's orch. 10:30, Nixon Restaurant orch.
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30
 P. M., news, weather. 3, Holy week sermon. 4:30, markets, Sunshine Girl. 6:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:45, police reports. 8, concert. 9, Victor artists. 10, Silver-town Cord orch.
WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M.,
 exercises. 9:30, "Tonight's Dinner," Woman's Editor. 10:25, weather. 11:35, time. 10:05 P. M., Hotel Stetler orch. 3, Detroit News orch. 3:50, weather. 3:55, markets. 6, concert. 8, Detroit News orch. 9, Goldkette's Victor Recording orch.
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, quotations.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4
 P. M., concert from Louisville Conservatory of

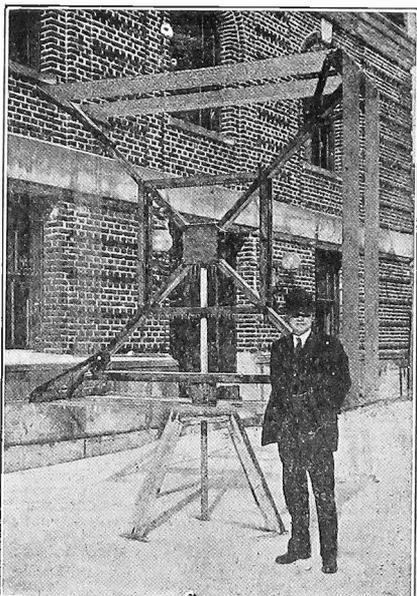
story. 7:15, letter from New England Homestead; "The Theatres," A. L. S. Wood. 7:30, "Psychology of Advertising," Professor Glenn Newton Merry. 8, Donald Pirnie, baritone; Dorothy Birchard Mulrone, pianist. 8:30, Chickering studio program. 9:30, Westinghouse Philharmonic trio. 9:55, time; weather. 11, Hotel Brunswick orch. 11:30, Don Ramsay's Radio Four. 11:45, Hotel Brunswick orch.
WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—
 12:05 P. M., music. 7:30, artists of Thorp Spring Christian College. 9:30, Burlison Hawaiian Guitar Club.
WMAK, Lockport, N. Y., 265.5 (E. S. T.)—12 M.,
 Whiteman's Midnight Serenaders.
WOAI, San Antonio, Tex., 394.5 (C. S. T.)—9:30
 P. M., Jimmie Joy's orch.
WPC, Atlantic City, N. J., 299 (E. S. T.)—9
 P. M., Hotel Ambassador Concert orch. 10, Allegro Club Concert. 11, Hotel Traymore dance orch.
WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M.,
 Halldry string trio. 8, Silverton orch.
WCAL, Northfield, Minn., 336.9 (C. S. T.)—9
 P. M., Thony Genevieve Felland, pianist; Adolph Engstrom, tenor; Neil Kjos, clarinetist; WCAL mixed quartette.
WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M.,
 organ, Vincent H. Percy. 8, relayed WEAF program through WEAR.
KPO, San Francisco, Cal., 423 (P. S. T.)—7 A. M.,
 "Daily Dozen." 10:30, "Ye Towne Crier." 10:40, local theatres. 11:50, markets. 12 M., time, Scripture reading. 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, Dean Gross, baritone.
KFDY, Brookings, S. D., 273 (C. S. T.)—8 P. M.,
 Men's Glee Club. 8:15, "Carrying Electricity to the Farm," R. L. Patty. 8:25, news, farm information. 8:30, violin, Miss Anne Coughlan. 8:40, "Future Farmers of Dakota," G. Heebink. 8:50, State College Glee Club.
KOA, Denver, Colo., 323 (M. T.)—12:20 P. M.,
 organ. 1, quotations, weather. 3, matinee. 6, stocks, news.
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, Pro-Easter service. 7:15, market, weather, news, police reports. 8, Oregonian Concert orch. 10, Multnomah Hotel Strollers.
KFMQ, Fayetteville, Ark., 299.8 (E. S. T.)—7:30
 P. M., Pi Beta Phi Sorority; Life in Other Worlds, A. M. Harding; Leaves, J. T. Buchholz; Adjusting Education, J. J. Weber; Household Management, Miss Madge Johnson.
KGO, Oakland, Cal., 361 (P. S. T.)—10:40 A. M.,
 classroom instruction, Oakland public schools. 11:30, concert. 1:30 P. M., stocks. 1:45, weather. 4, orch. Hotel St. Francis. 6:45, stocks. 7, weather, news. 7:15, golf lesson, Joe Novak. 8, "Civilian Clothes," drama by KGO players. 10, Hixstead's orch.
KNX, Los Angeles, Cal., 337 (P. S. T.)—4 P. M.,
 Estelle Lawton Lindsay's travel talk. 6:30, Ziegler's orch. 7:30, business talk, J. R. Dourlas. 8, feature program. 9, May Dept. Store program. 10, Coconut Grove orch. 11, Campus Night, U. of Cal., Southern Branch.
KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—12:30
 P. M., markets, weather orch. 8:30, violin, Jacques Renard; Louis Culp, accompanist. 9, organ, Lawson Reid. 10, New Arlington Hotel orch. 12:15 A. M., Phil Baxter's singing orch.
CNRM, Montreal, Que., 411 (E. S. T.)—8:30
 P. M., St. Andrew's mixed quartette.
CNRW, Winnipeg, Man., 384.4 (C. S. T.)—8:15
 P. M., markets. 8:30, bedtime travel tales. 8:30, Miss Hazel Mills, soprano; Mrs. D. G. Edmond, contralto; Mr. Emile Mignacca, violin; Mr. Frank Redlich, cello; Mr. Burt Hook, piano. 10, Frank Wright's Country Club Dance orch.
CNRC, Calgary, Alta., 430 (M. T.)—7 P. M.,
 bedtime travel tales. 9, Canadian National Railways Symphony orch.

Friday, April 10

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M.,
 time. 9:35, quotations. 10, quotations. 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, Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.
WOAW, Omaha, Neb., 526 (C. S. T.)—4 P. M.,
 matinee program. 5:45, news. 6, story hour. 7:15, sports, Ivan L. Gaddis. 9, Good Friday program.
WBAP, Fort Worth, Tex., 475.9 (C. S. T.)—
 12:05 P. M., Ward's "Trail Blazers." 7:30, Venus String band. 9:30, Wagner's Hawaiian trio.
WRBC, Valparaiso, Ind., 278 (C. S. T.)—7:30
 P. M., "The Crucified Redeemer."
WCAE, Pittsburgh, Pa., 462 (E. S. T.)—12:30
 P. M., weather, news. 3, Holy week sermon. 4:30, Sunshine Girl, markets. 6:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:50, police reports. 8:30, concert from studios of Mrs. Inaud Wilson-Smith.
WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M.,
 exercises. 9:30, "Tonight's Dinner," Woman's Editor. 10:25, weather. 11:35, time. 12 M., Good Friday services. 3 P. M., Detroit News orch. 3:50, weather. 3:55, markets. 6, concert. 8, Detroit News orch. 9, Goldkette's Victor Recording orch.
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, quotations.
WHAS, Louisville, Ky., 399.8 (C. S. T.)—4
 P. M., concert from Louisville Conservatory of

(Continued on page 30)

A Giant



WITH this giant loop as his companion, Dr. L. W. Austin (above), chairman, American Section, International Union of Scientific Radio Telegraphy, is conducting static tests in the Panama Canal Zone. (World Wide).

Sergeant Sings His Broadcast Plea for Recruits

RECRUITING Sergt. Eddie Goldfield, 560 West 108th St., New York City, attached to Troop C, Mounted Police Reserve, is a well-known radio baritone. He sang from station WGBS and addressed the radio audience in an effort to encouraging recruiting for the mounted police reserve troop. Troop C is a self-supporting unit attached to the Police Department and is composed mainly of former cavalrymen and other ex-service men.



SERG. EDDIE GOLDFIELD

The 3,000 men of the Police Reserves, who stand ready to replace the regular force in times of need, are all interested in the success of the radio innovation in recruiting, which has increased greatly through the broadcasting of Sergt. Goldfield from stations WGBS, WNYC and WAHG.



DEANE MOORE, COMEDIAN, GETS MANY APPLAUSE CARDS.

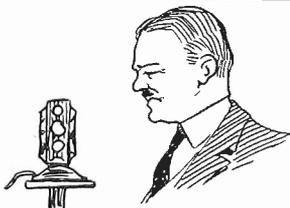
WGBS, the Gimbel Bros. Department Store station in New York City, is one of the most popular stations on the air. Variety marks their programs. One night it is an opera performance, done with great artistic skill, and the next night a medley of popular attractions and specialties. One recent night Irving Hoffman, RADIO WORLD artist, visited the studio, with the above result. First he met A. V. Llufrío, the announcer, whose mellifluous speaking voice is on a par with the singing voice of Senor Edouard Lippe, of the same station. This night, unfortunately, Senor Lippe was at home, sleeping off the effects of an arduously successful performance of "Madam Butterfly" in which he appeared in Philadelphia.

At

BROADCASTING STATION



WITH IRVING HOFFMAN



VETERAN ANNOUNCER A.V. LLUFRIO ADDRESSING A FEW MILLION PEOPLE.



MISS CHRISTINE THOMPSON, STATION PIANIST. A MASTER OF PIANO TONE AND TECHNIQUE.



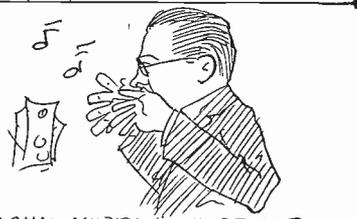
FRED VECCHIO, ASSISTANT ENGINEER OF THE STATION.



E.J. FRY, ART EDITOR OF THE N.Y. TRIBUNE.



JOHN THOMAS, IRISH TENOR, A-BIG HIT.



JOHN MURRAY, VAUDEVILLE HEAD-LINER, AND HIS HARMONICA.

How Can The Lone Violin Wreck a Great Building With Just One Note

By Tim Turkey

EVERYTHING has a fundamental wavelength. Every body has its own, every coil, "every everything" buildings large and small. In a radio set, by the proper receiver is made most sensitive to the wavelength desired to be received. By using variable condensers, for instance, which alter the capacity in the circuit, hence the wavelength, the fundamental wavelength is changed. This fundamental is sometimes referred to as the natural period.

Take a large office building, for instance. It may have a wavelength within the broadcast belt. That is true in the vicinity of some New York stations to such an extent that receivers situated in the direction of one of these buildings find it difficult to get anything from these stations. The buildings of approximately the same wavelength as the station absorb the energy and produce a shielding effect, so that the waves are blocked from successful travel in the given direction.

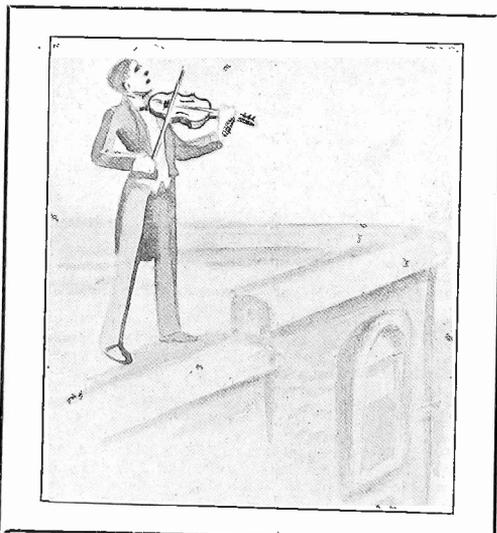
Why the Building Will Vibrate

If a note is struck of exactly the same pure frequency as that to which a building is tuned, the building responds to the impulse by vibrating, just as when a piano string is struck it will set up vibrations in a piano string that vibrate at the same frequency. No other string will respond. In the building the vibrations may be carried on and on, and when soldiers march in step over a bridge being strong enough to wreck the bridge.

The Mercy of Nature

A violinist can strike a note of exactly the same frequency of the natural period of a large office building and the effect of the air may cause the building to rock and finally, if the effect is strong enough, the building may be shattered. Nature, however, provides the safeguard of foreign vibrations, rendering a pure note almost impossible. In any way, it isn't sociable to try these experiments on small buildings and the musicians' union is opposed to it.

If it weren't that way who would feel safe in any...



THE violinist strikes one note—

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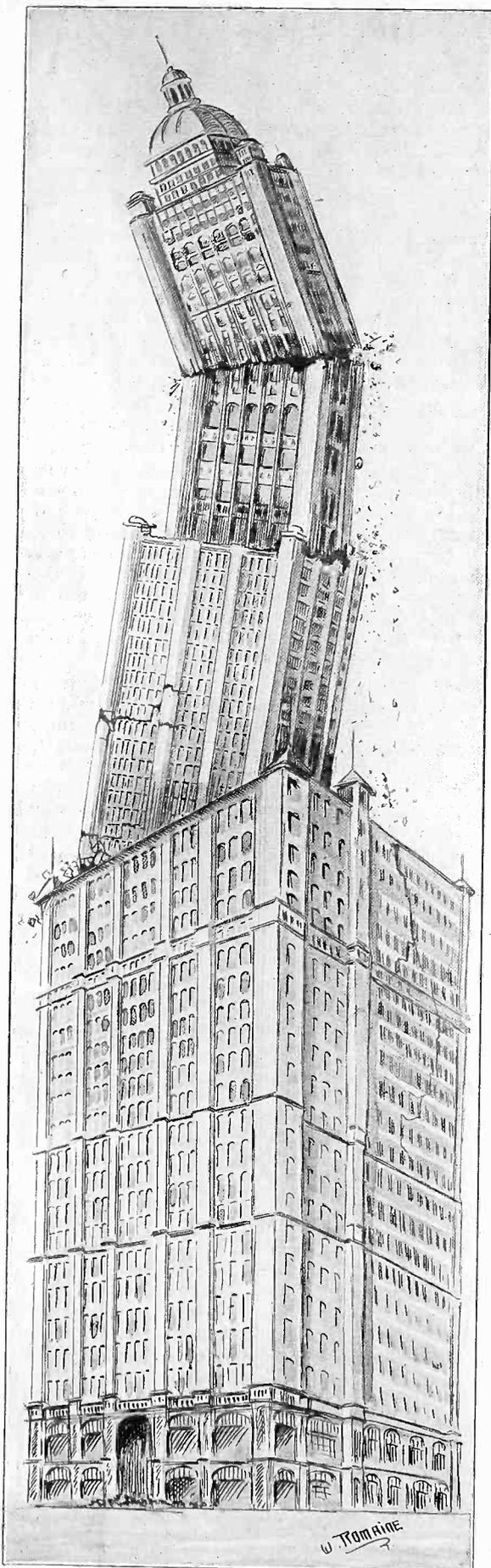
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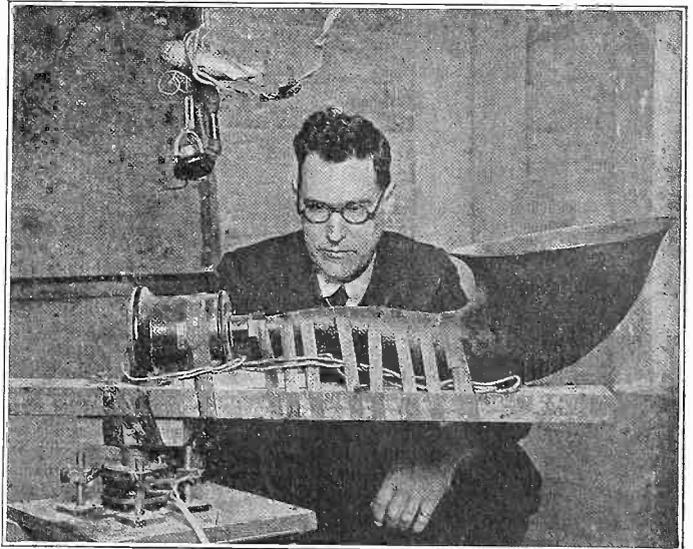


—AND the great office building is shattered by that one note, if all conditions are met. But, as Tim Turkey explains, meeting the conditions requires a strictly solo performance, whereas noises constitute benevolent interference.

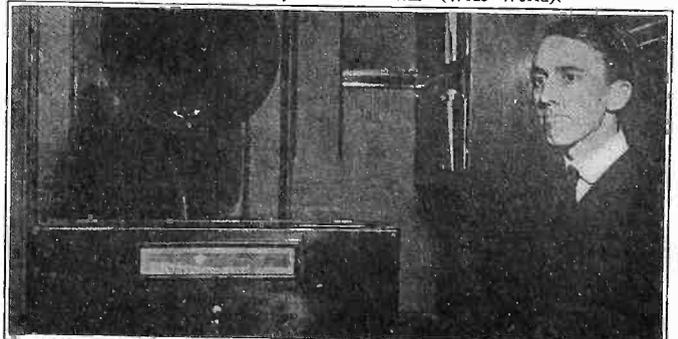
Beauty's Hobby



CLAIRE WINDSOR, movie actress, operating her miniature receiver. (Underwood & Underwood).



SOUNDPROOF quality of building material is tested by V. L. Christler, Bureau of Standards, in this fashion. (Wide World).



A NO-DIAL set (above) is controlled by an electric switch. (Underwood & Underwood).

A THOUGHT FOR THE WEEK

THREE years old—only a moment in His great plan, but an aeon of time when figured in terms of the hopes, disappointments and final success of the editors and publishers of a radio paper.

RADIO WORLD

Title Reg. U. S. Pat. Off.

TELEPHONE LACKAWANNA 6976, 2063 PUBLISHED EVERY WEDNESDAY (Dated Saturday of same week) FROM PUBLICATION OFFICE HENNESSY RADIO PUBLICATIONS CORPORATION

EDITOR, Roland Burke Hennessy MANAGING EDITOR, Herman Bernard

SUBSCRIPTION RATES

Fifteen cents a copy. \$6.00 a year. \$2.00 for six months. \$1.50 for three months. Add \$1.00 a year extra for foreign postage.

ADVERTISING RATES

Table with 2 columns: Ad type and Rate. Includes 1 Page, 7 1/2 x 11", 462 lines at \$200.00; 1/2 Page, 4 1/2 x 11", 231 lines at 100.00; 1 Column, 3 1/2 x 11", 154 lines at 100.00; 1 inch at 10.00; Per agate line at .75.

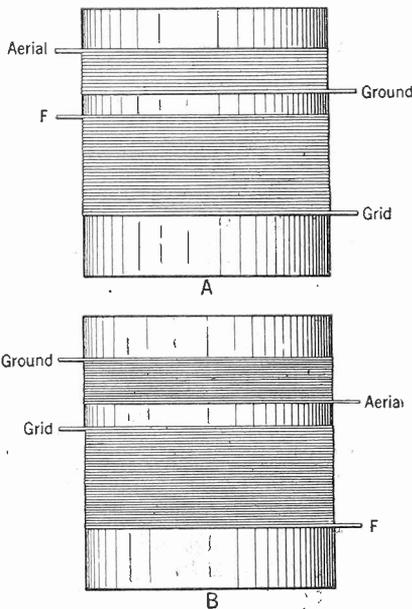
CLASSIFIED ADVERTISEMENTS

Ten cents per word. Minimum, 10 words. Cash with order.

Entered as second-class matter, March 23, 1923, at the Post Office at New York, New York, under the act of March 3, 1879.

APRIL 4, 1925

Correct Coil Connections



IN connecting coil terminals keep like potentials together where the primary and secondary terminals adjoin. If aerial goes to the top of primary, ground to bottom, the secondary terminal nearer the primary goes to A battery.

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.

"The World at My Command"

RADIO progress is largely made these days by the stations. This may be a tribute to the advanced stage reached by radio receivers. With the stations there seems to be greater room for ready improvement, including better programs, tests of Increased Power and even Super Power (50,000 watts).

With stations interconnected and sending out excellent programs there is a natural damping effect upon distance-hunting. One may be getting distance, but if so it may be distance negotiated largely by land-wire telephony, rather than distance covered by the radio wave itself.

There is a thrill in receiving signals from great distances, even if a telephone land wire intervenes. One naturally prefers to pat one's own receiver on the back (of the cabinet) in recognition of its individual performance in bringing in 2LO (London), but it is also delightful to realize that, by whatever course they travel, signals thousands of miles away are brought right into one's home.

A recent example of fine progress was the reception of dance music and the chimes of Big Ben, transmitted by 2LO and heard by many thousands in the United States. An extremely sensitive receiver of the Radio Corporation of America picked up the signals at a station at Belfast, Me., on a 1,600-meter wave.

Three Years Old

THE third year of RADIO WORLD was marked by wholesome circulation increase. The immediate goal of distributing an issue totalling 100,000 copies was reached a few months ago. The first hundred thousand, like the first hundred years of life, are always the hardest.

Now that RADIO WORLD enters upon its fourth year it intends to continue this same successful policy, rendering, however, still greater service to its readers. This service is given painstakingly and embodies several exclusive helps, such as being the instrumentality for readers getting radio literature.

The articles on construction of sets and parts have become more and more valuable as the staff of contributing editors has been increased. There will be no let-up in this improvement.

The radio public, experimenters and non-technical fans have given RADIO WORLD excellent support, making possible a field in which our editorial influence is great and response to advertisements published in the magazine is second to none, on the dollar-for-dollar comparison basis.

RECENT BACK NUMBERS

of RADIO WORLD, 15 cents each, or any seven for \$1. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

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 15 cents to RADIO WORLD, 1493 Broadway, New York City.

Sets for the Devotee of DX

By Lt. Peter V. O'Rourke

TO GET distance on a 1-tube set you must use regeneration. The tickler feedback system, a rotatable coil connected to the plate and in inductive relationship to the secondary, is eminently satisfactory. Tuned plate, where a variometer is used in the plate circuit instead of a tickler, or where a fixed coil tuned by a variable condenser does the same work as the variometer would, is also good. But the tuned plate does not always work well, sometimes no regeneration at all



LIEUT. PETER V. O'ROURKE

being obtained, where the internal capacity of the tube is too small. This is true of the UV199, the C299 and some other similar tubes. The tickler method works well with all oscillatory tubes.

Rheostat Controls Regeneration

Another form of regeneration control is that present in the so-called 1-knob set, where the grid return is to plate, instead of to filament, and the plate is capacitatively coupled to the grid. There are really two controls here, as in the other instances, for the rheostat is the second control. Regeneration is influenced by the degree of heating of the filament, for that has an effect on the electronic flow within the tube. Rheostat control of regeneration is the "least best," because of the suddenness and uncertainty of variation and the propensity of the set for getting beyond control. But the set is a DX marvel.

Best DX on Two Tubes

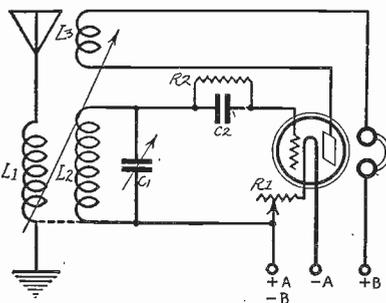
With only DX in mind the best 2-tube circuit would embody a stage of tuned radio-frequency amplification. Regeneration may be used either in the RF stage or in the detector stage. If used in both stages the set may get beyond control and be very hard to tune. The double regeneration system is feasible, however, although something of a nuisance from the operating viewpoint.

When two tubes are used neutralization may be resorted to, the grid of the RF tube being capacitatively coupled to a point on the grid coil of the detector stage, the capacity being a variable neutralizing condenser. The tap on the grid coil may be at one-fourth the total number of turns, from the grid end. Thus on a 44-turn secondary it might be at the eleventh turn from where one terminal of the coil goes to grid. Neutralization may completely prevent radiation and possibly render operation of the set a little more stable.

Employing the Reflex Principle

If one has had some experience with making radio sets he may use the reflex principle to obtain one stage of audio from the RF tube. In no case need the set be expected to excel the straight two-tube high-frequency circuit plus one tube for a stage of straight audio. But it may be as good and the plan has attractions for those who find tube economy a necessity.

There is no need of adding another stage of RF to a regenerative circuit that already has one RF stage. Usually more trouble than gain results. There is a limit to radio amplification, this limit being imposed by the tubes, and to overload them beyond all reasonable expect-



THE STANDARD 1-tube regenerative set of the 3-circuit tuner variety. L1 may be 10 turns, L2 43 turns, one below the other on a 3/2" diameter tubing, wire No. 20 double silk covered. C1 is .0005 mfd. L3 is the tickler, 30 turns of No. 26 SSC wire on a 2/4" diameter tubing, inside the stator.

tations of successful operation is to attempt to beard the lion in the jungle. Thus a set that would give all that can reasonably be expected from modern receivers of few tubes would be one stage of tuned RF, detector (with regeneration in either stage, preferably in the detector stage for neutralization possibilities) and some form of audio amplification for speaker operation. Two transformer-coupled audio stages give all the volume one could need in a home on a total of 4 tubes. Three resistance stages give less volume, cost less and afford better quality. Therefore a 4-tube or 5-tube set of this kind, depending on what form of audio you use, would give wonderful results and would bring in stations thousands of miles away with volume.

Where the Neutrodyne Ranks

The Neutrodyne is about on a par with this circuit. It necessitates five tubes, if the conventional circuit is to be embodied, consisting of two stages of tuned RF, detector and two transformer audio stages. The commercial Neutrodynes do not use regeneration, but a variometer may be placed in the plate circuit of the detector tube for greater DX. This requires an extra control, four in all. But if a double condenser is used to tune two stages (both RF stages, or detector and one RF stage) then the controls are kept down to three, which seems to be the highest number the fans will stand.

The Neutrodyne is excellent for DX, but it can scarcely be said that its DX performances excel those of the tuned RF-regenerative set embodying two tubes on the radio-frequency side. The Neutrodyne does not radiate, is quiet and smooth in operation, and is an excellent set for use where various members of the family, some of whom know little or nothing about radio technique, will do considerable tuning in. Regenerative sets are harder to tune. Also the Neutrodyne with regeneration is harder to tune than the non-regenerative Neutrodyne, although with feedback more DX may be expected.

The Super-Heterodyne

The acme of distance-getting is possible on the Super-Heterodyne. This set, if properly built, with sharp filter, is as selective a set as can be constructed. It should be used on a loop, however. On the subject of loops it may be pertinent to remark that the standard Neutrodyne is not suitable for loop operation, a fifth tube being necessary, while the tuned RF-regenerator may be made to work a loop satisfactorily.

If one does not desire loop operation the Super-Heterodyne is not pre-requisite to distance-getting, for with an outdoor aerial the Neutrodyne or tuned RF-

regenerator will bring in as much DX as the Super on a loop. If an outdoor aerial is used greater DX may be obtained on a Super-Heterodyne than perhaps on any other set, but the noise that is brought in is sometimes terrific, due to the strong amplification factor in the Super-Heterodyne. Usually the more DX you get the higher the noise level, but the Super-Heterodyne excels as a noise-producer when hooked onto a substantial outdoor aerial. A short indoor aerial, say 50 feet, would be better with the Super-Heterodyne than a long outdoor one.

The Crystal and DX

Considering only DX, the crystal had better be left out of consideration. Only in a Super-Heterodyne may crystal rectification be used with any assurances of consistently getting stations a couple of thousand miles away, even when the receiver is in the heart of an air-crowded broadcasting center.

When we talk of the crystal we are discussing quality rather than DX, although many crystal hookups, embodying sufficient RF, will bring in stations hundreds of miles away, and occasionally get much greater distances. The better class crystal sets are usually reflexes that operate on a loop, but the DX fan will find that combination of crystal and loop serve rather to defeat his purpose. Those who are strong for quality will find the crystal-loop set satisfies them, but the DX fan may be disappointed.

Supposed S O S Halts Atlantic Stations

ALL broadcasting along the Atlantic Coast from Cape Sable, Nova Scotia, to New York, was shut off for a short period about 8 o'clock one recent Saturday night in the belief that a steamer in distress was sending S O S calls.

One broadcasting station thought it heard the signal, a message was flashed to the Naval Communications office, and at 7:58 the order Q S T, the international code for "Quiet; Stand By," was sent on the air, and all stations listened in for the distress call. No S O S signals could be heard, however, and in a short time the regular evening broadcasting and commercial business was resumed.

A report from Boston said that a message had been intercepted from the British steamer Cedric which had heard S O S signals from another ship. There was no indication as to the identity or position of the other ship.

SOME RECENT DX SPECIALS

THE DIAMOND OF THE AIR, by Herman Bernard, a 4-tube DX Loop Set, described in RADIO WORLD, issues of April 4, 11 and 18. Send 30c, get the April 11 and 18 issues.

THE REGENERATIVE DX NEUTRODYNE, 3 controls, by Abner J. Gelula. Send 15c for January 31 issue.

A 1-TUBE, 1-DIAL DX SET, by Lieut. Peter V. O'Rourke. Send 15c for December 6 issue.

THE WORLD'S SIMPLEST 1-TUBE DX SET, by Lieut. V. O'Rourke. December 13 issue. Send 15c.

A 3-CIRCUIT TUNER YOU CAN LOG, REFLEXED, by Herman Bernard. Tuned plate. Three tubes, including one RF, detector and two AF. Send 15c for March 14 issue.

A 3-TUBE DX TICKLER-TUNED PLATE CIRCUIT of Wonderful Tone, by Herman Bernard. No reflex. Send 30c for December 20 and 27 issues.

A 1-TUBE DX TICKLER-TUNED PLATE CIRCUIT (the above without audio). Send 15c for December 20 issue.

A SIMPLIFIED NEUTRODYNE, by J. E. Anderson, 3 controls, no regeneration. Send 15c for September 6 issue.

A VARIOMETER-TUNED SUPER-HETERODYNE, by J. E. Anderson. Send 15c for December 6 issue.

Send 15c for any of the above numbers to Circulation Manager, Radio World, 1493 Broadway, New York City.

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

- James S. Bohan, 2828 Grand Route St. John, New Orleans, La.
- Noblitts Garage, Edina, Mo.
- H. Birnbaum, 38 W. 182nd St., New York City.
- W. H. Raven, P. O. Box 149, Pictou, N. S., Canada.
- W. A. Ivery and T. A. McKay, 32 Water St., Pictou, N. S., Canada.
- Philip Curran, Suite 42, Strathmore Apts., Winnipeg, Manitoba, Canada.
- Eugene Rivers, Box 537, Edmond, Okla.
- W. C. Mayer, 1305 E. 124th Pl., Cleveland, O.
- C. H. Regan, 936 So. Taylor Ave., Oak Park, Ill.
- Fred Cardinal, LB 273, Conway, N. H.
- H. Clifford Varhan, Jr., 4500 Forest Hill Ave., Richmond, Va.
- Paul F. Ktuse, Tiffin, Ohio.
- K. L. Ingalls, Richards, Mo.
- Victor J. Johnson, Box 32, Clarissa, Minn.
- Arthur J. Ballar, 922 Western Ave., Peoria, Ill.
- V. O. Mathias, 344 N. W'way, New Philadelphia, Ohio.
- L. Mansfield, 442 Barker Ave., Peoria, Ill.
- Radio Equipment Co., Dealers, 120 N. Madison Ave., Peoria, Ill.
- F. S. Thompson, 69 S. B'way, Yonkers, N. Y.
- George E. Streepy, Bloomsbury, N. J.
- Carl Runnels, P. O. Box 610, Chicago, Ill.
- M. J. Matty, Draw 43, Evans Mills, Jefferson County, N. Y.
- Charles H. Zahn, 223 So. Walnut St., Pinckneyville, Ill.
- Delaware Co. Telephone Co., Manchester, Iowa.
- Harry Weiss, 3319 Locust St., St. Louis, Mo.
- H. N. Dobbelbower, 414 Bryn Mawr Ave., Cywyd, Pa.
- E. Lovelace, Blue Springs, Mo.
- McGuire Bros., Dealers, Blue Springs, Mo.
- E. W. Ross, Big Spring, Tex.
- William Fowler, Library, Pa.
- Kaufman's Store, Pittsburgh, Pa.
- Grover C. Parsons, Creston, Tenn.
- Lewis J. Eberman, 72 Flivania Ave., Jamestown, N. Y.
- William A. Smitham, 1941 Curtis St., Denver, Colo.
- Philip R. Dixon, 530 Milton St., Cincinnati, Ohio.
- Howard Diehl, Millwood, Wash.
- Carl Midner, Paxton, Mont.
- Harry C. Blake, 137 13th St. at Madison, Oakland, Calif.
- Standard Implement Co., Admiral, Sask., Canada.
- John De Le Blanc, Port Arthur, Texas, P. O. Box 132.
- Dan L. Newkirk, 433 Nona Ave., Dearborn, Mich.
- Thomas H. Butler, Paris, Ky.
- G. C. C. Belling, 34 E. Falls, Blvd., N. Tonawanda, N. S.
- B. L. Baker, Arcadia, Kan.
- Chester Frost, Healdsburg, Calif.
- Venus Radio Co., 32 Union Sq., New York City.
- R. B. Baldwin, 402 Center St., Bangor, Me.
- John W. Murphy, 303 W. 42nd St., New York City.
- A. A. Ehreman, Payne, Ohio.
- Williard Leary, 713 Lee Ave., Fredericksburg, Va.
- Jordan Radio Co., 136 Bway, Denver., Colo.
- D. L. Cody, Geneseo, Ill.

New Corporations

- Harman Radio Mfg. Corp., Cedarhurst, N. Y., \$10,000. H. Tessler, C. Jacobs, C. Goldberg. (Atty. L. J. Weber, 276 Fifth Ave., New York City.)
- Permanent Battery, Electricity, \$100,000; C. B. & K. B. Low, B Zanditon. (Atty., W. C. Low, 353 5th Ave., New York City.)
- William Radio Panel Co., supplies, \$10,000; S. Rose, W. Seigel, R. Kogel. (Atty., M. B. Lesser, 299 Bway., New York City.)
- Modern Cabinet Co., Jamestown, N. Y., furniture, \$28,000; A. G. Lindross, H. J. Halberg, E. C. Rockman. (Atty., C. M. Joes, Jamestown.)

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

THE RADIO TRADE

"Empire 5" Is a New, Handsome Receiver

THE Empire 5, "King of Radio," is a new 5-tube tuned radio-frequency receiver, consisting of two stages of tuned radio-frequency amplification, tube detector and two stages of transformer-coupled audio-frequency amplification. It is contained in a handsome walnut cabinet and has an attractive black onyx panel. The Empire, as one of its special features, has a tone control, which not only brings the signal quality up to higher standards than otherwise, but regulates volume as well. There are three controls, two of them tuning the radio-frequency stages, the third the detector stage. The inside of the set, viewed from the top, discloses only the condensers, coils, sockets and grid leak, atop a fine sub-panel, the other parts and the wiring being out of sight, below the sub-panel. The set has variable condensers of excellent make and the coils are specially made, in honeycomb fashion, and mounted at an angle to prevent losses and instability. A master A battery switch enables one to turn the set on or off with a single motion. A means is provided for turning off the radio-frequency tubes and operating the set as a 3-tube affair to save tubes and battery consumption when hearing locals. The dials are very attractive and neatness characterizes the set.

The Empire Phone-Parts Co., 2262 East Fourteenth Street, Cleveland O., are the manufacturers of this set.

LACAUT BECOMES CHIEF ENGINEER OF PHENIX RADIO CO.

THE Phenix Radio Corporation announces that Robert E. Lacaut, E. E., A. M. I. R. E., formerly associate editor of "Radio News" and designer of the Ultradyne, has become chief engineer for their corporation, in which capacity he will exercise his inventive genius in behalf of the company's products. His entire time will be devoted to the design, development and perfection of radio devices.

DEVICE RESTORES TUBES

THE Thos. Brown Co., of Newark, N. J., claim for their tube reviver the ability to re-activate rundown tubes to make them function normally for as much as 500 additional hours of service. The operation of the reviver is very simple and it requires but the throwing of the switch to put it into operation. The machine is a box-like affair with the case measuring about 8" square and 6" deep. There are four tube sockets on top holding the tubes to be revived. On two sides of the case are switches to throw on the current; on a third side is a socket and a connecting wire. This wire connected to the house current gives the necessary operating current. To recharge four tubes of the same type requires but 10 1/2 minutes.

HARD RUBBER SHEETING IN STOCK

THE New York Hard Rubber Turning Co., 212 Centre Street, New York City, has a full line of hard rubber sheets, rods, tubing, etc., in stock for special purposes and all-around radio use. They also carry a full line of Radion products, including the well-known Radion panels in all sizes, Radion dials, knobs and tubing, and the new Radion loud speaker horn. Herman Schiffer, of the N. Y. Hard Rubber Turning Co., is prepared to figure with manufacturers on panels for sets in large quantities and on special panels for portable sets, Super-Heterodynes and radio units for phonographs.

STATIONS IN BOOK FORM

THE Radex Press, of 220 Euclid Arcade Annex, Cleveland, O., is publishing a booklet called "Radio Index" in which are indexed all the broadcasting stations, wavelengths, dial readings, locations, frequencies and call letters. It is claimed that with this little book, which they mail prepaid for 50c, one is enabled to get stations far more easily.

NEW NAME FOR FORD MICA CO.

THE Ford Mica Company, of New York, announces that its corporate name has been changed to the Ford Radio and Mica Corporation. There has been no change in the organization, control or management of the company. It will continue its standard lines, including the production of FMC transformers, Supertrans and other radio accessories.

JANUARY EXPORTS \$784,619

WASHINGTON. EXPORTS of radio apparatus from the United States during January amounted to \$784,619 compared to \$1,080,168 for December.

RECENT BACK NUMBERS

of RADIO WORLD, 15 cents each, or any seven for \$1. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

B BATTERY ELIMINATOR

THE Power Well B battery eliminator, manufactured by the American Battery Company, differs from the standard transformer-type B battery eliminator in that it consists of a storage battery and charging apparatus combined in one container. The Power Well causes no irritating noises due to line fluctuations. The advantage of using a B battery eliminator is that a constant voltage is maintained upon the plate, and as the charge never runs down, the current is always at highest operating efficiency.

NEWEST WHOLEMOUNT RHEOSTAT

THE latest scientific achievement that materially improves the value of any radio set has been brought out by the United Scientific Laboratories, 80 Fourth Avenue, New York City. Among its premier features are non-corrosive resistance unit firmly set in groove, acorn fastening nut firmly securing contact lever, phosphor bronze contact slider, genuine bakelite base, milled flat on shaft preventing contact lever from turning, mounting nut, lock washer.

(Tested and approved by RADIO WORLD)

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. 18 TO 19—Washington (D. C.) Radio Show. Address, Homer Bldg., Washington, D. C.
 - OCT. 17 TO 24—Brooklyn (N. Y.) Radio Show, 2d Regt. Armory. Address Jos. O'Malley, 1137 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.

Business Opportunities Radio and Electrical

Rates: 50c a line; Minimum, 2 lines.

BIG MONEY Selling Radio Log Books and Complete Station Directories; guaranteed correct; in thousand lots to dealers, jobbers, mfrs., etc. Full proposition and samples, 16c coin or 18c stamps. State territory wanted. Radio Press, 1426 W. 3rd Street, Cleveland, Ohio.

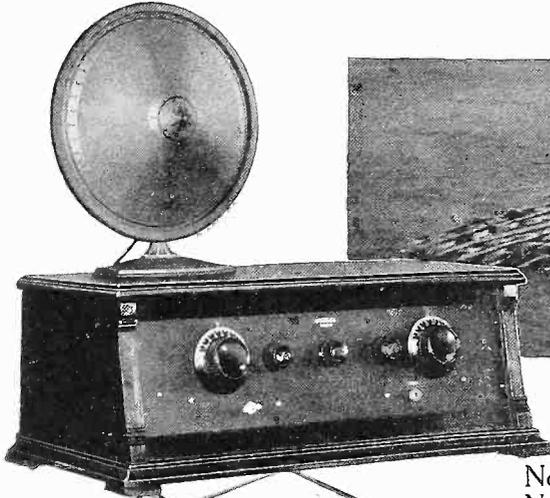
RADIO CHAIN STORE proposition offers exceptionally profitable investment and official connection to one or two men with \$5,000 to \$15,000; particulars personal interview only; give phone number. Box 111, Radio Man.

RADIO PRODUCTION MAN—An established manufacturer of radio receivers with complete factory and good sales needs a man thoroughly experienced in the technical and production branch of the radio industry to handle that end of his business; for the right man there is an interesting proposition that will enable him to secure a liberal share of the business at an attractive price. Box 222, Radio World.

A MANUFACTURING SERVICE—A large plate metal and machine shop located on tidewater in the New York metropolitan district desires to take on the manufacture of specialties where high class workmanship is required and where a highly functioning engineering department is capable of assisting in the development and perfection of such specialty. Box 333, Radio World.

LARGE FACTORY which has been producing radio parts will entertain a proposition to manufacture radio sets or parts under contract; well-equipped plant for metal stamping, finishing and assembling; efficient radio engineer and production manager in charge; excellent opportunity for one contemplating putting a radio set on the market, without the expense of equipping a factory. Box 444, Radio World.

What the Trirdyn gets where it's hotter than Summer!



Crosley Trirdyn—on the Sahara Desert at mid-day—brings in Radio-Paris on the loud-speaker!

Not only at mid-day, but in February—mid-summer in Northern Africa and far hotter than any American summer.

The picture above, a post card snapshot sent from Tunis to Mr. Crosley, by D. F. Keith of Toronto, Ont., tells this story on the other side:—

Tunis, North Africa, March 3, 1925

Dear Mr. Crosley:

Fishing here is rotten but radio is fine. On the Sahara, using three tubes on the Trirdyn circuit, reception from Paris came through on the loud speaker. Along the south coast of the Mediterranean, using this set, six or eight high power European stations came in with good volume by day-light and all of them after dark. Can usually get a few American after 1 a. m. Can you fish with us this year?

Cordially,
(Signed) D. F. Keith

Further details on the margins of the picture:—

Sahara Desert, 250 miles south of Algiers, February, 1925. Receiving noon-day concert from "Radio-Paris", Paris, using aerial and counterpoise.

Who said summer in America is a poor time for radio—if the receiver is a Crosley Trirdyn?

Every radio fan—actual and aspiring—is invited to think this over and then act.

On the Trirdyn is the beautiful new Crosley Musicone, radio's most startling development. The Musicone's ability and its beauty are so superior that we expect it to replace a half million loud-speakers this year. \$17.50.

The Crosley Radio Corporation, 528 Sassafras St., Cincinnati
Powel Crosley, Jr., President

CROSLEY RADIO

Better—Costs Less

\$65.00
Accessories Extra

Crosley Trirdyn Special

Three tubes better the results of five or six
A highly efficient, non-radiating combination of tuned radio frequency, Armstrong regeneration and reflex amplification.
New cabinet, sloping panel
Battery self contained
Exclusive Crosley 3-tube circuit

CARTE POSTALE
Tunis, North Africa
March 3, 1925

Dear Mr. Crosley,
Fishing here is rotten but radio is fine. On the Sahara, using three tubes on the Trirdyn circuit, reception from Paris came through on the loud speaker. Along the south coast of the Mediterranean, using this set, six or eight high power European stations came in with good volume by day-light and all of them after dark. Can usually get a few American after 1 a. m. Can you fish with us this year?
Cordially,
D. F. Keith

Mr. Powel Crosley, Jr.
Crosley Radio Corp.
Cincinnati
Ohio
ETATS-UNIS

From Poverty to Easy Street

How Gifted Pianist, Starving, Penniless, Eager For Job as Deckhand, Won Artistic Success Through Microphone

WALTER HAEFLIGER, pianist, broke, was on the verge of trying for a job as a deckhand, when Radio grasped him in her tender embrace—and now he is a prosperous stage pianist!

Born in Berne, Switzerland, Walter, at the age of fourteen, displayed such musical ability he had the attention of the

best critics of his native town. Krause and Stavenhagen, both pupils of Liszt, took an interest in him, and tutored him for the Brahms festival in Zurich. Later he won the Ibach prize in Berlin, and when little more than a boy was invited to follow into the office created by Busoni at the National Conservatory in Helsingfors, Finland.

A Tough Break in New York

With such a record and a little money he had saved, Haeffliger went to New York; his hopes high and letters to the most prominent musical artists carefully put away in his pocket. The musicians had no time for him and his hopes dwindled almost as quickly as his little money;

months passed and he could get no engagements.

Things got so bad in his little furnished room on Second avenue, New York City, that he didn't have anything to eat. He appealed to the Swiss Consul, who sent him to the Colombian Steamship Company in the hope he might get a job as a deckhand. It was a picture he'll never forget—of falling snow, and no overcoat, of an empty stomach and dreams that were nearly dead.

At the Colombian Steamship Line he was given a job and he might have gone away on some freighter. But he mentioned to one of the company's officials his concert record in Europe. Immediately he was given money for food and arrangements made for him to broadcast. It needed only the first program on the air to convince those who knew just how much talent this hard-pressed man had.

Within two weeks he was playing from the stage of a New York theatre to an audience that filled the house, filled by the enthusiastic efforts of a few steamship officials who wanted to help him.

Because radio served as his first public appearance in America, Haeffliger played again recently.

Radio With World-wide Range Invented, Says Playwright

COSMO HAMILTON, author and playwright, told a large audience at the National Democratic Club, New York City, that radio was a growing menace to the theatre and that the future of the stage was in the home. He predicted that in the near future plays, as well as books, would be written especially for the radio, and that families would listen in on their favorite play while lounging comfortably at home.

To meet this demand and development of the radio he asserted that the technique of the stage as well as that of playwrighting would have to be revised, and actors educated to speak for radio audiences alone, so that each word will receive full value.

Present Programs "Infantile"

With the playwright it will be a process of elimination, he said, plays being boiled down to one act, with one strong moment, and all unnecessary characters, like lawyers and mothers-in-law, left out. The programs of entertainment now offered, he said, were infantile.

He prophesied that within five years radio "fans" could tune in on what he termed the fourth dominion, and listen in not only to Caruso but to Mozart, and perhaps hear a new opera by Puccini—"these so-called dead men."

The radio is going to solve the problem of life after death, and the fear of death will go, he predicted.

Tells of Secret Invention

During his talk Mr. Hamilton intimated that he had just learned recently of a newly invented radio, the secret of which he said was locked up in a safe and he could not divulge, that would bring the

Radio Preference Over Stage Cited By G. B. Shaw

LONDON.

"IF I COULD see and hear a play from my fireside, I would never enter a theatre again," was the ambiguous appreciation of broadcasting vouchsafed by Bernard Shaw in response to the inquiry whether he thought broadcasting of plays would doom the theatre to extinction.

The playwright, though he did not offer any suggestion for adding the advantage of sight to the delights of wireless audition, was quite ready to use broadcasting as a stick to beat the theatre managers.

"I shall not prophesy," he said, "but I remind our managers that theatregoing is very dear, very inconvenient and horribly stuffy and promiscuous. Unless they can overcome those disadvantages by the overpowering fascination of good plays, good acting and theatres that are like enchanted palaces instead of hotel smoking rooms, broadcasting will knock them out."

entire world to the radio fans in New York. The invention was so amazing, he stated, that a person at the South Pole would be heard as distinctly as Premier Mussolini speaking in Rome.

Mexico to Educate from CZE

THE Mexican Department of Education at Mexico City has arranged to broadcast concerts and lectures through its radio station.

CZE is the station call, pronounced "Say, Say-Tah, A." The hours will be from 8 to 9:30 P. M. on Wednesdays and Saturdays for concerts and daily from 8 P. M. to 8:20 P. M. for lectures. No Sunday broadcasting will be attempted.

A 450-meter wavelength will be used (666 kilocycles frequency). Noon in the Eastern Time belt is 10:24 A. M. in Mexico City.

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.

Raymond Wahl, 1616 Laurel St., Wilmington, Del.

Charles Goode, Griffin, Ga.

Orwin P. Sather, Rugby, N. D.

William Rych, 3177 W. 56th St., Cleveland, O.

Max H. Hopf, Harper, Texas.

William Tumielewicz, P. O. Box 15, Florence, Vt.

Joseph Mirabella, 1856 Benson Ave., Brooklyn, N. Y.

Carl G. Broberg, 613 54th St., Brooklyn, N. Y.

William E. Rosenlieb, Box 264, New Metamores, Ohio.

Conley Webster, R. F. D. 2, Versailles, Ky.

Walter E. Hedman, Jemtland, Me.

Mrs. James F. Corrigan, 325 W. 44th St., New York City.

William Fus, Jr., 382 Littleton Ave., Newark, N. J.

Safe Way to Use a Charger

SOME chargers may be ruined or badly damaged if an attempt is made to charge the battery without first disconnecting the wires that run from the receiving set to the battery terminals. One side of the power line is usually grounded and one of the filament leads of the set is connected directly to ground. If the wrong connection is made, then a short circuit is made through the charger.

If the charger is left attached to the battery after charger is turned off, then the battery is likely to discharge through the charger. The best arrangement is to detach the battery clips from the set when charging and to detach the charger clips

from the battery terminals when the battery is fully charged.

Articles Win Him Over to Radio

EDITOR, RADIO WORLD:

I AM a novice in radio and do not even own a set, but shall some day undoubtedly have one. I have become interested because of the fine articles in RADIO WORLD. Please start my subscription at once.

GEO. DICKERSON,
Swan River, Man., Canada.

Portable Set

(Concluded from page 11)

made between stator and rotors. This connection should be provided for even prior to the actual winding. Fig. 20 shows the hole in the bakelite or hard rubber rod through which this pigtail connection is to be threaded. By boring a hole part of the length of the shaft or by using a tubing as the shaft, the pigtail is brought out as shown clearly in Fig. 22. Note that the rod does not pass all the way through the interior of the form, but the shaft connections to rotor are made just inside the rotor form (Figs. 20 and 22).

The coil used, therefore, is of the cutout variety, and those requiring more explicit details of its construction are referred to RADIO WORLD, issue of January 17. All one need do is to adopt the directions therein set forth to the new dimensions.

[This concludes Part II of Herbert E. Hayden's three-part article on how to build the Model 1-A 1925 Portable. Part I was published last week, issue of March 28.

Next week, issue of April 11, the number of turns and kind of wire will be described, and each winding identified to correspond with designations in the circuit diagram, published in the March 28 issue. Also the completion of the set will be described thoroughly and will be fully illustrated.]

The DAVEN RESISTANCE COUPLED AMPLIFIER KIT

For those who build their own, and insist on quality amplification, there's nothing to equal Resistance Coupling. The

DAVEN AMPLIFIER KIT

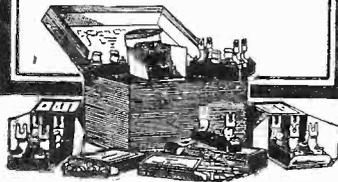
comes with full instructions for assembly. Easy to build—efficient in operation. (Without sockets and condensers.)

Supplied in either 3 or 4 stages. Sold Everywhere.

Ask your dealer for the "RESISTOR MANUAL." It's full of information on Resistance Coupling. Price, 25c.

DAVEN RADIO CORP.

"Resistor Specialists"
Newark New Jersey



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 March 28 and April 11 issues. This set is the successor to Hayden's famous DX Dandy. RADIO WORLD, 1493 Broadway, New York City.

THE DIAMOND OF THE AIR works a 4-tube non-reflexed circuit that works a loop. Published in three parts. Send 30 cents and get the April 11 and 18 issues, RADIO WORLD, 1493 Broadway, New York City.

POWER WELL

A well of power for the "plate" circuit of a radio receiving set. Permanent—no connections to change—no fussing to charge—no noise—not affected by line fluctuations. For attachment to any electric light socket. It supplies an absolutely steady direct current that is always available in abundance at maximum pressure.

AMERICAN BATTERY COMPANY
Established 1889
2045 North Racine Avenue Chicago, Ill.

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. Fatigue-stock clips used.

Eliminates Soldering

ARC RAD PRODUCTS

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

GUARANTEED

TYPE 201A
Radio Tubes

\$1.00

Pay in Advance and Save Postage Charges.

Dextron Radio Lab.

74 STERLING ST.
EAST ORANGE, N. J.
ORANGE 9918 'Phone



RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS brings results; 10c a word; minimum \$1. RADIO WORLD, 1493 Broadway, New York City.

WRITE FOR NEW CATALOGUE

Home of Semi-Assembled Kits
THE RADIO SHACK
55 Vesey Street Dept. D-151 New York

"STERLING FIVE"

The utmost in 5-tube tuned radio frequency; solid mahogany cabinet

DISTRIBUTORS, DEALERS, USERS—it will pay you to write for details.

THE GIBSON-SEARS RADIO CORP.
48 WEST BROADWAY NEW YORK

AT BARBLEY'S "The AMBASSADOR MAN"

AMBASSADOR 4 TUBE
R. F. KIT, Genuine
Ambassador \$26.95
Parts.....

Wired and Beautiful 7x18 Cabinet—Factory Built—All wired under sub-base \$40.00

Endorsed by RADIO WORLD Laboratories

Sold on a Money-Back Guarantee. THE AMBASSADOR IS THE MOST SELECTIVE SET ON THE MARKET. MAKE US PROVE IT BY ACTUAL DEMONSTRATION.

Barbley's Radio Service

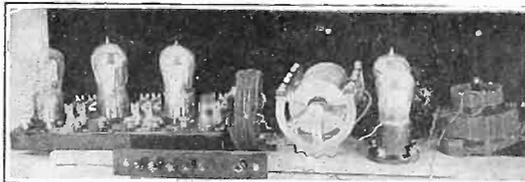
(Dept. R.W.) 135 Liberty Street, New York City
Official Ambassador Service Station
MAIL ORDERS SOLICITED
Ref.: Coal and Iron National Bank

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

RADIO WORLD'S

1925 Model 4-Tube DX Superdyne

WONDER



All the parts we sell have been tested and approved by
RADIO WORLD

BERNARD'S "DIAMOND OF THE AIR"
A Four-Tube DX Loop Set, in This Issue, including Loop. Complete Parts for

\$44.75

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 Variable Bradleyleak	\$1.65
One Double Flewelling Condenser	9.00	One Bradleystat	1.00
Two 4W Black Accuratone Dials, ea	2.95	One Bradley Push-Pull Battery Switch50
One Federal No. 65 Audio-Frequency Trans- former	4.95	One 2x24" Black Raulon Panel	2.85
One Federal No. 65A Audio-Frequency Trans- former	4.95	One Tri-Jack90
Four Federal Sockets, ea80	Two Silver Eureka Dial Pointers20
One .0025 Mfd. Dubilier Grid Condenser.....	.35	Two Lengths of Spaghetti.....	\$0.20
		One Terminal Block60
		Wire, Screws, etc.	1.00
			\$42.50

Complete Parts for Resistance Coupled, Amplified Superdyne Circuit as Checked, Specified and Certified by Herman Bernard in March 28th issue.....

\$45.00

The Famous WALLACE Low-Loss Coil for Superdyne..... \$7.50
The Flewelling Condenser for All Bernard's Circuits..... 9.00

COILS FOR HAYDEN'S 1925 PORTABLE IN STOCK

WALLACE RADIO COMPANY, Inc.

Send 50 cents for latest list of Broadcasting Stations, Radio Log, Practical Radio Information in conjunction with the greatest Radio Catalogue issued in America. This will be refunded on any order of \$5.00 or over.

135 LIBERTY STREET, NEW YORK CITY

ADVICE on Superdyne Circuit FREE!

If Not Listed Above, Write for It.

RESULTS GUARANTEED MAIL ORDERS SOLICITED

2LO, Relayed, Regales Americans

Dawn of the "International Era" in Radio Heralded By R. C. A.

THE OLD description of a cockney as a person born within the sound of Bow Bells may soon have to be modified on account of the success of the broad-

cast experiments conducted by the British Broadcasting company, the Marconi Wireless Telegraph Company and the Radio Corporation of America, when the chimes of Big Ben booming out the midnight hour from the Clock Tower, over 300 feet high, of the British Houses of Parliament were heard plainly in New York, Big Ben weighs thirteen tons.

Two Hours of Dance

Besides bringing Big Ben to New York, Station WJZ broadcast two hours of dance music by the orchestra of the Hotel Savoy. Thousands in the United States heard the program.

As in a previous successful experiment the music and the chiming of Big Ben were carried over a land wire to Chelmsford, about thirty miles from London, and then sent out from station 2LO on a 1,600-meter wave length. It was picked up at Belfast, Me., and again broadcast on 122-meter wave length from Station IXAL. Picked up at the experimental station of the Radio Corporation at Van Cortlandt Park, it was relayed by land wire to the broadcasting station of WJZ on West Forty-second Street, and broadcast again on 455-meter wave length.

The International Era

Though not quite as distinct as previously the orchestra could be heard quite clearly in "Let Me Alone," the tune that the Prince of Wales favored for his dance must during his visit to America last year; "Me and My Boy Friend" and other popular American dance music.

In a statement issued by the Radio Corporation at the conclusion of the second program it was said the experiment

may result in the very near future in bringing programs from Paris, Buenos Aires and stations in the Far East to American radio fans.

"Enough progress has been made," the statement said, "to enable us to say that we have now definitely entered upon an era of international broadcasting, which will eventually bring the entertainment, music and speech of other continents to every home in America.



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

Write for Catalog.

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



For Battery, Antenna and Ground Leads—

Jones MULTI-PLUG

THE STANDARD SET CONNECTOR

HOWARD B. JONES
618 S. CANAL STREET CHICAGO

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 \$6.00
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

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



LITTLE WONDER! SOLDERLESS LUG

Holds Bus Wire Like Clip!
Connect or Disconnect Wires Without Disturbing Terminals!
Price 10 for 5c. Ask your dealer. Distributors Wanted.

Mfd. by **PAUL GLAMZO**
203 Lafayette St. New York



BELLTONE RADIO TUBES

201A \$1.25
199—\$1.50

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

FREE!

Everyone Interested in RADIO Should Write for this FREE Radio Book

(Just send your name. No postage. Let us surprise you with our amazing values of all the up-to-date radio apparatus.)
Complete best-quality parts as used in RADIO WORLD Laboratories checked

by *Herman Bernard* for

RADIO WORLD'S

BERNARD'S 1925 MODEL 5-TUBE DX WONDER as shown in our ad in RADIO WORLD, March \$44.50
28th issue

Positively no Substitutes.
Ask This Magazine About Us.

Wholesale Radio Service

Dept. B
9 CHURCH ST. NEW YORK CITY

Two-For-Price-of-One Subscription Blank

For NEW RADIO WORLD Subscribers Ordering NOW

Radio World has made arrangements

This is the way to get two publications

- To offer a year's subscription for any one of the following publications
- with one year's subscription for RADIO WORLD
- RADIO NEWS or -RADIO DEALER or
- POPULAR RADIO or -RADIO JOURNAL or
- RADIO BROADCAST or -RADIO (San Francisco) or
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- for the price of one:
- Send \$4.00 today for RADIO WORLD
- for one year (regular price
- for 52 numbers)
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- eight publications for twelve months.
- 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, 1409 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.....

Index to March Issues

Leading Articles Published March 7, 14, 21 and 28

MARCH 7

Scientific Coil Data, by J. E. Anderson. Part I of a 2-part article giving instructions for winding ideal coils. Inductance formulas given.
Benson's Reflexed Super-Heterodyne. Part II

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

"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

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

 **39.50**
Easy Sales Big Profits

\$ 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.

(conclusion) of an article by Thomas W. Benson with picture and other diagrams. The 6-tube set includes three reflexed audio stages and crystal detector. Part I was published February 28.
Construction of a Storage B Battery, by Herbert E. Hayden.

MARCH 14

Reflexing the 3-Circuit Tuner That You Can Log, by Herman Bernard. A set of considerable power and range embodying a stage of tuned radio-frequency amplification ahead of a regenerative detector, with two transformer-coupled audio stages. The set comprises three tubes and three controls. Article includes black-print and picture diagram.

Coil Problems Solved for You, by J. E. Anderson. Part II (conclusion) of an article on scientific coil construction. Part I was published March 7.

How to Put Coils and Condensers Correctly in Sets, by Byrt C. Caldwell. Use of low-loss parts alone is not enough, says expert, explaining results of tests he made. Tips on how to conserve gain that low-loss parts made possible.

Theory of Wave Band Tuning, by Warren Perley.

MARCH 21

The Most Efficient 4-Tube, 3-Control DX Set, by Lt. Peter V. O'Rourke. Set comprises a stage of regenerative tuned radio-frequency amplification, detector and two stages of transformer-coupled audio-frequency amplification. Circuit not only gets DX wonderfully but gives great volume and is excellent in tonal quality.

A Home-Made Variable Grid Leak, by Herbert E. Hayden. Simple household materials employed.

Conserving Condenser Losses, by Carl Kaplan. Expert explains capacity factors in condensers and simplifies an understanding of condenser qualities.

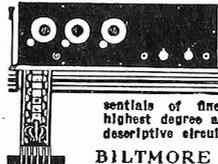
MARCH 28

The Model 1A 1925 Portable, by Herbert E. Hayden. Part I of a 3-part article on the construction of a portable that works a speaker on one stage of audio. The circuit has amazing distance-getting power and gives surprising volume. The set employs but two tubes and two controls. Article includes schematic diagram and detailed constructional photographs by author.

A 3-Tube Reflex for the Novice, by Feodor Rofpatkin. Distinguished Russian expert describes construction of a simple and stable reflex with DX range and fine volume. Set comprises 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 employs three controls. Article includes schematic and picture diagram.

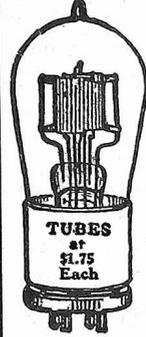
The 1925 Model DX Wonder with Resistance AF, by Herman Bernard. Circuit combines distance-getting power, pure tone quality and enjoyable volume. Set comprises one stage of radio-frequency, detector and three stages of resistance-coupled audio-frequency amplification. Only two controls are used.

The Significance of Tuning-In, by Dr. Frederick W. Grover. Professor explains theory of tuning by simple analogies. Written so the novice can understand.

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ADVANCE PROGRAMS

(Concluded from page 19)

Music, police bulletins, weather, readings. 4:55, markets. 5, tie. 7:30, Children's Home Glee Club and orch.; George Colvin; Civil Service talk by O. A. Beckman.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., Star's radio trio. 5:50, marketgram, weather, time, road report. 6, (School of the Air); piano tuning-in; Tell-Me-a-Story Lady; Trionon ensemble. 8, popular program. 11:45, "Merry Old Chief" and Plantation Players.

WEMC, Berrien Springs, Mich., 286 (E. S. T.)—9 P. M., Radio Lighthouse quartet. 9:25, Miss Thelma Abel, soprano; Miss Nelva Mundt, contralto. 9:40, Bible Chat, Mr. Wm. Lake.

WJJD, Mooseheart, Ill., 278 (C. S. T.)—3:30 P. M., Mooseheart's children's concert, Mr. M. P. Adams; Mooseheart concert band. 6:30, Albert

F. Brown, organ. 7:15, music from Mooseheart studio; "Child Care," by Mr. M. P. Adams. 10:30, concert from the Garod studio; Charley Straight orch.

WFFA, Dallas, Tex., 475.9 (C. S. T.)—12:30 P. M., Dr. Robert Stewart Hyer. 4:30, woman's hour, Mrs. Bessie M. Tribble, in song, reading, instrumental music. 6:30, Paul Cretien, banjo quintet. 8:30, Treble and Bass; Clef Cubs.

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

WEAR, Cleveland, Ohio, 390 (E. S. T.)—7 P. M., music.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., home service talk, Betty Crocker. 6:30 P. M., Buffalo trust hour. 2, Lenten service, Rev. Martin Walker. 8:30, Ontario M. S. Church. 9, "Cherry Blossoms," Zuleika Grotto Chanders. 10, Larkin string orch.

WCAL, Northfield, Minn., 336.9 (C. S. T.)—8:30 P. M., "Poetry and Immortality," Dr. George W. Spohn.

WPG, Atlantic City, N. J., 299.8 (E. S. T.)—9 P. M., Hotel Traymore concert ensemble. 10, Madame Lillian Stradling, contralto; Dr. Ralph G. Morris, tenor; Nathan Reinhart, pianist. 11, Hotel Traymore dance orch.

KPO, San Francisco, Cal., 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, markets. 12 M., time, Scriptures. 12:45 P. M., Commonwealth Club luncheon. 1, Fairmont Hotel orch. 4:30, Fairmont Hotel orch. 8, Oratorio, "Seven Last Words of Christ."

KFAE, Pullman, Wash., 348.6 (P. S. T.)—7:30 P. M., baritone, Prof. Heber Nasmyth; piano, Mrs. Louise Nasmyth; Scotch songs and readings, Janet Rae; piano, Nathalia Balakshin; College Y. W. C. A., Marcia Seeber; book chat, Alice Lindsey Webb; bees during fruit bloom, B. A. Slocum; legume inoculation, Dr. S. C. Vandecaveye; purebred sires, Prof. R. T. Smith.

KNX, Los Angeles, Cal., 337 (P. S. T.)—11:30 A. M., Estelle Lawton Lindsay's talk to women. 6:15 P. M., Beverly Ridge Co. program. 7:30, Eastern Outfitting Co. program. 8, west coast theatres. 9, Davis program. 10, feature program. 11, Coconut Grove orch. 12, Night Hawks.

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, news, police reports. 8, lecture, University of Oregon Extension division. 10:30, Hoot Owls.

KGO, Oakland, Cal., 361 (P. S. T.)—11:10 A. M., Home Making, Prudence Penny. 11:30, concert. 1:30 P. M., stocks. 1:40, stocks. 1:45, weather. 3, music. 4, orch. Hotel St. Francis. 5:30, Girl's Half Hour, Esther Wood Schneider. 6:45, stocks. 6:55, stocks. 7, weather. 7:05, produce news. 7:15, news.

KFDM, Beaumont, Tex., 315.6 (C. S. T.)—9 P. M., Refinery band.

KOA, Denver, Colo., 323 (M. T.)—12:20 P. M., organ. 1, quotations, weather. 3, matinee. 6, stocks, news. 6:40, Book of Knowledge program. 8, Rialto Theatre orch. 8:10, Olinger Highlander Boys' band.

KOB, State College, N. M., 348.6 (M. T.)—7:30 P. M., Popular Science Course, Dr. D. S. Robbins; "From Stone Axe to Band Saw," by D. M. Lang.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—8:30 P. M., Fischer orch.; Tubby Veil, Doug Johnston, cornet; Burton Fischer, piano. 9, New Arlington Hotel orch. 10 to 11, Jack O' Lantern Tea Room

CNRA, Moncton, N. B., 313 (E. S. T.)—7:30 P. M., bedtime stories, Uncle Alf. 8, markets. 8:30, Mrs. W. A. Whynocht, pianist; Mrs. G. O. Baker, soprano; Mrs. B. G. Oxner, contralto; Mr. W. A. Whynocht, baritone; Mr. R. G. Silver, tenor.

CNRT, Toronto, Ont., 356 (E. S. T.)—6:30 P. M., King Edward Hotel concert orch.

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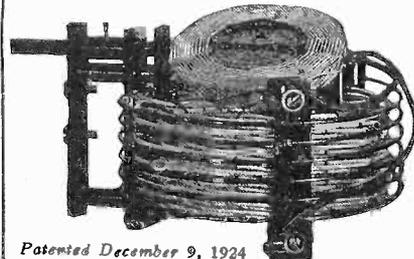
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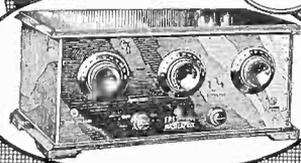
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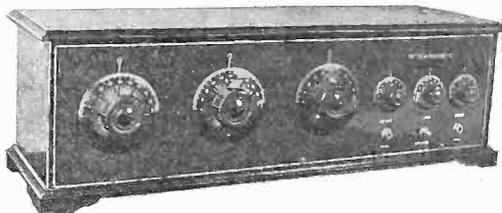
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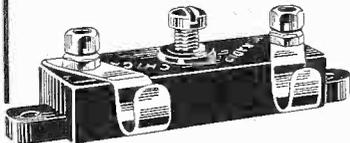
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Loop Jack Used in "Diamond"

(Continued from page 6)
 appease DX appetites. How to include this aerial coil, a radio-frequency transformer, in the circuit is shown in Fig. 5. The double-circuit jack designated J1 on the panel layout, Fig. 2, is used. The out-

side leaves of the jack, that is, the right-angle and the hooked spring, are connected respectively to A battery minus and to grid. When the loop is plugged in it is automatically connected to these two leads. But when the loop is not

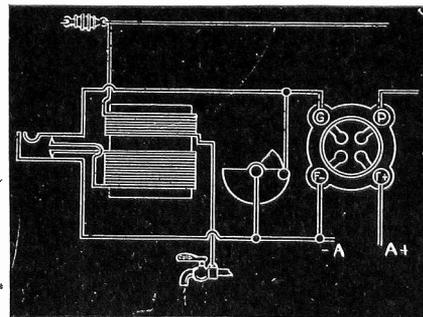


FIG. 5, how the loop jack is used in the circuit.

plugged in these leads make contact with the secondary of the radio-frequency transformer, whose primary is permanently connected to aerial and ground. The reversed connection of the inside springs of the jack, shown in Fig. 5, makes for correct connections to the terminals of the RFT for observance of the polarity rule. The lead that goes to A minus (beginning of the secondary third terminal from the top of the coil as shown) has the low potential, corresponding to the ground, which is connected to the terminal nearest it, second from top in Fig. 5. In any event the variable condenser C1 is used for tuning either the loop or the secondary of the RFT. Different dial settings will result unless the impedance of both is about the same. The loop may be adjusted to the secondary or the secondary to the loop, whichever the constructor finds preferable. On the other hand, the difference, if any, may be tolerated, one simply logging C1 for the loop and once again for the secondary of the aerial coil.

The Rheostats

As for the filament controls, there are two rheostats, one a 6-ohm wire-wound type, R1, the other a Bradleystat, R2. In Fig. 4, the two rheostats are represented as looking alike, for the sake of clarifying connections, but only R1 is "true to life." The Bradleystat actuates the detector tube and the two audio tubes. This is a sensible combination and makes for simplicity of wiring and control. The audio tubes are not critical and the

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How Switches Work in DX Set

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The List of Parts For Bernard's Loop Set

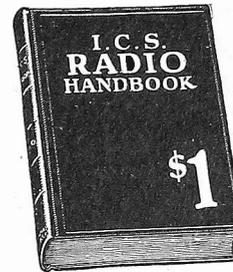
- One loop, L.
- One 3-circuit coupler, L1L2L3 (Bruno No. 77).
- One radio-frequency transformer (Bruno No. 55).
- Two .0005 mfd. variable condensers, C1, C2.
- One sub-panel bracket.
- One 6-ohm wire-wound rheostat, R1.
- One Bradleystat, R2.
- One .00025 mfd. fixed grid condenser, C3.
- One .002 mfd. fixed condenser, C4.
- One single-circuit jack (J1 in Fig. 1).
- Two double-circuit jacks, one J2, the other for loop-aerial switching.
- Two audio-frequency transformers.
- Three 4" vernier dials.
- Three Dalco dial pointers.
- Four standard sockets.
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- Three UV201A or C301A tubes.
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voltage that is correct for the detector tube will be nearly enough correct for the audio tubes to serve every reasonable purpose. However, as a jack is optional for earphone reception, a means of cutting off the two audio tubes is provided. It is the push-pull or toggle battery switch, S2. The other switch, S1, of the same design, turns the set as a unit off or on, being a master switch whose operation is modified by the other switch.

The variable condensers may be Flewelling, Cardwell, Bruno, USL or other good .0005 capacity instruments.

[Next week, issue of April 11, the details for constructing the coil, and the data on wiring will be published.]

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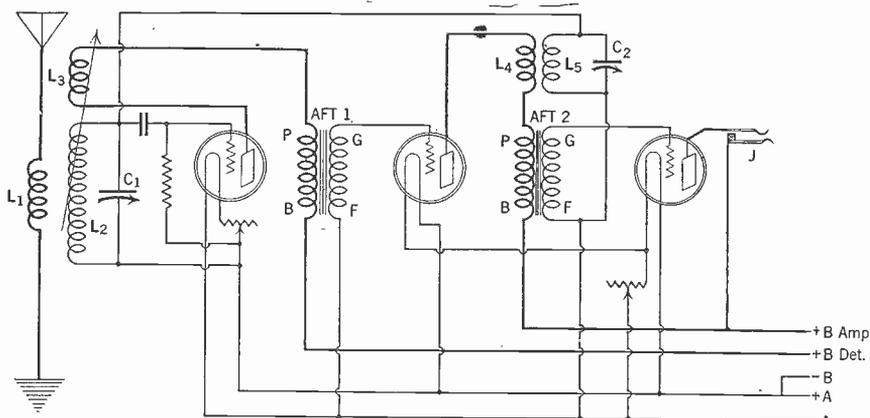
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The Prevention of Radiation



WIRING DIAGRAM of Brewster Lee's hookup for preventing radiation in a regenerative set.

the tuning of L5 offers a path of lesser resistance for the heterodyned note, so that it favors the path toward the speaker, rather than that toward the antenna. Another theory is that a reversal of the leads of L4, so that the current is rendered negative, produces the neutralizing effect which results when the flow of the neutralizing circuit is opposite to that of the oscillatory circuit. Notice the doubly-tuned detector grid and the stray RF currents picked up by L4L5.

L1L2L3 is any variocoupler of the 3-circuit type, tuned by a variable condenser, C1, that matches the secondary L2.

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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—\$8.00, prepaid anywhere. Nothing more to buy. Over a thousand "converted" Neuts are daily bringing in clean, resonant volume from Coast to Coast. Details—10c. 45 page meaty catalog of PARTS ONLY—10c.

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Guaranteed 500 Hours

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TUBES MUST LIGHT TO BE PROCESSED

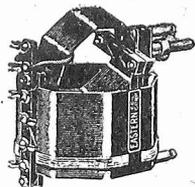
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By Brewster Lee

AS the result of some experiments with plans for preventing radiation from regenerative sets I devised the circuit shown in Fig. 1, which, while it naturally did not prevent the listener from hearing squeals from his own set, did fail to produce any sign of the squeals in a set using an aerial fifteen feet away from that of the experimental receiver. The set was not as stable as it might be and probably is not sufficiently advanced

to warrant a certificate of operating dependability. The signals were made louder and the set was indeed very selective and a good DX-getter. Some harshness of signals was noticed, but this could be cleared up by placing a fixed condenser across the secondary of the second audio-frequency transformer, AFT2. This condenser should not be oversized, or it will cut off the higher harmonics, producing notes of cloying if not annoying sweetness.

Fans may try out this circuit, using their present sets, without making any panel changes, simply by adding a radio-frequency transformer, L4L5, and tuning the secondary thereof with a variable condenser. The condenser-coil unit may be mounted externally on a very small panel and baseboard and the connections made temporarily to the set to produce the hookup.

The circuit partakes of the nature of reflex, since there is tuned radio-frequency in the first audio stage. The common lead of the primary of the RFT with the primary of AFT2 should not give rise to the assumption that tuning is introduced in the second audio tube.

The circuit is new and the theory of its operation has not been definitely settled. One idea that might be considered is that

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"Radio is the Croesus of fame, playing the Prince for many Cinderella cities," says the National Geographic Society. "Once Hastings was just one of the 'American cities under 12,000 population.' Now it is a radio Mecca. A tube set that has not made a pilgrimage to Hastings and back is an outcast indeed. It is at once the best known and least known city in the United States. The huge relay station for KDKA, of Pittsburgh, located there is nearly in the geographical center of the United States.

"Absence of tall buildings in Hastings and of high hills in the neighboring countryside and the presence of good ground water are conditions counted in favor of establishing a station at this place."

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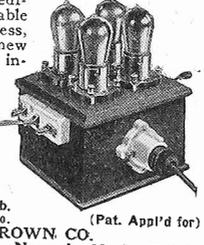
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IF THE vacuum tubes does not light it may be caused by many other defects besides a burnt-out tube. The A battery switch or connections may be open, dirty contacts of the rheostat, socket or tube tips, or the tube may not be seated properly in the socket.

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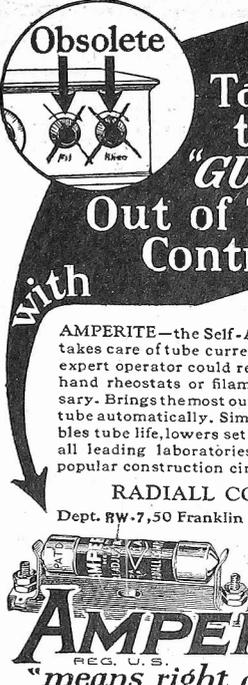
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AMPERITE—the Self-Adjusting rheostat, takes care of tube current better than any expert operator could regulate it. No more hand rheostats or filament meters necessary. Brings the most out of each individual tube automatically. Simplifies wiring, doubles tube life, lowers set cost. Approved by all leading laboratories. Used in every popular construction circuit.

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RADIOLA Super-Heterodyne, Super VIII, Zenith. Finest radios made. Any standard make you want at a money-saving price. Get our lowest price first before you buy. Write today, address, G. W. Stimms, Lake, New York.

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How to Operate the Sodian

(Concluded from page 8)
plate. There is also present sodium, upon which the action of the tube depends. The grid and plate are but a system of

spiral wires surrounding the straight filament suspended inside the tube.

The resistance coil wound around the tube is connected in series with the filament, and heats up the tube to the correct operating temperature. When the tube is first lit it will operate, but after burning for a minute or two it is in full operating condition.

When a grid leak is used the grid return must be connected to the negative side of the filament. The use of a variable leak proved advisable.

When the tube is used without a grid leak, then the grid return may be connected to either side of the filament. The rheostat is placed in the negative lead.

When this tube was used in a regenerative receiver results were very good. In a non-regenerative the tube was a very good detector, being very sensitive on weak signals and good on loud ones.

The tube was then tried in a radio-frequency amplifier as the detector tube and operated the receiver well.

The filament has a drop of 2.6 volts and the heating coil a drop of 2.4 volts. They are in series, so the tube voltage is 5, just about the same as the 201A. It is the first tube to use a tantalum filament instead of tungsten.

Both grid and plate are cage construction, open cylinders of parallel wires.

The S13, or the new S14 (the same tube with standard base) serves as well for a non-regenerative stage, and is splendid for reflex sets, only as detector, however.

The manufacturers give this information concerning the tube:

"When the tube is first lighted, immediate operation will be secured but its sensitivity will gradually increase for about two minutes, which will, in some cases, make it desirable to slightly readjust the filament current after the tube has been for a short time in operation.

"The D-21 requires a current of approximately .25 ampere and a potential of 5 volts. It can be operated on four dry cells or on a six-volt storage battery. For best regulation of filament current the rheostat should have a resistance from ten to fifteen ohms.

"In applying the D-21 to any receiving set it is desirable always to try various values of "B" battery since this value, for best operation, will depend to a certain extent upon the type of circuit used. The "B" battery voltage is not critical and the best value will be between 22½ and 60. In receiving sets where there is no regeneration in the detector circuit the best detection will be varied at each different "B" voltage of 22½ volts but if the circuit is of regenerative type, 45 volts or more will give superior results. The filament current should be varied at each different "B" voltage

although this latter adjustment is not critical and can be varied throughout a wide range without a material effect upon the signals. The correct adjustment of filament current is very simple since if the filament is lighted too brightly, a hiss will be audible in the receivers. This is due to too much filament current and it should be reduced to that point where the hiss just disappears to where the signals are perfectly clear."

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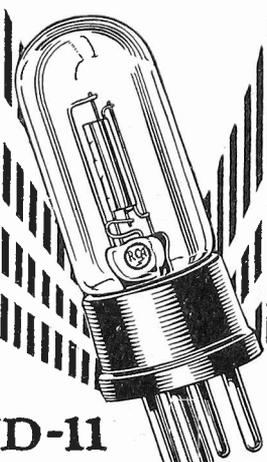
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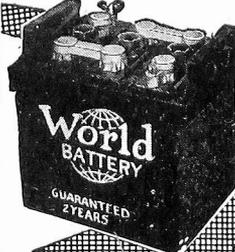


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Crewless Trains Run by Radio

By G. Y. Allen

Radio Department, Westinghouse Electric and Manufacturing Co.

THROUGH the use of modern developments in radio, it is entirely

possible to operate electric trains from a central control office. I do not wish to be understood as advocating the elimination of the motorman, conductor and crew, for no mechanical device, however perfect, can take the place of human intelligence, but it is interesting to note some of the possibilities of radio control.

Wonders of the Plan

It is now entirely feasible, through combination of automatic control and radio supervisory control, to start a train without a crew from a station, run it at full speed over clear tracks, slow it down or stop it, in accordance with the signals of an automatic block signalling system, start it up again, when the signals clear, stop it at its next station stop, and open its doors.

Supervisor's Work

The supervisor at the central office would receive complete information by radio at all times as to the position and operation of the train; he could take personal charge of its operation at any time; and he could talk directly to the passengers to give them any desired directions.

Radio on Long Trains

An interesting railroad application of this system is its use on long freight trains. Some trains are upward of a mile long and the ordinary methods of communication between the engineer at the head of the train and the conductor in the caboose at the rear, or the engineer of a pusher locomotive, become difficult to use. Carrier current radio telephones can now be installed on a train which make

communication between various parts of it as easy as between the offices in a building.

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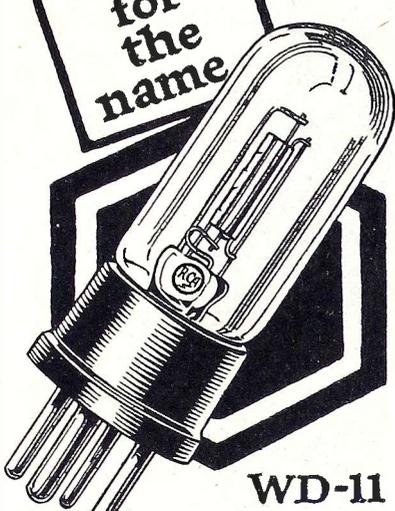


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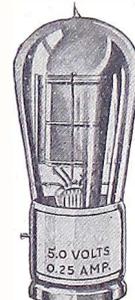
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\$1.00 EACH

Positively Only Five Tubes to One Person

\$1.00 EACH

EVERY TUBE GUARANTEED

ABSOLUTELY GENUINE—TESTED AND APPROVED

ADDRESS

JAMES H. KONKLE

192 MARKET STREET

NEWARK, N. J.

AT LAST

ROCK BOTTOM PRICES

\$1.00



BLUE TYPE 201-A



CRYSTAL TYPE 200



SILVER TYPE 201-A

NOTICE

These tubes are
Meter tested and
guaranteed. Equal
the best Radio Tubes
in THE WORLD.

All tubes shipped
parcel post, C. O. D.
Pay in advance and
save postage charges.

*Dealers and Distributors
write for attractive prices*

Manufactured under patent numbers 1422019 and 1469761.

MODERN RADIO TUBE MANUFACTURING CO.

57-59 BRANFORD STREET

NEWARK, N. J.

100% Tone



Magic Radio Clearness

With this new principle horn, based on the scientifically proved magnetic diaphragm control theory

The Kellogg Symphony Reproducer — Some Exclusive Features

THIS offers a new conception of radio clearness—a recent scientific advance in radio reproduction.

It offers a new way in receiving that eliminates the “tinny-ness,” the unpleasant scraping sounds, of your loud speaker. It brings to your home the marvels of the air exactly as they were broadcast. With an absolute fidelity of tone that is remarkable.

This new way is the Kellogg *Symphony* Reproducer—a super-horn that is adjustable to the requirements of any radio set. Now made in quantity production to sell at a price within the reach of practically every radio owner.

What It Is

The Kellogg *Symphony* is made by the famous Kellogg Switchboard & Supply Co., for 28 years leading specialists in the reproduction of sound. The acoustical engineers of this experienced company worked for years on the problem of clarifying radio reproduction before they finally succeeded.

The principle of this new reproducer is two-fold. The shape and composition—the contour of the horn itself, is one of the features. But the magnetic “unit” of the reproducer is the secret wherein other horns fail.

This “unit” is unlike anything ever offered

before for radio. It brings the sound waves to you in their natural values, unmarred by distortion or chattering from the loud speaker—things you have probably thought were unavoidable at times.

By an exclusive patent this unit is *adjustable* to any set, gauged upon the “output requirements” of that particular set. The improved results are instantly noticeable.

Hear It Today

The Kellogg *Symphony* brings in the human voice with a clearness that is remarkable. Songs take on new beauty. The exquisite notes of the violin seem to be in the very room with you. The greatest test of all is piano-music. Now the notes come through clearly and beautifully—no thumping, glassy sounds.

Today see the Kellogg *Symphony*. Do not buy any ordinary “loud speaker” until you have heard it. It will give your set 100% musical quality—in pleasure to your family and yourself. Any dealer will gladly demonstrate this new reproducer for you. Hear it—today!



Price
\$20

KELLOGG SWITCHBOARD & SUPPLY COMPANY, Chicago, Illinois

Kellogg Symphony Reproducer

With every Kellogg Radio part, Use—is the Test



TO STAY FOR 6 MONTHS.

Can't blow out!

GUARANTEED. NEEDS NO RHEOSTAT.

A NEW INVENTION!

At last a tube can be offered the Radio Public which overcomes at one stroke all the defects of former tubes. The Blo-Pruf 501A is the result of months of experimentation and effort. Incorporated in the tube is a new invention which enables us to absolutely guarantee this tube for six months against blow-outs, and in addition, there is built into the tube a filament regulator which eliminates all necessity for rheostat to control it. The Blo-Pruf always burns at the proper intensity. If you are making a set and use Blo-Prufs you need no rheostats.

If you use Blo-Prufs in your present set you can turn the rheostats on full and you never have to touch them again. The Blo-Pruf automatically regulates the amount of current which passes through. Even without the Blo-Pruf feature or the Filament control it is an ideal tube, a perfect detector, a perfect radio frequency amplifier on a perfect audio frequency amplifier.

SOLD DIRECT BY MAIL

Blo-Pruf Tubes are sold direct by mail. For the same price as ordinary tubes you can now secure a tube which will give you the finest reception with all danger of blow-out absolutely removed. When you install Blo-Pruf Tubes you KNOW that your tube worries and expense are over.

Sold on a Money-Back Guarantee

Blo-Pruf Tubes are sold on a positive money-back guarantee. If the tubes are not entirely up to your expectation return them and your money will be immediately refunded. If the tube blows out inside of six months from any cause it will be immediately exchanged without question. Blo-Pruf Tubes are distributed by the oldest, exclusive Radio house in New England. Its name is a guarantee of your satisfaction. Mail the attached coupon today. Get your supply of Radio's latest and most startling development NOW! Blo-Pruf Tubes require care and time in their production. The output at the factory is limited. Don't wait until a tube shortage makes it difficult to supply Blo-Prufs promptly. Act at once. Mail the coupon now!

300 POST PAID

-COUPON-

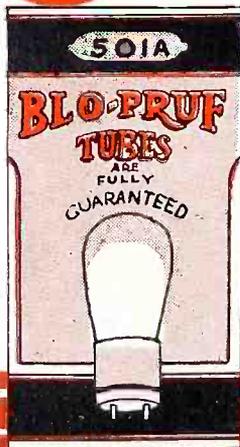
Radio Equipment Company,
18 Stuart St., Boston, Mass.

Gentlemen:

Inclosed 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

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RADIO EQUIPMENT COMPANY

New England's Oldest Exclusive Radio House.

18 STUART ST.

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