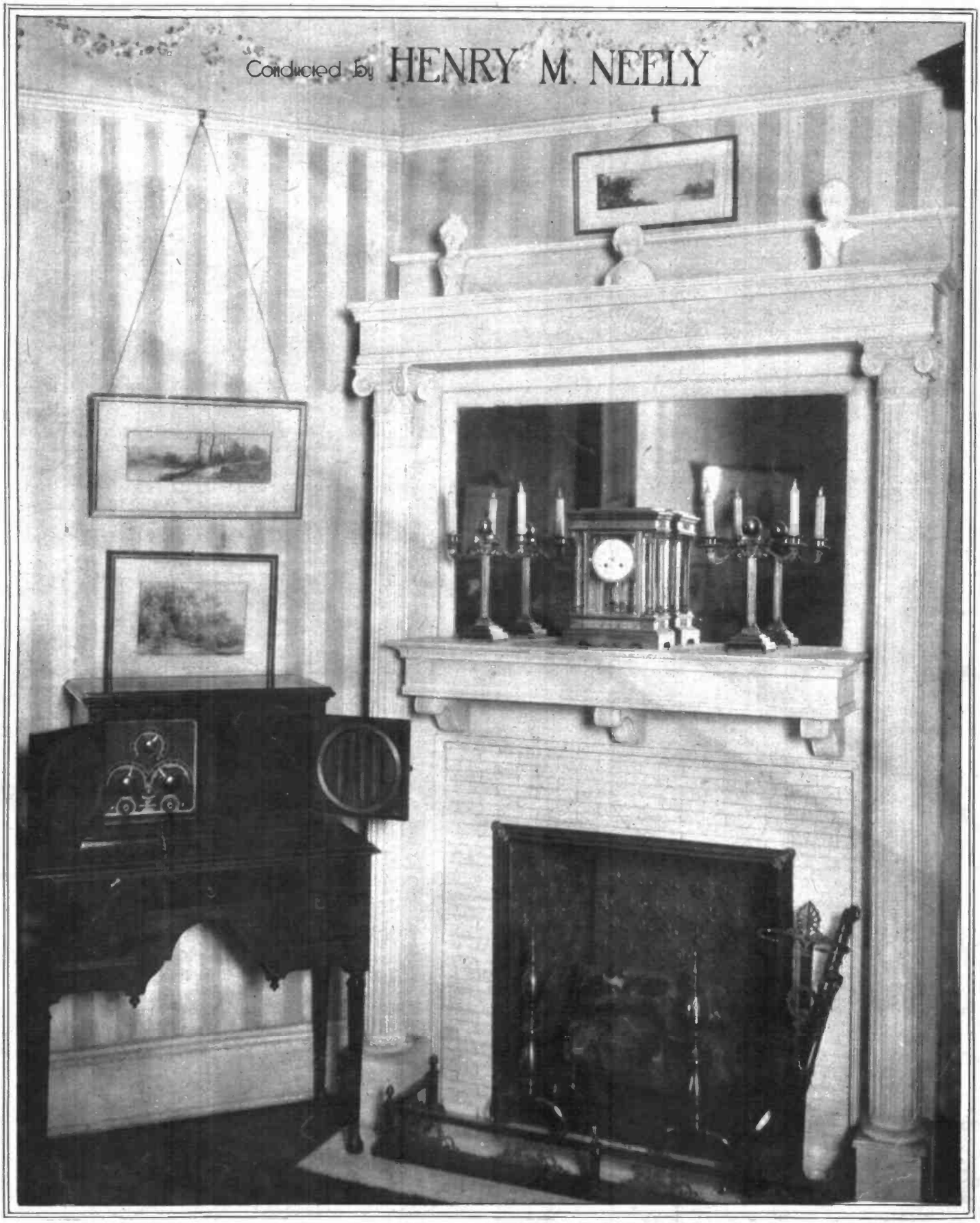
Radio in the Home

Conducted by HENRY M. NEELY



Radio in the home of Colin H. Livingstone, 1249 Kenyon St., Washington, D. C., National President, Boy Scouts of America

Photo courtesy of Radio Sales Studio, Washington

August 1923 *Twenty Cents*

Radio in the home of Louis Cole Emmons, of Swarthmore, Pa., President of the Emmons Coal Mining Co.

RADIO IN THE HOME

VOLUME II — August 1923 — NUMBER III

Published Monthly by the
HENRY M. NEELY PUBLISHING COMPANY
608 Chestnut St., Philadelphia, Pa.
BELL TELEPHONE—LOMBARD 8431
Experimental Station (3XP), Delanco, N. J.

HENRY M. NEELY.....*President and Editor*
G. W. KRAFT.....*Secretary and Treasurer*
FRANKLIN N. SUPPLEE.....*General Manager*
NORMAN NEELY.....*Art Editor*
THEODORE F. VOLLTEN.....*Technical Assistant*

Radio in the Home is sold at 20c per copy at all newsstands, radio shops and bookstores. Subscription in the United States and Canada $2.00 per year.

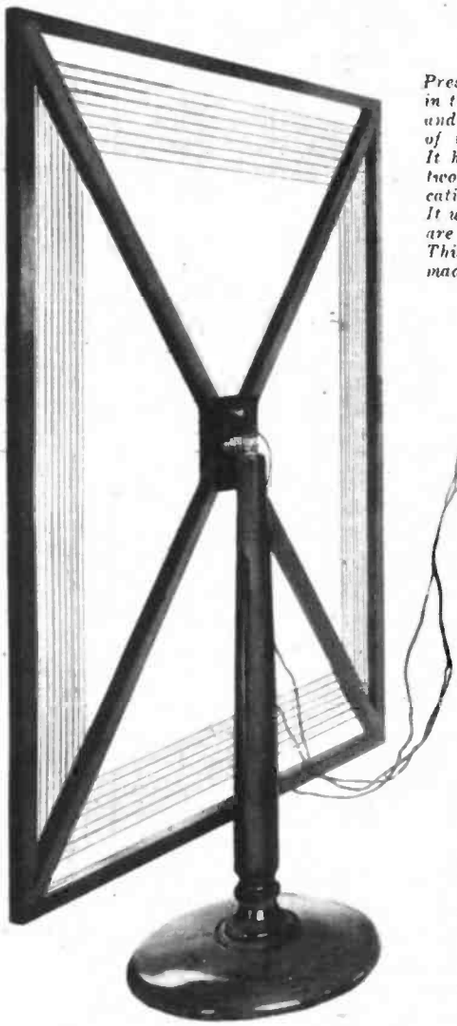
Entered as second-class matter May 26th, 1922, at the Postoffice, Philadelphia, Pennsylvania, under the act of March 3d, 1879

Circle—Radio in the home of Dr. Grant H. Barnhart, 1434 Rhode Island ave., Washington, D. C. Photo courtesy Radio Sales Studio.

Square—Radio in the home of James F. Oyster, 2400 Sixteenth street, Washington; Commissioner of D. C. Photo courtesy Radio Sales Studio.

CONTENTS OF THIS ISSUE

Washington Welcomes Radio



THE PRESIDENT'S SET

President Harding's receiving set in the White House was designed and built in the Radio Test Shop of the Washington Navy Yard. It has three stages of radio and two of audio frequency amplification with a power loud speaker. It uses the tiny "N" tubes, which are about the size of a peanut. This photograph of the set was made by the Navy Department.

By Our Washington Representative

THERE was a time when Washington, D. C., was quite prominently marked on the radio map of the United States. This was when the great naval air station NOF was broadcasting with its fifteen amperes of radiation smashing through static and other local interference and with its Marine Band concerts proving about as popular as anything in the eastern part of the country.

In those days the NOF concerts were reported clearly audible from the Alleghanies to the Rockies and on one occasion were heard in the Hawaiian Islands.

Then official orders came in the course of events and NOF was no more.

The transference of the broadcasting to Arlington proved unsatisfactory and local private stations could not satisfy the demand for more live broadcasting from Washington, so radio development in the heart of the nation ceased almost entirely.

Like a spoiled child, radio was reared and ruined within the shadow of the nation's Capitol, but now it returns to it as a prodigal son with the opening of two of the finest broadcasting stations in the country.

On July 4 station WCAP, operated by the Chesapeake and Potomac Telephone Company, a subsidiary of the American Telephone and Telegraph Company, started re-broadcasting or relaying the concerts being given by station WEAF in New York and now the Radio Corporation of America is opening another topnotch broadcasting station, WRC, on the building of the Riggs National Bank at Fourteenth street and Park road, N. W.

Fans will have no difficulty in remembering the letters of these stations because they have been very cleverly selected to represent the initials of the company operating them, preceded by the W which is the first letter of all of the broadcasting stations in the eastern part of the country.

The Radio Corporation's station adds RC to the W and the Chesapeake and Potomac stations add CAP to the W.

WRC was to have opened a month or more ago, but for some reason or other there was postponement after postponement and it failed to get on the air.

Early in July the definite date of its opening was set and at once WCAP stole a very surprising march on its rival by opening up broadcasting—or rather relaying—of the WEAF broadcasting from New York on July 4.

This was a totally unexpected move, and those who are in the radio game believe that it is more than significant because nothing of this kind was expected at the Washington plant and no arrangements had been made to broadcast until suddenly on July 3 a long-distant phone call from New York ordered everything ready to relay the next day.

And the next day WCAP was on the air.

The Radio Corporation and the American Telegraph and Telephone Company have always been thought of as one and the same so far as radio is concerned. In fact, the A. T. and T. is one of the integral parts of the Radio Corporation, and this evidence of rivalry, coupled with other evidences which have cropped up in a patent law suit in New York, have opened the eyes of the people in the business to the fact that everything in the Radio Corporation family is probably not as happy as it should be.

However, that has nothing to do with this story of radio and its re-entry into the national Capital.

With these two stations in the field, no subject of local or national interest is likely to escape being transmitted to the far corners of the continent.

The weight of the local broadcasting may possibly fall upon WRC, for it will cater entirely to Washington performers, and its range and general efficiency are to be the best of the several Radio Corporation stations.

But there is no question about it that the Chesapeake and Potomac Telephone Company station has one very great advantage, and that is in the control of land wires, which means the inside track of broadcasting events that are not taking place actually in the studio, and this control of land wires, reaching to WEAF in New York and anywhere westward that may be desired, will mean simultaneous broadcasting from a number of stations in different parts of the country of important events and significant speeches which take place in the national Capital.

Radio fans may now expect occasional remarks from the President of the United States; if not from the White House, then by means of wire services maintained between the station and important meeting places in Washington, particularly the hotels and clubs.

Members of the Cabinet and of the Senate and House will be called upon to broadcast speeches of national interest.

The Marine Band and other Washington organizations which persons scattered over the land are familiar with only through reading of them will be heard directly and with a degree of modulation comparable to that of Washington's favorite radio station, NOF, long since silent.

Radio broadcasting stations in the Capital at one time numbered seven. The Department of Commerce was puzzled to allocate wave lengths and to assign satisfactory hours. Dealers were pleased with the fact that at all times of the day the efficiency of receiving sets could be demonstrated.

Then a lull loomed in the radio field and one by one the broadcasting stations announced their final programs. Lack of radio interest, cost of operation and limited sales of apparatus accounted for the tale of woe current everywhere. WPM, WEAS, WIAY thus dropped out of the field; WMU and WJH, two of the oldest Washington stations, still operate, but on less extensive schedules. Little interest

was taken in the broadcasting attempted on 435 meters by NAA, for this station has never operated efficiently. Long speeches lasting more than a quarter of an hour each were broadcast at night by certain of the Government departments until listeners-in refused to listen in.

In short, radio broadcasting through poor program management had passed into the discard and the people would have none of it.

Companies which had operated stations successfully in other cities, however, were not slow to seize upon the vacuum thus left. They erected at great expense modern stations and employed program managers who could appreciate the wealth of material available in Washington for broadcasting, but which must be properly arranged to interest and arouse the listener-in.

A visitor from the coast recently asked for permission to broadcast a speech which concerned the harbor development of a small California seaport. The object in this instance was to secure support for a bill then pending before Congress. Consequently the request was refused.

An efficient broadcasting studio manager would have seized upon this opportunity of affording his listeners-in a lecture of great educational value and interest by simply eliminating those portions of the speech which bordered on propaganda.

So it is with the great mass of educational material stacked on the shelves of the Government departments in Washington. To read volumes of this material verbatim would drive the listener-in from his receiving set, but to enlist the co-operation of the Government experts each in his own line and broadcast condensed passages gathered from the dusty pigeonholes would enliven radio programs and encourage the attention of all family members.

This is the task welcomed by the program managers of the new stations, schooled to give the public what it wants and as it wants it.

For example, during his trip to Alaska and the Western States President Harding passed through country with which few Easterners have the slightest acquaintance. The geological survey in Washington possesses complete records of every square foot of territory the President passed over. One object of the Chief Executive's trip was to study the natural resources of the great undeveloped sections of the Alaskan peninsula. A series of brief lectures, outlining this trip and data concerning the territory covered, would fascinate the radio audience.

Washington is the playhouse center of the nation. Here all plays previous to their presentation on Broadway are tried out and their success or failure marked before they leave the theatres of the Capital.

With the present elaborate wiring systems installed in theatres and permission granted in many instances for broadcasting the plays, the isolated farmer and the poor mechanic are included in the judges of the play and the players. Following years of patient work in overcoming indifference to a Washington opera house, a building will be started this fall, erected and dedicated to Washington opera. High-grade musical talent, now appearing exclusively in New York, Philadelphia and Boston, will be scheduled for appearances at the nation's Capital, and much of this material will be broadcast.

A peculiar pocket of magnetism or other cause for interference existing between Washington and New York makes it impossible at the present time for Washington listeners-in to hear New York stations regularly. Opening the new stations in Washington will thus make audible throughout that section of the country all that those within range of the New York station hear.

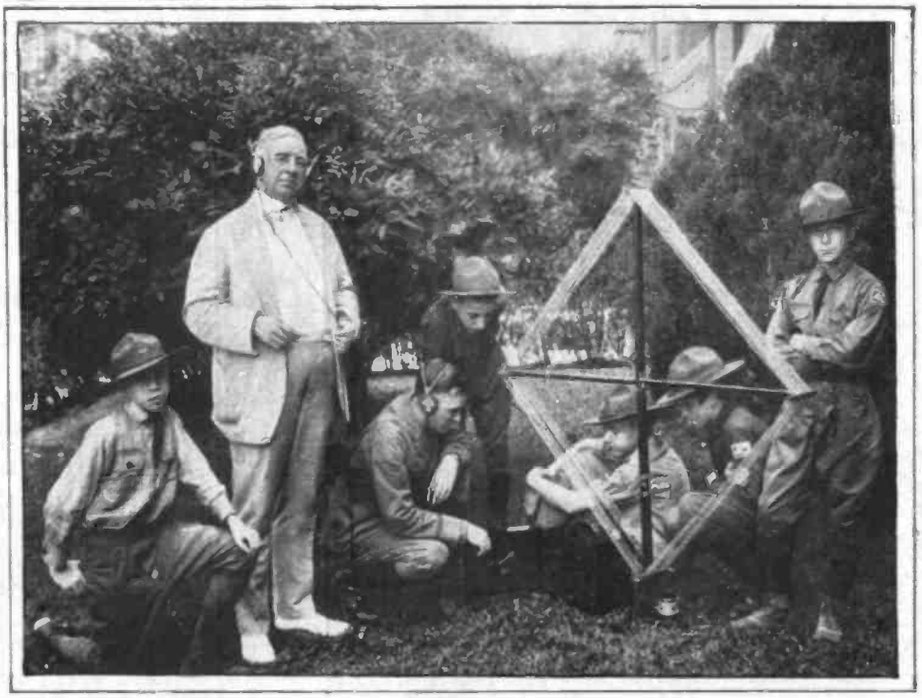
Concerts scheduled regularly from WEAF in New York are conveyed by wire to Washington and rebroadcast from the American Telephone and Telegraph Company station there. This service, in addition to the programs broadcast at first hand from WRC, will re-establish Washington as a radio center.

Officials of nearly every Government department have their desk telephones in circuit with the transmitting apparatus at Arlington, enabling them to broadcast at scheduled periods without leaving their desks. The new stations may likewise have access to these individuals whom the people at large would desire to hear directly.

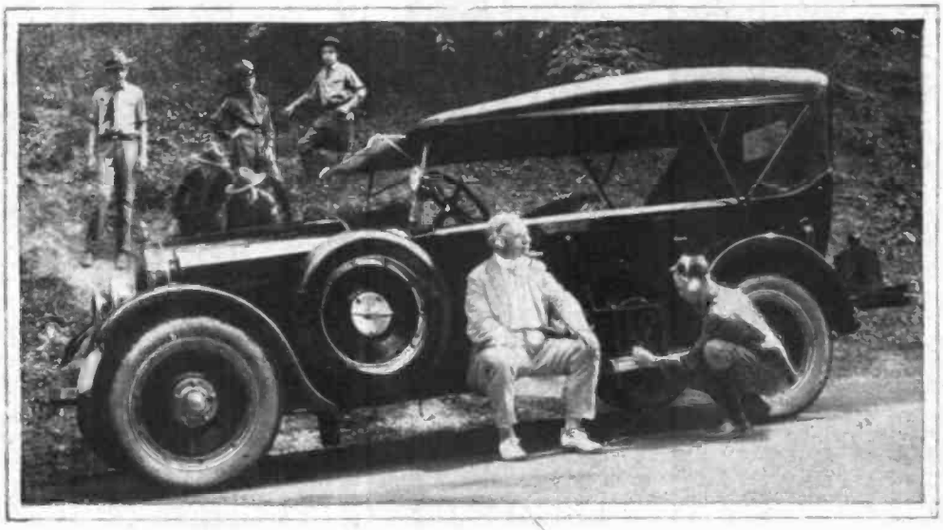
President Harding has a radio set at the White House, Herbert Hoover, Jr., is an active radio fan, not to mention the representatives of foreign governments stationed here who listen in regularly.

Dealers learn the advertising value of selling a receiver to a general or a high Government official.

At his S street home, ex-President Wilson now listens in regularly. On July 9 General Gouraud called a local radio dealer from his hotel and asked that he install a complete receiving outfit aboard his private railway coach at Union Station. It was the plan of the general to tune in the several radio



Colin H. Livingstone, National President of the Boy Scouts of America and one of Washington's leading citizens, is an enthusiastic radio fan. Here he is with the Boy Scouts testing a set before starting on a hike.
Photo courtesy Radio Sales Studio, Washington



Mr. Livingstone and the boys stop en route to get the time signals from Washington on the step of their auto mobile.
Photo courtesy Radio Sales Studio, Washington

station programs while en route over the country.

Alexander Graham Bell just previous to his death experimented a great deal with radiophone apparatus, and it is in part the great inventor's interest in the science which prompted the erection of station WCAP by the Chesapeake and Potomac Telephone Company.

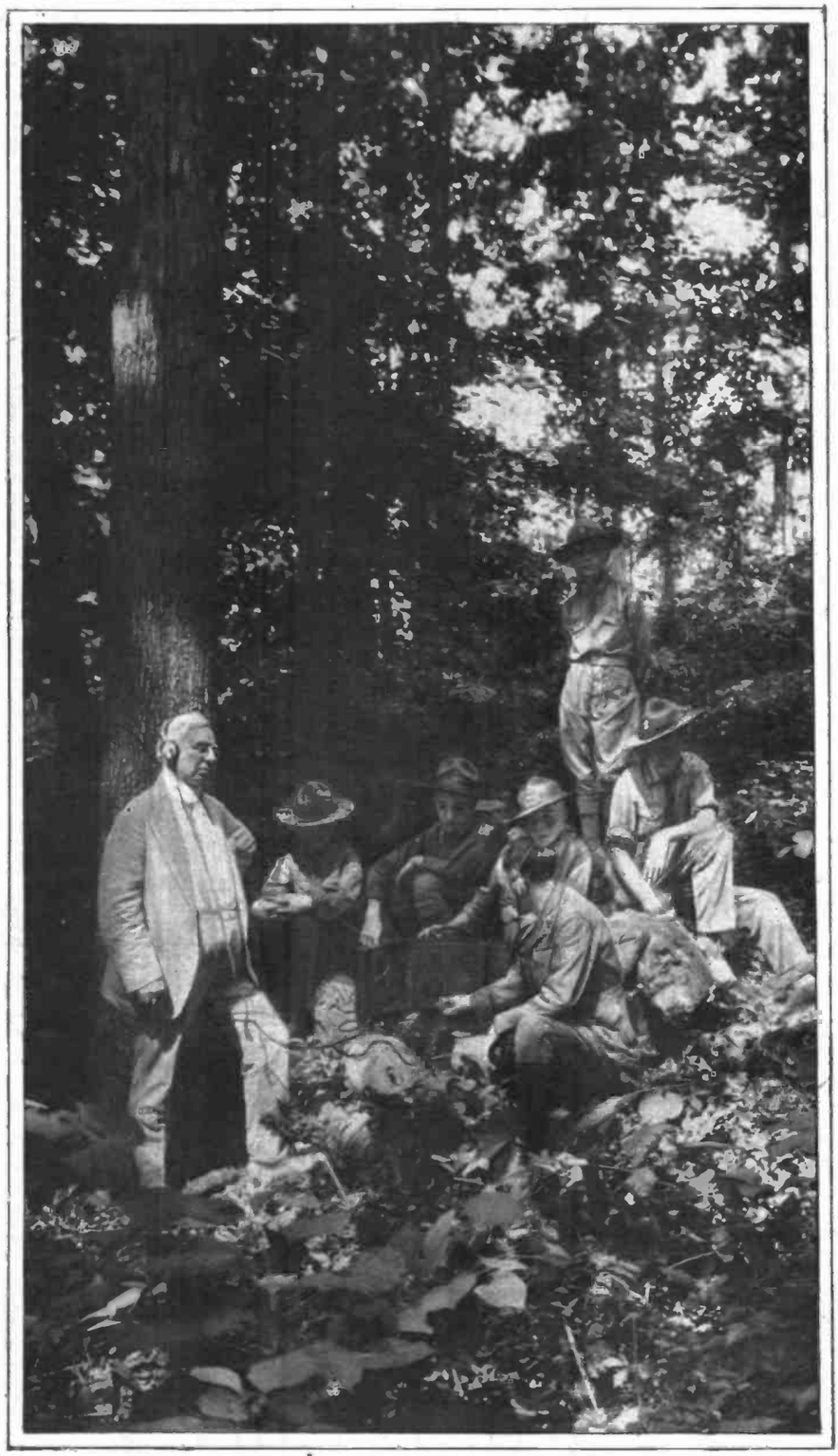
Many Washington political leaders and members of the Diplomatic Corps put radio receiving sets in their homes and offices, expecting that the elaborate transmitting equipment installed in the Senate and House some months ago would be used regularly.

However, this service passed with the passing of NOF. With the large, new station under way a possibility of a return to this broadcasting is hoped for. Citizens of the country who have little time for reading the lengthy speeches of their representatives may at will pick up head phones and hear such portions of the several speeches as interest them.

Radiophone broadcasting service emanating from the Capital will then be as serviceable and made use of as regularly as are the Arlington time ticks.

Washington might readily become the leading radio merchandising center of the East coast in proportion to its size. There is a large resident population here of persons who earn high incomes and whose home life is more favorable than that surrounding the average city dweller. The hundreds of Government employes are away from home and make their rented apartments homelike. A firm recently established offices here for the installation of radio receiving in apartment houses, so that individual tenants would hear concerts received on a single aerial placed across the apartment house roof.

New houses now building in the District of Columbia are being equipped with this system. Dealers are awaiting the time when dwellers in apartment houses here will not hesitate to buy apparatus because they live in an apartment.



Mr. Livingstone enjoys the broadcasting in the woods before the boys stop for lunch.

Photo courtesy Radio Sales Studio, Washington.

One of the most enthusiastic radio fans in the city is Colin H. Livingstone, who is most widely known throughout the country as the national president of the Boy Scouts of America, but who is known in the business life of Washington as the president of the Washington Old Dominion Railroad Company, president of the Merchants and Miners Steamship Company and connected with various other large business enterprises.

The photographer for *Radio in the Home* found Mr. Livingstone at his home with a pair of radio receivers over his ears listening in like a regular dyed-in-the-wool fan. Boy Scouts all over the country can now look forward to hearing the voice of their national leader now that the two big broadcasting stations have been established in Washington, for Mr. Livingstone will undoubtedly be asked to make frequent visits to the studios for the purpose of addressing the members of his great young family.

While the representative of *Radio in the Home* was with Mr. Livingstone, word was received that Thomas A. King, Scout master of Troop 40 and an official in the Navy Department, had called and that his boys were on the lawn outside waiting for Mr. Livingstone to go on a radio hike with them.

So the two men with the camera and the fountain pen for *Radio in the Home* jumped in the automobile with them, and the photographs that are reproduced with this article were the result of the hike.

Incidentally, Troop 40, of Washington, ought to be of particular interest to radio fans. There are forty-seven boys in this troop and forty-four of them own radio receiving sets. The two assistant Scout masters, Ralph T. Bartlay and Carey Sweeney, have just graduated from an electrical school in Washington.

Mr. Livingstone lives within six squares of the new broadcasting station WRC, and as the range of this station is expected to exceed most of the others now in operation, it is hoped that Mr. Livingstone will from time to time either go to the studio or address the boys from the broadcasting station by means of land wires from his own home telephone.

More careful selection of program material will be needed in the operation of WRC than any other in the entire country. The reason is not in the size of the station, although it is the largest of, and embodies more novel features than, other

RCA stations, but in the expectation of listeners-in that the nation's Capital should broadcast more and better radio entertainment than is available to the whole list of 509 licensed broadcasting stations.

The possibilities of reaching in the same instant thousands upon thousands of citizens and transmitting to them a statement from the President of a review of the most recent political events as recorded by observers who, from their residence in Washington, have first-hand information, is sufficient incentive to awaken officials interested in making WRC the premiere broadcasting station of the nation.

The political and educational features, however, will not overbalance the programs arranged for this station. In securing the services of Ralph Edmunds as director of programs, local manager of the Radio Corporation E. C. Guthrie brings to the Capital a former business manager of the Metropolitan and Chicago Opera Companies and of the Philadelphia Orchestra.

Access is thus gained to the most varied and the best of classical musical talent.

Negotiations are under way for broadcasting the latest fashion developments as reported by representatives of the house of Gidding, of New York and London, and book reviews by members of the staff of Brentano, these features to supplement the regular program of music. WRC is a class B station, which will broadcast first-class entertainment only.

What is going on in Congress? What are the real developments in the political world? Can we hear Congress in session? These are queries already addressed to the director of the new station, who finds himself absorbed in shaping a program which will embody these features unthought of in the preparation of other station programs.

People want such information from the Capital; here and in far distant States WRC means little unless this information is broadcast and made available to all.

Government talent will now be mustered into the radio service in answer to the popular cry for "more news from Washington." There will be an Army night, with Secretary of War Weeks and General Pershing on the program; a Navy night, with the Marine and navy bands; a Government department night, when the old and dusty volumes of instructive data gathered by the Government's research workers are brought to light and the people told by radio what they have neither the time nor opportunity to read.

In short, the outstanding importance of this new station is its duty to "broadcast Washington," to open the heart of the nation for all to listen in when politics, industry, manufacturing, foreign entanglements or any national events alter the steady beating of that huge heart of things American — the nation's Capital.

A duplicate in many respects of the huge station at Aeolian Hall, New York, WRC is further favored by location, so that its range is expected to outdistance that of WJZ by many hundred miles. A description of the Aeolian Hall station reads: "From the studios to the great aerial on the roof every feature is unique, novel and in advance of anything of the kind ever before attempted." Had the Aeolian Hall station been exactly duplicated, WRC would have been in operation several weeks ago. But something better in studio arrangement, an alteration in transmitting apparatus was designed so that no station would be the equal or the peer of that in Washington.

Atop the new Riggs National Bank building the towers of WRC rise 150 feet high, their steel bases 175 feet apart and their tops spanned by four antenna wires. Lead-ins shaped as a fan from the aerial wires pass through the roof below, and are connected with the transmitting apparatus located on the third floor.

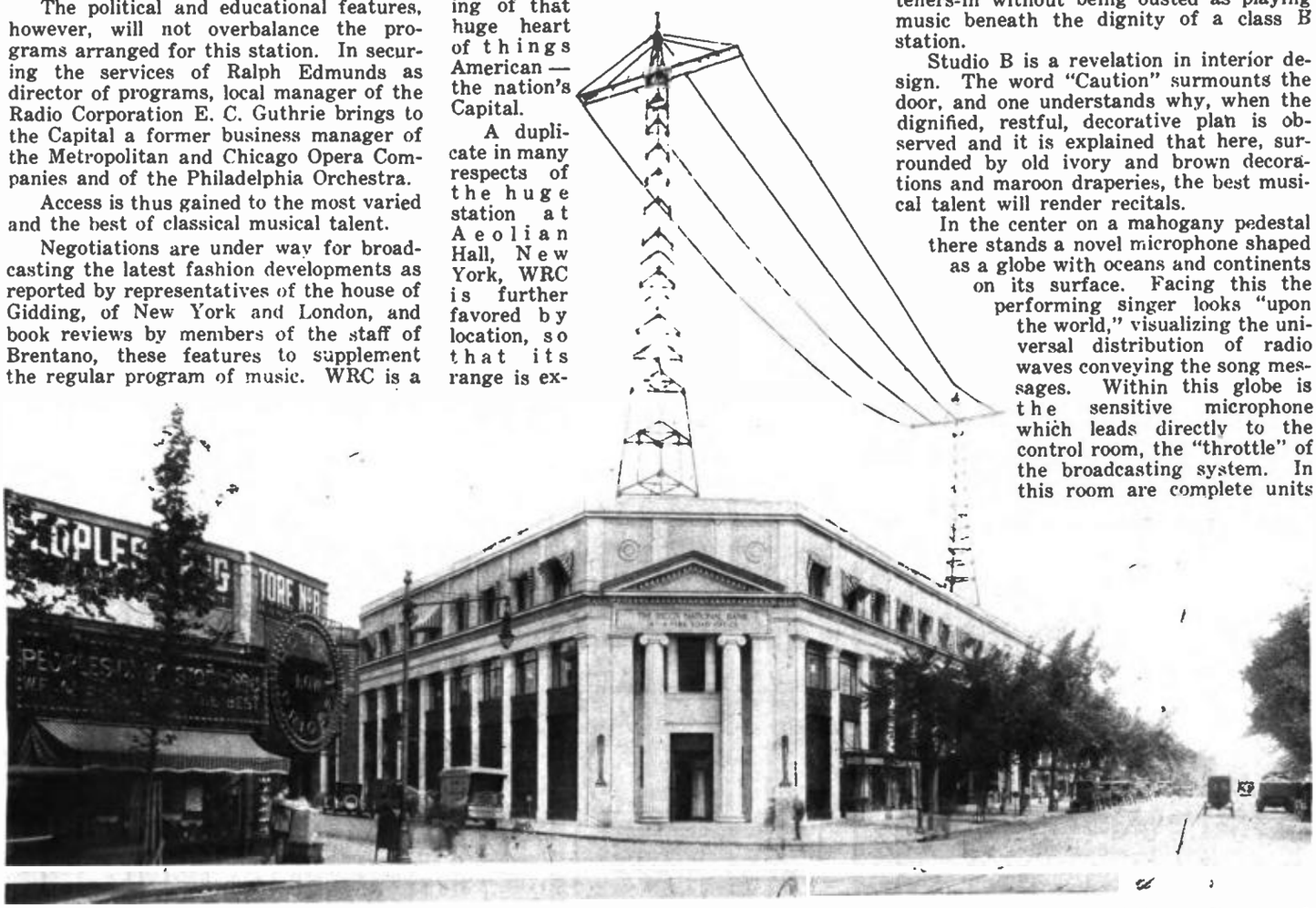
This is one of a suite of rooms, the first of which is occupied by the studio director. Next is the reception room, tastefully furnished in soft, quiet colors, where the artists wait their turn on the program. From this reception room one door leads to Studio A, the other to Studio B, the popular and classical music rooms, respectively.

In Studio A, dance orchestras, humorists and popular song artists will hold forth, the lively entertainers, those who will try to please the lighter fancies of listeners-in without being ousted as playing music beneath the dignity of a class B station.

Studio B is a revelation in interior design. The word "Caution" surmounts the door, and one understands why, when the dignified, restful, decorative plan is observed and it is explained that here, surrounded by old ivory and brown decorations and maroon draperies, the best musical talent will render recitals.

In the center on a mahogany pedestal there stands a novel microphone shaped as a globe with oceans and continents on its surface. Facing this the performing singer looks "upon the world," visualizing the universal distribution of radio waves conveying the song messages. Within this globe is the sensitive microphone which leads directly to the control room, the "throttle" of the broadcasting system. In this room are complete units of generators, tubes, inductances, condensers and transformers, all in duplicate, so that a program may never be delayed due to a breakdown of the apparatus.

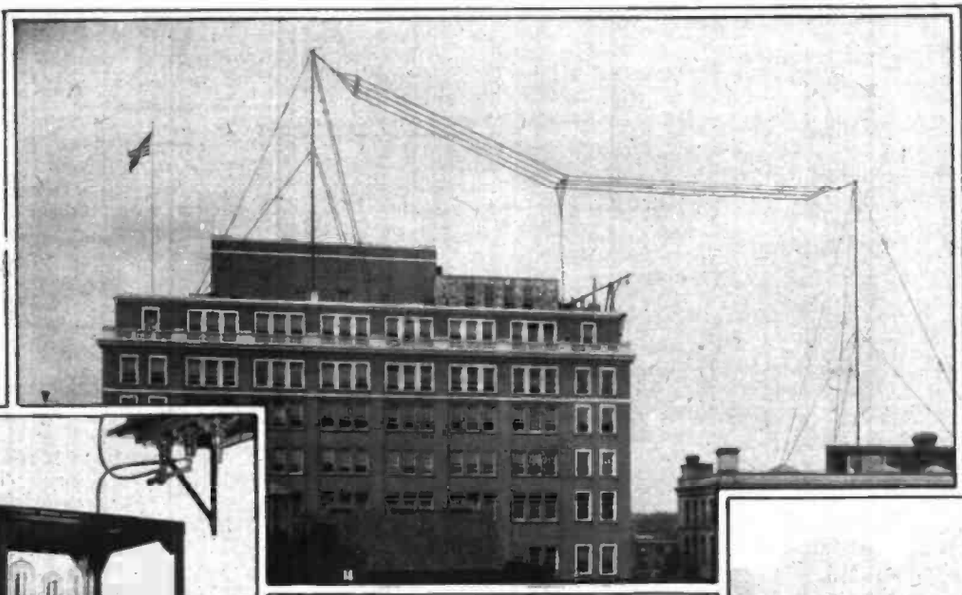
The control room is the center of an intercommunicating phone system leading to the studio and all other rooms of the station. The announcer has before him an "oscillograph," a device designed to indicate the quality of modulation and the effect of disturbing "carrier waves" upon the system. Thus no detail is left undone which might insure clearer and more perfect transmission. The operating branch of the station represents the embodiment of every device known, every precaution taken, in accordance with the most recent and approved practices of radio station design. Station WRC is rated as a 2KW



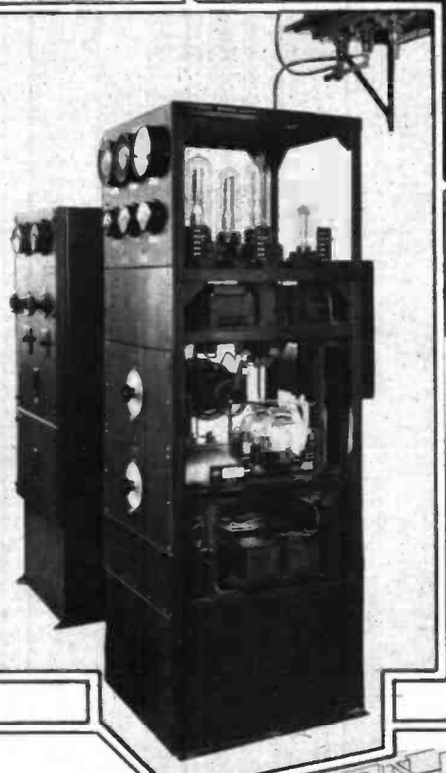
Station WRC, the new Radio Corporation broadcasting station in Washington, is in the Riggs National Bank Building at Fourteenth street and Park road. The broadcasting studios are on the second floor to the left of the main entrance.

Photo courtesy Radio Sales Studio, Washington

WCAP



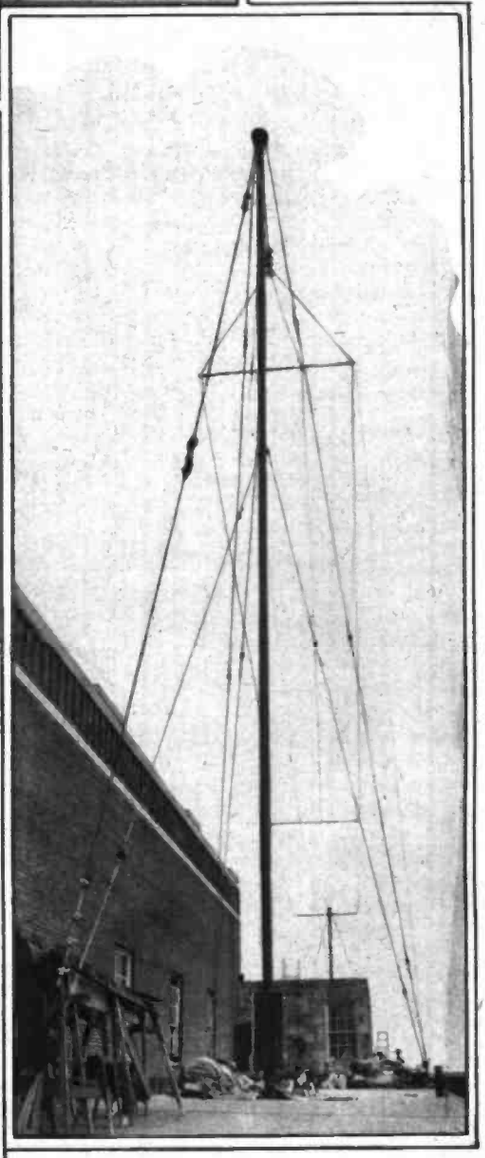
WEAF

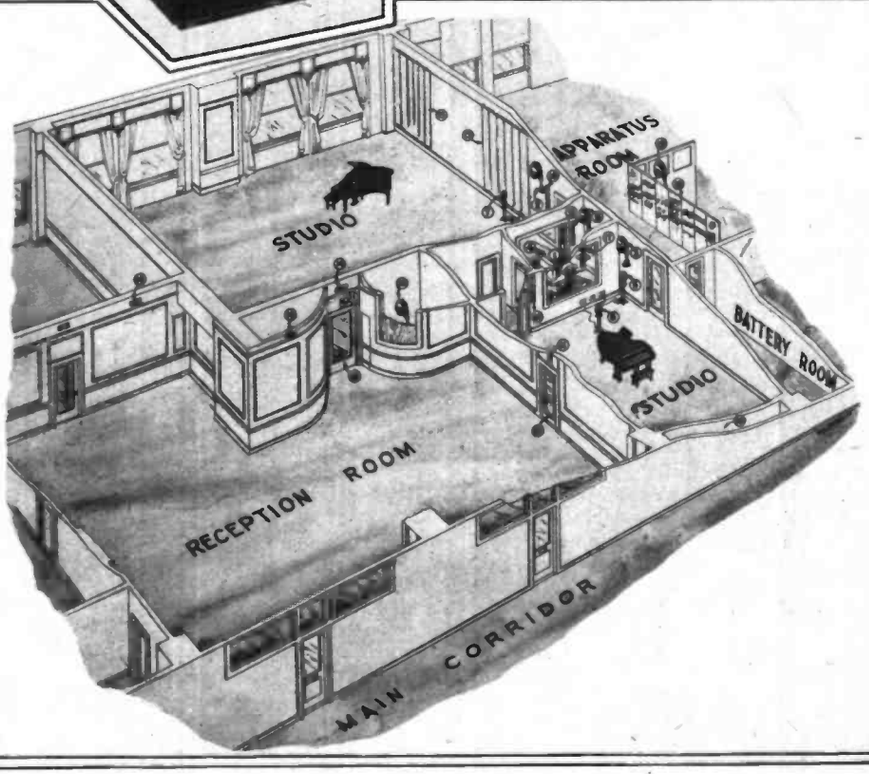


Station WCAP, the new Chesapeake and Potomac telephone broadcasting station in Washington, D. C., stole a march on the new Radio Corporation broadcasting station in the Capitol by suddenly deciding to relay WEAF'S New York concerts beginning July 4.

This gives Washington the best concerts that can be obtained in New York, and the Washington fans are very enthusiastic about it.

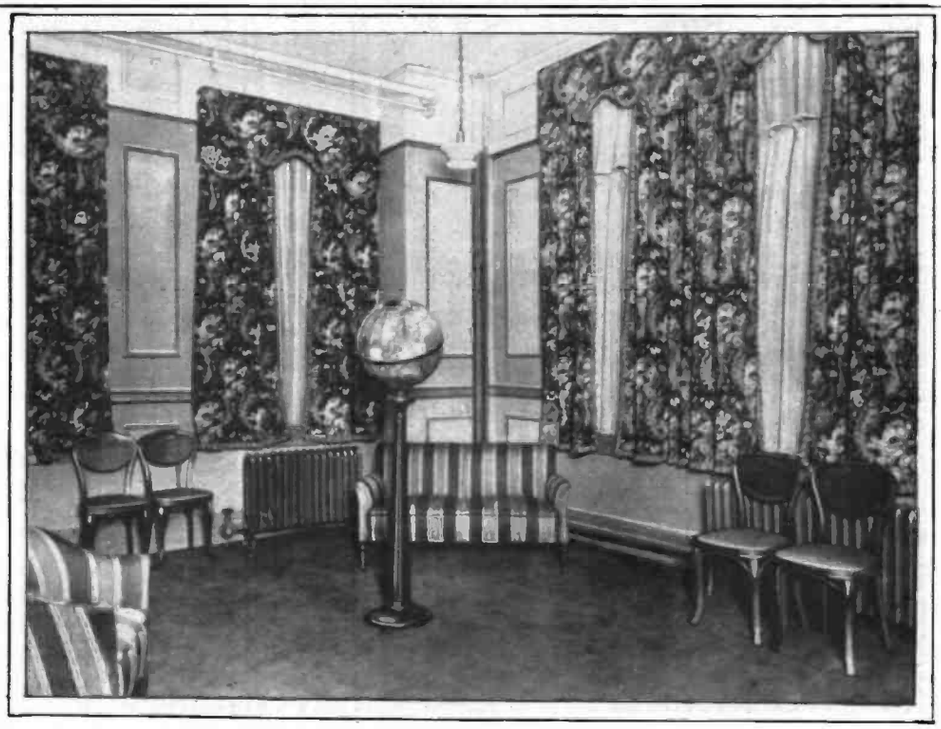
The top picture shows the aerial installation of WCAP, while to the left are the two panels of transmitting apparatus and to the right one of the great masts which support the aerial.





To the left is a plan view of the studio lay-out at station WEAF in New York, where are given the concerts that are relayed and broadcast from station WCAP for fans in Washington.

station; it will normally employ ½ K.W. transmitting power. It so happens that the position of the apparatus and towers is far removed from other steel structures or radio stations and in a part of the city known to be more favorable for static elimination—that is, listeners-in have reported a marked absence of any local interference. When, therefore, this station operates its regular broadcasting schedule the programs will be favored with a good "start-off." Reception, either local or at distant points, should be correspondingly improved. An indication of the worth of radio to the Diplomatic Corps or high officials of foreign governments is indicated by the installation aboard his private railroad coach of a complete radio receiving set by General Gouraud, leading French military official now touring this country. This receiving apparatus was installed just previous to the departure of the general's train from Washington on July 9. Although the immediate use for such apparatus is solely for entertainment, foreign representatives en route over the railroads of this country may easily keep in touch with their Washington legation headquarters en route.



Interior view of the "Jazz" studio of Station WJY

Photo courtesy of Radio Corporation of America

WRC and WCAP broadcast on 469 meters. This wave length was assigned by the Department of Commerce with permission to broadcast certain hours of the day and night selected to avoid interference with each other. Reradiation effects common to other stations in the District of Columbia because of complicated antenna systems will be obviated in WRC, due to the simplicity and the isolation of the aerial equipment. The regular procedure for the erection of Radio Corporation of America stations was followed in this case, namely, a study of the place and surroundings of the station proposed by the research engineers, installation of the apparatus by the constructing engineer, in this case O. N. Howard; then turning the completed station over to the operating engineer, who is responsible for its maintenance. This insures nearly perfect broadcasting, for from ground to aerial every detail is checked and proved efficient.

General Pershing was scheduled to give the opening address from the new station, and it is expected that General Harbord, recently resigned from the army to accept the position of president of the Radio Corporation of America, will conduct the first program.

In the nation's Capital are two distinct radio departures. One of these is the Radio Sales Studio, situated directly beneath station WRC, and a store which retails radio sets exclusively. It is an example of "Radio in the Home," for the furnishings are such as would do credit to the most particular of stay-at-homes.

The other oddity of the city is "Uncle Dudley," known as "the Radio Doctor." He came here to repair receiving sets as a typewriter or machine repairman would ply his trade.

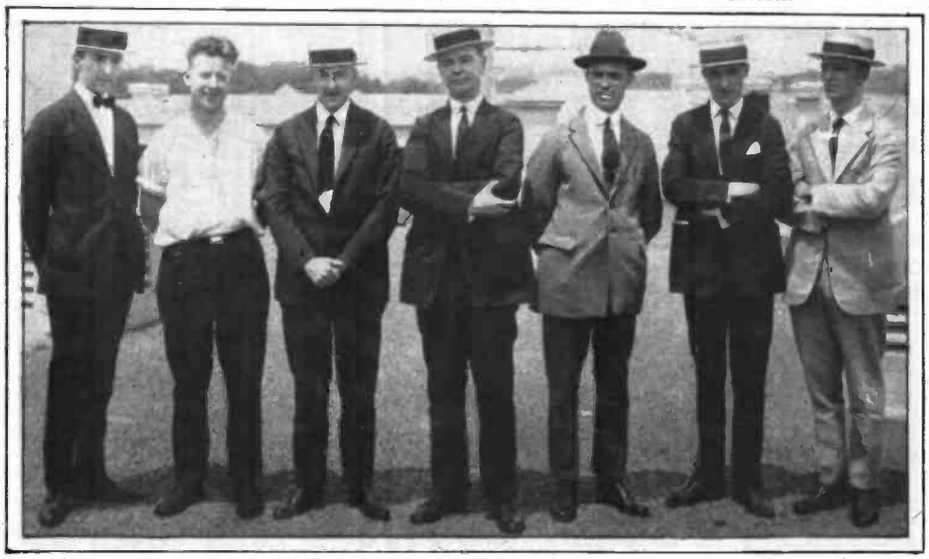
The National Radio Chamber of Commerce was organized in Washington. Its advocates said, "Washington is the center of things, from which events in the radio world will be broadcast."

The Department of Commerce, the ruling body for all radio activities, is in Washington. Radio apparatus is standardized and wave lengths of transmitting apparatus check up at the Bureau of Standards here.

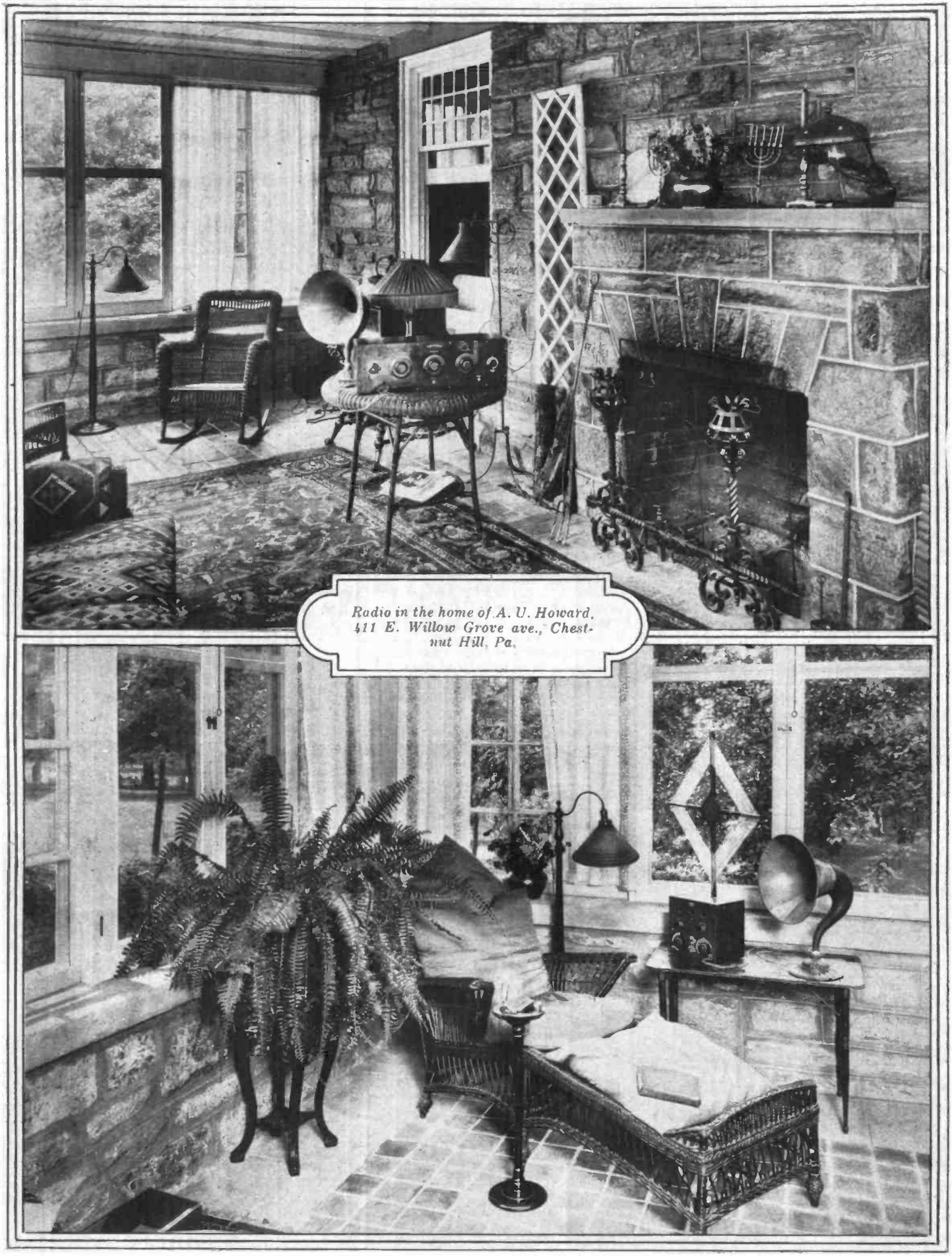
Because of the large Government station in Washington, NAA, this will ever be a great radio center. The Government service rendered by this station has been invaluable since the days when radio was first experimented with.

But there was need for a commercial organization to take hold of the failing radio situation and save it. An aggressive policy was needed to give the people what they wanted and free from the regulation red tape of the Government radio service.

Radiophon broadcasting is a separate enterprise; its success is dependent on new things, novel features, news broadcasts, all of which the Government station cannot handle properly even if officials should so decree. The situation is now well in hand, and listeners-in from Maine to California will look to Washington for radio entertainment emanating from the heart of the nation.



Ready for WRC to open. Reading from left to right: T. F. Ganon, announcer; William H. Howard, construction engineer; F. P. Guthrie, formerly head of Radio Dept., U. S. Shipping Board, now Washington district manager for Radio Corporation; Ralph Edmunds, program manager (formerly manager Philadelphia Orchestra and connected with Chicago and Metropolitan Grand Opera Co.); W. E. Grier, vice president, Radio Sales Studio; M. D. Meyerson, Radio Editor, Washington Post; Donald G. Stevens, president, Radio Sales Studio



Radio in the home of A. U. Howard, 411 E. Willow Grove ave., Chestnut Hill, Pa.

"Gosh!" says Ted, "They Call That Wiring!"

WHENEVER the air gets particularly blue around Station 3XP, I can always feel sure that some one has handed "Ted" Vollten a typical amateur home-built set. I know that Ted will turn to me and hold the thing out with his usual exclamation:

"Gosh; look at this, boss! And they call that wiring!"

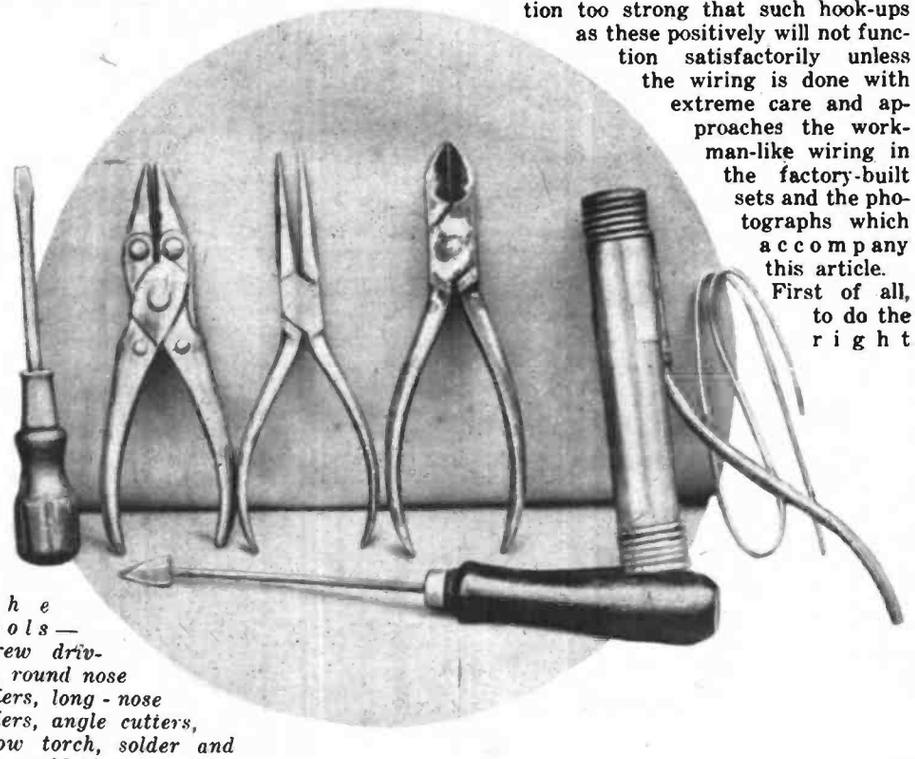
And then will follow one of Ted's picturesque dissertations on amateurs in general, particularly those who write us and tell us that we are fakers and that our hook-ups will not work. He will usually end up with:

"No wonder they can't make it work when they smear it together like this. You've simply got to write an article telling them how they ought to do their wiring."

And so originated this article.

A year ago this would not have been so necessary. In those days the average person was perfectly satisfied to hook up a simple single-circuit set with one tube, and almost any kind of wiring will function in that hook-up.

Nowadays, however, no beginner is satisfied with any such thing. It seems to me that nine out of ten want to start their radio experience with at least two stages of radio frequency amplification and two of audio frequency and a large percentage want to plunge right into such circuits as the Grimes inverse reflex or the Armstrong super-regenerative or the Hazeltine neutrodyne. I cannot make the assertion too strong that such hook-ups as these positively will not function satisfactorily unless the wiring is done with extreme care and approaches the workman-like wiring in the factory-built sets and the photographs which accompany this article. First of all, to do the right kind of wiring you ought to have the right kind of tools. You may manage to get by with a pair of pliers and a screw driver, but you will do very much better work and the work will not be nearly so tedious if you have the tools that are intended for this purpose.



The tools—screw driver, round nose pliers, long-nose pliers, angle cutters, blow torch, solder and soldering iron

It is not necessary for you to get a complete layout of tools that will fill a whole chest. All you need are the tools shown in one of the photographs with this article.

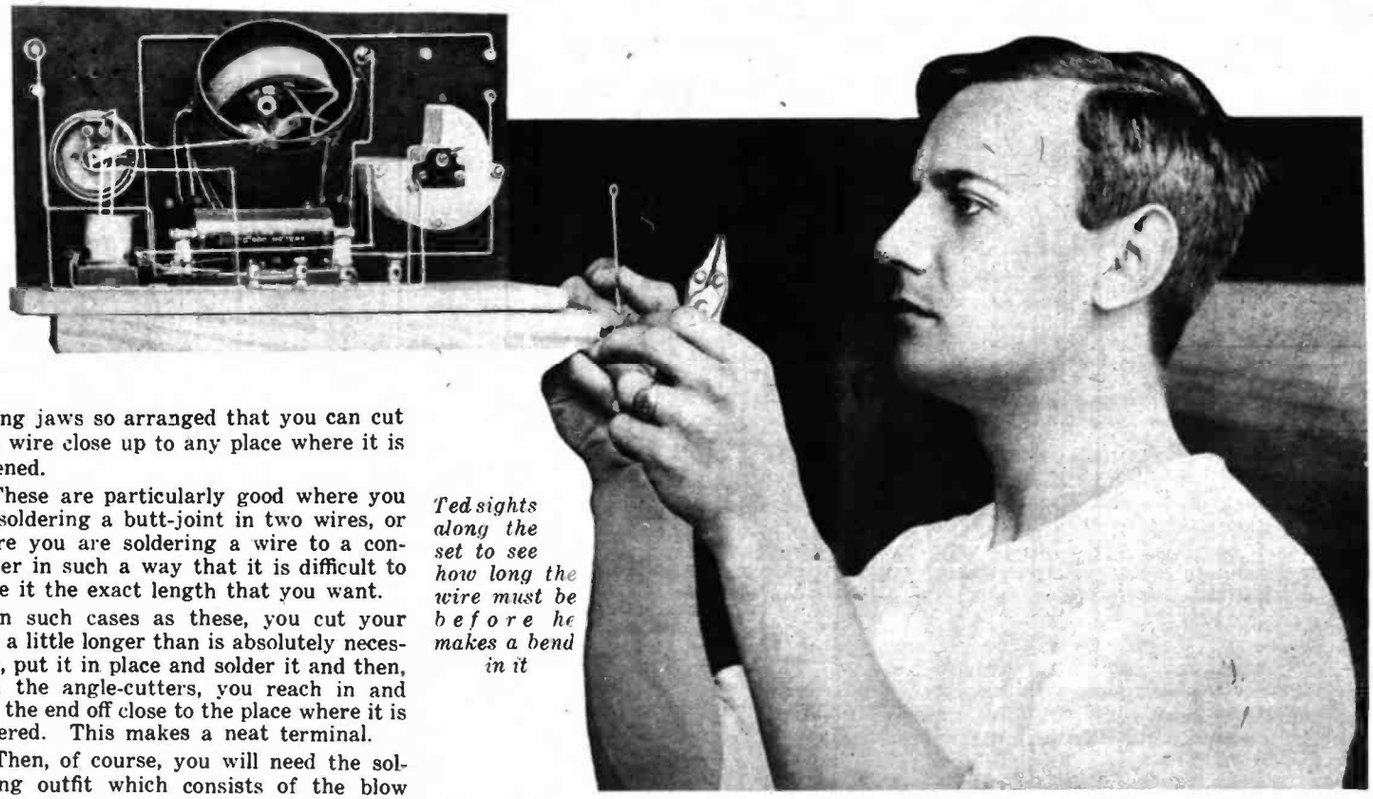
You will want a pair of round-nose pliers. These are used almost exclusively for bending loops in the ends of wires where the wires are to be fitted over binding posts. Of course, you can bend loops with any kind of pliers or with your fingers, so far as that is concerned, but as long as we are talking about the proper way of wiring a set we may just as well face the fact that the best loops will be made with regular round-nose pliers.

You will also want a pair of long-nose pliers. These also can be used for bending loops, but the round-nose ones are better for that purpose.

The long-nose pliers are particularly useful for reaching in among a lot of wires already installed and getting at the more inaccessible parts of the set.

These long-nose pliers are rounded at the ends, but the base of the jaws is square and the square part is the part with which you do the bending of the wires where they are to make right angles to go around things.

You should also have a pair of angle-cutters. These are a pair of pliers with



Ted sights along the set to see how long the wire must be before he makes a bend in it

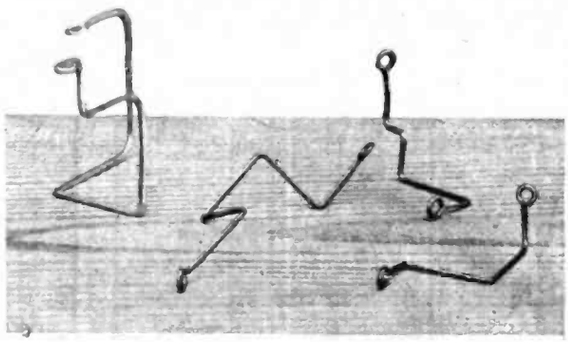
cutting jaws so arranged that you can cut off a wire close up to any place where it is fastened.

These are particularly good where you are soldering a butt-joint in two wires, or where you are soldering a wire to a condenser in such a way that it is difficult to make it the exact length that you want.

In such cases as these, you cut your wire a little longer than is absolutely necessary, put it in place and solder it and then, with the angle-cutters, you reach in and snip the end off close to the place where it is soldered. This makes a neat terminal.

Then, of course, you will need the soldering outfit which consists of the blow torch and the piece of wire solder and the iron itself.

The small screw driver just about completes the necessary outfit, assuming, of course, that you have the usual ordinary tools, such as a saw and a hammer.



Your wires will look like this when you have bent them and are ready to insert them

The tendency of the average beginner is to wire his connections as short as possible, letting his wires go diagonally or at any angle that is most convenient and paying no attention whatever to how close the wires come together nor where they cross, nor where they run parallel.

This, as I have said, does not make so much difference in the ordinary simple circuit using only one tube, but as soon as you get into amplification, and particularly where you are having both radio frequency and audio frequency amplification, the spacing of your wires becomes an extremely important element in the successful operation of the set.

It is for this reason, as much as for the appearance of the thing, that the standard form of what is popularly known as "buss-wiring" is a good thing.

This form of wiring makes all turns at right-angles and there are no diagonal wires at all. It enables you to check over and very quickly tell whether two wires are too close together, and by too close together I mean within a half inch of each other.

Wherever two wires are to run for any distance they should not be so close together, and where this seems to be almost necessary, it can be avoided by making another right-angle or perhaps two and so getting them separated.

It is an axiom in radio hooking up that all leads should be as short as possible and this refers particularly to the leads that go to grid and plate of the various tubes. The length of the battery wires is not important and so the secret of good wiring is in so placing the tubes and the transformers that the wires going between the transformers and tubes and connecting plates and grids with transformers should be just as short as it is possible to get them. Then the long leads can be used for the battery connections, as here there will be no waste of current in overcoming resistance.

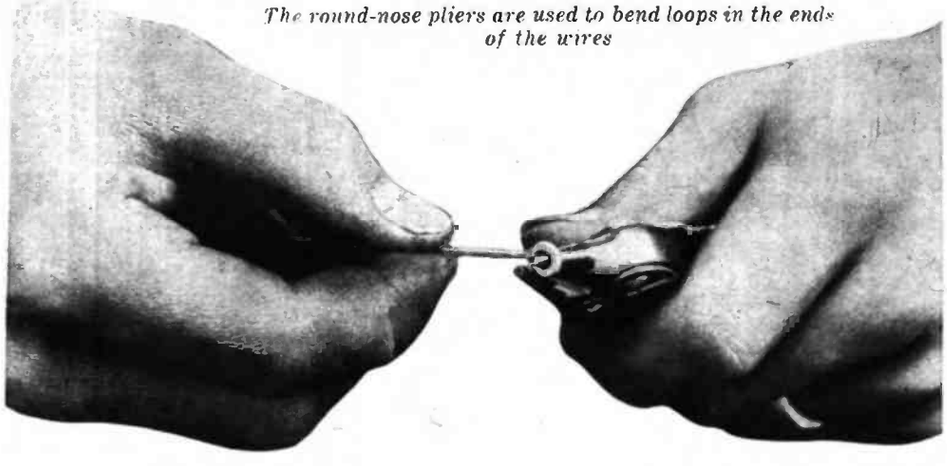
There is a very wide latitude in the choice of wire to be used in hooking up the set. Ordinary bell wire is perfectly satisfactory in simpler forms of hook-ups, and will, indeed, give fairly good satisfaction in almost any hook-up, but it is really better to use a wire that is just a little larger than this.

We, at 3XP, personally prefer Number 14 bare copper wire throughout the set. Most amateurs like to use spaghetti, but our own tests of the cheap spaghetti which is on the market have proved it to be so very bad as an insulator and it has caused so much trouble that we have discarded spaghetti entirely, although we have found that the best grade of cambric spaghetti is very efficient.

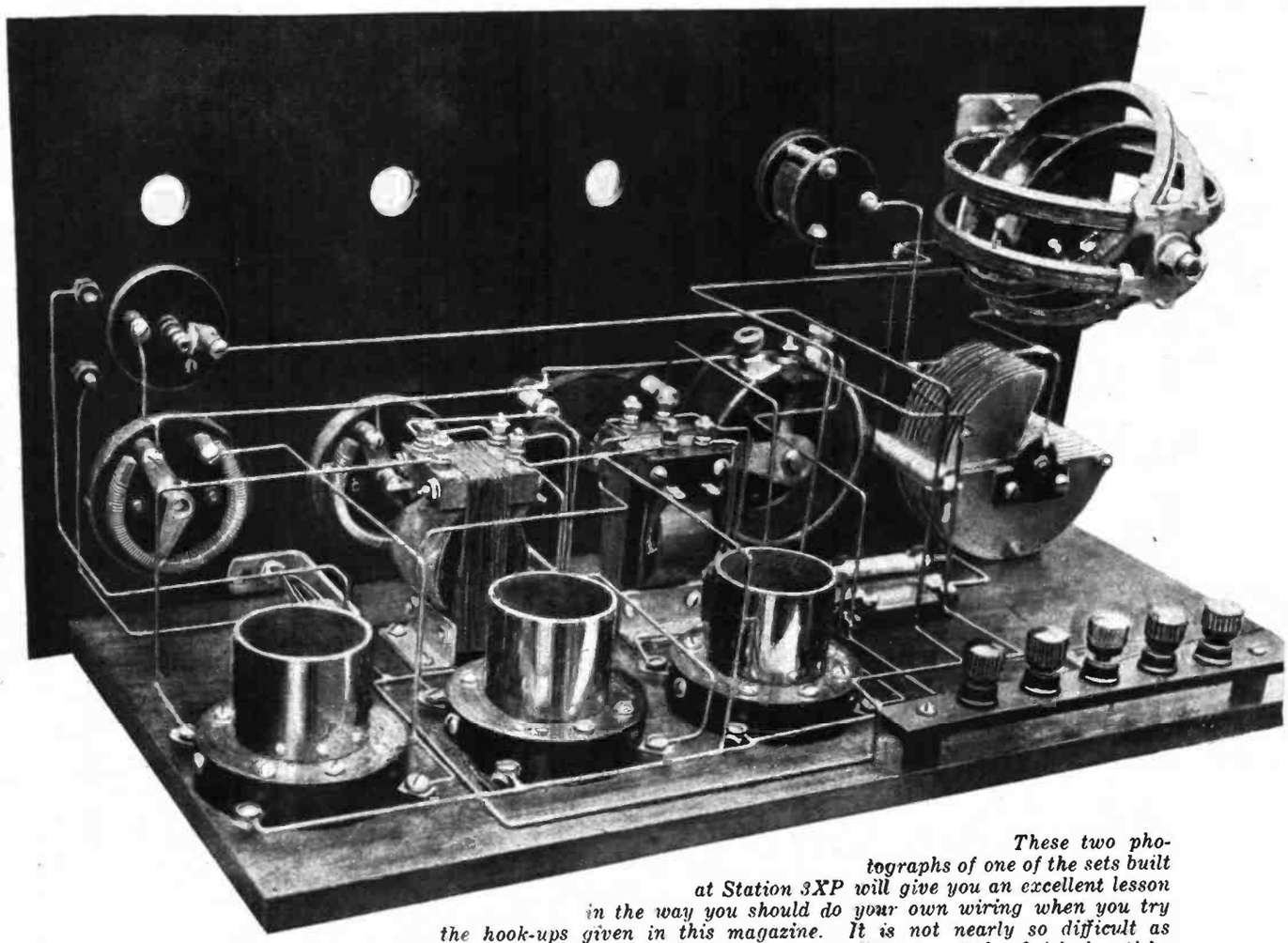
Still, however, we prefer to use the bare wire, because we figure that by doing this we will be more careful to have our spacing correct. If you use spaghetti

(Continued on Page 30)

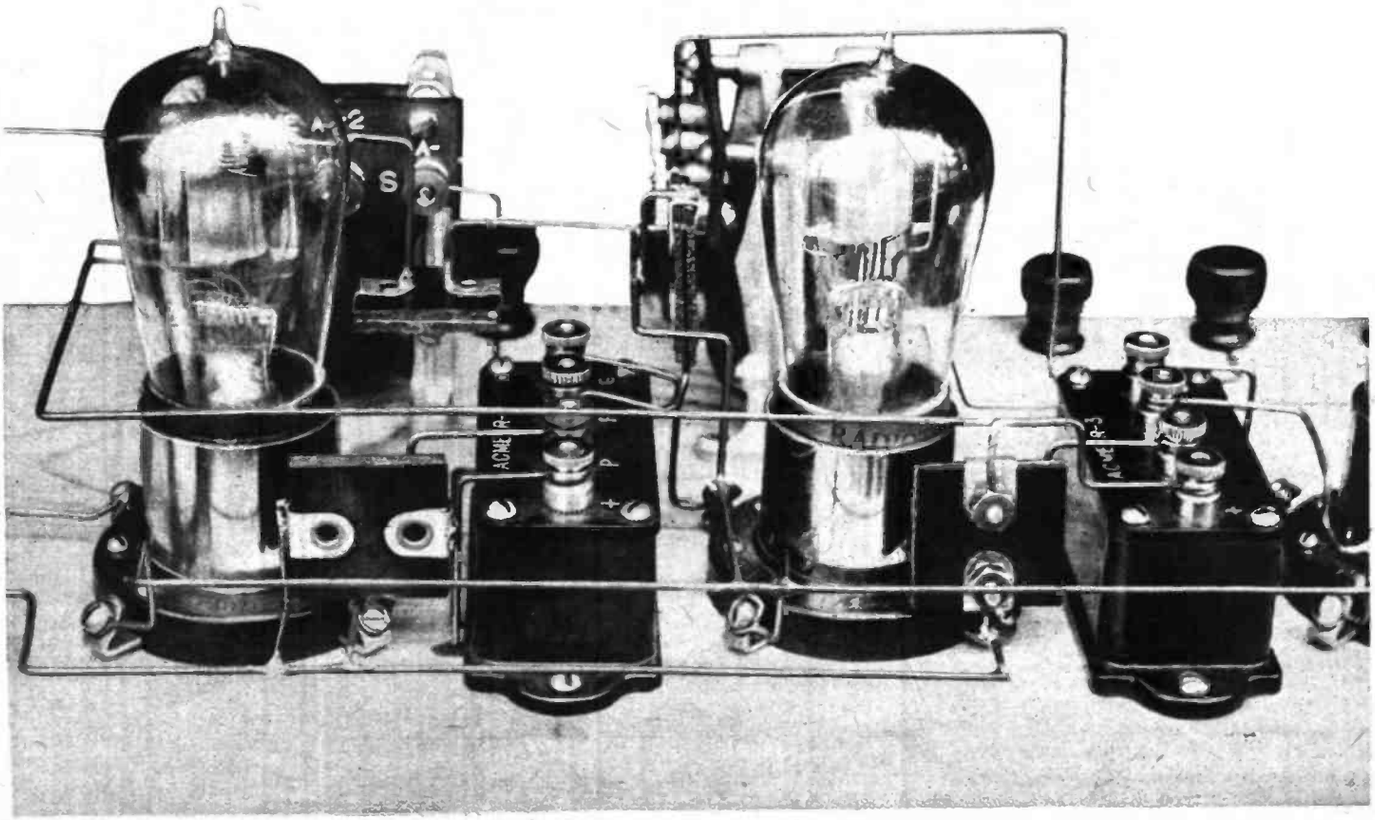
The round-nose pliers are used to bend loops in the ends of the wires



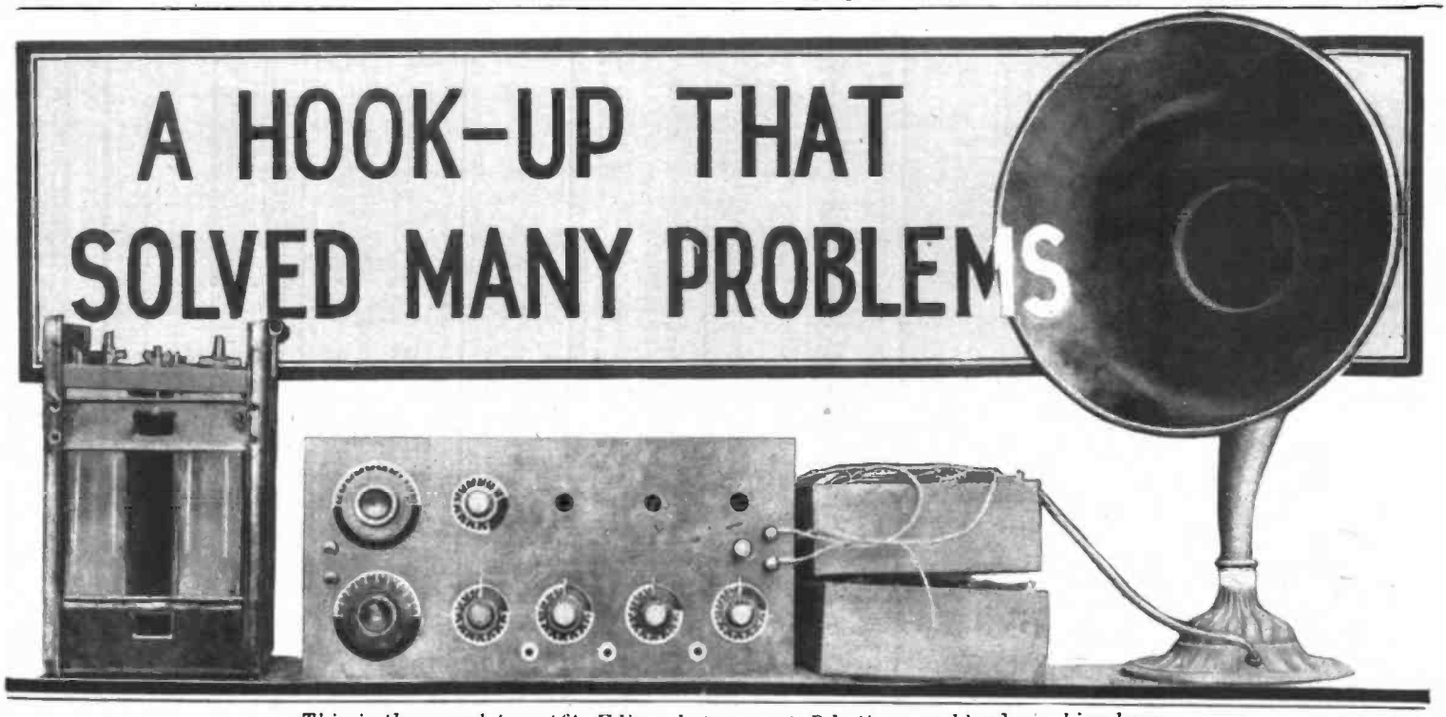
When You Wire a Set, Make It Look Like These Pictures



These two photographs of one of the sets built at Station 3XP will give you an excellent lesson in the way you should do your own wiring when you try the hook-ups given in this magazine. It is not nearly so difficult as it looks and adds immeasurably to the efficiency of the finished article.



A HOOK-UP THAT SOLVED MANY PROBLEMS



This is the complete outfit, Edison battery, set, B battery, and loud speaking horn

SITTING in the editorial chair of a radio magazine is not by any means the easy job that you, who casually read this publication, may think it is.

Every day the mail brings in heaps of letters all requesting hook-ups for different purposes and to meet different specifications.

It is utterly impossible to comply with all such requests, but every now and then there comes a letter which states conditions which are undoubtedly quite widespread, and the answer to such a letter as this will therefore probably appeal to a great many people.

This article is not written in response to a letter, but is written because of the personal visit paid to this office by a man who was on his way back to a large farm which he owns in the South, and who was very anxious to have a radio set.

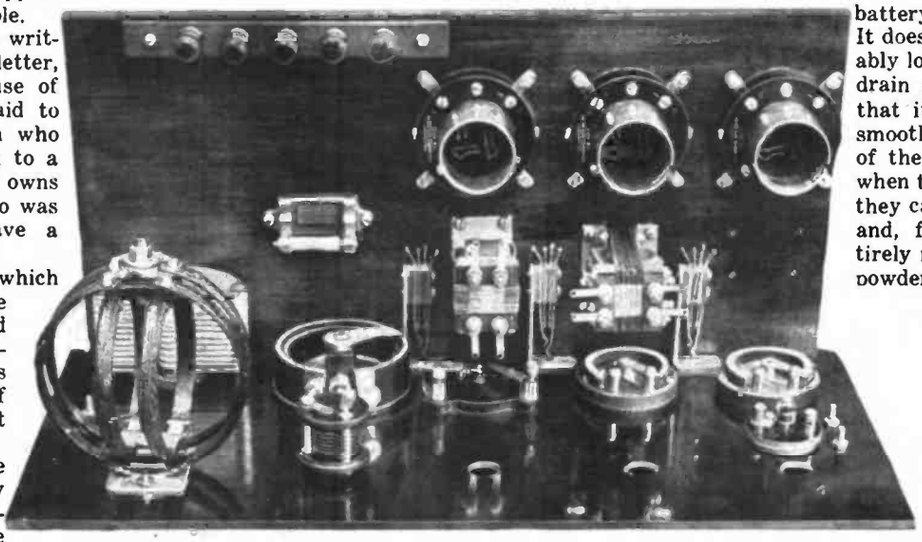
The conditions which confronted him are very widespread, and I think that our solution of his problems will probably be of interest to a great many readers.

In the first place he wanted to do away with the storage battery entirely, because be had no electricity on his farm, nor was there an electric light plant near enough to him to make electricity sufficiently economical to install.

He therefore had to have the kind of tubes which will burn on dry cells.

Here again the problem was puzzling to him, because he was a good many miles away from a large town, and even that town seldom was able to furnish dry cells that were really fresh. He had tried a number of shipments of these cells and had found that they had so much deteriorated in the country store that there was very little life left in them. He also wanted to have at least three tubes, so that he could work a loud speaker.

Another thing that troubled him was how he was going to put the set together. He did not want to get a set which was already assembled. He confessed that he was only a fair-to-middling mechanic, and that, while he might be able to bore the holes necessary for the shafts of a few instruments, and could wire up the instruments from such diagrams as we publish in *Radio in the Home*, the thing that deterred him was the necessity of boring semi-circles of holes for contact points for the tap switches of the variocoupler and the wiring up of all of these various taps from the primary of the coupler to the contact points.



This gives an idea of how the instruments are arranged before wiring

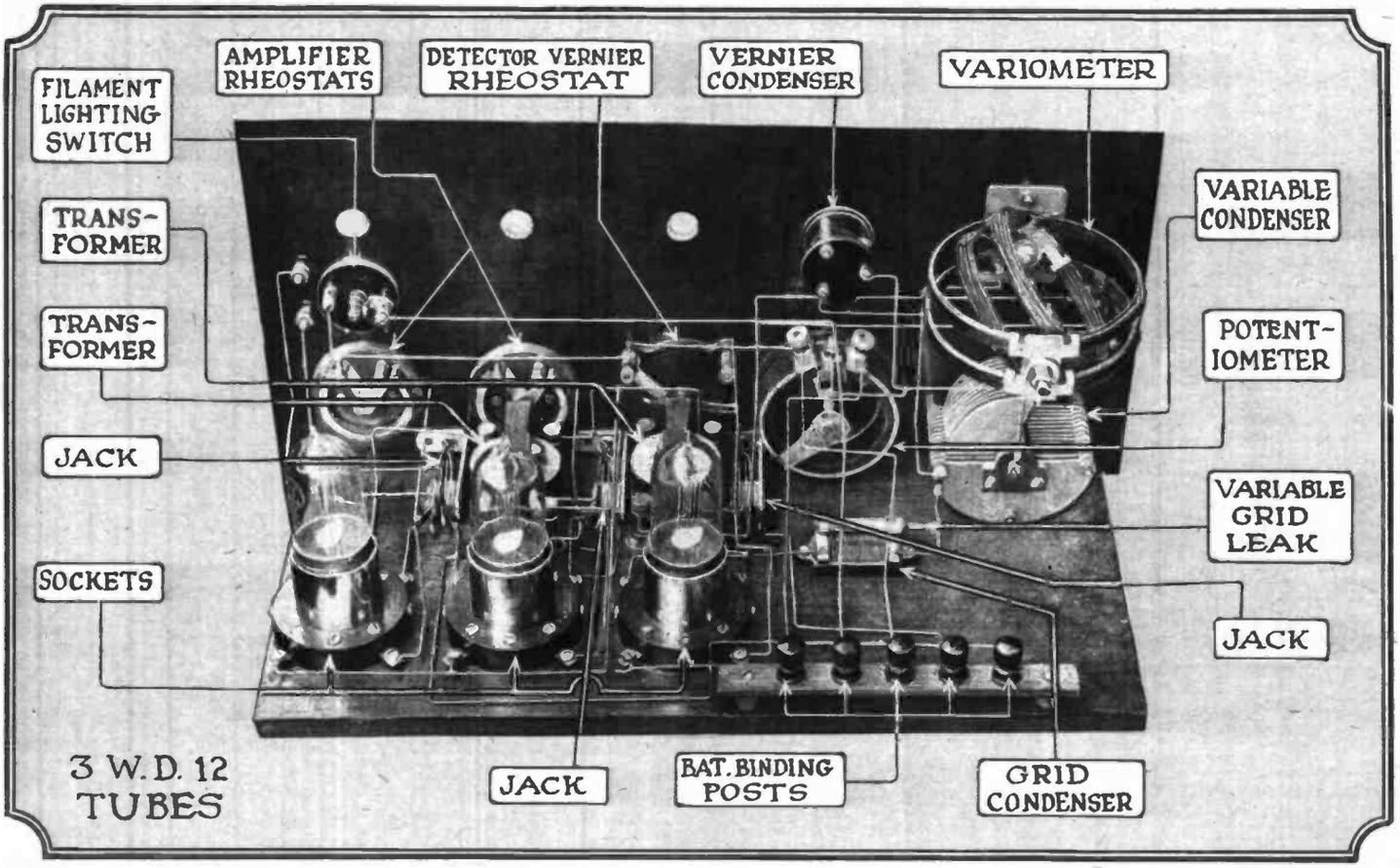
Our problem then was quite a complicated one to meet all of these conditions, but we have done it very successfully, and I think that the hook-up which we gave this man will be very popular with others who are in about the same position as he is.

We solved his battery problem by advising him to use the WD12 tubes as detector and for two stages of audio frequency amplification. Instead of the dry cells we advised him to get an Edison primary cell.

The advantages of this Edison primary cell are many. It is not a storage battery and cannot be re-charged. It does, however, give a remarkably long life under considerable drain and the best part of it is that its operation is absolutely smooth right up to the last gasp of the life of its plates. Then, when the plates are all worn out, they can simply be thrown away and, for three dollars, an entirely new set of plates and new powder for the solution can be bought and the battery is then in exactly the same electrical condition as when it was first put up and is good for the same length of life.

For one WD12 tube (and the same, of course, is true of the WD11) this battery gives a continuous life of one thousand hours. For three tubes, therefore, the battery will give a life of three hundred and thirty-three and a third hours. This is the small-size battery.

This solved the battery and tube problem for him and will do the same for anyone else who is situated as he is or for the very many persons who, even though they have electricity in their houses, do not feel justified in going to the expense of having



a battery charger and who know the unsatisfactory operation of having to take the battery out every now and then to a charging station.

The other problem of this man was just a little more difficult to solve. He was strongly opposed to using a variocoupler. He was sure that he would never be able to make a neat and efficient job of connecting up the taps of the primary and he did not feel like going to the bother of learning how to do it.

And yet this man insisted on having a very selective hook-up. He said that there were several stations within range of his place fairly close together in wave length and he wanted to tune one out and get the other in without much difficulty.

We discussed his problem pretty thoroughly out at 3XP and finally gave him the hook-up shown here. This is the Gibbons modification of the DeForest ultra-audion circuit using a variometer in place of the usual fixed coil.

For the past year or so I have been boosting this Gibbons hook-up as an extremely efficient one for broadcast reception and our new tests made with it at 3XP in this hook-up with two stages of audio frequency amplification have confirmed me in my belief that it is among the top notchers of hook-ups for amateurs.

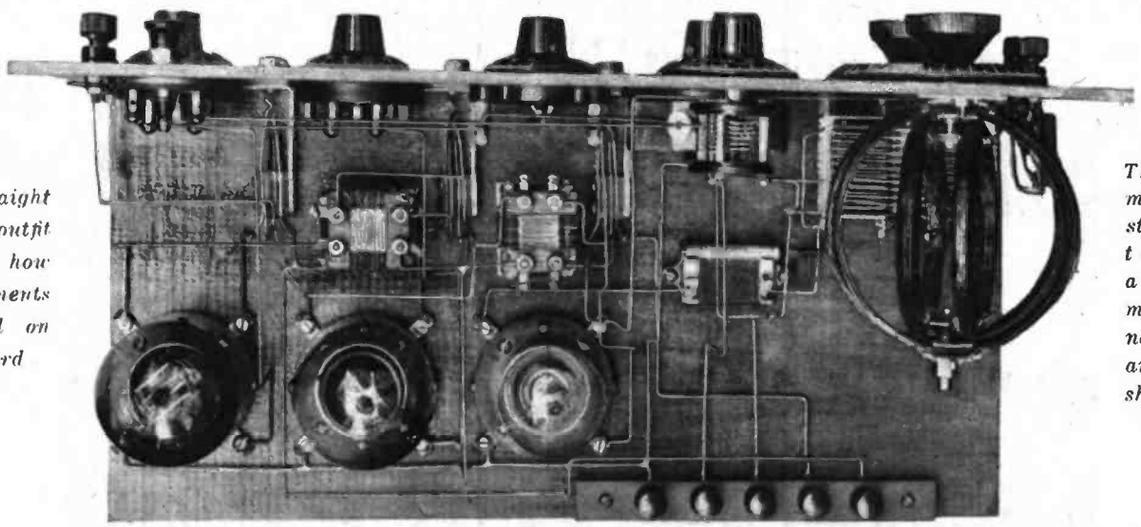
In this particular form I would say that it is about the best arrangement for the beginner to try, because it combines extreme simplicity in building with ease in operation and remarkably selective tuning.

I am showing you with this article a scale drawing of the panel as we laid it out and this together with the photographs will give you all of the information you will require about it.

We used a Thompson-Levering bank-wound variometer because of its economy of space on the panel, but any standard variometer will do equally well in this circuit.

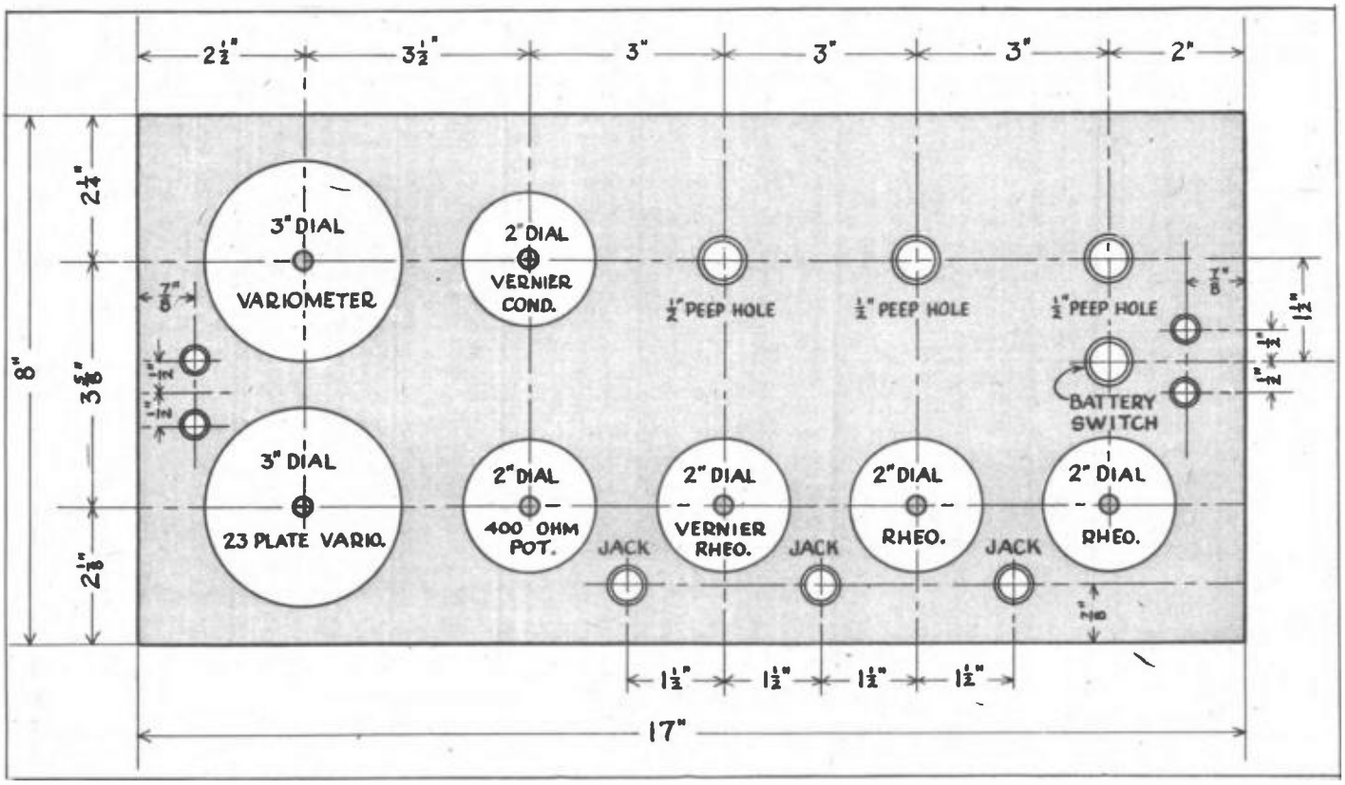
I included the potentiometer although it is not really absolutely essential. If you want to do without it simply connect the minus of your B battery with the plus side of the A battery and that connection runs to the grounded side of the condenser and to the ground. I advise the inclusion of the potentiometer, however, because for distant stations it will do a great deal in clearing up hissing and whistling and the usual noises which sometimes interfere with weak signals.

We found that the WD12 tubes operate



Looking straight down on the outfit you can see how the instruments are arranged on the baseboard

This arrangement of rheostats, jacks, transformers and tubes makes the neatest wiring and gives the shortest leads



This scale drawing will enable any one to lay out the panel as we did it

very satisfactory with the Acme, the 3YQ, the General Radio Company, the Geraco and the Federal transformers. It would undoubtedly function with others, but I am naming these because they are the only ones I have tried in this circuit with perfect success.

We also tried a new stunt to improve the looks of this hook-up and that was to use a panel of celeron in its natural finish instead of the usual black finish. This natural finish is a beautiful chocolate brown and it makes an especially effective background for the black dials and black indicating instruments and goes very well with a good hard-wood cabinet.

The secret of tuning in this set lies in a nice adjustment between the setting of the variometer and the variable condenser. This balance can be found in a number of combinations and some of them may bring in very strong signals but very badly clouded by mushiness.

In such a case the vernier condenser will get rid of much of this mushiness and clear them up, and a slight touch on the potentiometer will also help, aided by turning down or up the rheostat of the detector tube alone.

When I speak of a "balance" between the variometer and the variable condenser and the possibility of striking this balance in a number of different combinations, I mean that the ability to receive a station is not confined to any one definite setting.

For instance, in order to illustrate this to you, I have just made a list of the settings of the two dials at which I have been able to get two of the local stations, WOO on 509 meters and WDAR on 395 meters. The various settings at which I get these stations—and let me say that each tuning completely tuned the other out—follow:

The tunings for WOO were:

Variometer 38 condenser 50
Variometer 52 condenser 30
Variometer 64 condenser 20
Variometer 79 condenser 10
Variometer 36 condenser 60

The strongest were the ones where I had the variometer at 64 and the condenser at 20, and the one with the variometer at 79 and the condenser at 10.

WDAR came in as follows:

Variometer 30 condenser 23
Variometer 26 condenser 30
Variometer 38 condenser 15
Variometer 46 condenser 5

This last setting with the variometer at 46 and condenser at 5 was the loudest for WDAR. In all of these settings the fine tuning was done by means of the little Chelten midget vernier.

Let me emphasize the fact again that in these various settings for one station, the other station was totally eliminated. In fact, you can eliminate a station by two or three degrees on either the variometer or the variable condenser. I have many times separated two stations which were very close together in wave length by turning nothing except the little midget vernier.

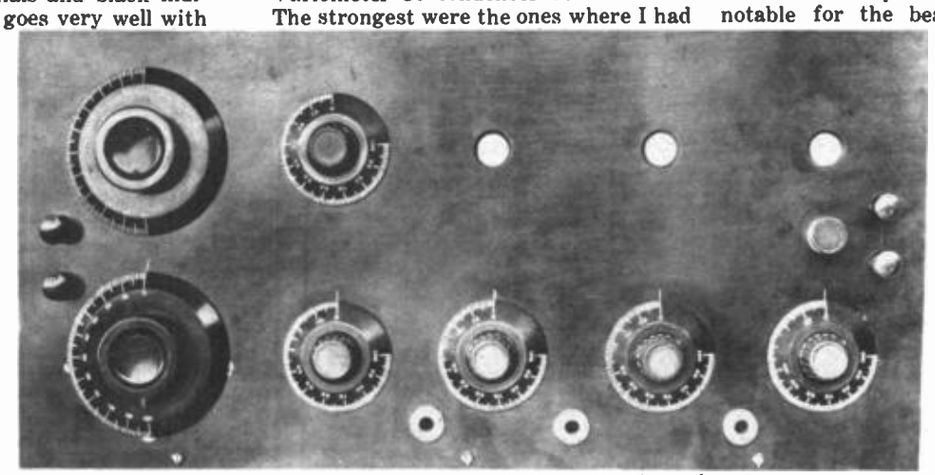
This hook-up in this particular form is notable for the beautiful clearness with which stations can be separated. Many hook-ups will permit you to separate stations, but when you are on one you will hear, when that one is silent for a moment, just a faint echo of the other.

With this hook-up as given here a few degrees will clean one station out absolutely and give you the other and there is no echo of the one you do not want.

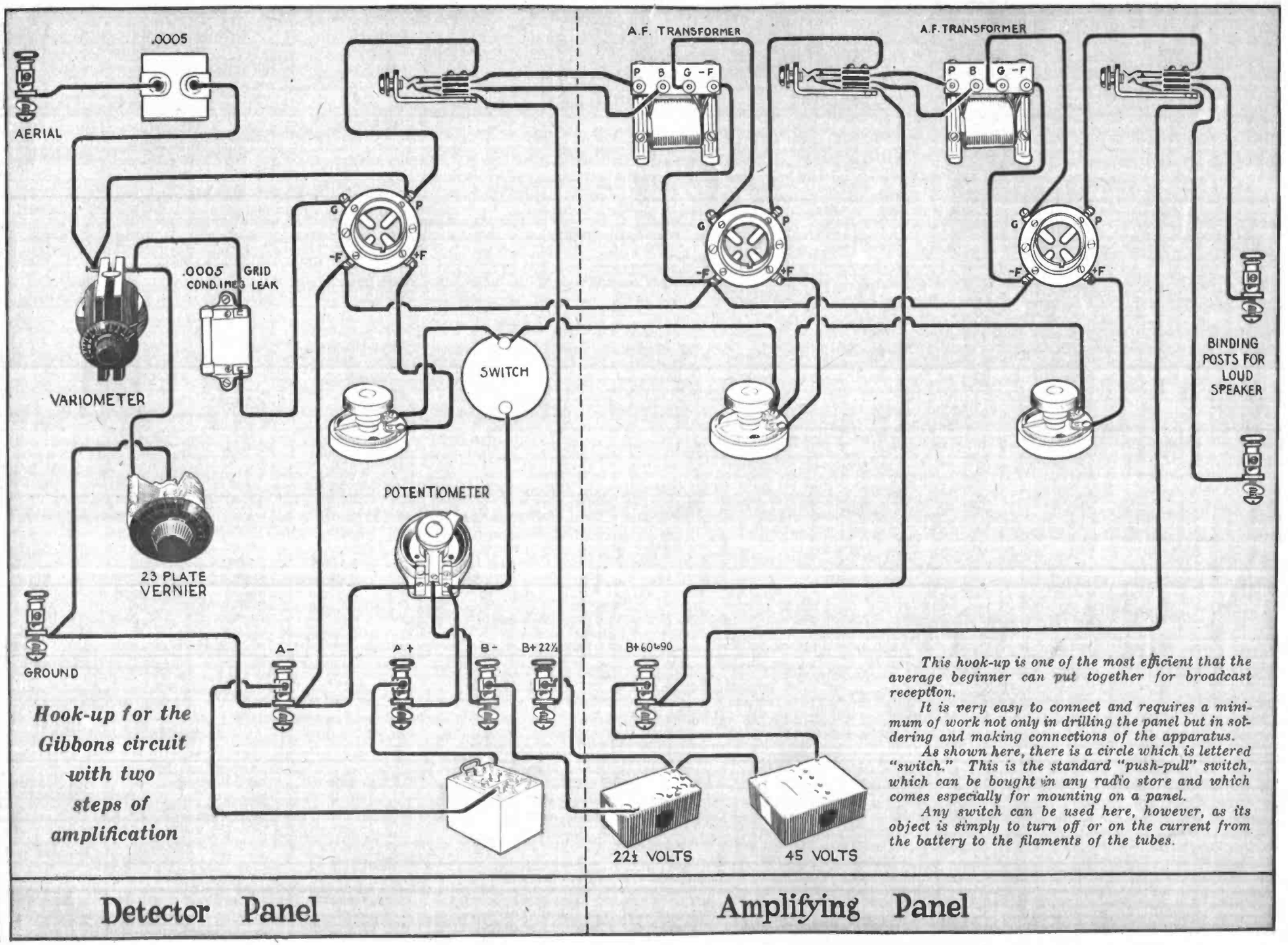
The value of this little midget vernier condenser is particularly apparent around the Philadelphia district. Here we have stations broadcasting on 395 meters locally and WGY, one of our favorite out-of-town stations, is only 15 meters away.

Likewise we have local stations broadcasting on 509 meters while station WEAF in New York, another of our favorite out-of-town broadcasters, is on 492 meters.

(Continued on Page 31)



This is the completed panel made from the above drawing



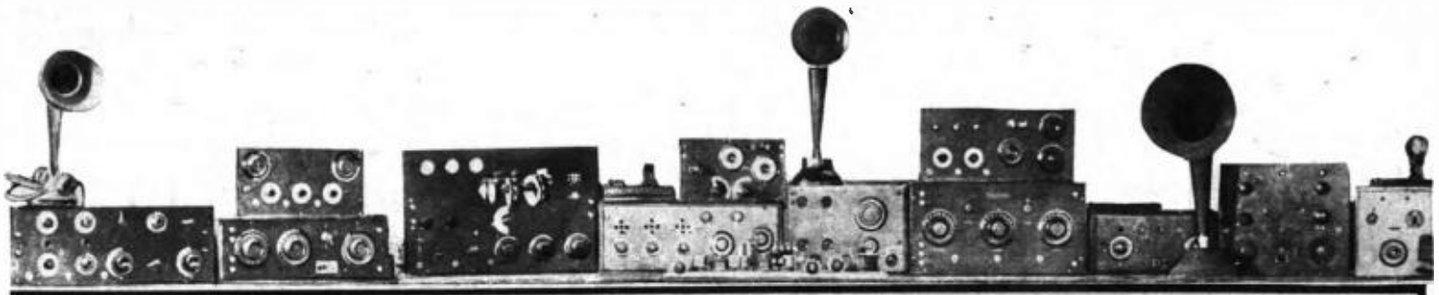
Hook-up for the Gibbons circuit with two steps of amplification

This hook-up is one of the most efficient that the average beginner can put together for broadcast reception.

It is very easy to connect and requires a minimum of work not only in drilling the panel but in soldering and making connections of the apparatus.

As shown here, there is a circle which is lettered "switch." This is the standard "push-pull" switch, which can be bought in any radio store and which comes especially for mounting on a panel.

Any switch can be used here, however, as its object is simply to turn off or on the current from the battery to the filaments of the tubes.

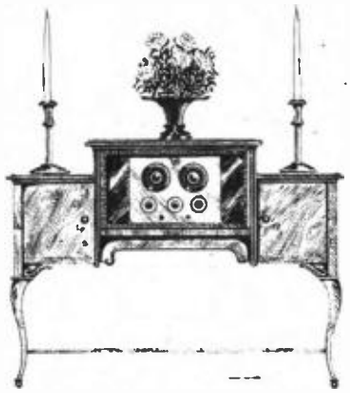


Editorially Speaking and—

Sets on the test table at 2XP, the experimental station of Radio in the Home at Delanco, N. J.

REVOLUTIONIZING radio is the favorite dream of people who know little or nothing about it. You hear these people talking very freely about the changes that are to take place almost overnight, and you will hear them add that they are not going to invest in a radio set now because, six months from now, all of the present apparatus will be junked and radio will starts out again on a totally new and an entirely different basis.

It always amuses me to hear these people talk. Of course, nobody knows what the future holds for anything, but I would be willing to give fair-sized odds to any one that the radio sets that are in use today will be just as good a year or two years from now as they are at present.



In spite of all of the many hook-ups and the numberless new ideas that are being invented all the time, the sets that were good a year and a half ago for the reception of radio broadcasting are just as good now as they were then. There have been improvements, of course, but so there have been improvements in the automobile and every other piece of apparatus made for human good. If there were no such improvements, it would not be worth while for finance to invest in business.

The radio set of today is as beautiful and as fine a piece of mechanism as any one need want, and no one who knows anything about radio is looking for any such radical changes as would mean that an investment in a set as at present developed will be money lost.

If I were asked what the three most vital necessities of radio today are, I should answer:

First, a device that would really eliminate static in the summer time.

Second, a device that would do away with the necessity of a storage battery.

Third, an improved microphone in the transmitting station that will be free from the unpleasant "air-rush" that at present mars so much of the broadcasting even from the best studios. It is not generally known, but it is nevertheless a fact that all three of these problems are now solved.

Six months ago I should have joined in the general opinion of people that a real static eliminator was an impossibility. Today it is not only a possibility, but is an accomplished fact. The Navy has perfected a device for cutting static out on the longer waves, and I happen to know of a device for the broadcasting waves which has been very thoroughly tested out during the last six months and is now pronounced perfect, or nearly perfect, by men whose opinion I value very highly and whose conservatism I have known for the last fifteen years.

These men have gone to a great deal of trouble and expense in developing this static eliminator, and they hoped to have their patent papers through in time to put it on the market this summer.

The papers are now well on their way, but the device is so valuable that they very naturally do not want to rush into the market with it before they are sure that they are going to be protected financially in the future.

I am free to confess that I did not expect to be convinced that a static eliminator was possible, but these people have convinced me, and I am free to make the prediction that next summer static will be almost unknown in the good radio receiving set.

For a long time scientists have been trying to devise some attachment that would enable us to light our radio bulbs by means of the house electric lighting current.

This current, as most people know, alternates at the rate of sixty cycles per second, and these alternations have always caused such a loud and unpleasant hum in the radio telephones or the loud speaker that nobody has been satisfied with the signals received.

Many devices have been tried out to eliminate this unpleasant hum, but the devices have been only partially successful.

A few weeks ago the chief engineer of one of the best established firms in the radio industry sat in my office and told me calmly that they have perfected and are ready to put on the market in a short time the device which we have all longed to see. He assured me that the hum of the sixty cycles is totally eliminated and they are able to control the current so that it will operate any tube now on the market.

This device will be put on sale very shortly and the present plan is to sell it for $35.00. In my estimation this will increase the radio enthusiasm of the American public by fifty per cent.

The third desirable change to be made—that which will eliminate the "air-rush" of the microphone at the transmitting station—is already under way.

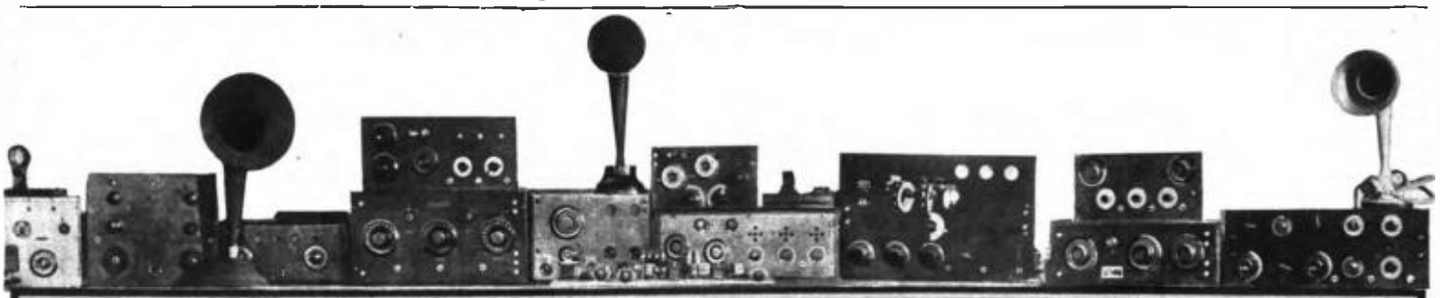
The new transmitting apparatus which uses the vibrations of a flame instead of vibrations of a little diaphragm has been so thoroughly tried out and so successfully operated that there seems no question of its immediate adoption by all of the up-to-date broadcasting stations. The General Electric station, WGY, at Schenectady, has had this flame microphone in operation for a long time and the wonderful change and improvement in the quality of their signals has proved that there is now no longer any reason for the annoying air-rush that mars so much of radio transmission.

You will notice that all three of these changes are extremely important and are almost revolutionary, and yet none of them affects the form or the details of the present receiving sets.

The static eliminator and the device for lighting the bulbs are both attachments that can be put on any of the present receiving sets and they do not in any way alter the construction of the apparatus as we know it.

The man who waits for radical changes in radio sets is going to die a gray-haired old codger without the joys of the most remarkable invention of modern science.

"But," many people say, "you see so



—still Editorially Speaking

We publish no hook-ups until we have built them ourselves and given them a thorough tryout here

many new hook-ups coming out all the time and they are all supposed to be better than any previous one."

No one need have any fear of the new hook-ups coming out all the time. They are all interesting, all fascinating to try, all helping spread radio.

And they all make circulation for a magazine of this kind. In spite of the opposition of many short-sighted manufacturers I am continuing to publish all of the hook-ups which prove at all satisfactory, but I want to say this right here, and say it very definitely:

There is not one man in ten thousand who can take one of these hook-ups and build it in such a way as to get even one-half of the satisfaction that he would get from any of six or eight standard radio sets which I could name.

I have been building radio sets ever since radio sets were built, and yet I have never built a set which has given me the satisfaction that I have had with four or five of the products of the reputable manufacturers.

In addition to this very great advantage from a purely radio standpoint which the manufactured set has, it has the added advantage of a distinction and a good taste in construction and design and workmanship that no amateur could possibly equal.

And yet I believe that the publishing of these hook-ups and the encouraging of the amateur to build his own set is a very valuable assistance to the manufacturer of the standard sets.

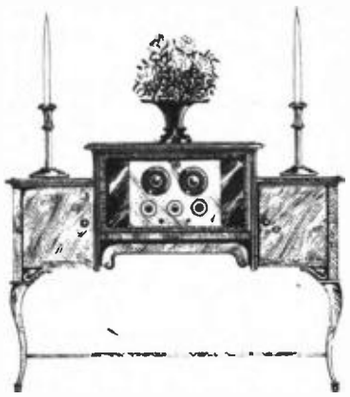
If we had nothing but factory products on the market, there would not be one one-hundredth of the number of ardent radio listeners-in that there are at the present time.

The average American loves to make something with his hands. He loves to try new things and to experiment and to sit down with a certain amount of satisfaction to view the product of his labor.

Radio has opened to him a wider and a more fascinating field for this instinct than anything has yet done.

Such men as these would not be sufficiently interested in radio to buy a set if they did not first have their interest keenly aroused by this ability to get their introduction through the work of their own hands. *Every man who puts together even a crystal set becomes at once a potential buyer of the $200 set of the standard manufacturer.*

Such a man may monkey around with his own devices for a year or two, but as he develops more or less trouble with the sets that he hooks up himself and as he continues to hear of the much superior results of the finer set and as his wife begins to be jealous of her neighbor who has a really workmanlike product and ashamed of her own home-made set—as all of these things happen, the amateur workman gradually finds himself envying his neighbors the possession of the set that they have bought from regular manufacturers and before long he himself is consulting with his wife as to the financial arrangements necessary to put such a set in their own home.



In publishing the hook-ups that I do publish every month in this magazine, I am doing it with the deliberate intention of increasing the interest of such people in radio, and I admit that my ultimate object is to convince them finally that radio is really such a fine thing that it deserves the very best that they can possibly afford to give to it.

I am not doing this for the benefit of the manufacturer; I am doing it for the benefit of the radio fan himself and for radio progress.

At the same time, I am trying to convince the radio amateur that he should keep away from all cheap stores and cut-price places and that he should never under any consideration include in his home-made set any piece of apparatus that is not backed by a very solid and substantial concern whose financial rating and whose technical record as well as business integrity are as reliable as he would demand from any other business whose product he is buying.

If I were to offer you an automobile for $75 or a piano for $15, you would very naturally laugh at me and not even consider such a proposition.

Yet there are cheap radio dealers and fly-by-night radio manufacturers who are putting out alluring-looking offers which are quite analogous to these offers, and what I cannot understand is why so many otherwise sensible, business-like Americans get on the sucker list and buy this cheap apparatus.

You all ought to know as business men that such delicate pieces of machinery as radio sets cannot be successfully put together to operate at maximum efficiency unless they cost money.

* * *

THE opening of two genuinely first-class broadcasting stations in Washington, D. C., is of interest to the fans and of rather unusual significance to those of us who are a little closer in touch with radio than most of the fans are.

To the man with a receiving set this will mean not only an opportunity to log other DX stations, but for those who are close enough to get these stations clearly it ought to mean the addition of some rather important phases to broadcast reception.

The national capital furnishes more people who are potentially interesting features for radio programs than any other city. It is to be hoped that these people may be induced to deliver their addresses by means of radio so as to reach a larger audience than speakers have ever before in the history of the world been able to address.

The significant thing to the rest of us is not the mere opening of the stations, but the auspices under which they are being operated.

Both the Radio Corporation of America and the American Telegraph and Telephone Company are vitally interested in radio.

(Continued on Page 26)

The Wise Wife Uses Radio

THE portable aerial—what a busy little lad that's been this summer! How it is traveling—to camp, to seashore and mountain, to country and to sea! For, what use is a vacation without that king of joy-bringers, the radio? Better to stay home and pretend you're where your concert comes from than go away and wish you were home so you could listen in.

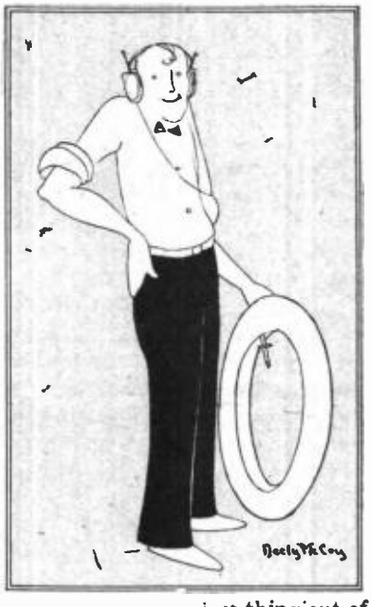
Indeed, before radio came into such prominence the long summer vacation at a seashore or mountain or country hotel got so tiresome that it was almost unbearable.

"If you had had my experience," said some one who had been through a number of these summers, "you'd be thankful enough to have a job that keeps you working all through the hot weather instead of sitting on some big porch with nothing to do day after day but read old books or listen to the old tabbies gossip!"

But, of course, now with that busy little portable aerial and a compact, easily carried radio set, it doesn't make much difference to her where she is; she has something a good deal better than tabbies' gossip to listen to.

Rocking comfortably on the porch, watching the ocean waves, while some self-sacrificing souls in a hot studio in New York or Philadelphia or somewhere make the air harmonious for you isn't such a bad way to spend a summer afternoon, now is it?

Perhaps seashore isn't your idea of a wonderful holiday, though. Every family has its own particular, and often peculiar, ideas about the ideal vacation.



One family, for example, thinks it wasteful and foolish to go to some other State for your summertime when you can be just as cool and much more comfortable in your own house, providing it is far enough out in the country. So they live in town in the winter and spend the hot months in a lovely, cool house in the country, surrounded by flowers, birds, trees and a never-failing breeze. The country club is near enough for them to get the benefit of its tennis courts and Saturday night dances—what more, they'd like to know, would you ask for?

And, my, how they do sniff at anybody who has any other kind of holiday

Very often a dusty, shabby-looking car rattles by, trailing a canvas-covered camping outfit. They stare at it in pitying contempt—how anybody can get any joy out of that kind of thing! The camping party stares back, the dog usually barks impudently just to show his defiance; mother and daughter, comfortably dressed in knickers and jumpers, wave in friendly fashion from the back seat; father toots the tinny horn in greeting, and the boy, swarming joyously about the front seat beside him, grabs the dog to keep him from falling out.

"How dreadful!" shuddered the country family, "to be so completely out of touch with everything for so long!"

"No dances at the club for them!" laughs the daughter.

"They won't know anything about what's going on in the world," says the father in horror.

"That would never do for you," observes the mother. "If you don't put that paper down and go get ready we won't get to the club ourselves tonight until the dance is about over!"

"Oh, do I have to go? What you people see in hopping around the floor that way—these new-fangled dances, I can't see what you get out of it—oh, all right, I'm coming!" "Coming"—to spend a grouchy evening standing around the edges of the ballroom, wishing he were home!

The criticism of this family, though, doesn't spoil the fun of the khaki-clad family in the car in the least. They go on their way rejoicing, because it's getting near camping time, when they stop traveling to settle down for the night.

If they have been foresighted enough — and campers always try to think of everything they will possibly need on their trip—they have brought along their radio set and their own version of that portable aerial. And the first thing out of the trailer is that; the first requisite of a camping site is "clear air."

Once that is settled and it is established that transmission will "do its stuff" here, connections are, or should be, broken, while everybody turns to with preparations for the evening meal. Then, comfortably seated around a real or imaginary table, they eat the most wonderful food in the world. Perhaps it's ham and eggs, perhaps it's a juicy beefsteak—what difference does it make what the food is when it is eaten by four persons whose appetites are sharpened by a long day of driving in the open, whose souls are uplifted by a glorious sun disappearing behind their own private landscape amid riotous colors, while on the other side a first star dares to glitter and whose atmosphere is charged with music broadcast from some place like home? Pity the poor gods in comparison, with nothing to eat but nectar and ambrosia, nothing to see but Olympus, nothing like so marvelous a thing as radio to entertain them!

The dusk gathers thick and black in the open country, but even Sister isn't afraid of it or worried about the lonely shadows of the big trees when the moon comes up if she is put to sleep by the lullaby of some familiar bedtime story teller, or gets momentarily awake later on to hear the homelike sound of some gentleman informing her in dance time that, yes, he has no bananas, or mourning that his sweetie went away and didn't say why.

It is just about at that time that the father of the Family Who Like to Spend Their Summers in the Country begins to leave the line of stags who are interfering with the dancing and sneak up to his wife.

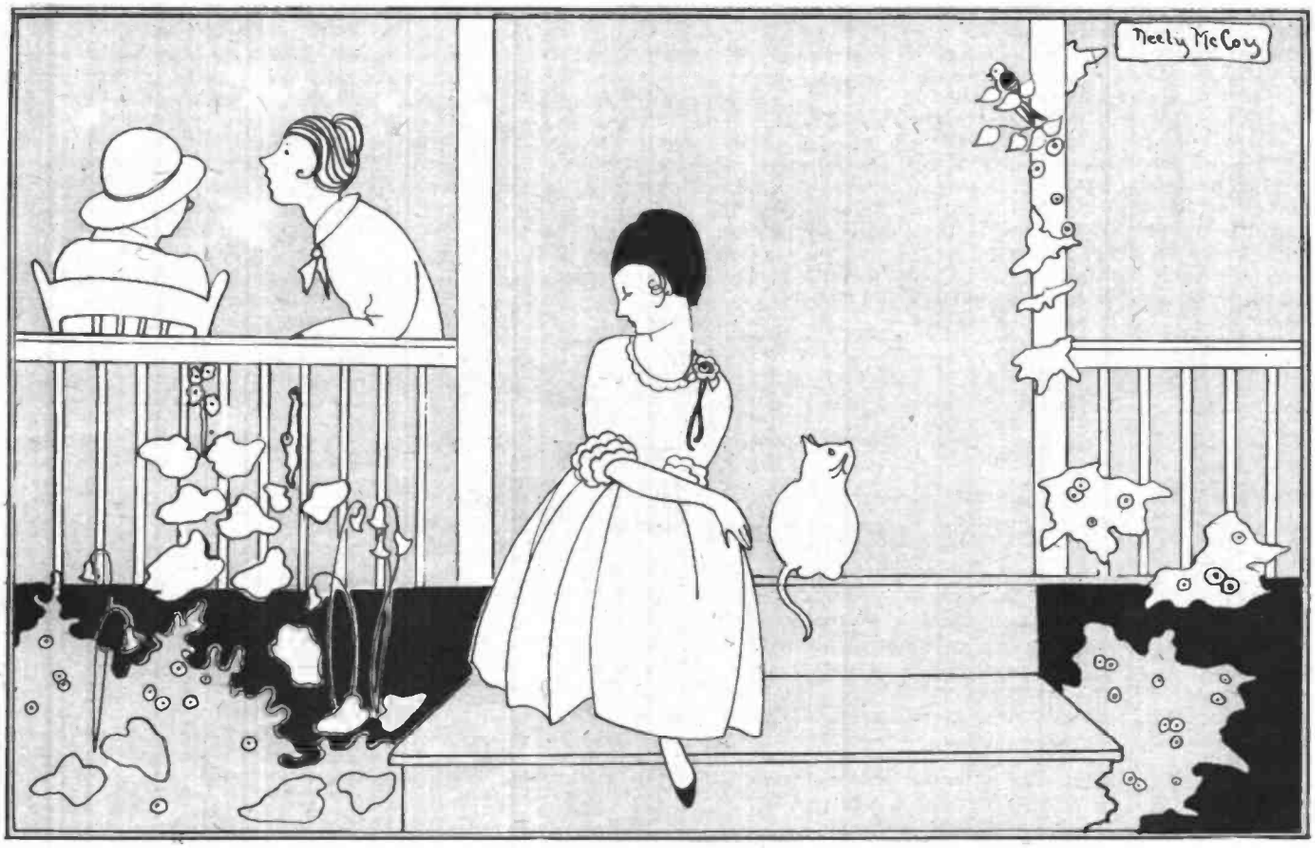
"Don't you think," he says quietly, for the first time, "that we'd better be starting pretty soon? It's getting pretty late, and I thought it looked a bit cloudy——"

He usually says exactly this five or six times before the orchestra begins packing up and his wife is ready to leave. He is one of those men who can't see what people see in these new dances.

Right there is where Mrs. Khaki-Clad has it all over Mrs. Country House, Mrs. Summer Hotel and all the rest of them. She has a husband like that, too, but with the clearness of vision and sharpened perception which her contact with wide, fresh air, broad, splendid views and the wonder of the heavens has given her, she understands him better. He used to dance very well indeed when they were engaged, and during the early years of their marriage they danced all the time. Then when the children were little and couldn't be left they both dropped out of such things for a while and he never picked it up again.

The reason, Mrs. Khaki-Clad knows now, is very simple. Naturally a man who has always been considered a beautiful dancer in his youth, who used to be the most

hoped-for partner at every dance, is not anxious, or even willing to make himself ridiculous trying to learn a new dance that is entirely different from anything he ever did before. He hasn't been able to pick up the new steps at odd moments as his wife has; he won't "make a fool of himself" tak-



Nothing to do but sit on the porch and listen to the old tabbies gossip

ing lessons, he won't admit that he is crazy to dance with his wife again as he used to.

And so, in mere self-defense, he becomes one of those scornful bridge players who "can't see what people see in these silly new dances!"

But his wife, if she is a clever wife, knows that he'd love to dance. She can get him to the point gradually in camp. Out somewhere away from amused spectators, with nobody but the children, the dog and the birds of the trees to see, there will be no excuse for his refusing to get up and try, at least.

And what a triumph when the prize dancer comes back into his own again and goes to the first Saturday night dance at the club after their return, a conqueror, once more the desired of all the ladies! What a triumph for the wife who has been dancing with other women's husbands and worrying because her own was smoking so many cigarettes over there on the sidelines! What delightful memories for both next winter while gliding over some polished ballroom floor to think back to dances in the cool moonlight beside some river in the open country, or on the edge of a little creek emerging from the woods, with the starry sky hanging straight down like a curtain and the invisible waves beneath it carrying their music to them!

And out there he has not even the excuse that it's too late and he must get to bed. For they can do their dancing early, just enough of it to satisfy them and get into their blankets in plenty of time to get enough sleep before morning. Only, of course, at about the time that the father of the country family is making his second reference to the hour and the weather, Mrs. Khaki-Clad is usually saying sleepily, "John, you *must* get to sleep; you'll never be able to drive tomorrow if you don't."

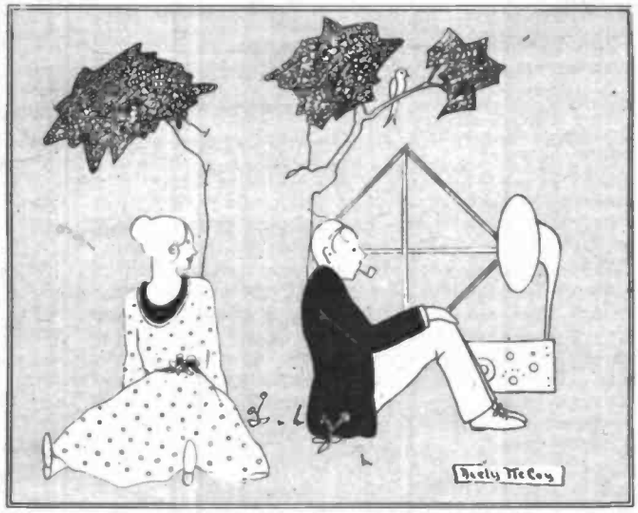
Mr. Khaki-Clad replies to this, with the furtive, bedtime manner of the real radio fan, "Yes, I know; I'll disconnect it in just a minute, but I want to find out—'weather forecast,' yes—whether it's going to be—'Tuesday'—clear tomorrow or not—'fair, light to fresh,' yes, that's all I wanted to know."

But Mrs. Khaki-Clad isn't fooled. Exploding drowsily into the youthful giggle which the camping trip has brought back to her, she remarks trailingly, "Clear tomorrow! How could i' be an'thing else wi' tha' moon?" And slid off into the deep sleep which is the reward of long days in the open—leaving her husband to sneak another earful of news dispatches.

Perhaps by next year, when the country family has fallen for the radio habit, they will realize how it overcomes all their objections to this one other kind of summer, at least, and how, with the combination of this kind of summer trip it solves this dancing problem which would never be worked out at home in a hundred years.

If they don't realize this, they should at least find out what a help a radio set would be to them in their country house, especially when they have guests. For there are so many practical uses for the radio set at a house party. The evening of dancing is no mean consideration at some out-of-the-way place where an orchestra is not available, and where a long, wide porch and a stiff breeze make the phonograph virtually useless around the corner.

The rainy afternoon is not so bad—you can go swimming in the rain, you can walk in the rain, you can even go boating in the rain. And the first rainy evening isn't bad. There may be charades, stunts, story-telling around a fire, or dancing indoors to the phonograph.



It's the second rainy evening that proves to the engaged girl whether or not she wants to marry her fiance; to the prospective roommates at college whether, after all, they will room together or not; to the hostess which of her guests are well bred and which aren't. That is the time when boredom set in, spirits rise high and seek expression or wane and show in sulky, impatient behavior.

That is the time, also, when the radio set makes itself worth its cost and more to the hostess. For the whole evening's program may be used as entertainment. Anybody can play bridge who wants to, but

for those who prefer not to there is something going on. The high-spirited ones may provide varied amusement for themselves and the others by staging impromptu stunts which fit the broadcasting. Some one standing beside the loud speaker, going through the motions and actions of announcer and performer, without saying a word or even moving his lips himself, could have the whole party convulsed with laughter if he threw himself into the parts quickly and whole-heartedly. Different ones might be appointed to act as singers or speakers, everybody falling into the

Camp councilors are having their work lightened this summer. Some stations have been broadcasting music and directions for setting-up exercises at the time most camps place this feature in their schedule. The hour of song and recitation or story-telling around the campfire in the twilight need not depend so entirely upon their ingenuity and wit. And as an extra bit of entertainment a councilor may without warning constitute herself a radio announcer and call upon the various girls for "numbers."

But out in the country, with no trolley

of your hat doesn't clash with that of the canoe; in short, that you would make a nice snapshot if anybody happened to take it.

The automobile picnic is so much helped by the addition of a bit of transmission here and there. When you have driven for several hours to reach your "eating joint," you are invariably a trifle sleepy and tired. You would really just like to sit still under the trees and dream a while. But the ancient tradition of picnics is to be in hilarious spirits, and so you must pull yourself laboriously together and try

Radio in the home of Harold J. Power, of Arlington, Mass., Vice President of the American Radio and Research Corporation

It is sets of this kind that prove even to the casual reader that radio has emerged from the status of the toy and has become a charming and dignified addition to home decoration. The photograph is through the courtesy of Amrad

spirit of the thing and forgetting whether it rains or snows outside.

It would make a good stunt for the usual entertainment given at either girls' or boys' camps, thus putting into action the impression gained of the performers at the broadcasting stations.

Another one that would be fun to watch would be a dance performed in perfect silence by two persons, in time to music heard by them through earphones worn under concealing hoods or hats, but not audible to any one else. If the dance is of the burlesque esthetic variety, performed in accented, almost jerky time, the effect can be made very amusing.

cars or automobiles to drown out the transmission, outdoor listening-in is a treat, and a radio set placed in a shady place will keep everybody clustered about waiting for a turn—incidentally giving the worn-out elders of the party a chance to relax and rest a bit.

If the picnic is also a canoe trip, as many picnics are, the loop aerial placed in the bow like some ancient bowsprit will give a most picturesque effect, in the first place.

And the looks of the thing have so much to do with a canoe trip. Somehow you have so much better time if you know that your sweater is pretty, that the color

to work up some semblance of pep as soon as you land.

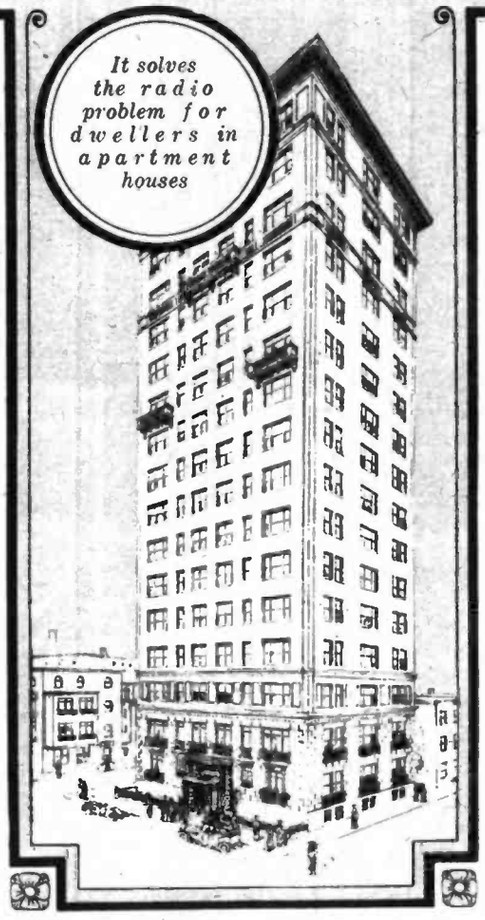
Your radio will prevent that, for it will give you a chance to sit silent and still until the reaction from the drive begins to set in and you really get into a picnicing mood.

to set in and you really get into a picnicking may be too much trouble to rig up the radio on the car just for a short ride, but this stunt smoothes out an amazing number of difficulties and hardships in the long drives of a motoring vacation.

Incidentally, if the party were going to the Coast and just happened to be crossing

(Continued on Page 25)

The Levin *No Aerial* Circuit



IT is an unimaginative fan in these days who does not sooner or later devise and put upon paper something that he considers a brand new original world-beating hook-up. Few of the fans know enough about radio to recognize the circuits which they think they have developed, but that means nothing in their young lives.

Those of us who sit in editorial chairs are the targets for dozens of such fans every week, and we have to be as patient with them as possible.

Not long ago I received a letter from one man enclosing a diagram and saying that he had devised it himself and asking me if I thought it would work. My reply was that it had been working for many thousands of people during the past two years, and I saw no reason why it should not work for him. It was the plain double circuit with the variometer in the plate connection.

And so, when a short time ago, the beautiful blonde who guards the outer door of the office here came in and informed me that a Mr. Levin wanted to see me to show me a new hook-up, I was at first inclined not to be in, but as it was not a particularly busy day I thought the best thing I could do was to be pleasant about it, and so I told her to bring him in.

Mr. Levin's first statement to me was that he was working on a hook-up which would operate a loud speaker on three bulbs and with no aerial. He said that all that was necessary was a ground connection to a cold water pipe or a radiator, and that he could bring in stations 1000 miles away on it.

He said that it was ideal for vacation purposes because, if a good ground was not available, a short aerial or length of wire about twenty feet long was sufficient and no ground was then necessary.

I suppose I exhibited my usual skepticism about the whole matter, because I realized that the man who developed a set that would really satisfactorily work a loud speaker without any aerial will confer a priceless boon upon all the dwellers in apartment houses and boarding houses and the many thousands of others who find it impossible to put up an outdoor antenna, who cannot quite afford the price of a multi-tube set to work on a loop, and who yet can easily arrange a connection to a cold water spigot or a radiator.

I spoke of the great desirability of such a hook-up to Mr. Levin, and he calmly informed me that he was sure that he had it; that he had one or two small details to work out, but that these problems were so nearly solved already that he felt quite sure that he would be able to let me have the hook-up within a week or so.

"And," he said, "I will bring my set down to you and let you take it out to 3XP and play with it for a week or so and tell me what you think of it."

That was the first surprise to me, because most of the fans who develop new hook-ups are not willing to have anybody examine them too closely.

A short time afterward Mr. Levin made good. He brought his set down to me and then at my request sat down and drew me the diagram. I took it, expecting to find something which I would recognize immediately as a slight variation of one of the old-time hook-ups, but much to my surprise I found that he had gone on a very different basis and that he had really devised something entirely different from anything that I was familiar with.

I took his set out to 3XP and tested it. We have our shop there on the ground floor, and the ground wire is not more than about ten feet long, and yet with this short ground wire and with no aerial at all the Philadelphia stations fourteen miles away came in so loudly on the horn that they could be heard a block away from the shop.

For several nights I experimented with this set and studied it very carefully, as I really felt the usual reluctance of the experienced man to admit that any one has found something better than what he has found himself. But I am now forced to confess that Mr. Levin has done it and that he has made good all promises.

In order to check up very carefully on the diagram that he had given me, Mr. Vollten and I built the hook-up ourselves and put it on a panel to give it a more thorough tryout.

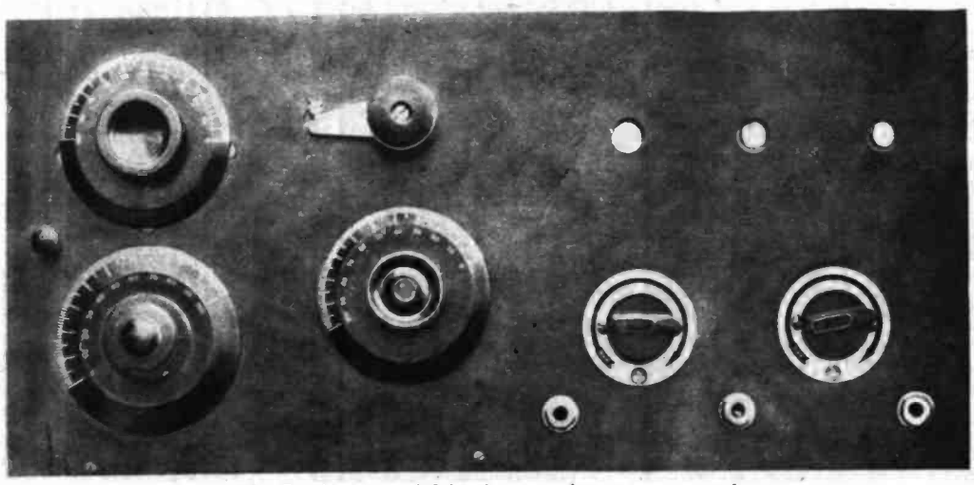
With the short ten-foot ground wire I was able to get quite clear reception of WEAF in New York, ninety miles away, on the detector tube alone. This is simply an ordinary illustration of what can be done with this set.

The peculiarity of this hook-up is that it will use either ground or aerial alone, but will not function with both ground and aerial.

For the apartment house dweller, the ideal outfit for it is the cold water spigot or steam radiator. Hooked up to a radiator, Mr. Levin has had Chicago on the loud speaker in Philadelphia, and this is a feat that should satisfy any man who does not care to go to the expense of more than three tubes and who cannot erect an outdoor antenna.

All of the material used in this set is standard stuff with the exception of the split-variometer. A split-variometer may be an ordinary variometer whose revolving windings have been separated from the stationary windings. This makes two separate coils just as a variocoupler has two separate coils.

I knew that there were several makes of split-variometers on the market — instruments that had been put out for experimenters who like to try out new ideas for themselves — and we



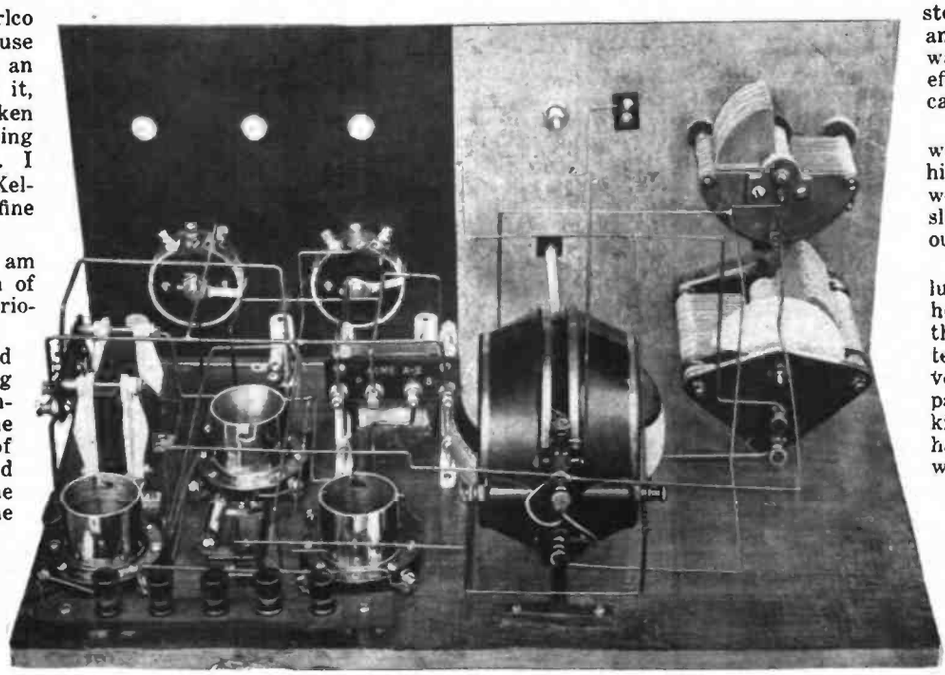
The Levin no-aerial hook-up makes a neat panel

settled on the Pearlco split-variometer because it has been made with an extra contact point on it, allowing a tap to be taken from the middle winding of the stationary coil. I have since found that Kellogg also makes a fine split variometer.

In my diagram I am showing a photograph of one of these Pearlco variometers.

The contacts A and B are for the revolving coil or rotor. The contacts C and D are the two outer windings of the stationary coil and the contact E taps the center winding of the stationary coil.

These variometers can be used in a number of interesting experiments or else they can be used as ordinary variometers by merely connecting the contact C to the contact B with a short wire and then connections to the contacts D and A are the usual ones that are found on an ordinary variometer.



Here is the layout of the apparatus looking from the rear

Mounted in some ways this hook-up of Mr. Levin's is subject to an unusual amount of "body capacity"—that is to say, that the magnetic effects of your hand in tuning enter into the magnetic effects of the set itself and will cause howling and whistling, or else, when you have the station tuned in clearly, the taking of your hand away will distort the signals badly, or even totally eliminate them. This body capacity is a most annoying feature of many sets, and it happens that in Mr. Levin's own first hook-up of the set the body-capacity was so bad as to make it almost unworkable at certain times.

We found one thing, however, and that was that even with this body capacity, you could bring a station to maximum strength, ignoring the body capacity, and then reduce the rheostat of the detector tube, and this seems to clear the distortion up entirely.

It was because of this bad body-capacity effect of the first set that we at 3XP built the long shaft on the variometer that you see in the photographs of our set. This was done in order to get the variometer as far as possible away from the hand and so as to get it outside of the electrical and magnetic influence of the body.

It is perfectly easy to make a shaft of this kind out of a fiber rod. Lacking that, you can do as we did. We had a long glass tube and we slipped this over the shaft of the variometer, having first filled the end of the tube with melted beeswax, and this we let harden. We did the same thing with the dial on the front of the panel, setting the set screw in first before the beeswax hardened, and when the whole thing cooled off we had a perfectly good long handle for the variometer, and this handle carried no magnetism with it.

During the time we were building this set, however, Mr. Levin hooked the circuit up in two other sets, and body capacity was not noticeable in either of them.

We discussed the matter pretty thoroughly, and came to the conclusion that the effect was caused by the fact that he had made his first set a "double-decker"—that is, he had placed his tubes and transformers on a shelf above the rest of the instruments, and we believe that there was a magnetic coupling between the two stories of his little house, and that this coupling was the thing that was effected by the body capacity of the hand.

He was not troubled with body capacity in his next two sets, and we have not had the slightest bit of it in ours.

One thing is absolutely essential in this hook-up, and that is that the rheostat on the detector tube shall be a vernier instrument capable of the very finest kind of adjustment. I have never worked a set where the finest control of the filament of the detector tube was so absolutely essential to clear reception of signals.

In this hook-up I would recommend either the Bradleystat, the Filkostat or the Marco helix rheostat. We use all three of these with very great success. I am emphasizing this point because it is very essential. The slightest turn of the detector control will clear up signals that may be clouded by a whistle or a hum or bad distortion.

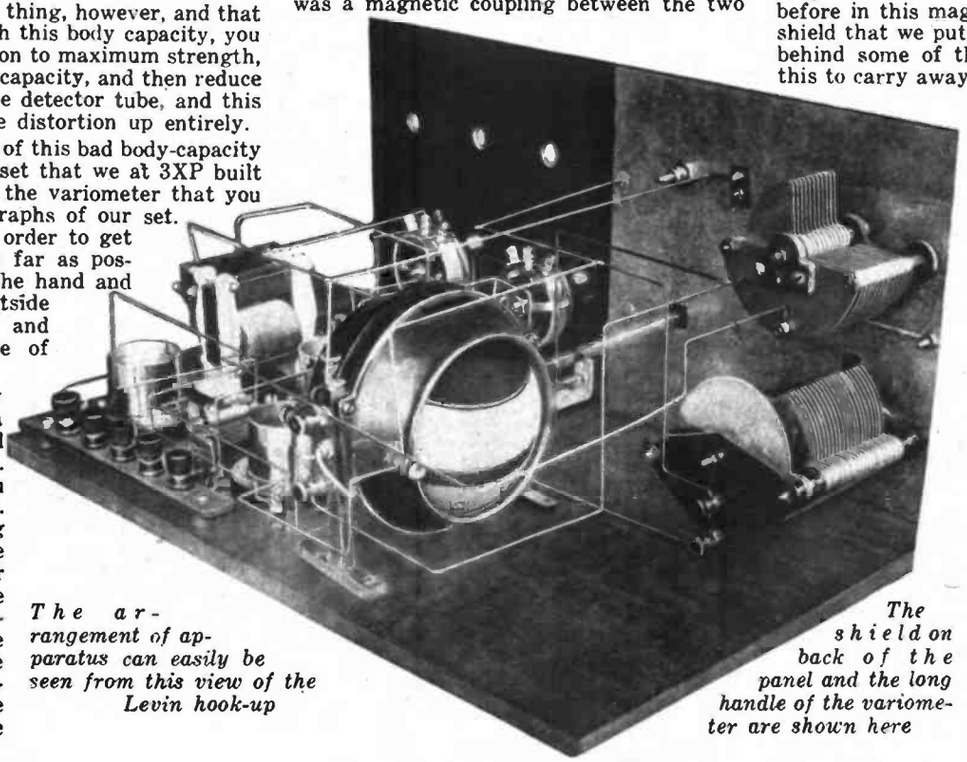
So, too, the larger condenser must of necessity be a vernier or have a small vernier condenser hooked up in parallel to it. We found the best condenser at this place to be .0008 with a vernier, but excellent results can be obtained with either the ordinary 23-plate or 43-plate vernier condenser.

This necessity for vernier adjustment will give you some idea of the sharpness of tuning of this set.

You will notice one thing in the photographs in our set that you have not seen before in this magazine. This is the metal shield that we put on the back of the panel behind some of the instruments. We did this to carry away this body-capacity effect in case the long handle of the variometer did not solve the problem for us.

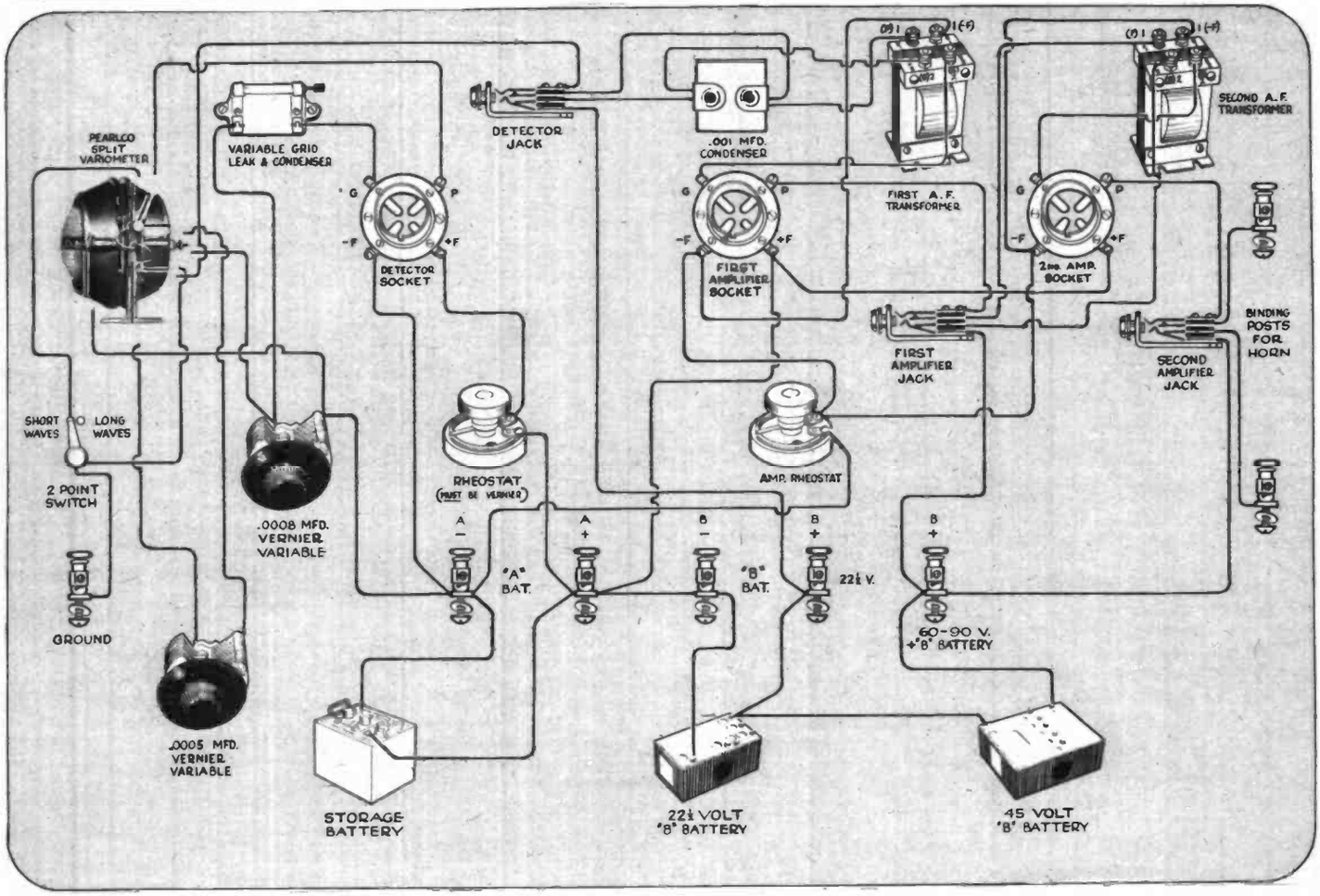
In most cases where you have a set that is very highly regenerative, as this hook-up is, you ought to put a shield of some kind behind the panel. This shield can be a piece of aluminum, as we made it, or tin, or else it can be tin-foil or copper-foil pasted all over the back of the panel before you drill your holes.

Then, when you drill your holes, you should cut this tin-foil well away from all holes, so as to be absolutely sure that it does not touch any part of any instrument. The only place that it should touch any metal is the ground binding post, and here the



The arrangement of apparatus can easily be seen from this view of the Levin hook-up

The shield on back of the panel and the long handle of the variometer are shown here



Here is the complete hook-up for the Levin "no-aerial" hook-up

contact should be good. Do not let it touch the aerial binding post, nor any other binding post, nor any other part of any instrument.

This shield then carries the effect of the hand directly to the ground and takes away the annoyance of body capacity.

The Wise Wife Uses Radio

(Continued from Page 22)

the mountains on a Sunday, how reassuring would be those prayers uttered by a devout clergyman in his church, as they reached the ears of a timid person expecting to be hurled through space into Eternity at the next turn! One could think, "Well, at least I shall die saying my prayers and attending the service of my church, even if it is a violent death!"

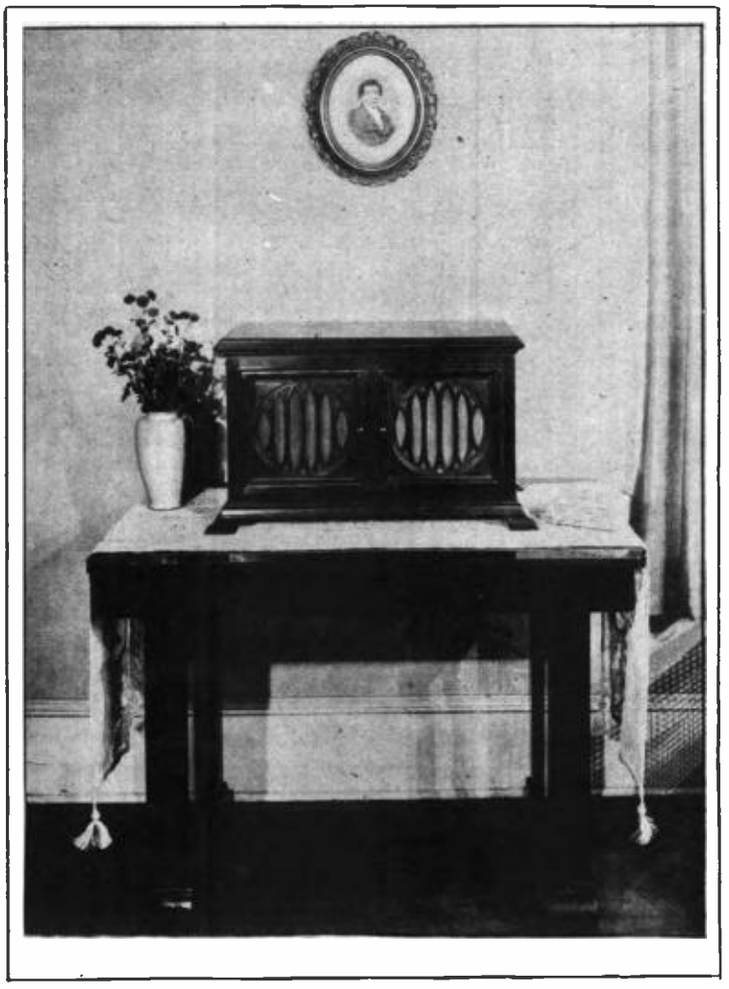
How much closer the radio is bringing the city woman and the farm wife! It may not yet have reached the distant farms, but this summer is seeing it pretty well established by motor trips, canoeing and motorboating, campers and hikers. They are introducing this contact with the outside world to the women who come down to the road or the river to sell them food of various kinds; and next winter, as you sit before your cheery steam radiator, with the trolley cars clanging through the icy street on which you live — oh, doesn't that sound nice and cool!—and your radio telling you what kind of coat you should wear in order to be entirely up to the minute, you may be listening in time and tune with some woman three or four States away who has just finished milking the cows and is sitting before a great open fire, with the snow banked high for miles around her house. She may live on the farm, but she likes to hear about the newest styles.

The lone vacationist who was banished to a farm boarding house this summer to get fresh air, fresh vegetables, rich milk and cream, and some health, knows what a glorious boon radio will be to that farmer's wife. The city woman gained her health and her pounds, all right, and enjoyed the fresh air, etc., but almost died of loneliness and darkness the first week! After that she sent to town for a radio set, put up an aerial, and then it didn't matter how early the lights went out; she had her entertainment in her room without disturbing anybody. She left her set there when she came home, too, since they have one at home. That farm won't have any "long winter evenings" to get rid of.

Don't leave your little wonder box home when you go on your vacation! Take it along! It will make friends for you, give pleasure to every one you meet, keep away any chance boredom, and keep you in touch with the world without making you come out of the wilds for your news.

Like Pandora's box, it is full of mysteries and unexpected surprises; but, unlike hers, it hasn't a single bad one in it.

Mr. Levin takes his set on his auto and strings a piece of wire along the ground for an aerial



Radio in the home of E. P. Edwards, of Schenectady, N. Y., manager of radio department, General Electric Company.

Photo courtesy General Electric Company.

Regarding Single Circuit Couplers

There seems to be a great deal of difficulty with some of the couplers on the market at present for use with the single circuit receiver.

If you have purchased a coupler for use with the single circuit receiver and after you have hooked it up you find that you do not get any results with it, there is a way of repairing it rather than throwing it to one side and purchasing another. Remove the rotor or the movable coil and take off all the wire on it, then rewind it with number twenty-eight double cotton-covered wire so it will have about eighty or ninety turns on it.

Before you buy a vario-coupler, be sure that you count the number of turns of wire on the rotor and see if it has about eighty or ninety turns on it before you purchase it.

Most of the vario-couplers that are on the market at the present time are lacking these greater number of turns of wire, and are made to use with the two-circuit receiver. The single-circuit receiver has to have a greater number of turns of wire on the rotor so as to let it oscillate. By oscillating, your receiving set is acting as a miniature transmitting station.

When it is so acting it is capable of picking up stations of a greater distance than when it is not oscillating.

If you do not hear the whistle, carrier-waves as they are called, you may be sure that your set is not oscillating. Then it requires a greater number of turns of wire on the rotor which is connected to the plate of your tube. I will mention here a few variocouplers that are suitable for single-circuit receivers: Thompson-Levering Special, the Pearlco, Kellogg, Fischer, Fada and Grewal.

Still Editorially Speaking

(Continued from Page 19)

They are members of that great and influential family which is financially behind the entire hobby, and it is their business to see that radio is put upon a status that will justify the great investments of capital that are being made in it, and the only way to justify this is to see to it that the money is returned with considerable profit to themselves and their associates.

As I look over the gradual evolution of this whole broadcasting problem, it seems to me that it is becoming more and more evident that the broadcasting must be carried on by those who are going to profit by radio. I mean by this, the people who are actually interested in the sale of radio apparatus or in some direct return.

Radio has been used up to the present time by very many business organizations which have been satisfied with the publicity that it has brought them.

Hotels have established expensive broadcasting stations and have seen the return of their money in the shape of added patronage and a widespread reputation which has placed them upon a solid foundation.

Department stores have very largely gone into broadcasting and have put the expense down to the general cost of advertising and goodwill. The actual returns have been exceed-

ingly indefinite, and there has been no way by which the store proprietor could put his finger upon a single nickel which was brought to his store through his radio transmitting station.

Money which he might have spent in newspaper advertising would have come back plainly labeled. The money he has spent in radio may have come back, but he has only his faith to make him believe it.

Newspapers have established radio broadcasting stations, and have regarded them as integral parts of their circulation promotion work.

Yet all of these people have been working and spending largely on faith, and faith will not last forever in business.

Broadcasting by such interests as these is all very well in its way, but it carries with it no very vital obligations to continue in spite of everything. Such stations can close down or can take a holiday and they do not feel that any one has a right to object.

We in the Philadelphia district have just been made victims of this feeling in a way that is anything but pleasant.

On the very flimsy excuse that there was a great demand for silent nights, the four big broadcasting stations in Philadelphia have ceased broadcasting entirely on Saturdays and Sundays until Sunday evening during July and August.

The thing that irritates me particularly about this is that I, like all other radio editors, have for a long time been bombarded by the radio manufacturers with urgent requests to continue a campaign to induce the public to maintain its interest in radio throughout the summer.

The summer months have been the slack season for radio during the past two years and everybody felt that by starting such a campaign as this we might be able to keep the business sufficiently alive during the hot weather to hold the Sheriff away until the boom time of winter came around again.

I have done my own part in this campaign, and only in the last issue came out with an article under the heading, "Summer Time Is Radio Time."

The Philadelphia stations have made me out a liar.

If there is one night during the summer time when radio broadcasting is essential to the vacationist or to the average persons, it is Saturday night. It is on that night that the usual dances on porches or lawns or out in the open are held, and then is the time when people in holiday mood gather around their radio sets for sufficient entertainment to make them forget the heat.

July and August are the months when static becomes a frightful nuisance in a radio set which is tuning in a distant station. It is only the powerful local stations that are able to ride through static in the hot months of summer, and without these local stations the radio set becomes an annoyance, and the more sensitive the set is in bringing in distant stations the more sensitive it is to the static, and it builds the static up too strong for the reception to be pleasant.

If local stations continue their broadcasting through July and August, dance music can be very successfully and satisfactorily received.

This means that, so far as the Philadelphia district is concerned, radio has died a pathetic death for two months.

So far as we are concerned out at 3XP, this is not quite so bad, because we have sets out there which can very successfully get the dance music programs from New York, and we put them on four and five horns at once and dance to them, but there is not one man in ten thousand who has the kind of sets which we have.

The average man in Philadelphia might as well put his radio set away until September.

Now there can be no question about it that the radio business will be exactly what the broadcasting stations make it and nothing more.

When a man goes into a store these days to buy a radio set, he buys it on the tacit understanding that the broadcasting stations will furnish him sufficiently continuous programs to make his set worth the money that he is paying for it. The broadcasting stations themselves, when they get their licenses and announce their programs, virtually agree to this understanding, and any broadcasting station which shuts down without good and sufficient reason is, in a way, repudiating a contract which, though not definitely made, should nevertheless be binding.

Far be it from me to attempt to solve this very involved and perplexing question of what the future of radio broadcasting is to be, but I venture the prediction that most of the good broadcasting will be done by such corporations as the Radio Corporation and the American Telegraph and Telephone and others who are financially interested.

Then, if there are such things as department stores and newspapers and hotels which wish to gain the publicity which they can get from radio, they will be able to pay for the use of these stations for certain stated periods, but they will not have the ability to close them down without notice and tell many thousands of ardent radio fans that they shall have no entertainment for such and such a time.

I am particularly interested in the Washington station of the American Telegraph and Telephone Company, or, rather, the Chesapeake and Potomac, which is its local name.

This idea of having the finest possible broadcasting station in the heart of New York and then, by means of land wires which are at the disposal of the company, relay these fine concerts to other stations in other cities, seems to me to point a very significant finger in the direction of the future.

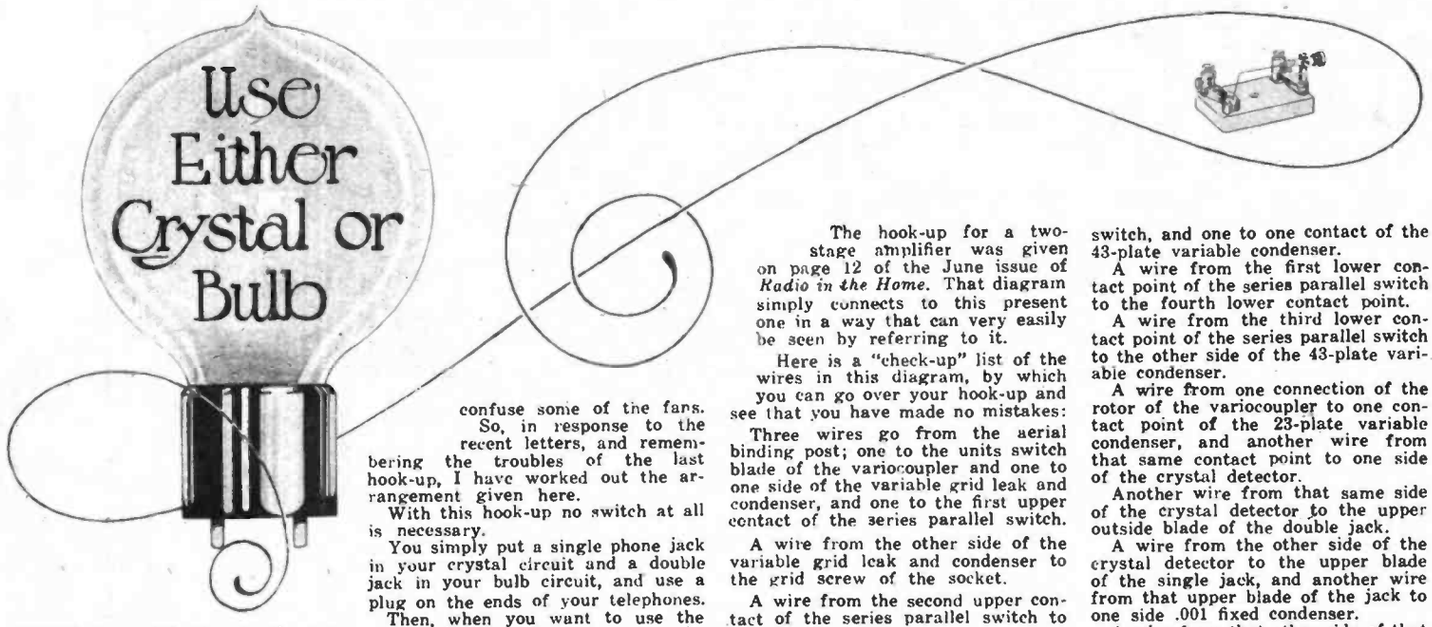
Such a scheme, if it grows to include a number of cities, will very materially reduce the cost of broadcasting by the simple expedient of dividing the price of the concert among all of the cities which participate in it. At the same time it will enable the man in Washington or Chicago or Philadelphia or any other city which is tapped by the system to begin his radio experience moderately, even with a little crystal set, and to grow in enthusiasm because such broadcasting will bring to his own city concerts and programs of a very much higher character than most individual stations in the smaller cities can afford to give.

This is an intensely interesting experiment to me, and I, for one, consider the opening of this station to be of greater importance in the general trend of radio development than most people seem inclined to think it.

But I find it particularly fascinating to speculate on what was back of the sudden decision of WCAP to open broadcasting on July 4 so as to beat the other station. And I am interested in a number of other little things in Washington that are evidences of a rivalry between these two great companies which have always heretofore eaten amicably out of the same bowl of porridge.

It looks to me as though things are happening behind the scenes in radio.

Use Either Crystal or Bulb



SINCE the publication in the last issue of a crystal hook-up which is very sharp in tuning and which will receive the entire band of wave lengths used by the broadcasting stations, I have had a great many letters asking me if I could give a hook-up which would include this one and which would have in addition some sort of switching arrangement by which a single bulb could be used for distant stations and the crystal used for local stations.

Some months ago, in the pages of *E-Z Radio*, I gave such a hook-up, but it used a double-pole, double-throw switch which seemed to confuse some of the fans.

So, in response to the recent letters, and remembering the troubles of the last hook-up, I have worked out the arrangement given here.

With this hook-up no switch at all is necessary.

You simply put a single phone jack in your crystal circuit and a double jack in your bulb circuit, and use a plug on the ends of your telephones.

Then, when you want to use the crystal and do not want to use the bulb, you turn out the light in your bulb and plug your phones into the single jack.

When you want to use the bulb, but do not want to use the crystal, you take the phones out of the single jack, which disconnects the crystal circuit, and plug the phones into the double jack, which gives you the "single circuit regenerative" set.

In this hook-up I am showing two binding posts on the right-hand side of the double jack. These are for use with a one or two stage amplifier, which all fans will undoubtedly want to add to the circuit later on.

The hook-up for a two-stage amplifier was given on page 12 of the June issue of *Radio in the Home*. That diagram simply connects to this present one in a way that can very easily be seen by referring to it.

Here is a "check-up" list of the wires in this diagram, by which you can go over your hook-up and see that you have made no mistakes:

Three wires go from the aerial binding post; one to the units switch blade of the variocoupler and one to one side of the variable grid leak and condenser, and one to the first upper contact of the series parallel switch.

A wire from the other side of the variable grid leak and condenser to the grid screw of the socket.

A wire from the second upper contact of the series parallel switch to the third.

Another wire from that third upper contact point to the tens switch blade of the variocoupler.

Another wire from that same third upper contact point of the series parallel switch to the minus filament connection of the socket.

Another wire from the minus filament connection of the socket to one side of the rheostat.

A wire from the other side of the rheostat to the minus connection of the A battery.

Two wires go from the ground binding post; one to the first lower contact point of the series parallel switch, and one to one contact of the 43-plate variable condenser.

A wire from the first lower contact point of the series parallel switch to the fourth lower contact point.

A wire from the third lower contact point of the series parallel switch to the other side of the 43-plate variable condenser.

A wire from one connection of the rotor of the variocoupler to one contact point of the 23-plate variable condenser, and another wire from that same contact point to one side of the crystal detector.

Another wire from that same side of the crystal detector to the upper outside blade of the double jack.

A wire from the other side of the crystal detector to the upper blade of the single jack, and another wire from that upper blade of the jack to one side .001 fixed condenser.

A wire from that other side of that fixed condenser to the lower blade of the single jack.

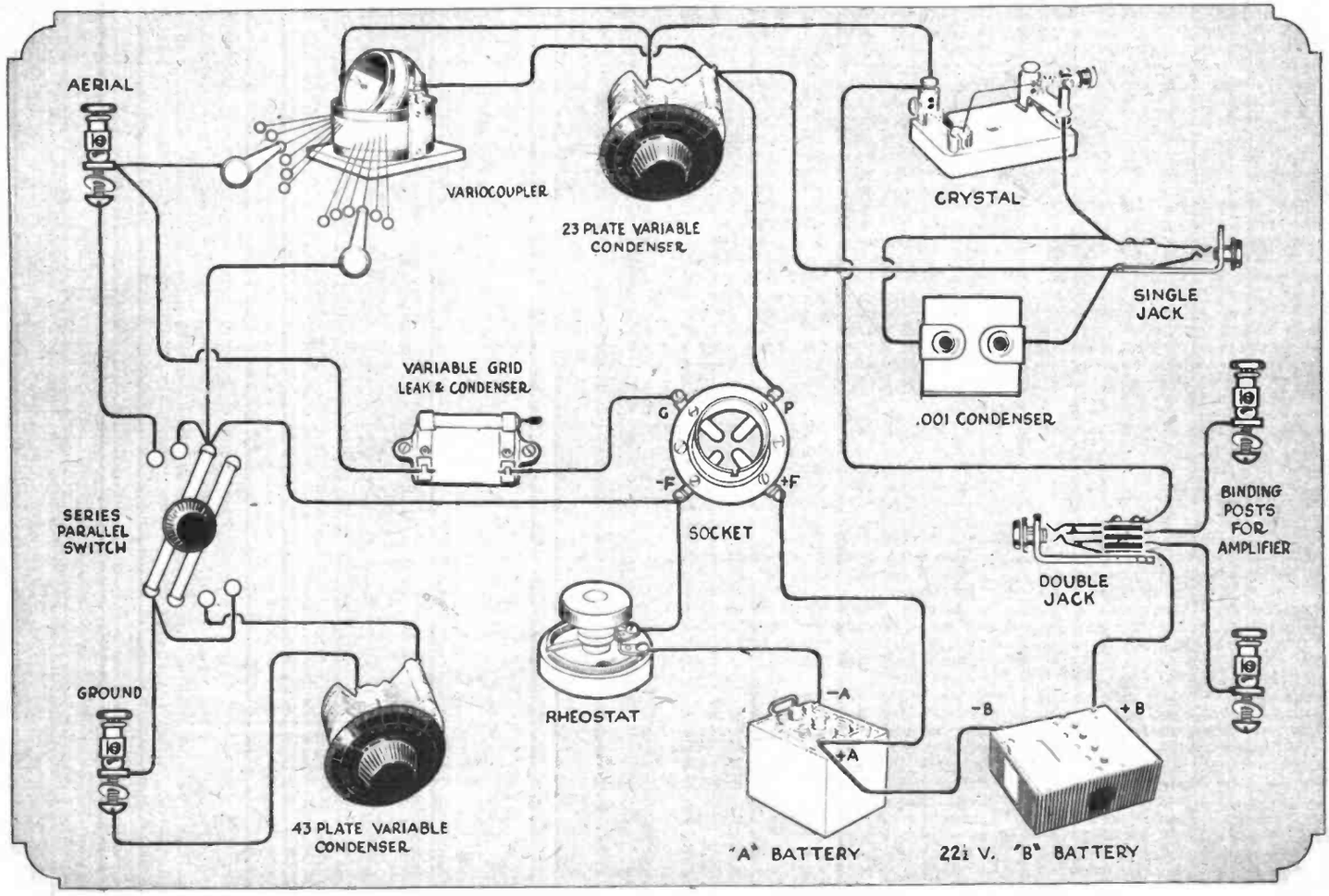
Another wire from the lower blade of the single jack to the second binding post on the 23-plate variable condenser.

Another wire from that same second binding post to the other contact on the rotor of the variocoupler.

Another wire from that same binding post on the 23-plate variable condenser to the plate binding post on the socket.

A wire from the plus filament connection on the socket to the plus

(Continued on Page 29)



RADIO LIGHTENS GOURAUD'S TRAVELS

(See article, "Washington Welcomes Radio" on Page 4 of this issue)

By the time Gen. Gouraud had got as far as Washington in his tour of the United States he had become intensely interested in the wonderful spread of American radio. He asked whether it would be possible to install a receiving set in his private car. There were some difficulties in the installation, particularly the planning of the aerial, but it was finally strung on pillar insulators along the top of one side of the car as shown in the upper photograph.

To the left, Gen. Gouraud is shown discussing the outfit with Ambassador Jusserand and below is the receiving set being operated by Donald Stevens, president of the Radio Sales Studio of Washington, who installed it.

Talking Machine Men Aid New Broadcaster

THE feeling that radio is injuring the talking machine business is very rapidly being dissipated, and one of the most significent signs of the times is contained in a recent issue of the Phonograph and Talking Machine Weekly, which prints the following dispatch from its Buffalo, N. Y., correspondent:

"Opening of the new Statler Hotel marked the opening of the new Federal Telephone and Telegraph broadcasting station, WGR, atop the hotel. The new station is second to none in the country in equipment and has a broadcasting radius of approximately 3000 miles, reaching every country on the European continent.

"The broadcasting studio is equipped with Victrola, Brunswick and Kurtzman talking machines. Special arrangements have been made with record distributors of all standard makes of records to broadcast the first release of each new record."

Use Either Crystal or Bulb on This Hookup

(Continued From Page 28)

connection on the A or storage battery.

A wire from the plus connection of the A or storage battery to the minus connection of the 22½-volt B battery.

A wire from the positive side of the 22½-volt B battery to the lower blade of the double jack.

A wire from the center blade of the double jack to the upper binding post for amplifier.

A wire from the lower center blade of the double jack to the lower binding post for amplifier.

Radio is entering the wide-awake factories these days as well as the home. Here is the lunch room of the Diamond State Fibre Company, Bridgeport, Pa., where employes listen to the music of the very best cafe orchestras in Philadelphia while they themselves are lunching many miles away

The Use of Shellac in Making Coils

ALMOST every one who winds his own coils gives them a coating of shellac to prevent the wire from coming loose and also to give the coil a finish.

I imagine they use shellac because it is handy and it dries very rapidly, but mostly because they don't know what else to use. Very few people take in consideration that shellac absorbs a great deal of moisture, and moisture is very detrimental to successful radio reception.

Now, the electrical energy that comes in the form of radio waves to the antenna has such characteristics that it will flow along any surface that is damp, and that energy is lost because it has taken a short cut instead of going the way we wanted it to. In shellacking a coil, the moisture that the shellac absorbs allows the energy to flow across it, and we find that our signals are weak.

I remember an instance when I wound a coil and gave it a heavy coating of shellac. I thought that I had the finest coil that ever was built, but when I started to use the coil I found that there was no signal.

I looked over my connections and found everything correct, but still there was no signal. Then I remembered reading somewhere that shellac would absorb moisture, and I thought that that might be my trouble, so, with some alcohol, I washed off most of the shellac and tried the coil again; this time I received signals, but they were weak.

Then I put the coil in the oven and baked it good and dry. And on trying it again the signals came in loud and clear. All my trouble was due to the use of shellac.

You cannot be too careful when you are building a radio set. You must guard against leakage of all description. The panel, baseboards and materials used for mounting instruments all must be taken in consideration. Don't use a stain or paint because it is pretty, but be sure before you use it that it doesn't contain any metallic substance that would cause leakage.

When you wind a coil, give it a good coating of beeswax or beeswax and resin. This can be made by melting half resin and half beeswax in a metal container and dipping the coil in it. This gives the coil a covering that is waterproof and at the same time it is a very good electrical insulator.

Or better still, if you can obtain some good spar varnish or insulating varnish and varnish the coil and bake it in the oven, you will have the best results.

So when you wind a coil, bear in mind that shellac may cause you trouble.

Wiring a Set

(Continued From Page 12)

insulation, there will be a tendency to feel that the spaghetti keeps the current from leaking from one wire to the other, and this is true, of course, but actual current is not the thing that causes trouble in a receiving set nearly so much as the magnetism that is thrown out from a wire by a current of electricity and that will cause interference when the magnetism cuts through another wire and causes a similar current of electricity there which may buck or oppose the current that you want to flow there.

This magnetism will be thrown out, no matter what kind of spaghetti you use. Nobody has ever yet devised a material which will prevent magnetism from going through it. That is one of the great differences between magnetism and electricity. You can insulate against electricity, but you cannot insulate against magnetism.

It is this "magnetic flux" or "magnetic field" thrown out by currents of electricity that makes so many failures in the radio sets built by beginners when two wires are close together. And on this account insulated wire gives the beginner a false sense of security and is likely to make him overlook cases where his wiring is entirely too close and he would probably not overlook these places if he used bare wire.

The regular square wire sold under the name of "buss-wire" in the radio stores is very excellent for wiring up a set. Personally, I like it very much, but Ted will not handle it. It has an undeniable tendency to twist when you are working it and, while this does not have the slightest effect upon its electrical efficiency, Ted always winds up the argument by shrugging his shoulders and saying, "Well, it doesn't look right." And that settles the matter, for Ted always insists that a set must "look right."

I think, when all is said and done, that the bare No. 14 copper wire is perhaps the most satisfactory of all.

Sometimes you will find this wire so hard and stiff that it is almost impossible to get the kinks out of it. In such a case it is necessary to take the temper out of the wire before you can get it soft enough to work satisfactorily.

This is a perfectly simple thing to do. When we get a new coil of No. 14 copper wire, we take it out into the yard, soak some old rags in coal oil and put them in a little pile and set them on fire and then put the coil of wire right in the flames.

We let it stay there as long as the fire burns, meanwhile getting a bucket of water and having it ready.

Just about the time the fire is ready to die down and when the copper wire is very hot, we take it out of the fire and dump it into the bucket of cold water. This heating and sudden chilling takes the temper out of it and makes it beautifully soft and pliable.

We then fasten one end of it to a post or a door jamb, uncoil the wire to as long a length as we can and then give it a number of good strong pulls until all of the kinks are pulled out of it. We then cut it up into lengths of about three or four feet and we have an ideal wire to use for hooking up a set.

This process of heating and chilling also has the great advantage of cleaning off of the wire every deposit of tarnish or dirt or anything of that kind which might have formed on it on the shelves of the store before we got it and which might act as a resistance to the electrical current.

A Set That Solved Many Problems

((Continued from Page 14)

I find that these differences of 17 meters can be completely covered with this midget condenser alone.

The success of the operation of this circuit depends largely on getting the detector tube in oscillation.

This can be told by moistening the finger and tapping the stationary plates of the 23 plate condenser.

If you hear a distinct click when you place the finger upon the stationary plate and another distinct click when you take it away—in other words, if you hear two distinct clicks for each time you tap the plate—the tube is oscillating.

If you hear only the one click when you touch the plate but not the click when you take the finger away, your tube is not oscillating.

The brilliancy at which you burn the filament of the detector tube seems to be especially critical in this hook-up.

You will frequently get signals quite loudly, but they will have a mushy sound that is very unsatisfactory. In many cases this can be cured by turning down the rheostat of the detector tube a little bit and until the mushiness is cleared away and then a slight readjustment of the vernier condenser will bring them up to strength.

The first setting of the dials of the variometer and the variable condenser is rathe rimportant. When you put these dials on, be sure that the setting of 100 on each is used as the guiding point.

That way, in setting the variable condenser, put the movable plates all the way inside of the stationary plates, then turn the dial around until the 100 division is opposite the index mark and that is where you want to screw in the set screw. Then when you turn your dial around and the mark zero comes to the index, your plates will be all the way out.

In the same way set the dial for the variometer.

Look at the windings of the rotor and see in what direction they are wound. Turn the rotor around until the windings go in exactly the same direction as the windings of the outside coil, place the rotor so that these windings are parallel with the other windings and as close to them as it is possible for them to get, then turn the dial until the figure 100 is on the index mark on the panel and screw in your set screw there.

With some makes of audio frev transformers there will be a cy in this set to howl or to gnals which will be distorted ch will begin to whistle and on as the filament of the d up the least bit too be entirely cured on across the letting it done, the ery greatnent can ter

this in there we found that we could retune and force all of the power we wanted into the loud speaker without howling and whistling, though, of course, there was no sweetness in the quality. I only make this suggestion for those who wish to use the loud speaker for dancing.

If you wish to get still louder volume you can use this same idea but put an amplifying tube in in place of the detector tube and put about 38 to 45 volts on the plate of this first tube with about 90 on the plates of the two other tubes.

Here is the usual "check-up" list for this set:

A wire from the aerial binding post to one side of the .0005 micadon condenser.

A wire from the other side of that .0005 micadon condenser to first side of variometer.

A wire from that same first side of variometer to plate connection on first socket.

Another wire from that plate connection on the first socket to the upper outside blade of the first jack.

A wire from the other side of the variometer to one side of the .0005 grid condenser and leak.

A wire from the other side of the grid condenser and leak to the grid connection on the first socket.

A wire from the other side of the variometer to the stationary plates of the 23 plate vernier variable condenser.

A wire from the stationary plates of the variable condenser to the ground binding post.

A wire from the ground binding post to the minus A battery binding post.

Another wire from the minus A battery binding post to the filament connection on the first socket.

Another wire from the minus A battery binding post to one of the outside posts of the potentiometer.

A wire from the plus A battery binding post to the other outside binding post of the potentiometer.

Another wire from that second outside binding post of the potentiometer to the one side of the switch.

A wire from the other side of the switch to one connection of the first rheostat.

A wire from the other connection of the first rheostat to the plus filament connection of the first socket.

A wire from the 22½ volt positive B battery binding post to the lower outside blade of the first jack.

A wire from the minus B battery binding post to the center blade of the potentiometer.

This completes the detector panel. If you are going to go ahead with the two stages of amplification keep on wiring as follows:

A wire from the minus filament connection of the first socket to the minus filament connection of the second socket.

A wire from the upper center blade of the first jack to the plate binding post of the first transformer.

A wire from the lower center blade of the first jack to the battery binding post of the first transformer.

A wire from the grid binding post of the first transformer to the grid ding post of the second socket.

wire from the minus filament g post of the first transformer minus filament binding post of d socket.

from that same minus fila- ng post of the second minus filament binding (this makes filament con-

of the second rheostat to one connection of the third rheostat.

A wire from the other connection of the third rheostat to the plus filament connection of the third socket.

A wire from the other connection of the second rheostat to the plus filament binding post of the second socket.

A wire from the plate connection of the second socket to the upper outside blade of the second jack.

A wire from the lower outside blade of the second jack to the plus 60 to 90 volt connection of B battery.

A wire from the upper center blade of the second jack to the plate binding post of the second transformer.

A wire from the lower center blade of the second jack to B battery binding post of the second transformer.

A wire from the grid binding post to the second transformer to the grid connection on the third socket.

A wire from the minus filament connection of the second transformer to the minus filament binding post on the third socket.

A wire from the plate connection on the third socket to the upper outside blade of third jack.

A wire from the lower outside blade of the third jack to the 60 to 90 volt B battery binding post.

A wire from the two center binding posts of the third jack to the two binding posts on the panel for the permanent connection of the loud speaker.

Troop No. 1 gets the scores at Camp Schnar, Ossining, N. Y.

Now for Camp

with the new

Portable Radiola!

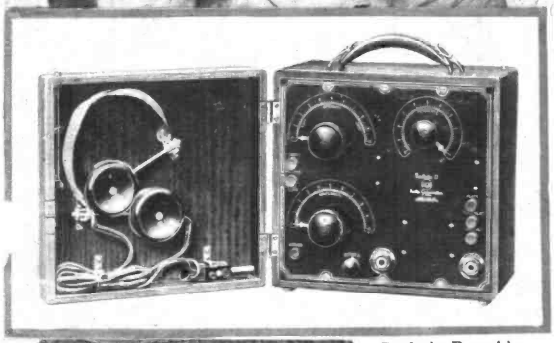
(Radiola II)

HERE'S a Radiola you can pick up and trot off with! In a cabinet that holds the headset, the tubes, and all the batteries. With a handle to carry it by. Think of taking your Radiola with you—tuning in almost anywhere, at any time, on half the country's broadcast programs.

Now for camp life, with a Radiola! Music at the evening campfire. Baseball scores. Songs, news, talks, going with you wherever you go.

Throw an insulated wire over a tree, and you are ready to listen in to far-away cities. Radiola II is a powerful receiver with two tubes. The secret of its smallness is the new Radiotron UV-199, that operates on ordinary little flashlight batteries!

One thing that will impress the family is the f appearance of the set for home use, when take off cover and handle. It's a portable ceiver—but, first of all, it's a fine rece sensitive one.

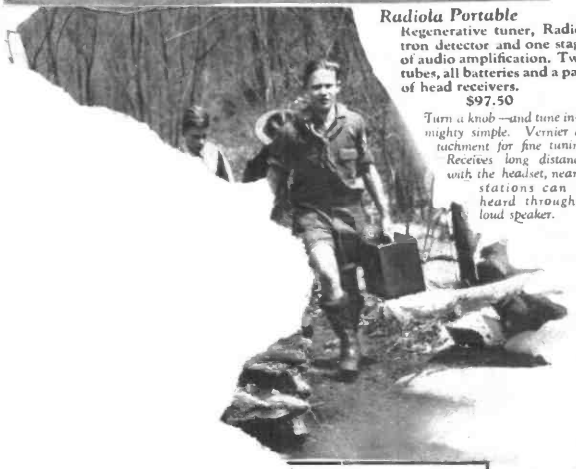


Radiola Portable

Regenerative tuner, Radiotron detector and one stage of audio amplification. Two tubes, all batteries and a pair of head receivers.

$97.50

Turn a knob—and tune in—mighty simple. Vernier attachment for fine tuning. Receives long distances with the headset, nearby stations can be heard through a loud speaker.



"*There's a* **Radiola** *for ev*

at the nearest Radio or F'

Radio Corpora

Sales Department
233 Broadway 10 S.
New York

This Symbol of quality is your protection

R