CLASSIC DANCERS have followed the fox-trotters in utilizing broadcast music. These graceful damsels, who are learning the fine points of their art at a fashionable studio, are portraying Supplication and Forgiveness with an Oriental atmosphere. A Super-Heterodyne affords opportunity for picking up any station in the United States broadcasting classical dance music at the moment. The school consults RADIO WORLD'S list of advance programs as its authority.
Approved by Over 200 Experts
New Crosley Engineering Achievement

A three tube set with five tube efficiency—the greatest selectivity with the minimum effort—positive calibration to any wave length between 200 and 600 meters. These are only a few of the many advantages offered in the remarkable new Crosley Trirdyn Radio Receiver.

It was only after a year of constant experimenting that our engineering department perfected this exceptional receiver. Thorough tests proved to us that it would outperform any receiver ever before produced. But we were not satisfied with our own opinion. So we shipped out 200 of these sets to experts in every part of the United States. Their criticisms are one and the same—"tried out your new Trirdyn Receiver Saturday night and logged 13 stations, among them Cuba, New York and Omaha, between 9 and 10 o'clock. The set was very selective. During the time this test was on local station KSD was operating and we went through them without any difficulty or interference whatever. The range of the local station was not more than three points variation in the dial setting."

"Tried one of these sets out and obtained wonderful results. Were able to log all stations which we heard very successfully. This set should go over big. The set has wonderful volume and is selective"—etc.

This new Crosley triumph is called the Trirdyn because of its original combination of three "R's"—Radio frequency amplification, Regeneration and Reflex. The first tube incorporates non-oscillating, non-radiating tuned radio frequency amplification; the second tube, a regenerative detector reflexed back on the first tube for one stage of audio frequency amplification. Then it has a third tube which acts as a straight audio frequency amplifier. It uses the ultra selective asperiodic antenna circuit and external selector coil, which adds to its wonderful selectivity.

The Crosley Trirdyn in range, volume and selectivity is the equal of any five tube receiver on the market. Greater volume will, of course, be obtained through the use of storage battery tubes, but it will function well in any type and can be used with either indoor or outdoor antenna.

The opinions of many experts have convinced us that the Trirdyn is the best receiver ever offered the public regardless of price.

Practically every radio dealer can furnish you Crosley Radio Sets, including not only the Trirdyn, but the Model 51, a two tube set for only $18.00; the Model V, a single tube receiver, at $16.00; the Model VI at $24.00; the Super VI at $29.00; the Model X-J at $55.00 and the Super X-J at $65.00.

Crosley builds more radio receiving sets than any other manufacturer in the world.

THE CROSLEY RADIO CORPORATION

POWEL CROSLEY, JR., President
Formerly The Precision Equipment Company and Crosley Manufacturing Company

5401 ALFRED STREET CINCINNATI, OHIO
Resistance and Impedance-Coupled AF

By Thomas W. Benson
A. M. I. R. E.

In Fig. 1 herewith is shown a standard impedance-coupled circuit for audio frequency amplification.

As shown, a high impedance is connected in the plate circuit with a fixed condenser between the plate end of the impedance and the grid of the next tube. This impedance should be at least twice that of the plate filament impedance of the tube to minimize distortion.

The theory of the operation of this circuit is similar to the phenomena encountered in the use of tuned plate radio frequency amplifiers. Any variation in the resistance of the tube, due to fluctuations of the grid potential, will result in variations in the drop of potential across the impedance which will be impressed upon the grid of the second tube and will be again amplified. So much for the theory. The practical application of this method is interesting.

 Authorities all agree that this method is less efficient than step-up transformer coupling. It may not give as loud signals as transformer-coupling, but it gives less distortion. Essentially it is a one-to-one transformer and if the impedance is high enough, will not have a sharp resonance peak and will, therefore, amplify with equal efficiency currents at all frequencies within the range of audibility.

It is a simple matter indeed to try this form of coupling. Should you have a transformer-coupled unit at hand simply disconnect the secondary of the transformers completely and run a wire from the plate terminal of the transformer to a fixed condenser having a capacity of .006 or better, run it also from the other terminal of the condenser to the grid of the next tube. This connection is shown in Fig. 2 where it will also be noted a high resistance grid leak is connected to the grid of the amplifier tube. This prevents the tube from blocking due to accumulation of negative charges on the grid. With some tubes a 2-megohm leak will keep it clear without draining excessive energy, but the higher leak is advised.

The impedances for the construction of an impedance-coupled amplifier. Just connect them up as shown in Fig. 1. It is not necessary to remove the primary winding, but make sure the secondary winding is not open, by connecting a phone and battery in series with it to test for an open circuit. The coils should be mounted at right angles and the grid leads be kept as short as possible to obtain best results. A little experimenting with condenser capacities in the grid leads will sometimes improve the operation of the set.

Now let us consider resistance coupling.

Here again authorities agree that this form of coupling, although free from distortion, is the least efficient of the three forms and that a resistance of 10,000 to 100,000 ohms, preferably the higher, gives best results. My experience with this form of amplifier indicates they are wrong on the value of the resistance and I am almost convinced it is as good as transformer coupling.

The circuit is identical to impedance coupling. As a matter of fact the resistance unit is simply a high impedance, but it has the disadvantage of limiting the plate current, whereas the inductive impedance has a lower direct current resistance and permits a higher voltage to be applied to the plate with a given B battery voltage.

The circuit is shown in Fig. 3. The resistances I have used are regular 2-megohm leaks. The grid leaks are also 2 megohms. The grid condensers may be from .002 upwards, and simply function to keep the positive B off the grid of the tube and to pass the audio frequency currents to the grid.

This form of coupling is extremely cheap and permits of the shortest leads possible, as shown in Fig. 4, where the arrangement of leaks and condenser as used by the writer is outlined. The tubes are mounted on a shelf.

(Concluded on next page)
How to Omit Transformer's Secondary

This shows how the ordinary step-up transformer can be used in circuit shown in Fig. 1.

Concluded from preceding page

screws go through the terminals of the socket, through the shelf and condenser below and into the terminal of the grid leak mounts. The one screw serves to hold the socket in place, mount and make connections to condenser and grid leaks. Shorter leads are thus impossible.

The writer originally built a two-stage amplifier with resistance coupling in the first stage and a high ratio transformer coupling in the second. As an experiment, the transformer was cut out and resistance coupling put in. If there was any drop in volume it was not noticed. On the strength of this test a five-tube set was built, using the anti-regenerative principle of radio frequency amplification with resistance coupling on the audio end and its volume is perfectly satisfactory and, above all, clear and distortionless.

The regulation 90 volts are used with all of them. Of course adding another B battery would increase the volume, but why bother? It is as loud as could be desired and one set using four tubes.

Bishop Lauds Church Radio Station

Bishop Thomas Nicholson of the Methodist Episcopal Church, with headquarters in Chicago, issued a statement urging the establishing of church radio stations. Bishop Nicholson says that radio has unbounded possibilities for good. He maintains the radio will not keep people away from church, as is sometimes said, but "will enable thousands to hear religious messages who could never otherwise hear them." Continuing, the Bishop says:

"Radio would even be a money saver, although I am not advocating its establishment for that purpose; it would be cheaper for persons living in inaccessible sections to own receiving instruments than to pay home missionaries to hunt them out.

"I favor the radio, not for denominational propaganda, but for broadcasting messages helpful to all who may listen in."

Canada Big Buyer

There were 184,965 pounds of radio apparatus exported during January, valued at $331,849, according to figures just made public by the Department of Commerce. Of this amount by far the largest went to Canada, with a value of $160,282.

Pig May Sign Off

The impresario of station KFNF, Shenandoah, Iowa, is striving to educate Penelope, a pig, the station's mascot, so that she will be able to give a flourishing signing-off call as a characteristic feature of the station. WLAG, Minneapolis, has a rooster that sometimes crows at the end of the program.
A Transcontinental Reflex

By Byrt Caldwell

ONE of the most efficient of the present-day circuits is the reflex. There are several reasons for the high efficiency of the reflex, chief of which, of course, is that one or more tubes of each set is used twice. Then, too, the tubes are used only as amplifiers. A tube will not act most efficiently as a detector and amplifier at the same time.

The fact that a crystal rectifier is used is the reason for the wonderful quality of music that is given by this receiver. This kind of reflex does not radiate.

The diagram above the lay-out of the panel, which is size 7" x 18". In preparing the panel it is a good idea to cut a piece of paper to the size of the panel, and then mark all of the points on the paper. Use this as a template in marking the panel.

After the panel is made and fastened to the base, place the apparatus as follows: The variocoupler, which may be any one of the standard couplers on the market, is placed at the extreme left of the panel. Next to this on the right is the .0005 tuning condenser, and to the right of this is the .0003 condenser. The tube sockets are next put in place. The first is placed between the two variable condensers. The second is placed to the right of the .0003 condenser, and the last is placed between the two bezels. The bezels are only used for the sake of a neat-appearing panel.

The two radio frequency transformers are next placed so that the P on the transformer is next to the plate connection of the sockets of their respective tubes. These may be of any good make on the market. Now place the two audio transformers at right angles to each other, and so that the leads to the grids of the second and third tubes may be as short as possible. The crystal should preferably be of the fixed type. Connect it between the secondary of the second transformer and the primary of the first audio transformer. The by-pass condensers are fixed, with mica dielectric. A rheostat is used only on the last tube. A single circuit is used for the phones.

A ordinary regenerative set will often work if the connections are carelessly made, but a reflex set must be wired with heavy wire (bus wire) and all connections must be soldered. In making the connections, think them out before you put the wires in place, so that you can get the shortest connection possible, without running two wires parallel for any considerable distance. If a flux is used, use plain rosin, and not muriatic acid, nor any of the soldering paste.

The three-tube reflex is equal to receivers using five and six tubes. It is an ideal receiver for the person for whom it is impossible to erect an outdoor antenna. Under good conditions, and with an indoor loop, stations up to a thousand miles can be heard on the loud speaker. With an outdoor antenna, transcontinental loud speaker reception is possible.

India Takes to Radio

CATALOGS and price lists for American receiving sets and parts for amateur assembling are wanted by radio enthusiasts in India. Firms interested are requested to send such literature to the American Trade Commissioner, James E. Miller, Esq., Room 29, Governor House, 21 Old Court House Street, Calcutta, India, who will be glad to make it available to those interested.

British Interest in Radio Increasing

ENTHUSIASM for radio telephony continues to grow throughout Great Britain, according to Acting Commercial Attaché Hugh A. Butler. Up to March 1, 1924, over 600,000 licenses for receiving sets had been issued.
Adventures with the Neutrad Unit

By Walt S. Thompson

Due to the interest manifested in the Neutrad Unit described by the writer in the April 12, 1924, issue of Radio World, further details concerning its construction and operation are given.

One of the Neutrad Units constructed by the writer is shown in Fig. 1 and Fig. 2 in which each piece of apparatus is given a designating letter corresponding to the letters in the following list of necessary materials and in the circuit diagrams:

- L, Primary and secondary windings of the special honeycomb wound coupler.
- C—14 plate variable air condenser (vernier).
- L—Special honeycomb wound coil.
- C—Neutralizing condenser.
- S—Tube socket.
- V—Vacuum tube.
- R—Rheostat.
- G—Flexible flat cord.
- H—Hardwood base, 7” x 5¾”.
- F—Binding post panel.
- B—Detector.

To D
To P
To F
To M
To R
To L

The binding posts, wire, etc.

Although the coupler may be wound on bakelite tubes as described in the April 12 issue of Radio World, it will pay the builder to take the extra trouble to wind this coil honeycomb style as illustrated by Fig. 3. The first requisite is a round, wooden winding form I, about 2” in diameter and 6” long. Near the end of this winding form mark off the circumference into nineteen equal parts and drive a nail into the form at each of these division marks. This will make a row of nineteen nails equally spaced. Drive another row of nineteen nails about one-half inch from the first row as shown by Fig. 3. Number these nails from 1 to 19. The windings should all be of No. 22 D.C.C. wire. Start winding by fixing one end of the wire to a brad driven into the end of the wooden form. Then bring the spool end of the wire between nails 19 and 1 over to the left hand row of nails, then winding around the form go outside of nails 1 and 2 on the left hand row across to the right hand row and outside of nails 6 and 7, back to the left hand row and outside of nails 11 and 12, across to the right hand row and outside of nails 16 and 17, back to the left hand row and outside of nails 2 and 3, etc. Continue winding in this manner until ten turns have been completed for the primary winding L. Leave a three-inch loop for connecting the primary and start winding the secondary directly over the primary in the same manner. This winding should consist of seventy turns, being different from that required when using bakelite tubes, due to the smaller diameter of the coils.

When the windings have been completed, they should be given a coat of white shellac such as can be purchased at any radio shop. A good shellac for this purpose can be made by dissolving some old celluloid in a 50-50 mixture of wood alcohol and banana oil. After the shellac has thoroughly dried, remove the nails and gently slide the coupler from the winding form, taking care not to disturb the wires. One method of mounting this coil is shown in Fig. 2, although an ingenious fan can probably find other ways just as satisfactory.

The panel layout is given in Fig. 4, the dimensions corresponding to the commercial apparatus selected by the writer. If other apparatus is to be used, the mounting holes will, of course, be differently located although the pane size will remain the same.

The flexible cord G was made as previously described, using the two wires from a length of lamp cord and a yard or so of friction tape. The other apparatus can be purchased at any radio shop.

The tube to be used will depend upon the builder's choice, either the UV199 or the UV201A being satisfactory. If separate A and B batteries are to be used, the 199 will, of course, save in upkeep expenses, but if the A and B batteries of the set are to be used, the tube selected should be the same as the amplifier tubes in the set. In the previous article on the Neutrad (Concluded on next page)
Windings for Neutrad Explained

(Concluded from preceding page)

Unit, referred to in my introductory remarks, two methods of attaching the unit to a receiving set were illustrated. Figs. 5, 6 and 7 show three more methods by which the unit may be added to a commercial receiver.

If the receiving set is of the coupled circuit type in which the primary is tuned by means of a tap switch and contains no series condenser, the Neutrad Unit may be connected directly to the antenna and ground binding posts of the set as illustrated by Fig. 5. In this case the plate circuit honeycomb coil will not be needed, the primary of the receiver set answering the same purpose.

Before making this connection and that illustrated in Fig. 6, an inspection of the set should be made to insure that the ground binding post is not connected to the filament batteries. If such a connection exists it should be broken as it would short circuit the B battery when the unit is connected.

If the primary of a coupled circuit receiver contains a series condenser, it may be short circuited as illustrated in Fig. 6 and then the Neutrad may again be connected to the antenna and ground binding posts. The correct position for the tap switch in either connection should be found by experiment after the unit has been put in operation.

If the receiver has an untuned primary circuit coupled to a secondary, the winding may be used as the plate coil of the Neutrad Unit by connecting it as illustrated in Fig. 7. In this connection the ground binding post should also be disconnected from the filament battery.

In any receiver which has a tuned circuit, a plate circuit winding for the Neutrad Unit may be wound directly over the receiver tuning coil and connected to the unit as illustrated in Fig. 7. This winding, _L_1, should have about fifteen or twenty turns depending upon how near it can be placed to the grid circuit coil, _L_2. By winding these few turns around the receiver tuning coil, the winding of a special plate circuit coil for the Neutrad Unit and the construction of a flexible cable may be eliminated.

Construct a calibration curve for Figs. 1, and 2 of the unit. A chart of this kind is a very convenient method of logging various stations, for after a few points have been located the curve may be drawn and from the curve the condenser setting for any station may be found if its wave length is known.

To plot such a curve, a sheet of graph or cross section paper should be procured. Draw the horizontal and vertical lines and place the scale numbers as shown in Fig. 8. Locate a point for every station received. If WGY on 380 meters is received when the condenser is set at 45, place a mark on the horizontal line corresponding to 380 meters at the point where the vertical line corresponding to a condenser setting of 45 meets the horizontal line. After some ten such points have been located a curve similar to that shown in Fig. 8 may be drawn, from which the condenser setting for any station may be found.

Suppose one wishes to locate KDKA on 326 meters. Follow the horizontal line corresponding to 326 meters until it meets the curve and note which vertical line also meets the curve at this point. Following this vertical line down to the condenser scale from which the condenser setting of 9 can be read. Thus we find that KDKA will be located by setting the Neutrad tuning condenser at 9.

By making a calibration chart for the Neutrad Unit, its addition to any receiving set will not complicate the tuning, because its setting can always be deter-
**Doing Away with the Outdoor Aerial**

**By Philip Edelman**

A radio set can be used without outside aerial. City apartments do not always permit well-located aerials. Results from an indoor aerial will be limited to very short distance if a crystal outfit is used. A one-tube set is the minimum equipment which gives good results on the average indoor installation. With three- to six-tube sets using one, two, or more stages of radio frequency amplification, an indoor set becomes as good as the usual outside aerial outfit.

**Concealed Indoor Aerial**

One type of concealed indoor aerial is illustrated by Fig. 1. Insulated wire is strung behind the molding of a room, or sometimes is placed under a rug. There are several makeshift variations of this, such as using a metal bed spring, or wires strung inside of an attic.

**Using Signal Wires**

Signal wires from a doorbell circuit may be used as an aerial. Fig. 2 shows how a subscriber’s telephone line can be safely used as an aerial when a mica condenser is inserted in series with one wire and the radio set. Such lines are likely to be noisy from interruptions in the signalling system.

**Using Fire Escape**

Fig. 3 indicates how a fire escape can be impressed into radio service, as an aerial. It is advisable to use a variable condenser between the radio set and the fire escape, and the user must as a rule be content with broad tuning.

**Phantom, "No-Aerial" Input**

Very good results over distances may be had by using a phantom input as indicated in Fig. 4. The first tube has its grid grounded, and no aerial is used. With one, two, or more stages of radio amplification, a phantom input is very effective. There is a small

(Continued on next page)
Hook-up Works Without Aerial

Radio Set

1 -Radio Amplifier
1/1/199
8.0005
400 Mr
30m.
rsIIVW-
A
--=:--- Ground
Connection
1/V/99
01
Turns
01
V
40V
60 K
60 Turns
eto9
meg.
Phantom Aerial-less Input.  
FIG. 4

Diagram of the Phantom Receiver that gives good results without any aerial.

(Continued from preceding page)

condenser effect between the radio set and its batteries with respect to the ground, and if the radio set is a regenerative type, difficulty will be found from body capacity effects in using some outfits this way. In the radio amplifier shown, only a few turns of the tuned second grid input coil are included in the plate output circuit of the first tube, to avoid self oscillation. A phantom input is ordinarily as effective as a good loop and permits sharp tuning without directional selection.

Using Short Indoor Aerial

The usual regenerative set will operate nearly as well as a one-stage radio frequency amplifier set, when a short indoor aerial is used as shown by Fig. 5, employing twenty to thirty feet of insulated wire. Sharp tuning is obtainable. One thing about indoor aerials is that they are often less subject to interference than the average outdoor aerial installation.

Socket Plugs

Various socket plugs employ two small mica condensers to insulate a lighting circuit from a radio set so that the lighting wires can be used as an antenna. This is illustrated in Fig. 6. It is effective in many

(Continued on next page)
By HUGO RIESENFELD:  
Director of Three Large Motion Picture Houses on Broadway

WHEN I look over our records I find that since the advent of broadcasting our attendance has not been affected. During the last few years the pictures have more than doubled their scope. By that I do not mean that our attendance has doubled, but the more people in general are attending the pictures.

If you visit the opera regularly, you will find that it is the same group of people who attend consistently. The same is true about the concerts. The same faces are always present. With the pictures it is different. New people are attending daily.

While our attendance has not been decreased, and even though more people than ever are attending the motion picture theatres, I feel that if radio had not come into popularity still more people than now would be drawn to the film houses.

When I compare the attendance records during the showing of an exceptionally good picture now with the attendance records of good pictures before radio had its vogue, I find that the results are very favorable. Of course, when we have a poor picture and our attendance falls off, we usually blame it on the weather or any number of things. Now, as an excuse, we can blame it on the radio.

I think the time is not far off when, in an educational respect, radio and the motion picture will co-operate. A lecture by some prominent speaker will be broadcast from a certain city and pictures describing this lecture will be shown simultaneously in motion picture houses in different cities throughout the country. Already experts are experimenting in this direction, and I have seen some of the preliminary results in Paris.

Taken at Her Word

On April 2 Tamaki Miura, Japanese opera singer, actuated the microphone of station KYW, Chicago. Her voice was heard as far west as Hawaii. She promised every listener who acknowledged reception of the program that she would send an autographed photograph, and up to the present time 10,000 letters have been received.

Aerial Possibilities

(Concluded from preceding page)

localities and very poor in a few instances, or in exceptional cases will not work at all. At best, reception is likely to be bothered from power circuit switching noises. Sometimes this plan works as well as or better than an outside aerial.

Loop

Loops and their directional ability are now well known. A loop gets a very much smaller portion of incoming radio energy than does an aerial. It affords directional selection because it receives best in line with the sending station and not at all when turned at right angles thereto.

Usually loops are used with two or more stages of radio frequency ahead of the receiving set's detector. For relatively short distances, even one tube can be used. Fig. 7 shows how a loop can be connected to the usual receiving set. The top condenser will sometimes be in series as shown or in other sets may need to be connected in parallel as indicated by Fig. 8. If one side of the loop is grounded as shown by Fig. 8, the directional effect is ordinarily lost, but when grounding is used on the grid side, increased signal volume results from phantom input action as was shown by Fig. 4. A loop is not needed to cut out local stations if the set itself is sufficiently selective, but where directions permit, even a fairly poor set as regards tuning selectivity, will permit working through locals with the aid of loop pointing.

Other Methods

Some sensitive sets will work without aerial or ground connection because the coils included in the set pick up sufficient energy for operation. Other sets will operate without either the ground or the aerial connection, using the ground wire on the terminal labelled for use of aerial. Often two-circuit sets will do this, as operating energy is transferred from the grounded primary winding to the tuned grid input circuit.

Where an aerial is out of the question as an outside installation, the indoor methods can be tried, and often the results will be very satisfactory. Distance is obtainable by the indoor methods.
Radio Antenna Makes a House Safe

By N. N. Bernstein
Technical Editor

The best possible means of protection from static electricity when it comes in an extra heavy charge is an outdoor radio antenna, properly grounded by a switch or furnished with an approved lightning arrester. In reality, the aerial is a lightning rod and, properly equipped, affords protection instead of being a source of anxiety.

Static, or electricity in the air, is formed by the action of the elements. This electricity collects in the air, but not necessarily in clouds or vapor that can be seen. It endeavors to dispose of itself to the ground or earth through anything that is a conductor, such as trees, wire fences, piping in buildings, lightning rods, and radio aerials.

It is a fact that electricity will take the course of least resistance. A high resistance lead to the ground, such as a tree or unequipped building, will not readily carry the charge, therefore enough electricity must accumulate to force itself through the high resistance of the earth. If a tree were properly equipped with conductors running from every limb to the ground, the electricity would not have a chance to accumulate, therefore a heavy static discharge would be impossible.

In the city the same rule applies. It is a remarkable fact that there is hardly any record of lightning having ever struck a building in a very congested district, due probably to the large amount of metal that goes into the construction of the buildings and which acts as a ground lead for all the static in the vicinity.

Radio antennae function in exactly the same way. For instance, take a house in New York City. You may see from one to fifteen aerials strung in all directions over the roof. These wires pass the electricity in the air directly to the ground, either through the receiving set or through the lightning arrester. This action is kept up all the time. During precipitation, that is when rain, hail or snow is falling, loud crackling noises are sometimes heard when the radio set is in operation. These noises are due to the static discharges collected by the antenna and passed to the ground through your set.

Thus it is easily seen that you have the best protection in the world when you have a radio antenna strung up in your house. BUT some aerials are put up regardless of fire department regulations and city ordinances.

A few of the simple rules that are often disregarded are:

1. Antenna wires must not cross above or below high voltage feed wires, and must never be fastened to any pole carrying any kind of service wires.
2. On roofs, aerial wires must be more than six feet above the surface, and the lead-in wires should be run at least one foot away from the side of the building and never touch it.
3. Radio antennae should never cross streets.
4. Every antenna should be equipped either with a ground switch of the proper capacity, or with an approved lightning arrester, properly placed.

Common sense will tell you that it is dangerous to place wires near high voltage lines. In a high wind, the antenna is likely to break loose and swing against the feed wires, causing a short circuit. Wires should be kept at least six feet above the roofs.

Another important consideration is to take down a discarded antenna. It is sheer negligence even to leave it so that the wire may dangle.

Oddities Recorded by the Lens

(Easter Week was made the more enjoyable at the home of Martin Foster, 12-year-old Cincinnati schoolboy, by reason of a crystal set which he rigged up in a toy rabbit.)

(Uypical to the American eye is a microphone of this sort, the very one used at Station 2LO, London. You may have heard of 2LO as the station tuned in nightly by the crystal-set owners of the United States (maybe). The microphone is mounted on a soft, shock-absorbing hammock, which prevents extraneous noises.)

(Although it is hard to develop a novelty in the line of a "smallest crystal set," Harry Friedenberg has succeeded in proving to the satisfaction of his friends that he can make a workable one, using his favorite pipe. You will notice from the photo that circumstances compel him to use the brier instead of the hard rubber for insulation, although this is contrary to the best principles of radio. Harry was able to tune in the local stations and could tell about tuning in DX ones. The cat-whisker is mounted in front of the bow, with a binding post cap for insulating purposes. Both the aerial connection and ground return are on the same side of the pipe. The set consists of nothing more than what you see in the picture.)
The Catch In Opposition to Kill Copyright Bill

When Victor Herbert, John Philip Sousa, Irving Berlin, Harry von Tilzer, Charles K. Harris, Gene Buck, William Jerome and Raymond Hubbell appeared recently before the Senate Patents Committee against the Dill bill, which would permit the broadcasting of copyrighted compositions without payment to the composers or publishers, they declared that radio had cut into royalties to a disastrous degree during the past year and that sales of sheet music had dropped off greatly. They failed, however, to add that composers had been grumbling for years over the drop in their royalties and that the music publishing business had been on the ragged edge for four or five years. Many music publishing concerns have gone out of business, and the remaining ones declare that there is no money in music publishing. And broadcasting was not a factor even three years ago. Give more facts, gentlemen—all the facts!

Boy Signals Arctic With $60 Set

Boy Signals Arctic With $60 Set

he was surprised to hear the Bowdoin calling him, and to find that he could work the vessel with ease. In fact, Donald Mix, the operator, reported that the signals came in like blows of a trip-hammer, and every one in the cabin could hear them. Mix also stated that he had been able to detect the signals from Amundsen's ship, the Maude, as she broadcast to Spitzbergen from the opposite coast of Greenland, but that she failed to reply to his.

He Got 3,000 Words

Continuous communication with the Bowdoin was maintained until five o'clock on the morning of February 15, and during that time Sutton received messages totalling 3,000 words, for relaying to the press and to private individuals, including Captain MacMillan's family, who had not heard from him since Christmas. Congratulations poured in upon the boy from many sources.

Did It Himself

Sutton assembled the sending and receiving sets himself, the parts having been purchased, except for the varicoupler, which he wrapped on pancake flour cartons. The receiving set consists of a detector and one step of amplification, and for a counterpoise he uses his mother's washline as a counterpoise—except on Mondays.

By P. M. Fogg

A t midnight, February 15, the MacMillan Arctic exploring expedition, frozen in the ice at Refuge Harbor, North Greenland, picked up and answered a CQ signal, broadcast by Everett Sutton, fifteen-year-old school boy of Port Angeles, State of Washington, and thus, for the time being, re-established communication with the world after an interruption of many weeks.

"Hay-Wire Outfit"

Sutton, whose five-watt set he declares is only a "hay-wire outfit," had frequently heard the Bowdoin, MacMillan's vessel, but he had no idea that with his equipment he could reach across the 3,000 miles intervening between his home and the location of the exploring party. Shortly after broadcasting his CQ,
How to Connect B Batteries

By Herman Bernard

If you would use more than one B battery you can connect them together so as to obtain the sum total of the maximum voltages of each of the batteries and at the same time derive the advantage of optional intermediate voltages.

The 22½-volt B battery is used to supply the plate current to the detector tube of any circuit using either one and one-half volt dry-cell A batteries or six-volt storage A batteries.

One terminal of the B battery is marked minus and usually is the pole which is all by itself on one side of the battery. You have a selection of five different voltages on this one B battery, as shown in the accompanying diagram (Fig. 1). These optional voltages are 16⅔, 18, 19⅔, 21 and 22½ volts.

The reason for the battery affording different voltages is that different tubes function best at varying plate voltages. In fact, even the same make of tube, such as the WD12 and UV199, do not all function best at 22½ volts plate voltage. Some tubes, like the UV200, are very critical as to plate voltage and although functioning excellently as a detector at say, 21 volts, may not work at all at 22½ volts.

The voltages beyond 22½ are used to supply the plate current to the amplifying tubes which step up the signal strength of any circuit using either one and one-half volt dry-cell A batteries or six-volt storage A batteries.

In connecting the B batteries to the amplifying tubes it is sometimes advisable to have a higher voltage delivered to the plate of the third tube (second audio-frequency) than to the second tube (first amplifier). If this proves desirable, the lower and the higher voltages can be obtained both from the series-connected B batteries.

Likewise the current for the plate of the detector tube can be tapped from the same series-connected batteries.

Although the function of the A battery is to heat the filament in the tube so that the filament can throw off electrons, and the

Simple Crystal Set

Perhaps the most simple and inexpensive radio receiver possible is the old tuning coil crystal set, which when used with a fairly long antenna (about 100 feet) gives good results on local stations. The parts needed are:

- 100 foot antenna wire.
- 50 foot lead-in wire.
- 25 feet ground wire.
- 2 antenna insulators and 1 lead-in insulator.
- Ground clamp.
- 1 single-slide tuning coil.
- 1 good crystal detector.
- 1ood pair earphones.
- 1.02 fixed condenser.

For the benefit of those beginners in radio who do not understand the diagrams and the wiring is explained in detail.

The end of the lead-in wire that comes from the antenna is fastened to one binding post on the tuning coil, the ground wire going to the other post. A second wire is connected to the ground binding post to one post on the crystal detector. A wire from the other post on the detector is fastened both to one side of the fixed condenser and one of the telephone cord tips. The other tip and the other side of the fixed condenser are connected to the binding post on the slider rod of the tuning coil and the circuit is complete. The only adjustment in tuning in stations is made by sliding the knob on the rod back and forth until the loudest signal is obtained. The tuning coil can be bought cheaply.

290 Stations in Russia

There are some 290 radio stations in Russia, Moscow being the center with some very powerful broadcasting and telegraphic sets. One is Shabalovk, (RAJ) called Moscow; with a power of 150 kw.; the central radiophone station, called Comintern, and the old station of Kodink (RAJ) now called October.
Snodgrass Leads in Popularity

WOS Pianist Takes First Place Away from Roxy, of WEAF, as Radio World’s Test for the Most Popular Entertainer Goes Merrily On—Leader Has 383, a Margin of 61—Old-Time Fiddlers, of WOS, Third—Dody Reimer, of WLAG, Jumps from Twenty-second to Seventh Place.

Harry M. Snodgrass, of WOS, entertainer, known as “King of the Ivories,” has snatched the lead from Roxy, of WEAF, by 61 votes in Radio World’s “election” to determine the most popular broadcast entertainer. Snodgrass has 383 votes, Roxy 322.

The Old-Time Fiddlers, of WOS, are going strong in third place, being 16 votes ahead of KDKA’s Little Symphony Orchestra. Wendell Hall, the red-headed music maker, now on tour, jumped from ninth to sixth place, and is making a strong fight.

Perhaps the most remarkable increase is credited to Miss Dody Reimer, of WLAG, who made a meteoric rise from twenty-second position to seventh. A new performer, Harry Richman, of WHN, has been entered on the lists.

It is up to Radio World readers all over the country to show appreciation in this way of the delightful entertainment broadcasters give, and this can be done effectively by balloting on your favorite. It’s only a minute’s work to clip the coupon printed on one of Radio World’s program pages, and mail it to Broadcasting Manager, Radio World, 1493 Broadway, New York City.

Already three tally sheets have been published. The accompanying one is the fourth. The fifth will be completed soon and published immediately thereafter.

Come on folks, show these people who are striving to make you happy that you like them, and do it NOW!

Millionaire’s Hobby

The opening spread for the section on broadcasting stations.

New Broadcasters

LIST OF CLASS “A” BROADCASTING STATIONS

<table>
<thead>
<tr>
<th>Station</th>
<th>Frequency (Kcs)</th>
<th>Wave Length (Meters)</th>
<th>Power (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KFQ</td>
<td>1300</td>
<td>351</td>
<td>10</td>
</tr>
<tr>
<td>KFPR</td>
<td>Los Angeles Co, Forestry Dept, Los Angeles, Calif.</td>
<td>1300</td>
<td>231</td>
</tr>
<tr>
<td>KFPS</td>
<td>Carter &amp; Ross Motor Service Co., Casper, Wyo.</td>
<td>1240</td>
<td>242</td>
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<tr>
<td>KFPV</td>
<td>Helitz &amp; Robinson, Inc., San Francisco, Calif.</td>
<td>1270</td>
<td>236</td>
</tr>
<tr>
<td>KFPP</td>
<td>St. Johns M. E. Church, St. Petersburg, Mo.</td>
<td>1120</td>
<td>268</td>
</tr>
<tr>
<td>WABB</td>
<td>Harrisburg Sporting Goods Co., Harrisburg, Pa.</td>
<td>1130</td>
<td>266</td>
</tr>
<tr>
<td>WCBT</td>
<td>Clark University, Collegiate Dept, Worcester, Mass.</td>
<td>1200</td>
<td>238</td>
</tr>
<tr>
<td>WCRU</td>
<td>Arnold Wireless Supply Co., Arnold, Pa.</td>
<td>1180</td>
<td>254</td>
</tr>
<tr>
<td>WCBV</td>
<td>Tullahoma Radio Club, Tullahoma, Tenn.</td>
<td>1190</td>
<td>252</td>
</tr>
<tr>
<td>WWCN</td>
<td>The Evening News Publishing Co., Baltimore, Md.</td>
<td>2200</td>
<td>363</td>
</tr>
<tr>
<td>WIAV</td>
<td>Woodwork &amp; Lothrop, Washington, D. C.</td>
<td>2100</td>
<td>272</td>
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NEW CLASS “B” STATIONS

<table>
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<th>Station</th>
<th>Frequency (Kcs)</th>
<th>Wave Length (Meters)</th>
<th>Power (Watts)</th>
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<tr>
<td>WOQ</td>
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An Opportunity

Radio dealers, attention! Cash in on the fact that every family that owns a radio set can “sit in” on all the baseball games everywhere and on the Democratic National Convention in New York City, and the Republican National Convention in Chicago. Tell your customers through newspapers, circulars, and word of mouth, that they can participate in all these important events, as well as the regular broadcasting program, by merely owning a radio set. Here is great, honest and effective propaganda that you should keep on broadcasting day in and day out during the coming spring and summer season.
The Radio Woman

Women Inspect Bulbs at U. S. Laboratory
By S. R. Winters

WASHINGTON.

The Radio Communication Section of the Bureau of Standards, United States Department of Commerce, maintains a laboratory for testing vacuum tubes, in which women do an important part of the inspection work. The behavior of different types of "Aladdin lamps" is observed by women and the performance in actual service determined.

How long is the life of various types of vacuum tubes? What is the power rating of power electron tubes? What is the effect of regeneration in radio receiving units? How can you avoid radiation from regenerative circuits? These are among the questions asked and problems attacked in the Radio Laboratory of the Bureau of Standards.

C. B. Jolliffe, a member of the staff of the Radio Laboratory, said:

"It was found that the amplifications due to regeneration decreases with the increase of signal strength and that the effect of regeneration is not strictly equivalent to a negative resistance for different values of current in the circuit."

This study also contemplates an analysis of different ways proposed for preventing radiation from regenerative receiving circuits. This form of interference is annoying, to say the least, and has brought derision upon this type of radio receiver.

Her First Play Wins First Prize of $500
By The Hostess

First Prize in the Radio Drama Competition conducted by WGY, the Schenectady Broadcasting Station of the General Electric Company, has been awarded to Miss Agnes Miller, of 150 East Seventy-second Street, New York City, for her comedy drama of business life, entitled "A Million Casks of Pronto."

The object of the competition was to develop a type of play especially adapted to radio presentation; a type of play that will tell its story through an appeal to the ear and imagination just as the screen play is directed exclusively to the eye. Miss Miller's play was selected from nearly three hundred manuscripts as the best original drama submitted and she will receive a cash prize of $500.

Miss Miller is a native of New York. She was graduated from Barnard College and later received her master's degree in comparative literature from Columbia University. For eighteen months, during the war, she served with the United States Naval Reserve on foreign language censorship. Some of her experiences in this work furnished the ground work for her successful radio play.

Miss Miller is a writer of juvenile fiction and has published three books in a series known as "The Linger-Not." The books are "Golden Quest," "Valley Feud" and "Mystery House." She has also contributed many stories to Young People's Magazine.

"This is the first play I have written," said Miss Miller. "I have never taken any courses in dramatic writing, but my profession is writing. Until now I have been writing books for young girls such as the 'Linger-Not' series."

The successful play will be presented by the WGY Players at a date to be announced later.

Additional prizes will be offered for several other manuscripts which the judges have deemed worthy of production on the air. Announcement of these prizes will be made later.
The origin of the Super-Heterodyne was in France when Major E. H. Armstrong, then with the Signal Corps of the United States Army, was trying to develop a sensitive receiver which would work efficiently on low wave lengths.

It was soon found that the ordinary type of radio frequency amplifier was very inefficient on the wave lengths with which they were working, that is, between 130 and 400 meters.

The reason for this inefficiency is due, in part, to the fact that the electrodes of the available vacuum tubes act as the plates of a small condenser across which the signal voltage is impressed. Referencing to Fig. 1, which shows a two stage radio frequency amplifier with a detector, it is evident that the secondary voltage of the radio frequency transformer T is impressed across the condenser C (Fig. 1).

By Walt S. Thompson, Jr.

The tuner is adjusted to the wave length of the incoming wave. The output goes to the frequency changer (Fig. 3).

In searching for a frequency changer, this plan was hit upon at first. But it presented difficulties (Fig. 4).

To which the circuit C and the intermediate frequency amplifier are tuned. On paper this seems to be a very fine development, but due to the fact that circuits A and B are tuned to so nearly the same frequency, they react one upon the other and spoil the operation of the frequency changer.

This difficulty was overcome by a most ingenious scheme. It is well known that the oscillatory current flowing in the vacuum tube when it is working as an oscillator by itself produces a wave which has a frequency double that to which the circuits are tuned. This condition is illustrated by Fig. 5 which is a graphical representation of this oscillatory current and its components. Curve A represents a pure wave which is called the fundamental, the frequency of which is that to which the vacuum tube circuits are tuned. Curve B represents the second harmonic which has a frequency double that of the fundamental. These two waves when added give the true oscillatory current wave C, which is found in the circuit B of Fig. 4.

Now again assuming that circuit A in Fig. 4 is to be tuned to 1,500 kilocycles, let us tune circuit B 735 kilocycles away from the frequency of signal wave A. These two frequencies have a difference of 765 kilocycles. As the frequency of the first harmonic, called the super-harmonic, is double that of the fundamental, the signal wave will produce a wave which has a frequency of 1,530 kilocycles.
Set Makes Its Own Wave Length

A STAGE of RF, placed before the oscillator, serves a double purpose. The second purpose is its utility in the first stage of the intermediate frequency amplifier shown in Fig. 6 (at left). Oscillation resulted. This trouble was remedied as shown in Fig. 7 (at right), showing the inductance coupling.

(Concluded from preceding page)

other and we have the desired result, that is, a one tube frequency changer.

As the oscillating tube V, Fig. 4, is coupled to the antenna circuit, such a set will radiate sustained waves and will cause considerable interference. This is true of the majority of Super-Heterodynes the writer has described and is sufficient to condemn them for anyone who has the slightest regard for his neighbors or for the future of radio. Radiation by regenerative and other types of receivers which are prone to oscillate is, in the writer’s opinion, the most prevalent cause of interference today and will, in time, force broadcasting stations to shut down if it is not eliminated. This can be done if everybody refrains from tuning with a whistle or beat note or by adding one stage of non-regenerative radio frequency amplification before the oscillating tube.

The addition of one stage of radio frequency amplification before the oscillating frequency changer was the next step in the development of the Super-Heterodyne. As this would add an additional tube to the set, this additional tube is used for two purposes, that is, in a stage of radio frequency amplification and in the first stage of the intermediate frequency amplifier as illustrated by Fig. 6.

The tube V acts as the combined radio frequency amplifier and intermediate frequency amplifier and the tube W is the frequency changer tube in this figure. The first set D is tuned to the frequency and circuits C, D and E to the intermediate frequency, the path of the waves through circuits A, F, C, D and E is easy to follow.

Due to the reflexing of two frequencies in one tube, this tube caused considerable trouble by oscillating. The remedy for this is illustrated by Fig. 7. There the tuned circuit C is coupled to the inductance L, which with the condenser D has been substituted for the tuned circuit D in Fig. 6. This arrangement makes the action of this first tube very stable and adds greatly to the ease with which the Super-Heterodyne can be tuned.

The writer cannot emphasize too strongly the necessity for using some method for preventing sets from sending signals into the air. The future of broadcasting depends upon the owners of radio sets. If you want broadcasting to continue do not let your tubes oscillate or use some method such as defined herewith.

CONY Sought as Letters of City’s Station

New York Will Begin Municipal Broadcasting Next Month, Whalen Announces

CONY. Those are the call letters Grover A. Whalen wants for the power broadcasting station the City of New York will begin operating in May. Decision by the Federal Government is awaited.

CONY—City of New York. Simple, isn’t it?

The idea came to Mr. Whalen, who is Commissioner of Plant and Structures in Mayor Hylan’s administration. As soon as the thought struck him he discarded the idea of running a prize contest to get the most appropriate call letters. What need of a contest when perfection already was achieved?

CONY is a sort of reflex circuit as call letters go. Its double duty is to signify City of New York and Coney, the name of the famous summer resort island that is almost as famous as New York City itself.

Mr. Whalen said that the broadcasting equipment which the city purchased from the Westinghouse Company would be delivered probably this week from Rio de Janeiro, Brazil.

“There is no truth in the report that the municipal broadcasting station is going to broadcast the meetings of the Board of Estimate or the Board of Aldermen,” Mr. Whalen said. “What we are going to broadcast is general information on city activities, showing what the different departments are doing. That part of the broadcasting will be educational.

“But the right of way will be given to the Police and Fire Departments always in cases of emergency. If the Police Department in case of a great disaster should require it, the regular broadcasting program would be stopped and the plant would be used by the police through a distant control station.

Mr. Whalen said that the concerts on the Mall in Central Park would be broadcast by means of loud speakers to many of the other parks.

“We will also broadcast the voices of opera singers of the first magnitude,” he continued. “The very best talent would come to the city to broadcast when their services could not be obtained at any price by other broadcasters.”

“There Will Be Another Rainbo in the Sky”

CHICAGO.

THE Rainbo Gardens here will shortly open its own broadcasting station. Their new angle is setting aside a regular hour, from 3 to 4 o’clock each afternoon, for sending out culinary recipes to exploit a brand of baking powder.

From 8 to 9 at night, popular songs will be sent out, and from 10 until 1 A.M. the cabaret show will be broadcast. The old second-floor room, formerly used for rehearsals, will be turned into a cafe of the kind requiring evening dress after 6 o’clock.

Jerry Sullivan, associated with Feist, will act as program manager and announcer.
Wednesday, April 30

WDAF, Kansas City, Mo., 411m (750k), E. S. T.-6 P. M., Special: dance and business talk by the Sew "York Health Speakers Service Bureau; market and weather reports.

WOR, New York, N. J., 645m (746k), E. S. T.-6 P. M., Weather and business talk by Thornton Fisher; dinner announcement for National Cardinal Patrick Davis Vocal School of Cincinnati.

KPLJ, Los Angeles, Calif., 640m (63k), E. S. T.-6 P. M., Special: dance and business talk by the Sew "York Health Speakers Service Bureau; market and weather reports.

WLW, Cincinnati, Ohio, 309m (970k), E. S. T.-3 P. M., Story Lady, Miss Ellen Lawrence enjoys her weekly boys and girls program arranged by the Toledo Oratorio Society, Percy Grainger, director.

WOC, Davenport, Iowa, 486m (63k), E. S. T.-5:15 A. M., A. M. time signals announce the announcers of WEAF, New York broadcasting station.

WBCN, Boston, Mass., 395m (690k), E. S. T.-11 P. M., "Ho-Down Tunes by Jake Itteutz, singer and处处长's Hawaiian Quartet.

WRC, Washington, D. C., 469m (6411k), E. S. T.-3 P. M., Program presented through the courtesy of the U. S. Weather Bureau.

KSD, St. Louis, Mo., 544m (550k), C. S. T.-3 P. M., Local: Sanders Turner, general manager of the St. Louis Organized Reserves. "General of the Organized Reserves."


WIP, Philadelphia, 500m (536k), E. S. T.-1 P. M. Evening Herald news bulletins 5:15 P. M. Examining new program of Nick Harris detective stories and concert 8 P. M., "Ho-Down Tunes" by the Sew "York Health Speakers Service Bureau; market and weather reports.

KPO, San Francisco, 425m (710k), P. T.-7:30 P. M., "Big Brother's Hawaiian Quartet." "Big Brother's Hawaiian Quartet." "Big Brother's Hawaiian Quartet.

WOC, Davenport, Iowa, 486m (63k), E. S. T.-6:30 P. M., Dinner announcement for National Cardinal Patrick Davis Vocal School of Cincinnati.

WBZ, Springfield, Mass., 337m (690k), E. S. T.-6 P. M., "Ho-Down Tunes by Jake Itteutz, singer and处处长's Hawaiian Quartet.

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KPO, San Francisco, 425m (710k), P. T.-7:30 P. M., "Big Brother's Hawaiian Quartet." "Big Brother's Hawaiian Quartet." "Big Brother's Hawaiian Quartet.
KAY, Chicago, 234m (50k), C. S. T. — 7:30 M., concert by the Newton Symphony Orchestra, Raymond Leonard, conductor. 6:00 P. M., music and fashion talk. 8:00 P. M., opera, "Le Nozze." 10:00 P. M., chimes concert.

WHAS, Louisville, Ky., 405m (50k), C. S. T. — 4:55 P. M., local livestock reports. 4:55 P. M., baseball scores. 5:00 P. M., central standard time announced. 7:30 to 9 P. M., concert by Fritz Reinhart and his orchestra; Reinhart, piano; director, and 5:55 P. M., results and police reports. 10:55 P. M., United States weather forecast.

WDBA, Chicago, 930m (100k), C. S. T. — 12:00 M., concert by the Chicago Symphony Orchestra; Mr. Stokowski, director of Philadelphia Symphony Orchestra. 1:00 P. M., United States weather forecast. 10:05 P. M., musical matinee.


WJY, New York, 405m (50k), E. S. T. — 7:30 P. M., Philip Steele, baritone; 7:45 P. M., "Gold," by Schroeder, music,饿f by Harry von Tilzer. 8:30 P. M., concert. 9:30 P. M., May Singh Brein, violinist. 10:30 P. M., program furnished by Harry von Tilzer. 11:30 P. M., Frank Gold- man, talk. 9:30 P. M., Marion Christian, soprano; HaroldS. Brown, tenor, soprano; Alfredo Mainardi, pianist. 10:30 P. M., Hotel Majestic Orchestra, dance program.

WJX, Hartford, Conn., 237m (50k), E. S. T. — 6:00 P. M., lunchtime music by the Tea Room Orchestra. 6:30 P. M., official weather forecast. 6:45 P. M., baseball scores. 7:00 P. M., music furnished by Harold Leonard's Red Jackets from Cleveland. 7:45 P. M., livestock market reports; agriograms furnished by the U. S. Department of Agriculture, Boston police headquarters. 8:05 P. M., evening program.

WOJ, New York, 669m (50k), E. S. T. — 11:15 M., grand organ. 11:30 M., United States weather forecast by the Tea Room Orchestra. 12:55 M., United States Naval Observatory time signals. 4:45 P. M., grand organ and trumpets. 5:55 P. M., United States weather forecast.

WDAR, Philadelphia, 235m (50k), E. S. T. — 11:00 M., concert by the Philadelphia Symphony Orchestra, Mr. Stokowski, director, and his Royal Hotel Dance Orchestra, specialties to be made in Esperanto. 9:30 P. M., operatic recital, by John van Dyke, baritone; Anna B. Scott, soprano. 9:45 P. M., song recital. 10:05 P. M., opera, "Le Nozze." 10:25 A. M., official weather forecast.

WHAN, Nashville, 610m (50k), C. S. T. — 12:00 M., concert by the Nashville Symphony Orchestra, Caruso, tenor. 6:00 P. M., radio church service. 7:00 P. M., syndicated broadcast of "Le Nozze."
Meanwhile Home-work Waits

A FANCY motor delivery wagon equipped with a radio receiving set, plenty of head phones and loud speaker, is making a tour of the country. Photo shows children in New York City having a glorious time listening in. Twenty sets of earphones are used. The novelty added a touch of radio to the sidewalks of New York and afforded a gleeful afternoon for a small army of youngsters and some adult lookers-on and listeners-in.

A REHEARSAL was held at Wembley, England, before the microphone to see that it was in good condition for the speech King George delivered.

Set Called M

POSSESSOR of a set termed "the magic" Bennett (above), of New York City, goes to stations each night. He has five aer...
New Station is on the Air

A new broadcasting station was added to the list of more than 570 now operating in the United States when WES, Chicago, went on the air. The photo shows J. A. Goodrich, one of the operators at the new station, doing double duty as broadcast listener and testing expert.

(Atlantic Foto)

HERE IS Irene Delroy, whose voice has charmed thousands of WHN listeners.

A MECHANIC climbs the aerial tower of CKCH, Ottawa.
Programs

Friday, May 2 (continued from page 19)

WDAF, Kansas City, Mo., 641m (620k), C. S. T.-7:30 to 8:00 P. M., concert of music by the Kansas City Symphony Orchestra, conducted by Robert L. Akin.

WBZ, Springfield, Mass., 337m (890k), E. S. T.-8:00 P. M., program presented through the courtesy of Barker Bros; weekly visit of Richard F. Currie, conductor, of the Cameo Picture Show Orchestra; playlet, "The Test," by Jay Lee Shepard; "The Triple-Bob" on the Duo-Art; marketgram; weather forecast.

KSD, St. Louis, Mo., 546m (555k), C. S. T.-8:30 P. M., program to be announced.

WFAA, Dallas, Tex., 476m (620k), C. S. T.-8:00 P. M., Yagoudor's Orchestra, Leighton Motors, sponsor, "In the Parlor," KSD stock reports.

WOR, Newark, N. J., 455m (70k), E. S. T.-6:15 P. M., major market reports; curriculum reports; forecast for the kiddies. 7:30 P. M., major market reports.

WLBW, Cincinnati, Ohio, 390m (70k), E. S. T.-10:15 P. M., market reports; popular program of music and songs; one act play, "The Test," by Jay Lee Shepard.

WOR, New York, 360m (70k), E. S. T.-11:30 P. M., "Man in the Moon" stories for the kiddies.


WOAF, New York, 220m (550k), E. S. T.-11:55 P. M., program announced.

WRCA, Washington, D. C., 464k (64k), E. S. T.-3 P. M., fashion developments of the moment prepared by "Women's Wear." 6:10 P. M., song recital by Arthur Mccormick, baritone. 7:30 P. M., "Beauty and Personality," by Elsie Pierce. 11:15 P. M., broadcast of the editors of "The Review of Reviews." 3:15 P. M., piano recital by Grant Beach. 7:45 P. M., recital by Frank Barksdale. 11:45 P. M., Garden Recital at the Magazine of Wall Street. 4:00 P. M., song recital to be announced. 5:15 P. M., re-transmission of "Man in the Moon" stories and songs for children by Peggy Albion and Mary McVicent and Pal Moran, direct from the radio studio.

WJOY, New York, 260m (550k), E. S. T.-6:00 P. M., program to be announced.

SATURDAY, MAY 3

WFVA, Dallas, Tex., 476m (620k), C. S. T.-12:30 P. M., address by Hugo Swaun, manager of the Looseleaf Current Topics; special musical program. 8:10 P. M., Ball-Richie-Smith faculty recital from the Conservatory of Music at De Pauw University; performance from the Conservatory Orchestra, broadcast from the studio; Arcadia Cafe Concert Orchestra. 8:15 P. M., New Alhambra Orchestra; playlet, "In the Parlor," KSD stock reports. 11:15 P. M., "In the Parlor," KSD stock reports.

FN, New York, 360m (70k), E. S. T.-8:00 P. M., program to be announced.

WNAC, Boston, 276m (60k), E. S. T.-10:10 A. M., WNAC women's club talks. 1:00 P. M., "America's Young Men" by the Peoples Fellowship Conference. 6:00 P. M., children's program. 9:00 P. M., special program from the Shepherd Colonial Orchestra. 8:15 P. M., New Alhambra Orchestra; broadcast from Jordan Hall.

chio, Springfield, Mass., 337m (890k), E. S. T.-6:45 P. M., special program from the Chesterton Club. 11:40 A. M., "Man in the Moon" stories for the kiddies.
Monday, May 5

WBAP, Fort Worth, Texas, 476m. (670k), C. S. T. - 7:30 P. M., concert by G. W. Stallory's Orchestra in the Auditorium, guided by the fifty-piece Moshe Temple Shrine Band.

KRL, Los Angeles, Calif., 469m. (610k), C. S. T. - 4:45 P. M., Evening Herald news bulletins. 5:15 P. M., Station.

(Continued on page 31.)

Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You probably don't care, but many of your friends do - and now you can know your choices, whether a comedian, an opera singer, a jazz band, or a story-teller.

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

Use the accompanying blank and mail to Broadcasting Manager, RADIO WORLD.

Cut off. Fill out. Mail today.

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

Dear Sir:

My favorite entertainer is: ____________________________

Street Address _________________________________

City and State _________________________________

A complete list of broadcasting stations was published in the April 5 issue of Radio World. Another list, corrected to the new date of publication, will be early in this issue.
The Radio University
A Question and Answer Department conducted by RADIO WORLD for its subscribers by its Staff of Experts.

Address Letters to Radio University Department
RADIO WORLD, 1493 Broadway, New York City

"I HAVE constructed the Superdyne according to Dec. 15th issue. It works great, the only difficulty being that I find it hard to control the oscillation. The rotor turns over one inch from the stator and lies almost parallel to it. What can I do to overcome this excessive oscillation?"—Ed Freeman, New Hor- mong, Ind.

You should have the rotor a bit closer to the stator. Try lowering it about three-quarters of an inch from the top winding on the stator. This should result in less oscillation and should enable you to decrease the coupling.

By using a crystal in the grid circuit, as shown by the accompanying diagram, I am able to get distance stations. However, they are not strong in Y. You will see that I use three variable con- densers. The 43-plate one is in the aerial lead, while the other two are 22-plate from W.W. Detored News, and get their contacts on the load rheostat with only one stage of A.F. I am using W.D. 11 tubes. I am sending this hook- up so you may get some ideas for possible improvement.—Walter R. Snyder, 422 Cadence, Groove Point, Mich.

DIAGRAM sent in by Walter R. Snyder, showing how he used a crystal in the grid lead of his tube to improve reception (Fig. 5).

You deserve to be complimented on your ingenuity. However, you should be just as considerate as you are ingenious, and add a stage of R.F. in such a way that not only will it make your set a still better distance getter, but take it out of the radiating class. See article by W. S. Thompson in RADIO UNIVERSITY DEPARTMENT, RADIO WORLD, issue of April 12.

1. What is the address of the company that makes the U. S. Tool Condensers specified for the Superdyne? 2. Would there be any ad- vantage gained by putting a variable grid condenser in the detector circuit of the Superdyne? 3. In what direction should the 4-turn primary of the Superdyne be wound in relation to the secondary? 4. When is the capacity of a variable condenser increased—when the rotor plates are turned in or out? 5. Is a .00016 mfd., fixed con- denser larger in capacity than one of .00025 mfd.—Robert Reynolds, 2274 - Creston Ave, New York.

U. S. Tool Condensers are advertised in RADIO WORLD, so would suggest your looking in the advertising columns. 2. Yes, but be sure to use one of first-class make. One of three small plates will do. 3. The primary is wound in the same direction as the secondary. 4. The capacity of a condenser is increased when the plates are turned in. 5. The condenser of .00025 mfd. is larger.

Enclosed send diagram of a set I intend building. What is your opinion of it as to selectivity? What kind of wire should be used on a small vario-coupler primary and secondary? What kind of tube is best for reflex circuits? Is the DeForest bulb good for this purpose?—Frank J. Kieswezki, 1406 Kielam Ave., Los Angeles, Calif.

This circuit has a fairly good ability to tune sharply. I use 22 and 24 gauge wire on the vario- coupler for both windings. UV201A tubes are recommended for the reflex circuit. The DeForest tubes do not work as well. UV201A tubes do also.

In RADIO WORLD for March 6, the article by Richard Carlisle calls for two condensers, one of .0001 mfd. and the other for .000025. How can these be constructed, or where can they be obtained?—John G. Lee, Lewiston, Ill.

These condensers can be made in the same manner as those used in the neon-light circuit, or regular neon-tube condensers can be purchased at any radio supply house.

I intend building the Superdyne receiver and would like to have the following information. What distance is the lowest turn of the tickler coil from the top turn of the secondary coil? What would an Amplier grid-denser be of value in place of the grid condenser and would a grid leak help?—Mal Mordaunt, 1038 Balbo St., San Francisco, Cal.

The bottom turn of the tickler is approximately on the same level as the top turn of the sec- ondary coil. You might try the grid-denser with a grid leak in plate of the one specified and com- pare results.

Wishing to build the Golden Rule receiver by W. S. Thompson, I find that I need a little more information. In RADIO WORLD for March 22, what are the capacities of C6, grid, and C27? Also what are R1 and R2? Are UV195 tubes used throughout—F. L. Philpot, Box 361, Neehอาจารย์a, Iowa.

C6 is a small capacity condenser of the neon-tube type, as used in neon-ray circuits. The grid condenser is .00005 mfd. A fixed variometer .0005 capacity R4 is a 15 ohm vernier rheostat while R2 is a 15 ohm rheostat. UV195 tubes are used throughout.

Please publish a diagram of an impedance-coupled radio-frequency amplifier. I have a vario- coupler and wish to supplement the regenera- tion set. Can these be used in the circuit I ask for?—L. M. Smythe, 680 Worninck Street, Brook- lyn, N. Y.

Fig. 6 shows a two circuit receiver with one stage of tuned impedance radio-frequency amplification. A variometer is employed as the im- pedance, in this case, since you have the same on hand. See H. E. Tisdale, Victoria, Ill., for information obtained from this set, which is very easy to handle.

Referring to RADIO WORLD issue of March 22, the article on Interference, by S. M. Kintner, he says in part that interference is caused by nearby amateur stations operating a spark set, but the article does not give a remedy to combat the evil. Would a device shown on page 14 of the same issue as above do the work?—A. A. Hop, 2814 Jackson St., Houston, Texas.

You are quite right. Mr. Kintner explains the interference, but does not tell how to overcome the difficulty. Mr. Caldwell's article on page 14 of that issue describes a very good device for eliminating interference.

In RADIO WORLD for March 22 you give a description of the Golden Rule receiver by W. S. Thompson. It says it was designed for UV199 tubes. Would it work as well if I used UV201A tubes, and would the wiring remain the same?—Geo. M. Gordon, 294 Pool Street, Baldford, Me.

UV201A tubes will function as well, the only change necessary being to substitute a six-volt storage battery for the dry cells in the filament lighting circuit. The other wiring remains the same.

Can I construct a crystal circuit using one varistor in the grid circuit of the Superdynef receiver utilizing a varistor. This circuit tunes sharp and is more sensitive than a tuning coil when the fact that there is no unused wire in the whole circuit. A fairly long antenna, about 100 feet, gives excellent results. The tuning is accomplished by varying the position of the rotor. No taps are needed.

An excellent crystal set can be made with one varistor, ear-phones and phone condenser. The circuit is shown in Fig. 7. The 0.001 condenser across the phones is not absolutely necessary, although it keeps out small stray noises and improves the tone.

Where can I get blue prints and full informa- tion for building the receiver mentioned on page 5 of RADIO WORLD for March 22?—J. F. Foster, Sarnas, N. C.

Write to the Electrical Research Laboratories, 2515 Michigan Avenue, Chicago, Ill.

Please send me directions for making a bat-tery charger. 2. Also a diagram showing how to add radio-frequency to a three-circuit receiver. My outfit.—Frank J. Kernos, 2526 South Austin Ave, Chicago, Ill.

A complete article on how to construct a battery charger appeared in RADIO WORLD for March 29 and April 5. 2. A good method on how to add a stage of radio-frequency to a re- generative set was described by Walt S. Thomp- son in RADIO WORLD for April 12.

Join RADIO WORLD'S University Club
And Get Full Question and Answer Service for the Coming 52 Weeks.

RADIO WORLD, 1493 Broadway, New York City:
Enclosed find $5.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year.

Name ____________________________
Street ____________________________
City and State ______________________

1. Please send me directions for making a bat-tery charger. 2. Also a diagram showing how to add radio-frequency to a three-circuit receiver. My outfit.—Frank J. Kernos, 2526 South Austin Ave, Chicago, Ill.

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Announcing the greatest recent contribution to Radio ~

R3
New Model

This instrument sets a new and higher standard of adaptability, refinement and economy of operation.

R3 (New Model), with Volume Control - - - - $35.00
R2 (New Model), with Volume Control - - - - $50.00
M1 requiring no battery for its operation - - - - $35.00

THE MAGNAVOX CO. : OAKLAND, CALIF.
New York Office: 350 WEST 31st STREET
Canadian Distributors: Perkins Electric Limited, Toronto, Montreal, Winnipeg
The Radio Trade

Joralemon New Chief of Crosley Sales

The appointment of A. M. Joralemon as general sales manager of The Crosley Radio Corporation, Cincinnati, brings another executive to the organization which has grown in the past three years under the guidance of Powel Crosley, Jr., its president. The new executive was with the National Carbon Company, serving in a managerial capacity, for fourteen years. His most recent endeavors were as sales manager of the radio division of that company. Mr. Joralemon succeeds W. W. Does, who has been appointed district manager for the State of Ohio.

Handy Card Index Log Put on Market

S. T. Aston & Son, 114 Worth St., New York City, have placed on the market a novel radio-log in the form of a card-index. The log consists of 10 good quality index cards printed with dial settings and data, a set of index dividers and a handsome cabinet. The cabinets can be had in mahogany finish or golden oak to match the user's set.

Imitator Guilty; Fined $100

As the result of charges preferred by the Dubilier Condenser and Radio Corporation, Harold Hyman, doing business under the firm name of the Micadine Company, pleaded guilty to having imitated the Dubilier Micadon fixed condenser. Hyman was prosecuted criminally under the commercial fraud statutes of the State of New York. A sentence of thirty days in jail or $100 fine was imposed by the court.

This is the first conviction in an effort to purge the radio industry and trade of fraudulent manufacturers and dealers.

New Corporations

Richardson Radio, New York City, 250 shares common stock, no par value; D. W. Richardson, 106 O. Blake and L. O. Blake, Jr. (Attorneys, S. V. Ryan, Albany.)

Walters Radio Research Laboratories, New York City, $3,000; Y. Goff, E. Elliot, T. S. Dworkin. (Attorneys, C. E. Genock, 27 Fourth Avenue.)

Marx Radio Shop, New York City, $15,000; A. and A. Fried, 197 Fifth Avenue.

Ehrlich Electric Service, Troy, N. Y., $15,000; E. S. and M. Ehrlich, H. C. August. (Attorneys, Stern & Hurshel, Albany.)


Ace Radio Horn Corp., New York City, $5,000; J. E. Benjamin, L. Kudel, E. M. Haas. (Attorneys, Cohen, Hall & Schummet, 32 Broadway.)

H. L. Radio Laboratories, Queens, N. Y., $10,000; H. Sorger, L. E. Rothfield. (Attorney, D. Blatt, 125 Broadway.)


General American Radio Manufacturing Corp., New York City, 3,000 shares preferred stock, $100 par; 10,000 common, no par value; I. Port, E. S. Friedberg, R. M. Friedberg, C. M. H. Wall, A. H. Saffar. (Attorneys, Cohen, Hall & Schummet, 32 Broadway.)


M. Miller Radio Supply Corp., New York City, $10,000; N. Horowitz, H. Goldberg, D. Berkowitz. (Attorneys, Fried, Mendel, 525 B'way.)

Names Changed


Radio Engineering & Development Corp., Dover, $100,000. (Capital Trust Co. of Delaware.)

“Big Summer” Is Prediction for Radio Fan

Plans and programs just completed by the larger broadcasting stations in the United States, as well as by the leading manufacturers of radio apparatus, will make the summer of 1924 the greatest radio summer since broadcasting was begun.

This is the prediction made by E. B. Mallory, Chairman of the Radio Section of the Associated Manufacturers of Electrical Supplies, which includes in its membership leading factors in the radio industry.

“In the first place,” said Mr. Mallory, “the Democratic National Convention in New York in June and the Republican National Convention in Cleveland during the same month, will place the radio fan right in the thick of the pre-election campaign. For the first time in the history of the United States, virtually millions of people will ‘attend’ the national conventions.

Radiograms

The Westinghouse Electric and Manufacturing Company has moved its executive offices from 165 Broadway, New York City, to the new home of the Westinghouse Company at 150 Broadway. The new building is known as the Westinghouse, and all departments of the company will conduct business from there starting tomorrow. The Westinghouse Electric International Company and the Westinghouse Lamp Company move in, also. The Westinghouse interests will utilize the upper twelve stories of the 23-story structure, the total space amounting to approximately 100,000 square feet.

Business Opportunities

Radio and Electrical
Rates 40c a line; minimum 3 lines.

Electrician—An opportunity rarely found awaits mechanics who can merchandise and finance an electrical and radio shop. Better, at opposite Hotel Blackstone, Manhattan Beach, N. Y.

Radio Department for rent, largest army and navy store in Newark; best location; wonderful opportunity for live wire. Box XX, Radio World.

Radio Established Business, receipts $1,000 to $1,500 weekly; great thoroughfare; stock and fixtures cost $6,000; sacrifice $3,500. Investigation invited. Crowe, Times Building, N. Y. C.

“Let Us Manufacture It.”

Manufacturer in the South with large factory and very modern equipment is interested in quantity production; articles made from stamped metal also wood. We do assembling and work in enameled parts. Would be interested in making small radio parts. Box 66 Radio World.

Partner with $5,000 cash and sales ability to assist in expansion and merchandising of a popular priced line of radio sets, with practically unlimited money-making possibilities. If you are serious, clean-cut and can qualify, give previous business experience or no attention will be paid to your reply. Box TT, Radio World.

Readers Ask for Literature

George Horn, 2213 State St., Erie, Pa.
W. A. Radle (Dealer), Clarckville, Ga.
E. E. Ledbetter, Carolton, Texas.
Roy Lee Taylor, 818 Electra St., Electra, Texas.

Coming Events

MAY 5—Convention of Chamber of Commerce of the United States, at Cleveland, at which adoption of metric units of weights and measures will be discussed.
SEPTEMBER 22 to 26—First Annual International Radio Show, Madison Square Garden, New York City.
WHN Licensed to Broadcast Ads

THE license granted by the American Telephone and Telegraph Company to Station WHN, New York, includes the right to charge tolls for broadcasting.

Before the sale of broadcasting privileges was made only by the A. T. & T. from its WEAF station, and considerable opposition to such commercialization of the air was made.

The news of the settlement of the patent infringement suit against WHN was published in Radio World, issue of April 19. At that time all possible secrecy was maintained as to the terms of the license, but now the facts come out.

It is said that WHN is now negotiating for considerable broadcast advertising, having already signed up the Keystone Ice Cream Company for 10:00 & 11:00 each night, at $75, or $3.75 per minute. A shoe store is advertising the fact that it has bought time at WHN.

H. G. Cisin Now With Radio Receptor

RADIO RECEPTOR COMPANY has appointed H. G. Cisin as sales and advertising manager. Mr. Cisin was formerly in charge of Dictograph Products, radio sales promotion, advertising and publicity. His initiative and constructive merchandising ability brought outstanding success.

Mr. Cisin was also engineering editor of "Electrical Record" for several years.

Mr. Cisin is a Cornell graduate, holding the degree of mechanical engineer and certificate of electrical engineer. In addition to being the author of "The Radio Telephone Handbook," he has written other books, including "Practical Electrical Engineering," "Modern Marine Engineering," etc. He has taught electrical engineering at Cornell University, Johns Hopkins University, U. S. Navy Electrical School and also Stevens Institute of Technology. While at Stevens he worked under Professor Hazeltine, inventor of the neotrodyne.
Hula-Hula Island Hears Chicago on 2 Tubes

Three letters and a radio bulletin have just been received by KYW, the Westinghouse station at Chicago, from Samoa, a British possession in the South Sea Islands—some 6,000 miles from Chicago.

"Mr. E. E. Dunwoodie, radio officer of Western Samoa heard you quite distinctly," wrote Quincy F. Roberts, American Vice-Consul, "He used a single circuit receiver, with one stage of audio frequency amplification. On Sunday, February 14, he heard you signing off at 1:04 A.M.

"The music modulation was splendid," wrote W. Ralph Ragsdale, of Savaii, British Samoa. "We heard the singing, the pipes with one stage of audio frequency amplification."

A Set in Dressing-Room

Leonel Atwill, star of "The Outsider," at the Ambassador Theater, New York City, is having a radio installed in his dressing room. Mr. Atwill has no particular interest in the violin solos or bedtime stories, but is a great prizefight fan. Theatrical engagements have always kept Mr. Atwill away from the big July bouts; this year he hopes to enjoy a vicarious thrill through his radio at the Ambassador.

8-Tube Super-Heterodyne

Assembled in beautiful Mahogany Cabinet. List price $96.00.

5-Tube Neutrodyne

 Completely assembled in attractive Mahogany Cabinet. List price $75.00.

M. H. Kleinfeld & Co.
Dept. P
161 West 46th Street, New York City

AN EXPERT SAYS:

RESISTANCE COUPLED AMPLIFICATION

G. Y. Allen, of the Westinghouse Electric and Manufacturing Co., writes in the May RADIO BROADCAST:

"True, great improvements have been made. But the former cannot ever give distortionless amplification.

"And that is why we have a new amplifier to offer. The transformer cannot ever give distortionless amplification. There is no doubt that the former cannot.

"Price is no longer a drawback!" Danon specialized resistances and amplifier parts have cut the price to less than $7.50 per stage!"

CHALFONTE-HADDON HALL

ATLANTIC CITY

Hospitable, hospitable. In the very center of things.

On the Beach and the Boardwalk.

For more than fifty years, these two delightful hotels have been the natural choice of cultivated, interesting people—bent on happy, health-giving days by the sea.

American Plan Only. Always Open. Illustrated folder and rates on request.

LEEDS and LIPPINCOTT COMPANY

RADIO WORLD

The "Goode" Two-o-One

Guaranteed

Price $2.39

QUARTER AMPERE AMPLIFIER-DETECTOR

RADIO TUBE

GUARANTEED SATISFACTORY

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

ONE—"Goode" Detector-Amplifiers.............. $2.39

THREE—"Goode" Detector-Amplifiers........... $6.42

The "Goode" Two-o-One is the only amplifier that will amplify or detect. It is a quarter amper, six volts, standard base silvered tube. Send express or postal money order or New York draft to:

The Goode Tube Corporation
Incorporated
EVANSVILLE, INDIANA

VAN'S RADIO RECORD BOOK

Everything right before you at a Glance when you have this copyrighted RADIO RECORD BOOK. Space opposite each broadcasting station for Dial Settings (any set). Keep a record of all stations you have heard, and go back to them when wanted. No set complete without one. Money back if you are not SATISFIED. Thousands of Listeners—in are using VAN'S RADIO RECORD BOOK everywhere. Send stamp for "sample page."

Price 50 Cents

At Your Dealer or Sent Postpaid on Receipt of Price.

VAN PUBLISHING CO.

112 Nassau Street, New York
Harry K. Thaw was of sound mind and able to manage his own estate, Russell Thaw, son of Evelyn Nesbit Thaw and Harry, tuned in, just to show he wasn't worrying. His mother expressed fear that Harry Thaw, if freed from the insane asylum, would menace her and their son.

A JURY in Philadelphia having decided, after deliberating eleven hours, that Thaw was of sound mind and

Russell Thaw Not Worried

able to manage his own estate, Russell Thaw, son of Evelyn Nesbit Thaw and Harry, tuned in, just to show he wasn't worrying. His mother expressed fear that Harry Thaw, if freed from the insane asylum, would menace her and their son.

378 DX STATIONS

DX fans, if you have not logged 300 stations in past six months you need a Kennedy Tuner. The Kennedy Tuner logged 378 stations from September 15th to March 15th, including 3LO, London; SJC, Cardiff; WQA, Albany; WOL, Oak Park; WAC, Detroit; WRE, Akron; WFTW, Columbus; WJZ, Newark; WEN, St. Louis; WIL, Seattle; KEXP, Vancouver; KBE, KCMC, KDKA, Chicago; KFI, Los Angeles; KPO, San Francisco; KUK, Salt Lake City; KDA, Denver; KOK, Minneapolis; KXL, Portland; KAI, Dallas; KIV, Kansas City; KGW, Portland; WJZ, Newark.

CHICAGO SALVAGE STOCK STORE

227 South State Street
CHICAGO

MAHOGANITE Dials that match the set

Like all other distinctive products, Mahoganite has its imitators. But, these imitations are on the surface only. Mahoganite is not a surface finish. The electrical values of Mahoganite extend through the material.

The only way to assure yourself of genuine Mahoganite Panels, or Dials which match the panels is to make sure that the RADION Trademark is on every one that you buy.

21 Stock Sizes
Mahoganite and Black

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INTRODUCING THE ULTRA-
SYNCHRODYNE
YEARS IN ADVANCE

THE PINNACLE OF RADIO. Years in advance of the present age. This wonderful receiving set is beyond comparison. It's the last word in radio reception. Not only is it synchronized, but it is ultraized. When others fail, this baby begins. Twenty-seven broadcasting stations logged in three hours. Los Angeles heard clearly on loud speaker 3,000 miles away. Mounted in a beautiful Mahogany or Walnut Cabinet. Quality material—high class workmanship. A set fit for King George, but made for you. No middle man profits added. Direct from manufacturer to user, at wholesale prices. This set comes to you complete, everything needed is furnished, or you can purchase it in parts or piece by piece, our written guarantee enclosed. Satisfaction or money refunded. In only one way can you compare this new wonder with others—See it!

Hear it! Write for complete details.

THE STANLEY RADIO SUPPLY COMPANY
2947 LORAIN AVENUE
CLEVELAND, OHIO
The Right Aerial
for Your House
MEANS SAFETY AND PROTECTION
FOR YOU AND YOUR NEIGHBORS

FREIDAG AERIAL MAST PIPE FIXTURES
MAKE A
SURE—SAFE—SIGHTLY AERIAL

DESIGNED to take the place of unsightly, poorly erected wood poles and towers used in the erecting of aerials. Will allow the erection of any height or length aerial. Uses 3/4 and 1 inch standard pipe. Equipped with Guy Wires. If your dealer cannot supply them, write us, giving his name.

DEALERS—JOBBERS: The fan has learned the importance of a perfect aerial. Sell them Perfect Aerial Fittings. Write today for discounts and descriptive booklet.

DIRECT SALES COMPANY
431 SO. DEARBORN STREET
CHICAGO, ILL.

The Bestone V-60 Super-Toned Receiver

Incorporates
All the Essential Qualities
for Ideal Radio Reception

Tone
Economy
Ruggenedness
No Regeneration
No Howls or Squeals

Distance
Sensitivity
Two Controls
No Distortion
No Body Capacity

Volume
Selectivity
Simple Tuning
No Reradiation
Only Four Tubes

Parts May Be Had by the Experimenter
Write for Particulars

HENRY HYMAN & COMPANY, Inc.
476 BROADWAY
NEW YORK

Manufacturers

"The 'Bestones' Receiver under tests conducted by the Radio Editor has proven superior in tonal quality to any set, commercial or home-made, tested under similar conditions. It was noteworthy that volume was not sacrificed for clarity as is commonly the case."
New York Telegram-Mail.

"It is easy to tune and it certainly does work—has the selectivity which is essential where the ether is congested as it is here."
New York Herald-Tribune.

"The 'BESTONE' Circuit combines the essentials of the ideal radio Receiver in an economical, practical combination. The outstanding features are its quietness of operation without distortion, its extreme sensitivity, simplicity of operation, faithful reproduction and distance-getting qualities."
New York World.
Programs

Monday, May 5 (continued from page 23)

P. M., Examiner news bulletins. 6:45 P. M., Nick Harris detective stories and concert. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., Hollywood Community Orchestra. 11 P. M., Ambassador-Max Fisher's Coconut Grove Orchestra.

KPO, San Francisco. 6:30 P.M. (706k), P. T.--3:20 P. M., John Favra, "festival" accompanied by Sarah I. McFarland, banjo solo. P. M., Budt, soprano solo. Augusta Hayden. 4:30 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 5:30 P. M., Hour story by "Big Brother" of KPO. 7 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 9 P. M., Dance Band under the management of Pearl H. Whitcomb. 10 P. M., E. Max Bradfield's Versatile Band.

CKAC, Montreal. 4:30 P.M. (706k), E. S. T.--1:45 P. M., Mt. Royal Hotel classic concert. 4 P. M., weather, stocks, news. 4:30 P. M., Mt. Royal Hotel Dance Orchestra.

WFAA, Dallas, Texas. 6:00 P.M., C. S. T.--12:30 P. M., address, Dr. J. R. Cranfield, business lawyer.

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FADA, complete .............$69.45
BUILT FOR YOU FREE
FADA Sealed Kit, 5-tube ........$54.75
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115 W. 23rd Street
59 Cortlandt Street
76 Cortlandt Street
NEW YORK CITY

RITTER COLLAPSIBLE

$6.50
Cut Out That Static
Leading Radio Engineers are unanimous in giving highest marks for ease of tuning through a Ritter Collapsible. Whether it's a Superheterodyne or Superheterodyne, you may have in hand, your Ritter Collapsible and you bring in distance. Ask your dealer or write us direct.

RITTER RADIO CO.
272 Canal St. N. Y.

DID YOU GET A COPY OF THE ANNIVERSARY NUMBER OF RADIO WORLD DATED APRIL 57? Larger than usual, and full of many special features. Mailed on receipt of 50c in stamps, or one subscription with that number.—RADIO WORLD, 1493 Broadway, New York City.

RADIO WORLD'S QUICK ACTION CLASSIFIED ADS

MAIL US YOUR DISCARDED JEWELRY—Gold Crowns and Bridges, Watches, Diamonds, Silver, Platinum and Old False Teeth. Money promptly paid, better return if member of U. S. E. T. 1:15 P. M., United States Smelting Works, The Old Reliable, Drive, Danville, Ill.

MAGNAVOX R3 or ML—Latest nationally advertised receivers. List, 835. Introductory, 145. The factory sealed carton is your guarantee. RADIO CENTRAL, Dept. W., Abilene, Kansas.


FREE RADIO MAP—With each order for loose leaf Binder containing Blue Prints and Design Data on all standard circuits. Sent prepaid for only fifty cents. J. E. Foley, 50th St. and 5th Ave., New York.


START A PICTURE SHOW. Full Equipments, Machines, Screens, and everything. Illust. $100.00 and up. Send for literature. WESTERN MOTION PICTURE CO., Danville, Ill.

DEFOREST'S WIRELESS AT THE PUBLIC

Mail Order Department

BRICKL RADIODEL
577 Myrtle Avenue
BROOKLYN, N. Y.

Telephones: Prospect 8168-2952

Send 5c. in Stamps for Catalogue

SLEEPER MONOTRON

Box 8, E. Pat. Off.

Licensed under the Grimes Inverse Duplex Inventions. No aerial—no good. Just dial to turn. Perfect selectivity—no interference.

The Monotron will bring in more stations with better reception than any other set you have ever heard.

Booklet "try" on request.

SLEEPER RADIO CORPORATION
18 Park Place
New York
Repeats Paul Revere's Ride; Broadcasts Warning

Paul Revere, impersonated by a State Guard trooper in Colonial costume, repeated the famous midnight ride of 149 years ago, when the countryside turned out to celebrate Patriot's Day. But radio and airplanes assisted in spreading the alarm of the advance of the British.

"Revere" mounted his horse in front of the old Paul Revere house in North End, and rode through Charlestown to Arlington and Lexington. Lexington Minute Men, dressed like their ancestors and carrying powderhorns and flintlocks, met "Paul" at the Buckman Tavern, which was the headquarters of Captain Parker's men, on April 19, 1775.

Ideas Worth While

Broadcast announcers should give their call letters before and after each rendition by singer, speaker or orchestra.

Manufacturers should furnish templates for all their panel-mounted parts.

"COMPLETE" in reference to a set should be used only when aerial, all batteries and tubes are furnished for the price stated. "Semi-complete" should be used to describe set including panel and cabinet, but excluding aerial, tubes and batteries. [Readers who have worthwhile ideas for improving and standardizing the radio field should address Idea Editor, Radio World, 1493 Broadway, New York City.]

For Reliable Up-to-Date Radio Mailing Lists

Use Our Catalog Directory

In Use Now With Over 200 Radio Manufacturers and Jobbers

Your Envelopes Addressed

At $2.50 per 1,000

Write for Particulars

Sydell's Radio Trade Directory

410 W. 31st St., New York. Chicking 8888

The long-life tube!

Since their inception, radio vacuum tubes have been fragile. But now there are Myers Tubes Practically Unbreakable—so protected by their unique design that they have been dropped on the floor without injury. But their sturdiness is only one feature. They are the most perfect detectors and amplifiers obtainable. Smaller capacity and no bunched leads mean less interference—more clarity and greater amplification. Actual tests, all over the world, have proved their supremacy. Two types—Dry Battery and Universal (for storage battery). At your dealer's—or send price and be supplied postpaid. Write for free circuit diagrams.

$5 Each. Complete with clips, ready to mount on your set: no sockets or other equipment necessary.

Twitchell Auxiliary Tuner

Cuts Out All Interference

A Twitchell Auxiliary Tuner connected to any make of tube receiving set will positively cut out any local broadcasting or code stations so you may tune in all long-distance stations any time regardless of local conditions. The Twitchell Auxiliary Tuner never decreases but in many cases increases volume from distant stations. This instrument will also enable you to bring in programs sent on longer waves than you can tune in without it, thus bringing all the broadcasting stations within the wave length range of the many sets of limited range now in use.

Complete instrument, walnut cabinet...$5.00

Diagram of Twitchell Tuner...50c

A New and Wonderfully Efficient Coil for the Reinhart circuit for those who want the best. Price $4.00, or with blueprint for either one or three tubes, $4.50.

This circuit brings in both coasts loud and clear and is the most successful Reinhart modification yet produced.
5-Electrode Tube Developed

made somewhat in the form of a ring, the plates are fastened to glass frames on both upper and lower ends; and on this frame of glass is coiled the grid, so that the latter actually surrounds the plate. The distance between the grid and the plate is about 2 mm. The filament is also fixed to a small glass loop or frame, the distance between it and the grid being some 2 mm. The tubes are used for the generation of very small waves (only two or three meters), the mounting commonly used being shown in the diagram.

GORMANY has quietly gone to work and built a five-electrode tube. It consists of a filament, two grids, and two plates. They are on the same plan as that thought of (but never put into practice) by a Russian, Danilewsky, in 1920. The filament is

RECEIVER BARGAINS

Crawley Supertubes.............. $10.20
Crawley WCT, 2 tube Receiver... $25.20
Radiofonics, 100 watts........... $40.00
Radio-1200, 6 tube Receiver... $120.00
Super-Neutrodyne Kit, essential parts... $55.00
Radiola Super-Neutrodyne, portable type... $180.00

THOMAS RADIO SUPPLY CO.
111 W. 6th St.
Brockton, Mass., U.S.A.

ACH LONG DISTANCE ONE-TUBE SET

$17.50 Mail Orders Only
Price includes case and parts, all mounted ready to wire. No solder. For Dry Cell Tube.
Including
2 A. C. H. Sharp Tuners........... $5.00
2 A. C. H. 4-Phone Connectors... $2.50
NOTE: $2.00 must be sent with O. D. Orders.
YES—Use the Wonderful A C H Sharp Tuners.
A. C. Hayden Radio & Research Co.
Brookton, Mass., U.S.A.

CRAM'S RADIO MAP IN TWO COLORS—The best map of its kind on the market. Mailed far 35c. The Columbia Print, 1493 Broadway, New York, N.Y.C.

COMPLETE LIST—Of Radio Stations in the United States, Canada, Cuba, Porto Rico and Mexico as appeared in RADIO WORLD dated April 5, 1924, and was corrected up to the date of going to press. 15c per copy, or begin your subscription with that number. RADIO WORLD, 1493 BROADWAY NEW YORK CITY.

TIPS TO THE NOVICE

on Purchase of a Set as given in the Radio World Decalogue, page 22, April 19th issue.
1. Quality of reproduction
2. Volume
3. Range (sensitivity)
4. Ease of tuning
5. Ease of construction
6. Low cost

GLOBE UNI-TUNE

These 10 Points are just what you expect from the GLOBE UNI-TUNE. Described fully on page 22, April 19th Radio World.

Globe Radio Equipment Co.
217 West 125th Street
New York

Record Your Radio Stations
On RADEX Log Cards to

GLOBE UNI-TUNE

100 Cards. Mahogany Finish or Oak Cabinet, and Index Dividers. Complete, $3.00. A Useful Accessory in Any. Name of Your Set or Sketch of Dial Arrangement. Sent Prepaid on Receipt of Cash or Money Order.

S. T. ASTON & SON
114 W. 18th Street
NEW YORK CITY

LARGEST RADIO DEALERS IN AMERICA

THE DE-LUXE NEUTRODYNE

For Beauty and Distance

ALL PARTS MATCHED
ALL PARTS LICENSED

Complete Assembly Kit to Build your Own Genuine Hazeltine Neutrodyne

$34.49

1 DRILLED Radio Mahogany Panel, engraved in gold.
2 Genuine Hazeltine Mahogany Dials, polished in gold.
2 Gold Plated Jacks.
2 Genuine Hazeltine Neutrodyne Transformers (Maclean) on the Hazeltine Commercial Radio Circuit.
1 Genuine Hazeltine Neutrodyne Kit. Incl. these vital Commercial Components.
2 Neutrodyne Transformers, high pressure.
1 Hazeltine Neutrodyne. Compact, solidly built, silent in operation.

Quick Assembly Kit to Build your Own Genuine Neutrodyne

$43.40—CABINET FREE

Complete Additional Operating Accessories. Complete, $46.40. Send 10c for Catalogue of N. T. Radio 

LARGEST RADIO DEALERS IN AMERICA

THE RADIO-SHACK

35 Vose St., Dept. RWS3
NEW YORK

ESSEX RADIO SERVICE

617 West 125th St.
New York

$15 Set Gets 2,000 Miles

The Essex Radio Special, for receiving sets with a sensitivity, gets you more distant stations clearer and louder than sets selling one third their price.

SET COMPLETE

$15

WITH CABINET WITHOUT TUBE OR BATTERIES

$20

SET COMPLETE

WITH CABINET TUBE AND BATTERIES

$78

No. 1001

1500 ohm Potent.

$1.50

20 Ohm Shunt.

11.50

Paid. 976.842

No. 1003

2500 ohm Potent.

$1.50

25 Ohm Shunt.

11.50

Paid. 976.842

Howard No. 1

500 ohm Potent.

11.50

20 Ohm Shunt.

11.50

Paid. 876.402

Howard No. 2

1500 ohm Potent.

$1.50

25 Ohm Shunt.

11.50

Paid. 876.402

Howard No. 2

2500 ohm Potent.

$1.50

20 Ohm Shunt.

11.50

Paid. 876.402

Howard No. 2

1500 ohm Potent.

$1.50

20 Ohm Shunt.

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Howard No. 2

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$1.50

25 Ohm Shunt.

11.50

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Programs

Monday, May 5 (continued from page 31)

ment of Agriculture. 10:30 P. M., program of popular dance music by Plush's Orchestra.

KFAE, Pullman, Wash., 320m. (810k), P. T.—

10:30 P. M., "Cans the Modern Church Prevent War?" Rev. Clay Palmer; soprano solos, Marguerite Miller, Spokane; mining talk, Dean L. O. Howard; saxophone solos, Louis Weisen, Mt. Vernon; piano trios, Geo. Seressean, piano solos, Lorraine Daniel, King, Spokane; guitar trio, Rex Turner, of Huntington Park, Cal.; Regional Cooper of Honolulu, and Horace Trimble of White Bluffs, Wash.

WGY, Schenectady, N. Y., 320m. (790k), E. S. T. —

7:45 P. M., program by the Georgetown Servios Club of Amsterdam, N. Y., Hazil Wehr director. Address, "Radicalism That Means Real Progress," by C. M. Ripley.

WEAF, New York, 492m (610k), E. S. T. —

P. M., "Can the Modern Church Prevent War?" Rev. Clay Palmer; soprano solos, Mar-

guerite Miller, Spokane; mining talk, Dean L. O. Howard; saxophone solos, Louis Weisen, Mt. Vernon; piano trios, Geo. Seressean, piano solos, Lorraine Daniel, King, Spokane; guitar trio, Rex Turner, of Huntington Park, Cal.; Regional Cooper of Honolulu, and Horace Trimble of White Bluffs, Wash.

ACME FOR DISTANCE

ACME RADIOMEMBERS

Post-Paid on receipt of price.

23 East 26th Street

SAMSON TUBES

SUNBEAM LEADERS

RADIO WORLD FROM JANUARY 6, 1923

FOR YOUR SCHEDULE

SUNBEAM ELECTRIC CO.

271 Third Avenue

New York City

RADIO WORLD FOR 1923

FOR YOUR LIBRARY

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

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

Circulation Department.

RADIO WORLD.

1493 Broadway, New York City.

liamson, tenor, accompanied by Everett Hall; Bella Girard, contralto, accompanied by Madeline Vose; talk by Paul Kravath; music by the A. and P. Gypsias.

WOO, Philadelphia, 580m (650k), E. S. T. —

10:30 P. M., Fox Theatre Grand Orchestra, Erno Rapee, director. 10 P. M., Grand Organ Recital, Mary E. Vogt. 10:30 P. M., dance program by the Havana Casino Orchestra. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast. 11:03 P. M., continuation of dance program.

KFAE, Pullman, Wash., 320m. (810k), P. T. —

8:30 P. M., Varisty Male Quartet recital; piano solos, Lapham Bailey, Spokane; tenor solos, Fred Marshall, Spokane; "Main Crop Potatoe." (Concluded on next page)
Tuesday, May 6

WBAP, Fort Worth, Texas, 476m. (620k), P. T.-4:45 P. M., Evening Herald news bulletins. 5:15 P. M., Examiner news bulletins. 6:45, vocal concert; 8:15 P. M., special Music Week concert. 10:15 P. M., special Music Week concert.

KPO, San Francisco, 421m. (615k), P. T.-4:30 P. M., organ recital by Theodore H. F. Imm, 5:15 P. M., Ruth Seeger’s Concordia College orchestra. 8 P. M., program by the 30th Infantry, U. S. Army Band.

CKAC, Montreal, 425m. (675k), E. S. T.-4 P. M., weather, news, stocks. 7 P. M., Kiddies’ stories in French and English.

(Concluded from preceding page)


The month of February 1924.

Of course, these stations were not all different. So far in March (17 days) we have received 300 stations.”

“A few of the stations tuned in: WOR, Newark; WSB, Atlanta; WEAQ, Ft. Worth; CKCK, Regina; KGB, Los Angeles; KGW, Portland; WKAQ, San Juan, P. R.

The above is only one of hundreds of letters that we have received, praising the wonderful efficiency of the Shamrock Kit. Inspect this kit at your dealer’s today. If he hasn’t it in stock, send us the coupon below.

Kit, list price $20

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Dept. 6, Market Street, Newark, N. J.

SHAMROCK MFG. CO.
Dept. 6, Market St. Newark, N. J.

Gentlemen—Please send me detailed information on the Shamrock Kit.

Name: _____________________________

Address: ___________________________

Dealer’s Name: ______________________

“37 distant stations heard in one night”

“If anything is good, I assure you, I can’t begin to praise your Shamrock Kit enough. I threw out a high priced regenerative set because of poor selectivity.

I am enclosing original list taken Thursday, February 21st, in which at least two Chicago stations were on.

The month of February we received 377 stations outside Chicago. Of course, these are not all different. So far in March (17 days) we have received 300 stations.”

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Name: _____________________________

Address: ___________________________

Dealer’s Name: ______________________
Wandering Husbands Converted by Radio Into Stay-at-Homes

THERE perhaps was an element of humor in the remark of a certain hen-pecked husband that radio was a great boon to married men. His wife, he related, had lately become so engrossed in listening to the radio set in their home that he could go out nights as much as he wished without even having to use his threadbare alibi. In fact his wife was so interested in the new set that she didn’t care any more whether he went out or not!

But there was more humor than truth in his statement so far as it applies to the average man and the average American home.

The fact is that since radio came in most husbands don’t want to stay out. The air is so full of interesting programs, high-grade orchestras, entertaining public addresses, and sport. And thus, they look forward to getting home at night so they can listen in.

It begins to look as if the answer to the question of the ages, “What will keep a husband home nights?” is, “Get him to build a radio set.”

A Long Island man recently told the writer of moving into a new house and of a delay of two or three weeks in beginning to operate the radio set to which he had been accustomed. Home didn’t seem the same to him or his family. Spare time hung heavily on their hands. Evenings seemed dull and flat. The whole family had begun to get on each other’s nerves, when they realized that all that ailed them was lonesomeness for radio. They were lonely at home. The set was quickly put in commission and promptly restored the household to its normal charm and cheerfulness.
Portable Set Expected to Solve Army Problem

WASHINGTON

The most difficult communication problem in the Army, according to Maj. J. O. Mauborgne, has heretofore been that of keeping in contact with advanced troops in battle. All forms of communication in use in the past war proved inadequate, he stated. He then told of a portable radio set developed toward the end of the war which is expected to solve this problem.

There are a great many radio sets on the battle front, he said, and the problem of assigning wave lengths to them all is a very complicated one. The wave lengths and call letters must be changed every day or so, in order to avoid giving the enemy a clue to the nature of the sending station. Radio sets are carried by tanks, airplanes, and advanced infantry units, and form part of the equipment of all grades of headquarters and of artillery brigades.

Summer Resorts
Plan to Broadcast

Radio broadcasting from Luna Park, Coney Island, may be one of the features at the resort this summer. The management is trying to obtain a license to broadcast and is looking for a plant.

Inquiries among the jazz band impresarios of New York during the last week showed that the park people wanted a strong band combination for their dance hall and broad broadcast.

Other summer resorts, throughout the country, are considering the same plan.

RADIO WORLD
College Boys on Cruise to Test Short Waves

Theodore Graves, of the class of 1922, conceived the idea of a cruise across the Atlantic with the special purpose of carrying out radio experiments. They made arrangements to take over the Nereus, an old square-rigged schooner, for the small body of wireless operators in the club, who will sail with a radio outfit costing several thousand dollars. They will be in continual touch with radio stations on both sides of the ocean. They have made arrangements with these stations for help in carrying out their experiments. The experiments are concerned chiefly with the use of a short wave length on the radio outfit of ocean-going vessels. Great difficulty has been experienced hitherto, especially during rough and stormy weather, in sending messages which can be distinctly heard. The rocking of the ship has caused interference and unevenness in the oscillations, with resulting lack of clearness.

RADIO Recorder.

Keep a permanently bound record of all stations you have received and how you received them. Radio Record A-5, $1.45-$1.95 each. All blank-casting stations listed and indexed with space for new stations—$1.90 Postpaid.

The Beadle Printing Co.

Mitchell South Dakota

Appliance Card 00 for $1.00 Postpaid

A. B. SHERMAN

Loud Speaker, $9.50

Complete—Ready for Immediate Use. Delivered anywhere in the U. S. A. A marvelous Speaker for the price of a basked. Dealers and Jobbers Write for Details.

ACKERMAN BROS., Inc.

301 W. 4th St. Dept. “RW” New York, N. Y.

For your reception you need

The Goodman

The all-time short wave leader on the market. Great for present broadcast, here and DX. Used in all parts of the world. Certificates of merit from text-

book libraries. Pamphlets on request.


RADIO Horn

Has clear, natural tone and an exceptionally free appearance. You re-
cover fits in base. Mail a dollar bill for horn like picture, knock down, prepared. Easily assembled by anyone.

FOX MFG. COMPANY, DEPT. C

247 So. Broadway, Los Angeles, Cal.

The Popular Neutrodyne!

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

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

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

Subscribe NOW and Receive Another Radio Publication Without Extra Cost

RADIO WORLD has made arrangements

to offer a year’s subscription for

any one of the following publications

For the price of one:

Send $6.00 today for RADIO WORLD

for one year (regular price)

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