# NATIONAL RADIO NEWS

**IN THIS ISSUE**

Loop Aerials

Making Radio Receivers Fit the Home

Alumni Association News

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# NEW G. E. PRESIDENT STUDIED IN SPARE TIME

From Schenectady, New York, comes news that Charles E. Wilson has been elevated to the office of President of the mammoth General Electric Company.

He started with this company in a small way, right down at the bottom, as a young man with imagination and a venturesome temperament. His enthusiasm and initiative in trying new ways of doing things attracted the interest of his superiors, and led to his first definite responsibility as an assistant shipping clerk.

But Charles Wilson was not content to stand still. He began spare time study at home in order to prepare himself for new opportunities. One promotion followed another in rapid succession, culminating in his recent appointment to the highest position possible in his company. Yet even today, Mr. Wilson remains a pioneer in electricity, still seeking better ways of doing things, in order to support the philosophy of his company, "More goods for more people at less cost."

The career of Mr. Wilson is comparable to that of numerous others. Many things enter into a successful life, and not the least of these is a keen determination to devote a liberal portion of spare time to preparation for the next step upward.

"The man who utilizes his leisure by studying at home is usually increasing his ability. I can subscribe to that method because I studied that way and know its benefits," says Walter P. Chrysler, President of the Chrysler Corporation. "Such success as I have had has been very largely due to home study," says Samuel O. Dunn, Editor of Railway Age magazine. "Home study courses bring practical results in cultural and vocational accomplishments," says E. A. Grace, President of the great Bethlehem Steel Company.

Not every man aspires to be head of a great corporation, nor need he set his star so high. Thousands of men are achieving success in their own chosen work through the aid of home study.

In our files at this moment are hundreds of letters from our own graduates, enthusiastically praising spare time study at home. These men all hold responsible positions now, and proudly give me full permission to use their letters in any way which will inspire others to take the N. R. I. road to success in radio.

J. E. Smith, *President*.

# Loop Aerials

By WM. FRANKLIN COOK

N. R. I. Technical Consultant

Wm. Franklin Cook

LOOPS are made in two general forms, the flat type—sometimes called a pancake—and another type that is wound very similar to a coil. They will be found on many of the new receivers and are now available for installation by the serviceman. Before considering installation problems a review of design characteristics should be made.

As the pick-up ability of the antenna is proportional to the area, it is advisable to have the loop aerial made on as large a form as possible. As the loop is still quite small compared to an ordinary antenna, it will pick up but little energy. Early attempts to use loops were hampered by insensitive receivers, but the high sensitivity of modern tubes and stages permits the return of this type aerial.

Even so, the loop must be tuned to take advantage of resonance step-up. As a result, its inductance is quite an important characteristic as it must be designed so that with the particular tuning condenser employed, the loop can be made to tune over the broadcast band. The number of turns, their spacing, the size of wire and other similar characteristics, (very similar to that of a coil) determine the inductance of a loop. It should be wound on a form that is mechanically rigid, to prevent inductance changes.

In the case of small midget type receivers employing such a loop, the presence of such a large body of metal as a set chassis, very close to the loop, immediately raises the question of distributed capacity. The distributed capacity of a loop is fairly high as it is and the chassis makes this factor worse. You will find that generally the pancake type loop will be used on small sets, as it is possible to keep down distributed capacity somewhat with this shape. As it is, the distributed capacity has made it necessary to increase the capacity of the tuning condensers in some sets designed for a loop.

A loop aerial in space is quite directional and in general must be pointed so that its plane lies in the direction of the desired station to get the maximum signal. As a result, the loop will favor reception from a particular direction. However, the presence of a large amount of metal such as a chassis, so distorts the reception pattern that most of this directional effect is lost.

Another variation in construction which is found in some loops would be an electrostatic or Faraday shield. Such a shield consists of a cage of parallel wires enclosing the loop. Only one end of each wire is connected to a plate or strip—the other ends are left free. This prevents any closed loops which could absorb energy. By grounding this entire structure, the loop is rendered a purely inductive device as the electrostatic shield removes all capacity coupling to the loop. As a result, it is possible to minimize the interference, particularly of the man-made variety.

Mention has been previously made of the directional qualities of a loop. It is possible to so rotate the loop that local interference can be cut down, depending upon the reception pattern. In other words, you rotate the loop so that it favors the desired station without favoring the undesired, where this be possible. This also works in the case of certain types of interference.

In the case of a small midget set, the loop is generally associated with the set cabinet, with the result that the entire set must be rotated. This is of no disadvantage in the case of a portable set, although it may not be quite so desirable in the case of a set mounted in the home, as some one particular position may be desired for the set which does not provide satisfactory reception from some one station or group of stations.

In the case of a large console type receiver, it is possible to design the loop itself so that it may be rotated, in which case the cabinet can be set in any desired position. In order to avoid the necessity of rotation of the loop, a manufacturer has recently brought out dual loop aerials fixed at right angles to each other so as to more or less destroy this directional characteristic.

Since directional qualities result in an apparent increase in selectivity, a small receiver having but a single tuned stage before the first detector will apparently have better selectivity with the loop than if it were being used with an ordinary type aerial. This permits the cheaper set to perform somewhat better.

The loop aerial has one considerable disadvantage inasmuch as it does not lend itself very well to the all-wave type receiver. Due to troubles in adjusting its inductance and distributed capacity, taps on the loop have been tried with only fair results. Some of the receivers of the console types now have more than one loop—a large loop for broadcast reception and a separate loop for short-wave work.

At best, it is important to remember, however, that the loop aerial does not provide any great amount of pick-up. As a result, an external aerial is frequently necessary even on a receiver using a loop in order to pick up distant stations. Many of the receivers available have the aerial and ground connections still provided so as to increase this pick-up. Generally, the connections from the aerial to the loop are in the nature of a turn of wire around the loop.

Therefore, if no aerial post is provided, you can connect the aerial generally by winding a single turn of wire around in the plane of the loop (as if you were adding another turn to the loop). Connect one end of the wire to the aerial and the other end to the ground. If considerable hum modulation is noticed, instead of grounding the end of this pick-up loop, connect the ground end to the set chassis. It is also possible to make a coupling by connecting the aerial and ground to a primary winding of many turns of small size placed within the field of the loop.

From the foregoing, one can see that the only real advantage to a loop aerial would be an increase in the portability of a receiver and its ability to reject to a certain extent local interference. The portability provided by the loop aerial is of course very important in the case of the modern battery portable type sets. In the case of a receiver within the home, it is no longer necessary to make aerial and ground connections to the set and it may be moved about from place to place in the home with just the power cord to be connected.

As a result of the wide advertising being given the loop, you may encounter set owners who will desire a loop aerial installed, or will wish to know how it will work on their particular receivers. First of all, a loop antenna is definitely of the indoor variety, designed for local reception and too much must not be expected of it. The receiver must, therefore, have fairly high sensitivity.

Loop aerials available now are satisfactory for the broadcast band, but will not perform satisfactorily on the short wave bands of an all-wave receiver. This will usually mean sacrificing of short-wave reception when an installation is made on an all-wave receiver; be sure the customer understands this.

Generally, on sets having a two-section tuning condenser gang, a loop can be made to work fairly well. These receivers will either be very simple tuned radio frequency sets, or a superheterodyne in which one tuning condenser section serves the preselector, and the other tunes the oscillator. If the receiver uses a three section tuning condenser, a tuned R.F. stage will be in the set. Because of tracking troubles, the loop may not perform satisfactorily on such a set.


Typical loop aerials sold by radio supply firms.

The illustration on the front cover of this issue shows a loop antenna made by Consolidated Wire and Associated Corporations, installed at the back of an R.C.A. table model Radio receiver.

It is not advisable to build a loop aerial for design problems are difficult and critical. There

are available on the market at present a number of packaged loop aerials which may be purchased at reasonable prices. You will find that, in most cases, these aerials have some means of varying their inductance. This generally consists of a small coil having a variable iron core, located on the form holding the loop. This is quite necessary, as the loop inductance must be adjusted to match the tuning condensers in the receiver, so that proper tracking can be obtained.

These loops are available in various sizes and this, of course, must also be considered. I doubt if any receiver owner would approve of an aerial housing which is wider or longer than his receiver. It will, therefore, be necessary to investigate not only the electrical characteristics, but also the sizes of the aerials available.

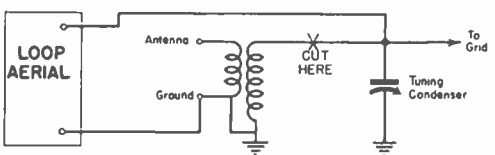



Figure 1

There are various means of fastening the aerials to receivers. Some are furnished with rubber suction cups, while others have various bolts or similar means of fastening within the cabinet or to the receiver. If at all possible, the loop should be mounted well away from the receiver chassis.

The installation itself presents a problem or two. If it were possible to connect the loop aerial to the antenna and ground posts of the receiver, then all would be well. This is impractical, however, for the loop would act essentially as a short circuit between the antenna and ground terminals. Very little signal energy would be picked up, and the loop would not be tuned.

In order to tune the loop, we must connect it *in place of the antenna coil* in the receiver. There are two types of receivers commonly encountered, the type where the grid return goes directly to ground, and the type where automatic volume control voltage is fed through the input coil to the grid of the tube. The first type will probably not have automatic volume control.

As shown in Fig. 1, it is necessary to locate the first or input tuning coil. Locate the lead going from this coil to the tuning condenser and the control grid of the first tube. This mechanical arrangement varies according to the receiver; generally the coil connects to the tuning condenser stator plates, with another lead going from the stator plates to the control grid of the tube. In any event, cut the coil lead going to the condenser, leaving the lead between the condenser and the grid of the tube as it is.

The loop is then installed in place of the coil by soldering one loop lead to ground and the other lead to the grid terminal of the tube. A convenient point will probably be at the stator terminal of the tuning condenser section serving the antenna coil. The instructions accompanying the aerial will tell you which lead should be connected to the grid. This makes a difference, particularly in the pancake type aerial, as the lead coming from the inside of the pancake should preferably be connected to the grid for a minimum of stray capacity and hum modulation.

The loop must then be fastened mechanically within the cabinet or to the receiver by whatever means are provided by the manufacturer of the loop. A small block or strip of wood can be employed if no means are provided for fastening the unit. Metal brackets should be avoided.

In the case of a receiver with automatic volume control, it is necessary to make two cuts, as the first coil must be disconnected completely. This is shown in Fig. 2. Again the loop aerial is connected in place of the first coil. The lead which formerly went to ground will, however, now go to the A.V.C. lead, while the other lead will go to the grid as before.

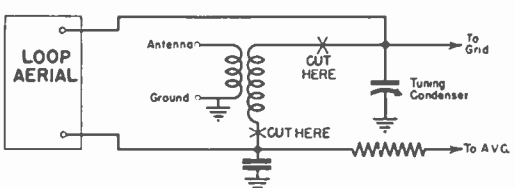



Figure 2

In regard to the adjustments necessary, if the loop is of the type having an adjustable inductance, a weak signal at about 600 kilocycles should be tuned in and the loop inductance adjusted for maximum output. Now tune to the high frequency end of the band and adjust the trimmer associated with the preselector tuning condenser for maximum output.

Some of the loops available do not provide any real method of adjusting the inductance, except by removing turns. This type, of course is considerably cheaper than the other, but will prove much harder to adjust.

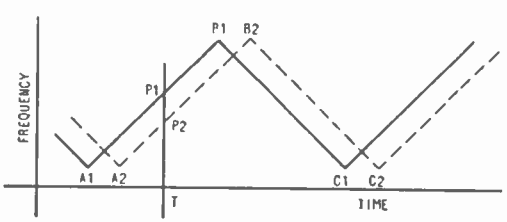
# New Radio Altimeter for Planes

THE commercial model of the terrain clearance indicator developed by Bell Telephone Laboratories has just been announced by the Western Electric Company. This instrument, known as the 1A Radio Altimeter, is designed to provide airplane pilots with an absolutely accurate indication of their height above the ground throughout an altitude range of from 50 to 5,000 feet. It is an outgrowth of the experimental model which was first demonstrated in October 1938.

At that time, the terrain clearance indicator was welcomed by all branches of the aviation industry as a major contribution to air navigation. Despite darkness or fog, a pilot using this instrument is always aware of his height, not above sea level, but above the ground beneath him. By keeping at a safe predetermined terrain clearance, or height above the ground, the danger of crashing due to lack of visibility or ignorance of the terrain becomes practically non-existent.

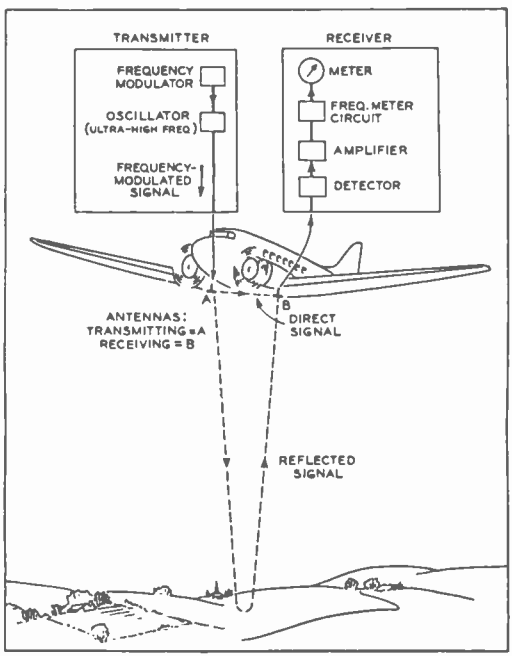
The 1A Absolute Altimeter employs a principle involving transmission of a radio signal from an airplane, reception of the signal as reflected from the earth, measurement of the elapsed time between transmission and reception, and the translation of this time interval into a direct reading of the plane's altitude in feet as shown on a meter. Due to its use of an ultra-high frequency, the new instrument is entirely free from static interference.

If an airplane is equipped with a radio oscillator whose frequency can be "wobbled" according to the saw-tooth curve A1-B1-C1 in Fig. 1, and if a corresponding radio wave is radiated toward the ground, some of the energy will be reflected back to the plane, where it will set up a current




*Courtesy Western Electric Co., Inc.*

FIG. 1. Curves showing how the frequencies of the radiated and reflected signals vary with time. The average frequency employed is approximately 430 megacycles, and the instantaneous frequency varies over a 25 megacycle band centered on this value at the rate of 60 times per second.




*Courtesy Western Electric Co., Inc.*

FIG 2. Essential components of the new Western Electric radio altimeter.

in an antenna. The frequency of that current will have a similar wobble, but displaced in time to the position A2-B2-C2 by reason of the time required for the radio wave to travel to the ground and back. At any instant, the frequency of the received wave will differ from that sent out by a constant amount equal to P1-P2. If the ground falls away or the plane rises, the travel time will be increased and the received current will be displaced still further; consequently, the frequency difference at any time will increase *in proportion to the change in clearance.*

The difference in frequency between two currents can be measured by passing them through a modulator tube and measuring the frequency of the "difference" component in a frequency meter. The scale of this meter, graduated in feet, will indicate directly the clearance over the terrain. Above five thousand feet, the conventional aneroid altimeter is entirely satisfactory, and below fifty feet the pilot will invariably be able to see the ground directly, hence the 50 to

5,000 foot range of this instrument is entirely adequate.

An indication of the character of the surface over which the airplane is flying is given by the variations in the meter reading. A city usually causes rapid fluctuations of the order of fifty feet, depending, of course, upon the height and the spacing of the buildings. Cultivated farmland causes fluctuations of lower frequency and amplitude. An isolated high object such as a skyscraper or a chimney is indicated only by a slight meter kick as the airplane passes over it. If the airplane passes only a few feet above the object, and the top is large enough to contribute momentarily most of the echo signal received by the airplane, the indication is unmistakable and the correct distance to the object is indicated by the meter.

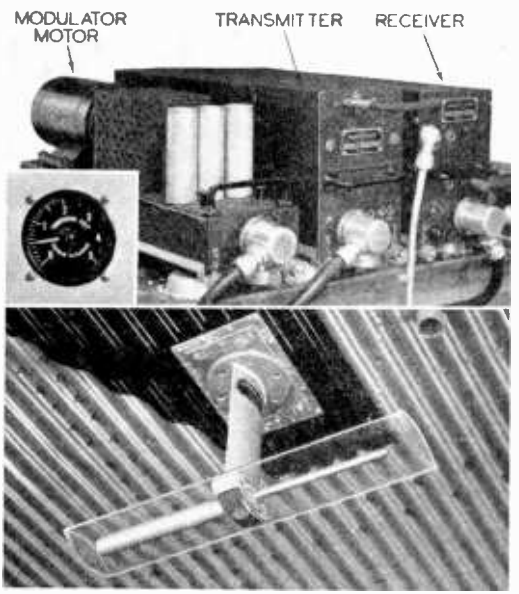
A study of the circumstances in connection with a number of crashes in the west during recent years has revealed that, in most of the cases, the airplanes crashed after having been within a few feet of the ground without the pilot knowing it, for several minutes before they struck. In such a situation, the terrain clearance indicator should be capable of warning the pilot in ample time to avert a crash.

The Western Electric 1A Altimeter is essentially a complete radio station, including a low-power, ultra-high-frequency transmitter in which is incorporated a modulator or "frequency wobbler," a radio receiver, a meter and two dipole antennas, as indicated in Fig. 2. The frequency modulator is simply a small electric motor driving a rotating tuning condenser in the oscillator tuned circuit, thereby making the oscillator frequency increase and decrease linearly as indicated by saw-tooth curve A1-B1-C1 in Fig. 2.

The transmitter, modulator and receiver are shown in Fig. 3; these units can be installed in the baggage compartment of the plane, with cable connections to the airplane battery and to the meter on the instrument board. The total weight of the entire apparatus is less than fifty pounds.

The two identical antennas are mounted on the under-surface of the wings on either side of the plane body, and connected to the transmitter and receiver by coaxial transmission lines. One of the antennas is shown in Fig. 4; it extends downward only seven inches and has a spread of approximately fourteen inches.

The antenna installation, utilizing half-wave dipole type antennas approximately a quarter wavelength below the reflecting surface of the wing, is not particularly directional. The signal is radiated over approximately the whole hemisphere below the wing which supports the transmitting antenna. The strength of the signal is greatest in the downward direction but does not fall off rapidly in other directions. The advantage of this arrangement is that the distance to the nearest reflecting surface is measured regardless of whether it is directly beneath, or to the front or side. As a result, very little change in reading occurs when the airplane banks steeply. Some advance indication also is given when an airplane in level flight approaches higher terrain.




*Courtesy Western Electric Co., Inc*

FIG. 3 (above). Modulator, transmitter and receiver units of the 1A Radio Altimeter. These can be mounted in the baggage compartment of a plane, so that only the indicating meter shown in the inset at the left occupies space on the instrument panel of the plane.

FIG. 4 (below). One of the dipole antennas with its streamlined plastic housing and support bracket, as mounted on the underside of a plane wing.

*nri*

## Tune In On 31.48 Meters For Radio Mailbag to Admiral Byrd

RADIO mail service to Little America was inaugurated on December 8 by 100-kw. General Electric short-wave station WGEO in Schenectady, and will be continued every other Friday night at 11 p.m. until Admiral Byrd returns from his third Antarctic expedition. The station operates on a wave length of 31.48 meters (9.53 mc.).

# Puzzling Radio Questions

**This new feature in National Radio News presents interesting technical questions received from N. R. I. students and graduates, along with answers by the N. R. I. staff of radio experts.**

## Old Tubes

QUESTION: *The tubes in my radio set are marked CX326, UX226, UY227, C327, SX280 and CX345. I cannot find these tubes listed in any catalog. What can I use for replacements?*

ANSWER: The tubes in your receiver are evidently quite old, as the method used to identify them has been simplified for many years. The letters designate the type of socket and the manufacturer. The letter *C* stands for Cunningham, the letter *U* for RCA and the letter *S* for Sylvania. The letter *X* means that the tube fits in a four-prong socket, while the letter *Y* means a five-prong socket. In addition, Cunningham used *3* as the first numeral, while RCA and Sylvania used *2*. The last two numbers identify the type of tube.

When tube manufacturers began stamping their firm names on tube bases, the first identifying letters (*C*, *U*, *S*, etc.) were dropped. With the advent of tube charts giving socket connections, the letters *X* and *Y* were deemed unnecessary, and dropped. Finally, the first number (*2* or *3*) was left off, giving the final tube designations in use today. Tubes CX326, UX226, SX226, etc., are therefore identical to the type 26, which can be obtained at any radio supply house. Likewise, SX280 is now type 80; CX345 and UX245 are type 45; C327 and UY227 are type 27; UX71 is now type 71A (the A represents a change in filament construction which does not affect the use of the tube); UY224 is type 24A; 247 is type 47. Likewise, for other less popular older tubes, having a *2* or *3* as first number, there will be a modern equivalent having the same two last numbers.

Some of the older Sparton tubes having a *4* or *1* as first number, such as the 485, 484 and 183, are exceptions (they cannot be replaced by the present 85, 84 and 83 type tubes), but these old tubes are still available and are listed by their old numbers in tube charts.

## Interference Occurs Only at Night

QUESTION: *When the modulation is off at a local 1,310-kc. station (such as between programs), one or more other stations can be heard clearly; sometimes these interfering stations can be noticed even when the local station is broadcasting speech or music, causing a choppiness which sounds like "monkey chatter." This particular interference occurs only at night. How can it be eliminated?*

ANSWER: Reference to a radio log book shows that sixty-three stations operate on a frequency of 1,310 kc. This means that if your receiver is at all sensitive and is connected to a good aerial, it will pick up several of these stations whenever atmospheric conditions are favorable for distant reception, such as at night and particularly during winter nights. The interference is more prevalent at the high-frequency end of the broadcast band, for the channels are particularly crowded here.

When the interference is particularly bad, it can sometimes be reduced by shortening the length of the antenna, or changing the direction of the antenna so it will favor reception from the local station and have minimum pick-up in the direction of the strongest interfering station. Modern receivers with efficient built-in loops can usually be rotated to a position where the interference is negligible, for the loops are highly directional. There is nothing which can be done to the receiver to correct the trouble.

## Voltage Drops

QUESTION: *How can a voltage which is lost or dropped in a resistor be used to bias a tube? It seems to me that when you drop a voltage, it is thrown away and is no longer in the circuit.*

ANSWER: When we connect a source of voltage (such as a battery) to a circuit containing a resistor, a current will flow through the resistor and will develop a voltage across the resistor. This kind of voltage, developed across a part by the flow of current, is called a *voltage drop.*

A voltage drop is a definite value, depending both upon the ohmic value of the resistor and upon the current value, in accordance with Ohm's Law (Voltage equals Current times Resistance). We can utilize this voltage drop by connecting a high-resistance circuit (such as the grid circuit of a vacuum tube stage) across the resistor terminals. The current and power taken by the high-resistance circuit will be negligibly small, and will not appreciably affect the value of the voltage drop across the original resistor.

Actually, it is the original source which is providing the voltage (and current) for the high-

# Answered By Experts

resistance circuit, but for all practical purposes it is more convenient to consider the voltage drop across the resistor as the effective source. Remember, however, that a voltage drop is not a true source; a true source supplies power, whereas a voltage drop does not. Any power which may appear to be coming from a voltage drop is actually being supplied by the original source.

## Building a 6-Volt Power Pack

QUESTION: *Is it possible to construct an eliminator to replace a storage battery, for testing automobile radio receivers in my shop?*

ANSWER: Before considering the construction of an eliminator, check up on the total cost of the parts you will need. To be useful for test work, an eliminator must deliver a current of 12 amperes or more. The transformer, the rectifier (usually a copper-oxide unit), the choke coil and the filter condensers must all be designed to handle this high current. In addition, the eliminator should have a voltmeter, a circuit breaker or fuse, and some means for adjusting the voltage output (generally accomplished by taps on the transformer).

Investigation shows that the total cost of all these parts today, when purchased individually as you would have to do, is just about the same as the price of a factory-built power pack unit having identical characteristics. When you add in the cost of the metal chassis on which the parts should be mounted, along with a reasonable allowance for small hardware parts and your time in assembling, you can see it is far cheaper to buy a commercially-built power pack. The reason for this is simply that the manufacturer can obtain the parts at lower prices because he buys in large quantities.

A storage battery on the workbench, recharged occasionally with an ordinary, inexpensive a.c. battery charger, will be adequate for auto radio work. Always use No. 14 or larger wire to connect an auto radio to a power supply.

You don't even have to get a separate storage battery, if you can drive your car to within 25 feet or so of your workbench: just get two 25-foot lengths of No. 8 or heavier insulated copper wire, attach extra large battery clips to the car end of each wire, clip one wire to the battery terminal of the starter switch and the other to the car frame, then run the wires through a window to your workbench. The longer the wires you use, the larger they should be to prevent excessive voltage drop in the wires themselves.

*The following questions are taken from a list prepared by the Federal Communications Commission. The questions on this list are typical of those asked at government license examinations for radio operators.*

## Ammeters in Series

QUESTION: *If two ammeters are connected in series, how may the total current through the two meters be determined?*

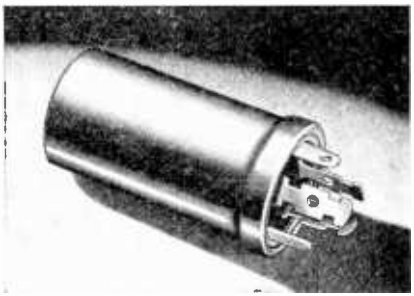
ANSWER: This is a typical "catch" question, but any one who has thoroughly mastered the fundamental radio principles as presented in the N. R. I. Course should have no trouble with even the most confusingly worded of these "catch" questions, provided he can "keep his head" (think clearly without getting excited or worried) during the tenseness of a government examination. Since the two meters are connected in series, the same current must flow through each one. An ammeter indicates the amount of current flowing through itself, hence each ammeter will indicate the same current value. Therefore, the answer is: The total current through the meters can be determined by reading either one of the meters.

## Transformer Smoke

QUESTION: *What would be the effect if d.c. were applied to the primary of an a.c. transformer?*

ANSWER: The only opposition which a transformer offers to direct current is the d.c. resistance of its primary winding. The inductance of the transformer will limit the current flow momentarily at the start, but this effect can be neglected here since it lasts for only a few seconds. Since the d.c. resistance of the primary is very low, the current will be high. The power dissipated in the primary by this current (the resistance multiplied by the square of the current) will quickly heat the copper wire of the winding enough to burn the insulation. Smoke will be produced; there will be a strong odor of burning insulation. Turns of the winding may short, increasing the current to the point where the copper wire or the soldered connections to it will melt, but since most circuits are fused, the fuses will blow before this occurs. If gas cannot escape fast enough from the inner windings, an explosion may result. You could answer this question as follows: Excessive current will flow through the primary winding. If fuses do not open the circuit immediately, the current will damage the insulation and eventually melt open the transformer circuit.

# WHAT'S NEW IN CONDENSERS FOR 1940



Prong-base midget electrolytic condenser, made by Aerovox Corp., New Bedford, Mass.


Recent additions to the Sprague condenser line, made by the Sprague Products Co., North Adams, Massachusetts.

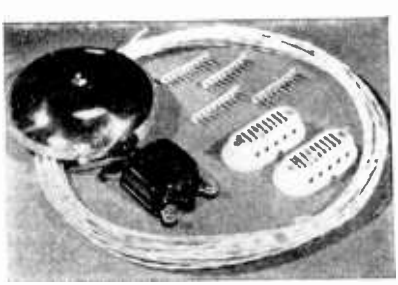
MIDGET dry electrolytic condensers in metal cans, with terminal lugs projecting from the base much like the prongs of tubes, are announced by Aerovox. . . . Although single electrolytic condensers cannot be made for voltages much over 480 volts, Sprague now offers electrolytics rated at 800 volts. No magic is involved; two condensers are connected in series inside the common housing, as shown above (top center), to give half the capacity but twice the voltage rating of a single unit. . . . Silvered mica is used to secure exceptional stability in Sprague fixed condensers for r.f. circuits. These come with pigtail leads, in sizes from 5 to 5000 mmfd. . . . Easily adjusted metal mounting tabs, shown in the circle above, are a new feature in the Sprague line of small cardboard-encased dry electrolytics. . . . For circuits where dangerously high voltages may exist at condenser terminals, Sprague has soft rubber caps like those shown above (upper right) . . . Sprague midget dry electrolytics with self-supporting leads are now available in handy kits of common sizes, as shown above (lower right).

## National Union Offers Free Forms

A radio servicing form patterned after the shop reports and statements being used so successfully by garages has been developed by the National Union Radio Corporation. This form, known as "Official Radio Service Analysis and Test Report" is available without charge to Radiotricians handling National Union tubes, and is obtainable through local distributors for these tubes. Each form is 5½" wide by 13¼" long. There are spaces for checking off and pricing each step in a complete radio repair and overhaul job.

## New Fire-Detecting System

A simple fire alarm system for homes and small shops, consisting of a fire gong, two or more thermostat-type detector heads, and hook-up wire, is now being marketed by the Technical Appliance Corporation, well-known manufacturer of radio antenna systems. The gong will operate either from dry cells or a heavy-duty bell-ringing transformer. The detector heads are located where fire hazards are greatest, such as near furnaces, stoves or in the attic. Radiotricians can easily install this Taco Fyre-Scout system.



Taco No. 700 Fyre-Scout kit, sold by Technical Appliance Corp., 17 E. 16th St., New York, N. Y. Write to them for literature.

# The Laboratory Page

By GEORGE J. ROHRICH

*The purpose of this department is to furnish supplemental experiments to students who have completed their Home Laboratory Course, but who wish additional laboratory experience. You are not required to perform these experiments, but you will gain increased knowledge by doing so.*

*Most of the material required will be that received as part of the Laboratory Course. Any other material necessary can be purchased very reasonably and will constitute an investment rather than an expense, as it will serve as replacements in service work or be useful in your shop later.*

George J. Rohrich, Engineer
in Charge N. R. I. Laboratory

## EXPERIMENT NO. 68

*Object*: To study the effect of static charges of electricity upon open and closed grid circuits of a vacuum tube.

*Apparatus required*: Baseboard (Item No. 16); socket (No. 11); 30 ohm resistor (No. 14); grid leak (No. 25); test prods (No. 8); type 30 tube (No. 10); 0-5 milliammeter (No. 1); 45 volt battery; one or two 1½ volt dry cells; a rubber hair comb; several dry drinking glasses; a silk cloth.

*Apparatus Assembly*: Note: Conduct this experiment preferably on a clear cool day or night when the humidity of the air is low, with very little moisture present in order to observe the best results. Then assemble the circuit shown in Figure 109. Use one or two dry cells for heating the filament and adjust the 30 ohm resistor until the deflection on the meter is some convenient value between 1 ma and 1.8 ma. Then *remove* the grid leak.

*Experimental Procedures and Observations with Explanations*:

1. Hold the red test prod by the insulated handle and scuff or rub your shoes over a woolen rug or carpet. Notice that the milliameter needle will move. In many instances the needle of the meter will drop to zero and remain there for several seconds before rising to its former value.

The reason for this peculiar action is due to a charge of static electricity being produced upon the shoes and clothing on your body during the time that these insulating materials are being rubbed or scuffed on the carpet or rug or being rubbed together where they come in contact with each other through the movements of other parts of your body. This static charge consists of an accumulation of electrons. Other electrons exist on the metal wire of the red test prod. When the accumulated electrons on your clothing are brought near those collected on the grid, these will repel each other, forcing a large number of them directly upon the grid and this will prevent the plate current from flowing and registering on the meter. A large number of these electrons on your clothing also leak away from the clothing and produce a further accumulation *upon the insulated covering* surrounding the test prod. In a later observation we shall prove this is so, by removing the insulation from a wire and repeating our procedures.

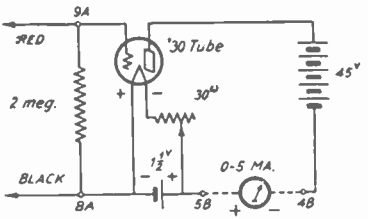



Figure 109

In extremely dry weather the charges will remain on the insulation of the test prod for several seconds before being conducted away by whatever moisture does exist in the air and in the insulated covering.

(Page 12, please)

# The Laboratory Page (Continued from page 11)

2. Rub the rubber comb briskly over woolen parts of your clothing. Then hold the comb near the test prod. Again notice that touching the test prod again causes the meter needle to drop to zero. Here we have another example where friction between two insulated materials causes electrons to accumulate on the comb and this will produce similar effects as observed during the first procedure.

3. Again rub the comb briskly over woolen parts of your clothing and wave the comb within several inches of the test prod. In many instances you may note that this effect will react at a distance of several feet away from the test prod. This demonstrates that the repelling action of electrons does not depend upon actual contact with the wire itself.

4. This time rub the comb through your dry hair on your head. Again note that the effect is the same as observed in Procedures 2 and 3.

5. Collect a charge on the comb as directed in Procedures 3 or 4. Test for the presence of the charge by waving the comb near the test prod. then wipe the comb with your hand so every part of the comb is contacted with your hand during this final procedure. Again test for a charge.

If your hand is reasonably moist with normal moisture found in the body, the final procedure will *remove* the charge from the comb. Consequently, no reaction will be observed.

In this procedure the hand and body become conductive and dispel the accumulated electrons. If your hand is extremely dry you may find it necessary to rub the comb several times in this manner.

6. Try rubbing the comb on a metal object. You will find that it is not possible to accumulate a charge as found in procedures 3 and 4. The reason for this is that the electrons are redistributed over the metal surface as soon as they accumulate.

7. Remove the insulation from a length of No. 24 wire. A piece of wire about one foot in length will do. Remove the red test prod and replace it with the bare wire. Repeat procedure No. 1. Notice that the needle on the meter will react in a similar manner as before with the exception that it will not remain at zero for a long period. This clearly points out the statement made in the first procedure *that the charges collected upon the insulation.*

8. Connect the wire from the grid so the other end of the wire fastens to one of the terminals of the dry cell. Repeat procedures 2 to 5 inclusive. Here you will find that very little reaction is noted. The reason for this is that the electrons have an opportunity to be redistributed in the remaining portions of the vacuum tube circuits, so they will not collect on the grid itself as observed previously.

9. Insert the grid leak in series with the grid and the wire used in procedure No. 8. Observe that conditions are the same, even when using extremely high resistance with values of two million ohms.

Summarizing the observations made in procedures 8 and 9 we can see that the static charges have their greatest effects only when the grid circuit is entirely open or disconnected.

These observations clearly show that the effects are produced by the action of static charges and not by defective connections or defective tubes and batteries. Consequently, while performing your regular experiments in the Supplementary Laboratory Course, do not become alarmed if the meter appears to act in an erratic manner while making measurements. The erratic action will occur only while the test prod remains disconnected. The static charges will not react on the measurements while the test prods are connected together or contacted to the sources of voltage being checked.

10. Reconnect the test prod to the grid and repeat procedure No. 4. Be sure that you have a charge collected on the comb. Then blow your breath upon the comb by opening your mouth wide and expelling warm moist air upon the entire surface of the comb. Again you will notice that this procedure dispels the charge. This shows why the experiment may fail or give poor results when the air is extremely warm and moist.

11. Repeat the tests outlined above while using other insulated substances such as glass which is rubbed with silk. Touching the glass to the test prod as in procedure No. 1 will have very little effect until the glass is contacted to the test prod and then removed. In this instance there is an absence of electrons on the glass during the rubbing procedure. When the glass is contacted to the insulated handle electrons will be removed from the test prod and additional electrons are taken from the filament in order to serve as a bias for reducing the plate current.

RADIO-TRICIAN
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Service Sheet
Compiled Solely for Students and Graduates
NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

# MOTOROLA 41B and 41F
## Alignment Procedure

1. Connect signal generator to control grid of Osc.-Mod. tube (1A7G) through a .05 MF condenser and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh. Set band switch in B.C. position. NOTE: The band switch is the slider switch on the rear of the chassis base. The UP position is for Short-Wave. The DOWN position is for Broadcast.

2. Set signal generator at 455 K.C. and carefully adjust the four I.F. trimmers (located on top of I.F. coil pans) to point showing highest reading on output meter.

3. Set band switch in "Short-Wave" position (UP). Connect signal generator to antenna and ground terminals, using 400 ohm carbon resistor in antenna lead.

4. Set signal generator at 18.0 MC and with condenser gang completely out of mesh adjust the S.W. OSC. trimmer until the 18.0 MC signal is heard.

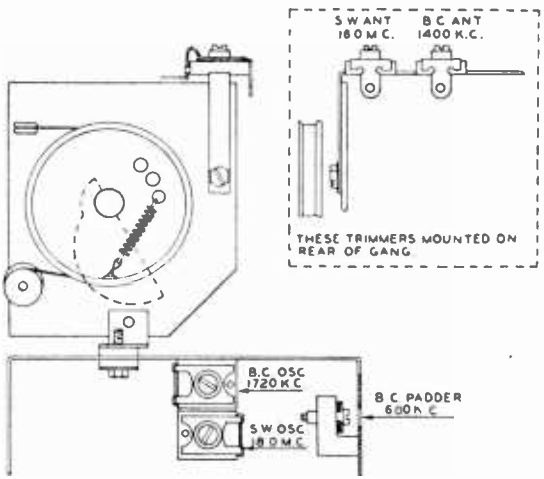
5. Set signal generator at 16.0 MC and tune the condenser gang to signal at 16.0 MC. Adjust S.W. ANT. trimmer to point giving greatest output reading.

6. Set band switch in Broadcast position (DOWN) and replace 400 ohm resistor in signal generator lead with .0002 MF condenser.

7. Set signal generator at 1720 K.C. and turn condenser gang to out of mesh position. Adjust B.C. OSC. trimmer until 1720 K.C. signal is heard.

8. Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading.

(NOTE: If there is noise at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

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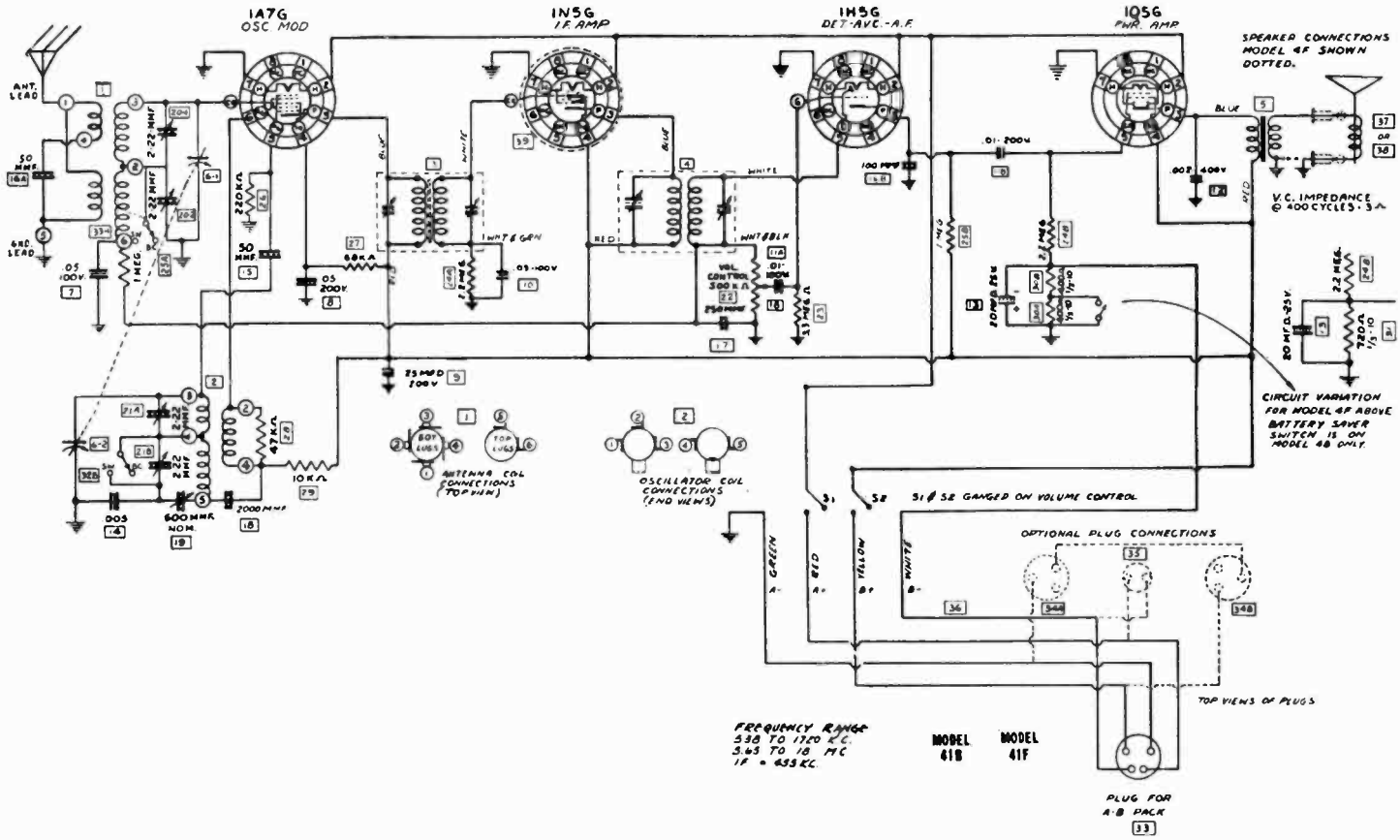



# MOTOROLA MODELS 41B and 41F

# You Are Traveling the Same Road These Men Did. Make No Detours

A few letters taken from many received from graduates. Read them. Determine that you, too, will get your share of the profits in the ever-growing field of Radio.

## Nice To Be Your Own Boss

"Everybody admires a technically trained man. I know I always did, never dreaming that some day I would be able to stand beside them. Words will never express my gratitude to the National Radio Institute for their unceasing efforts to make my future successful. This you have done and I extend many thanks to all of the staff who so willingly pushed me to the front. Already I find it necessary to install a complete new laboratory to take care of my work and speed up the output.

"I am free of all debt and have a wonderful credit rating, besides money to spend for ourselves and some on the side. When I look back two years ago at the rut I was in and our position today, I always have that one kind thought for N.R.I. I hope more fellows will profit from my experience. It's nice to be your own boss. Depressions don't bother me."

FRANK BECKMAN, 155 Howth St.,
San Francisco, Calif.

— — *n r i* — —

## Enjoys Finer Things of Life

"It wasn't long after I enrolled with your school that I started making money and if it had not been for your training in the fall of 1937, I don't know what I would have done. I bought a car and shortly after this I was laid off. My Radio work paid for the car and my room and board.

"Those experimental units were a big help. I got quite a kick out of putting them together and seeing how they actually work. I can truthfully say that I am really glad that I cut out that advertisement of yours and took the Course which is enabling me to enjoy the finer things of living. I made around $600 within the last year in my spare time and it seems to me like finding it on the street."

PAUL TWELVES, 510 N. Rath Ave.,
Ludington, Mich.

## Not Much Education! Read This

"I just received my diploma yesterday and was really surprised and glad. The lessons were a little tough, but I determined to go through with them if it was the last thing I did. I only went to the fifth grade in school. My folks passed away when I was six years old and I had to make my own living since. I started repairing Radio sets when I was on my tenth lesson. I have made enough money to pay for my Radio Course and also my Radio instruments. I really don't see how you can give so much for so small an amount of money and this was repaid to me when I was half way through the Course. I made $600 in a year and a half. I make an average of $10 to $20 a week. That is just for spare time work."

JOHN JERRY, 1529 Arapahoe St., Rm. 17,
Denver, Colo.

— — *n r i* — —

## Hasn't Lost a Day's Work In Ten Years

"Looking back to 1927 when I first became interested in Radio, I realize how much of my success has been due to my selection of National Radio Institute as my instructors.

"No one can succeed in Radio without a complete knowledge of fundamentals. N.R.I. presented these fundamentals to me in such a manner that it was fun to study.

"After two months of study, I started right off doing Radio service work and upon completion of the Course I took a Radio operator's examination given by the FCC and passed with a high grade at first attempt. I secured a position with the Portsmouth Police Department as regular operator and three years ago was promoted to Chief Operator. Since taking your Course, I have not lost a day's work in ten years and will always praise N.R.I. for equipping me to do efficiently the work I chose."

H. E. SAYLOR, 2735 Gilbert Ave.,
Portsmouth, Ohio.

# MAKING RADIO RECEIVERS FIT THE HOME

By JOSEPH KAUFMAN

N. R. I. Director of Education

At the left: Joseph Kaufman in his home alongside the bookcase radio which he designed and built to harmonize with the furnishings of his sun-room.

WOMEN have, in recent years, become increasingly more conscious of the furnishings in their homes. Wallpaper, wood trim, curtains, draperies, rugs and furniture which harmonize in color, design and size are being selected, in order that the home will reflect warmth, cheerfulness, comfort and relaxation. Magazine and newspaper articles written for women are stressing more than ever before the importance of observing the fundamental principles of interior decoration. Home makers are being taught the elusive art of converting a house into a home which solidifies the family.

But what does all this have to do with radio? The answer should be obvious to any one who has noted the gradual change in radio cabinet design during the last two years. Let us, therefore, consider the factors which affect cabinet design.

Ever since the beginning of radio, manufacturers have delegated the problem of designing radio cabinets to men who cared little about interior decorating. These designers tried to incorporate in radio cabinets the atmosphere and feeling of a modern miracle, or tried to make the radio stand out by itself in the home. Many of these men, no doubt, fully appreciated the designs of Chippendale, Adams, Sheraton, Duncan Phyfe, and Hepplewhite; some may even have had sufficient ability to design adaptations of Colonial, 18th Century, Georgian, Queen Anne, Renaissance, Regency, Neo-Classic, and Modern period furniture—but if these men ever recommended such authentic period designs to receiver manufacturers during the earlier days of radio, they certainly did not get to first base.

The current trend toward the use of true period interior arrangements has placed squarely upon the shoulders of receiver manufacturers the problem of producing radio cabinets which will harmonize with room furnishings rather than stand out from them. The problem is by no means simple, for there is practically no limit to the variations which are permissible in interior design. Furthermore, there are so many furniture periods that a very large number of radio cabinet designs would be required to meet every interior decorating requirement. You can hardly blame radio manufacturers for their attempts to create universal designs which would be accepted in almost every home.

Even though the fundamental desire of a radio manufacturer is to keep the number of models in his line at a minimum, the demands of the public must also be recognized. It is for this reason that the number of radio cabinets which

are available in period designs has increased so greatly during the beginning months of the 1940 radio season.

Stromberg-Carlson is one of the leaders among manufacturers who have tackled the problem of making radio receivers fit the home. Consider, for example, the Stromberg-Carlson model 340-V receiver which is illustrated in this article; it shows you how properly designed radio cabinets can blend with surrounding furnishings. This is an authentic Early American design, adapted from a beautiful corner cabinet shown in Wallace Nutting's "Furniture Treasury."

Note how well the turned posts in front of the grille, the fluted sides, the exposed dowels and the typical Early American curves at the base harmonize with the ladder-back arm chair, the hooked scatter rug, the Colonial side table, the hand-hammered metal bowl and the electrically-adapted Colonial lamp. No wonder women who admire authentic maple furniture designs are falling in love with this corner-cabinet receiver. There is no need to hide a cabinet like this behind large overstuffed chairs!

Radio cabinets having shelves for books and pieces of pottery are likewise increasing in popularity with women, for these serve a dual function in the home. With this article are shown illustrations of two typical bookcase radios in the 1940 Sears, Roebuck radio line. One is finished in maple, and has the rounded corners, turned wood knobs, H hinges and mellow golden finish characteristic of Early American furniture. The lower two doors of this bookcase conceal ever-useful storage space, while the upper two doors swing out to reveal the radio receiver controls and the loudspeaker grille. Performance is comparable to that of a table model radio.

The other Sears model shown with this article has lines characteristic of an 18th Century breakfront cabinet. On each side of the grille which conceals the loudspeaker and baffle are narrow shelves for books and art objects. Above each shelf is a small drawer, and above the grille is a panel which swings down to reveal the push-buttons and other controls of the radio receiver. This cabinet is finished in mahogany. The performance is comparable with that of a conventional console cabinet-model receiver.

It is the duty of the true radio dealer rather than the radio servicing technician to provide radio receivers in appropriate designs for customer requirements. Where radio dealers refuse to recognize this growing public demand for better radio cabinet styling, the furniture dealers who also handle radio receivers will take over the business.

But where do you, as a Radiotrician who is interested primarily in getting rid of the squeals, noises and other troubles which impair radio receiver performance, come into this changing picture? Here is the answer; you will be asked to give expert advice upon the choice of cabinets, and to discuss the possibilities of installing radios in existing pieces of furniture. For instance, the customer may ask: "Why can't I have my radio set built into this desk, or that breakfront cabinet, or that low-boy, or that bookcase?"

Stromberg-Carlson model 340-V nine-tube receiver. The corner cabinet is an authentic Early American design.

And why not! Of course, you will not be expected to do the actual cabinet work, but there will certainly be a skilled cabinetmaker in your locality who can do this under your supervision. Your job will be to size up the piece of furniture and determine whether there is room for the particular receiver chassis and loudspeaker in question, and determine how these will be mounted. If the receiver is too old or too poor in quality to be worth bothering with, or too large for the particular piece of furniture in question, you can suggest buying a good modern chassis and loudspeaker or a good table model receiver which will fit into the piece.

Explain to the cabinetmaker the precautions which are necessary from the standpoint of good acoustics, and emphasize the need for having

ventilating holes so that air can circulate around the chassis as it normally does in an ordinary radio cabinet. Of course, these holes must be located where they will not be visible, either at the back, bottom or top of the piece. Sometimes they can be slots rather than holes.

In some cases, you may even be able to suggest a change in the design of the piece which will not appreciably alter its appearance but will make installation and operation of the radio receiver more satisfactory.

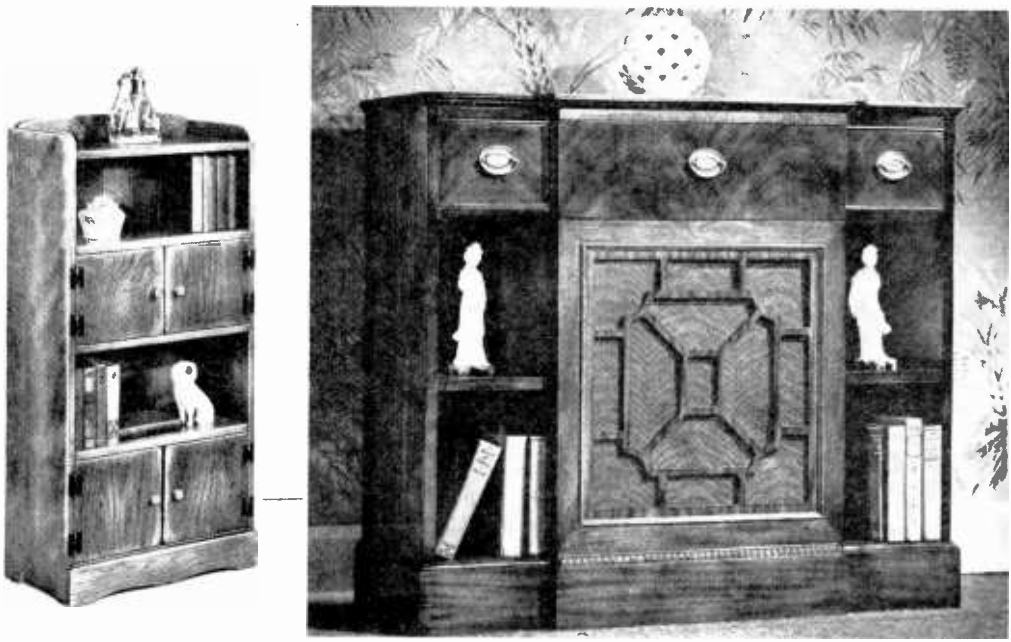
But suppose you encounter a situation where the lady is afraid to let any one work on her priceless antique or reasonable facsimile thereof. Good furniture should be treated with respect, and she may find it difficult to imagine how her piece will look after it has been "wired for radio." In a case like this, suggest having a cabinet built especially for her receiver and home. Here are some suggestions, based upon actual experience.

Every home can use an extra bookcase, one which fits so snugly against the wall that it appears to be a part of the room. It may go across an entire wall or fit into a nook where it can take on a "built-in" appearance. When finished in enamel or stained to match the woodwork in the home, it makes a pleasing addition which alters neither the period nor the mode of the home furnishings.

Take a good look at the bookcase radio I built; it is shown at the beginning of this article, with me reading a book of fiction while listening to the fifteen-tube Philco receiver which I tuned up a bit for high fidelity. If you are handy with tools, you can build one like this yourself; otherwise, turn the job over to a good carpenter.

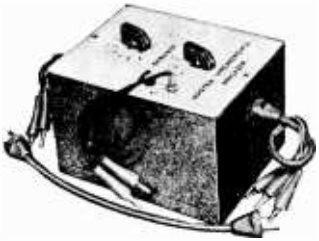
When there is a fireplace in the living room, there will oftentimes be either bookcases or cupboards and shelves on either side of the hearth. A radio receiver can readily be adapted to fit somewhere on the shelves. When there is a fireplace but no cabinet, a pair of bookcases can be built especially for these locations, with the radio receiver being mounted in one of them.

As Radiotricians, let us not lose sight of the homemaker's problems, ideals and wishes. Let us not get into the habit of thinking that performance is the only thing which matters in radio servicing. Let us give the appearance of a radio cabinet its due share of attention, for otherwise many a person will be forced to buy a table model radio receiver and hide it from sight. Those who appreciate fine furniture will not spoil a home by bringing in a large console which fairly shrieks its presence.



These two attractive bookcase radio designs, one in maple and the other in mahogany finish, are in the 1940 radio line of Sears, Roebuck & Co.

# Three Weapons for Fighting Man-Made Interference




Write to Sprague Products Co., North Adams, Mass., for additional information on any of these three interference-eliminating items.

IN localities where man-made interference is the cause of many noisy-reception complaints, the Radiotrician can well consider this trio of new products announced by Sprague. . . . There is a specially-designed portable battery-operated receiver with a highly-directional built-in loop antenna and a fishpole antenna, for determining the exact location of the interference source. An output meter is provided for measuring the noise level before and after corrective filters are installed. . . . The second item is the Sprague Master Interference Analyzer, which makes available a total of sixty different filter combinations simply by rotating two switches. This unit tells exactly which type of filter to buy for a particular job. . . . Finally, we have the new Sprague Interference Manual selling for 25 cents, telling how to secure and handle radio interference elimination work at a profit.

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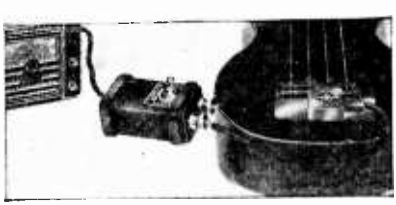
## Amplify Musical Instruments Through Any Home Radio Receiver With Transformer For Kontak Mike



Boosting transformer made by Amperite Co., 561 Broadway, New York, N. Y., and sold by most radio supply firms.

WHEN an Amperite Kontak microphone is mounted on any stringed instrument such as a violin, piano, ukelele or guitar and connected to a home radio receiver through the new Amperite boosting transformer, tone quality becomes comparable to that obtained with the most expensive instruments. The connections to the phono input terminals or volume control terminals of a receiver are readily made by a Radiotrician, and a single demonstration will usually be sufficient to sell the equipment to a prospect.

*n r i*

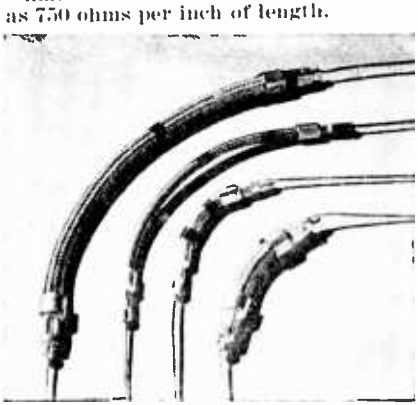
## 584 Tubes Listed in Free Handbook

THE essential characteristics and socket connections for 584 different types of radio receiving tubes, including new tubes developed within the past few months as well as many older tubes now considered obsolete, are given in the latest edition of the National Union Tube Characteristics Handbook. This pocket-size book is available free of charge to Radiotricians through National Union distributors.

*n r i*

## Fibre-Glass Resistors Are Flexible

NEW Clarostat Glasohm resistors, made with fibre-glass cores and braided coverings of the same glass thread material, are extremely flexible yet can be operated at red heat without damage. Ohmic values are as low as ¼ ohm and as high as 750 ohms per inch of length.



Glasohm resistors, made by Clarostat Mfg. Co., Inc., 285 North 6th St., Brooklyn, N. Y.

# POLICING THE ETHER

*This article was released to* NATIONAL RADIO NEWS *by the Federal Communications Commission, Washington, D. C.*

IN administering and enforcing laws, regulations, and international treaties pertaining to radio, the Federal Communications Commission depends largely upon its field staff. The ether waves are, in effect, patrolled by twenty-six offices located strategically throughout the United States and its possessions, augmented by seven monitoring stations—at Atlanta, Baltimore, Boston, Grand Island, Nebr., Great Lakes, Ill., San Pedro, Calif., and Portland, Oreg.

The monitoring stations, in general, do not participate in the investigation of "pirate" or other unlicensed stations other than to report and record their signals as proof of operation. This task is performed mainly by inspectors.

*Radio Inspectors Are Well Trained.* The one hundred and fifteen inspectors in the Field Division are radio engineers and, in addition, are capable radio operators, many having had previous experience in maritime, aviation, and other communications services. Inspectors are selected through Civil Service competitive examination.

*Duties of Inspectors.* Besides investigating unlicensed stations, these experts inspect all classes of radio stations—broadcast, police, ship (domestic and foreign), amateur, aviation, and television; examine radio operators for various classes of licenses; monitor radio transmission for adherence to frequency, quality of emission and compliance with prescribed procedure; and investigate complaints of interference to radio reception.

*Lottery Broadcasts Are Illegal.* The Federal Communications Act specifically prohibits the transmission of information concerning lotteries and other similar schemes. Licenses have been revoked for using obscene and indecent language on the air. The law prohibits the transmission of false distress signals and the rebroadcasting of certain programs, except with authority of the originating station. A certain radio station was reprimanded recently for intercepting, decoding, and broadcasting secret radio communications of the British and German governments.

*Tracking an Outlaw Station.* Though highly technical to the layman, the apparatus and technique employed by inspectors are well known to radio engineers. Advantage is taken of certain factors such as the directive properties of antennas, attenuation of field intensity with increased distance from the transmitting antenna and skip distance phenomena.

*Listeners Tip Off Inspectors.* In many cases of unlicensed operation in the broadcast band from 550 to 1,600 kilocycles, the inspector gains his information on the basis of complaints of broadcast listeners, particularly the ardent DX'ers, who are constantly striving to identify foreign stations and are quick to note appearance of a strange station in the band.

Frequently, an unlicensed station operating in the amateur bands first comes to the attention of an inspector when investigating a complaint of interference in the home of a broadcast listener, by recognizing the interference as originating from key clicks in a telegraph transmitter even though the frequency of operation may be in a band many kilocycles removed from the broadcast band. Field offices also receive tips from the monitoring stations concerning the operation of illegal stations.

*Under-Cover Observance of Suspected Station.* At each radio district headquarters, inspection cars are provided, at least one of which is equipped with an all-wave communication receiver which may be operated, if necessary, from the car's 6-volt battery while the car is in motion. Under certain conditions, it may be necessary to watch a station for a particular length of time. These receivers are constructed so that they may be removed from the car and operated from a 110-volt a.c. power supply available in a residence, tourist cabin or such other place that might be chosen by an inspector as a base of operation.

*Getting Clues.* The first determinations made by an inspector on the track of an unlicensed station are the call letters employed by the station, as well as the station or stations called, the type of emission, frequency or frequency band used for transmission, time and duration of operation, nature of the communication, and whether in plain text or code (if a telegraph station, characteristics of the operator's "fist") and any other peculiarities.

*Gadget Locates Outlaw Transmitter.* A milliammeter requiring but a small current for full-scale deflection is fitted with a crystal rectifier which in turn is connected to a wire concealed in the trouser leg of the inspector, or in a loop circuit made in the form of a vest worn by the inspector. A device of this kind is easily concealed and the meter can be easily held in the hand or pocket of the investigator as he proceeds from floor to floor, or door to door, observing at what point the highest deflection of the meter occurs. Resourcefulness, keen power of observation, and patience on the part of investigators have been of invaluable aid in the locating of outlaw transmitters.

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NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

# MOTOROLA 5A CHASSIS (51A, 53A and 54A)

## Alignment Procedure

When aligning AC-DC receivers it is advisable to use a blocking condenser in series with the ground connection to the signal generator. If your signal generator is AC operated, it may not be possible to connect to the Modulator grid for IF alignment because of hum. If this is so, feed 455 K.C. signal into the antenna lead, advancing signal generator attenuator accordingly. (In loop models, connect to the coupling turn in the loop.)

1. Connect the signal generator to the antenna lead through a 200 MMF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

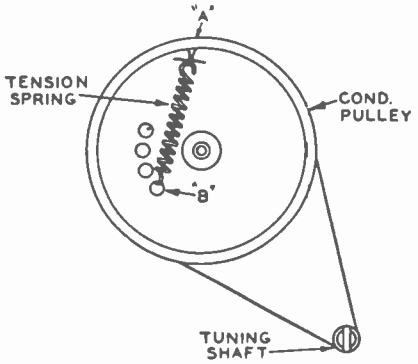
2. Set signal generator at 455 K.C. and carefully adjust the two I.F. trimmers and the two DIODE trimmers to point showing highest reading on output meter. Advance signal generator attenuator if necessary.

3. Turn signal generator to 1750 K.C., and with condenser gang completely out of mesh, adjust OSC. trimmer (on small section of condenser gang) until 1750 K.C. signal is heard.

4. Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust ANT. trimmer (on large section of condenser gang) to point showing highest reading on output meter.

### TO RESTRING DIAL DRIVE CORD

1. Remove dial crystal, pointer, dial scale and plate.




2. Cut a length of silk fish cord approximately 12 inches long.

3. Make two turns with cord around tuning shaft.

4. Continue both ends of cord around condenser pulley in opposite directions until they meet at the hole (A) in the rim of the pulley.

5. Thread both ends through the hole and tie them securely together inside the hole.

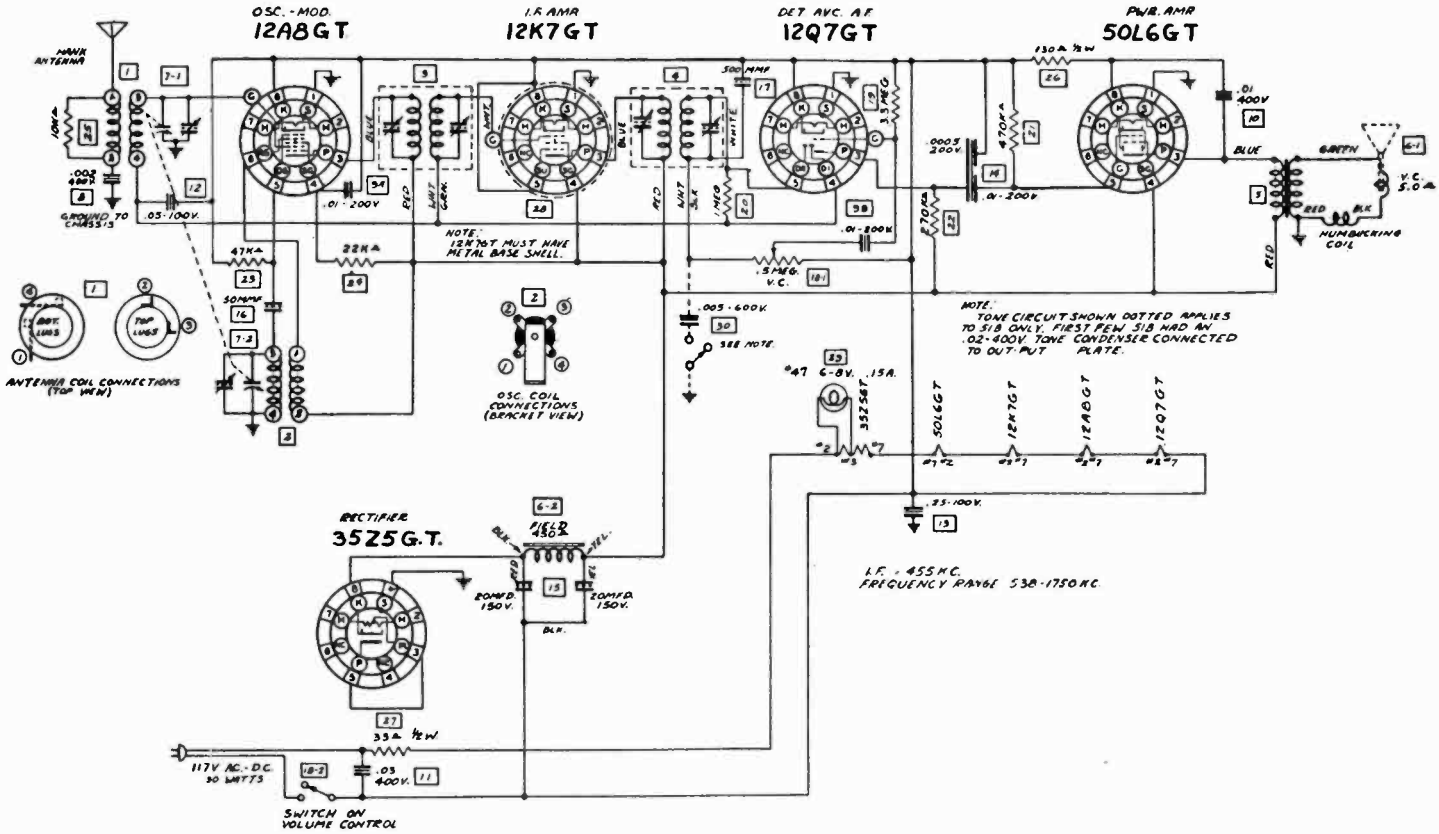
6. Tie in the dial cord tension spring and hook the free end of the spring in the hole (B). Cut off surplus cord.

## VOLTAGE CHART 5A

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 12A8GT | Osc.-Mod. | 95 | 65 | 0 | 90 |
| 12K7GT | IF | 95 | 95 | 0 | — |
| 12Q7GT | Det.-Avc. | 55 | — | 0 | — |
| 50L6GT | Output | 85 | 95 | 5 | — |
| 35Z5GT | Rect. | AC | — | 120 | — |

All measurements from B— to socket terminal, using 1000 ohms per volt meter.

Readers who file Service Data in separate binders remove page carefully, trim on dotted line for same size as data published heretofore.




MOTOROLA 5A CHASSIS (51A, 53A and 54A)

# Novel Radio Items

—BY L. J. MARKUS—

## Bingo Game Uses Wireless Mikes!

At a monster bingo game held on Staten Island (N.Y.) recently, eight wireless microphones were scattered throughout the crowd of twenty thousand persons, for checking winning cards. Mike wires could not be run overhead or on the ground, and underground wires were too costly, so p.a. expert S. J. White mounted a small battery-operated transmitter on each velocity mike stand, and used a radio receiver to feed his p.a. amplifier. All transmitters and the receiver were tuned to the same frequency. Each mike had a press-to-talk switch, to prevent pick-up of crowd noises during games.

## Squeal Is Emergency Alarm Clock!

During a recent war crisis, NBC stations WMAL and WRC in Washington promised to wake up listeners for important news flashes if radio sets were left in operation after the usual 1 a.m. sign-off time. Engineers rigged up an audio oscillator which could be used to broadcast an ear-splitting wake-up squeal.

## Police Carry Portable Radios!

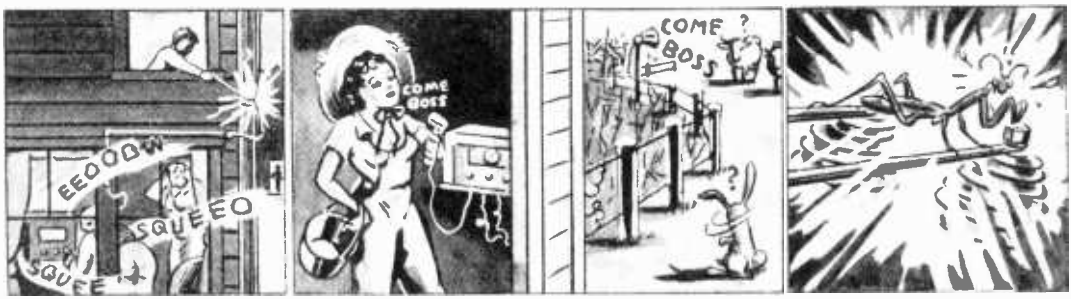
Pittsburgh traffic patrolmen will have three-pound portable radio receivers strapped to their chests for reception of police radio broadcasts, according to a recent announcement. Soldiers could well be kept in touch with commanding officers and general headquarters in this same way during maneuvers and attacks.

## CQ CD CQD SOE SOS SSSS

Marine radio operators are preferring the unofficial SSSS to the official SOS as a distress call, according to a Federal Communications Commission analysis of war news reports. The explanation is simply that the dot-dot-dot letter S repeated four times has a characteristic swing and is immediately recognized. All distress calls are chosen for the speed and clarity with which they can be transmitted. SOS does not mean "Save Our Ship," nor does the old call CQD stand for "Come Quick Danger." The first distress call, used at sea about 1900, was CQ. This was replaced in turn by CD, CQD, SOE, and SOS.

## Station Has Secret Code for Chimes!

Code signals known only to staff members can be tapped out on the station-break chimes used at station WJNO in West Palm Beach, Florida, to call off-duty operators or announcers to the studio for emergencies without letting listeners know the station is in trouble.




BOY - MADE INTERFERENCE! The complaint was noise during evening programs. A serviceman found black thread running from a bare spot on the aerial lead-in wire to the room of the youngest boy. Jerking on the thread grounded the wire intermittently to a drain pipe, creating the noise. Cross-examination revealed that the lad wanted to make his parents disgusted with their old set, so they would buy an all-wave set.

P. A. SYSTEM CALLS COWS! A public address system calls the cows home at milking time on one Libertyville, Illinois farm. For a system like this, weather-proof outdoor loudspeakers can be spotted at strategic points in the pasture and connected by insulated fence wires, overhead wires or buried cable to the p. a. amplifier in the barn. For a few dollars more, an automatic record changer can be obtained to provide music for the farm hands and the cows all day long. Radio programs can also be fed into the system, simply by feeding the audio output of any good radio receiver into the input terminals of the p. a. amplifier. Another microphone can be located in the kitchen, and used for calling the farm hands to dinner at noon.

PRAYING MANTIS SILENCES WLW! The radio transmitter of Station WLW in Mason, Ohio, was thrown off the air for four minutes recently by that weird, long-legged insect known as a praying mantis. Transmitter operators saw a flash and heard a thunderous roar as the huge insect shorted across the terminals of one of the 12,000-volt filter condensers. Protective relays prevented serious damage.

N.R.I. ALUMNI NEWS

Clarence Stokes ..... President
Dr. Geo. B. Thompson, F. E. Oliver ..... Vice-Pres.
Allen McCluskey, Alfred E. Stock ..... Vice-Pres.
Earl Merryman ..... Secretary
Louis L. Menne ..... Executive-Secretary

# OFFICERS FOR 1940

THE N.R.I. Alumni Association is to be congratulated. The final result of the election of officers shows Clarence Stokes of Philadelphia on top. Those who know Stokes can best appreciate that we have made a good choice.

During the past decade Stokes has been a glutton for work in Philadelphia-Camden Chapter. He has served his Local in several offices and he also is a past Vice President of the National Organization.

The race between Stokes and Morehead was no run-away, by any means. Morehead polled a large number of votes. His work, as Vice President during 1939 made a deep impression on all who had the good fortune to meet him personally. He is a clear thinker, likeable in demeanor and tremendously interested in the welfare of our Alumni Association.

In fact, when informed that he was nominated to run against Stokes for President, Morehead expressed the hope that Stokes would be elected. "For ten years Stokes has been giving his best to our Association," said Morehead. "He deserves the honor. I am voting for him. There is plenty of time for me."

That's the kind of fellow Morehead is. He met Stokes in Philadelphia last summer and was impressed with the loyalty, the enthusiasm which Stokes, our new President, displays in his every effort in behalf of the N.R.I. Alumni Association.

It should be very inspiring to Stokes to know that he is held in such high esteem by those who know him best.

Dr. George B. Thompson, of Los Angeles, former Vice President, who was a candidate for President last year, again has been elected a Vice President. Dr. Thompson ran far ahead of all other candidates for Vice President. He is very popular with the membership-at-large, and rightfully so. We have every reason to be proud of officers such as Dr. Thompson.

F. Earl Oliver of Detroit and Allen McCluskey of Birmingham were reelected. These standard bearers for the N.R.I.A.A. are good men and it is hard to beat a good man in any race.

But the vote, except for Dr. Thompson, was close—very close. Alfred Stock of New York, Ed Sorg of Chicago, Charley Fehn of Philadelphia, John Stanish of Detroit and Ted Telaak of Buffalo ran neck and neck, but in the final tally Oliver, McCluskey and Stock pulled out in front with the necessary lead to be declared elected and round out our slate of four Vice Presidents.

Earl Merryman, a charter member, and Secretary of our Alumni Association since it was organized in 1929 was easily reelected. Earl, splendid fellow that he is, has a great many friends in our organization who vote for him year in and year out.

Our Executive Secretary, L. L. Menne, was reelected. Being Editor of this magazine, as well as Executive Secretary of the N.R.I.A.A., modestly forbids Menne to say anything about himself, except perhaps, that he is very grateful for the large vote cast for him, and treasures deeply the many friendships he has made, in person while visiting, in the interests of the Alumni Association, and by letter, in his work at Headquarters.

We greet our new officers with full confidence that they will continue the good work of their predecessors and that they will ever keep in mind our motto, "To cultivate fraternal relations among the Alumni of the National Radio Institute, to promote the welfare of each alumnus by interchange of helpful information, to foster the spirit of unity and loyalty to our Alma Mater."

# The Service Forum

Conducted by

J. B. Straughn, N. R. I. Service Consultant

*Send in your service notes. We will re-word them for publication. To qualify your note for the* NEWS *you must have observed the same trouble on two or more identical receivers.*

**PHILCO MODEL 37-650 INTERMITTENT ON BROADCAST BAND**

This is sometimes due to a partial open in the antenna coil. Install a new coil.

GEORGE BATINOVICH, Wash.

*n r i*

**AIRLINE MODELS 62-504, 62-505 DEAD AT LOW FREQUENCY**

This difficulty is due to failure of the oscillator to function at the low frequency end of the dial and may be corrected by increasing the value of the oscillator grid resistor. Increase the present resistor value from 20,000 ohms to 50,000 ohms.

*n r i*

**SPARTON MODEL 16 WHISTLES AND FREQUENCY DRIFT**

This is due to a change in frequency of the oscillator. Check the connections on the oscillator coil. One is fastened by a small screw which works loose.

*n r i*

**MAJESTIC MODEL 440 OSCILLATION**

Oscillation which can be started and stopped by twisting the chassis is due to an open common connection in the by-pass condenser block located under the speaker. Separate condensers may be used for replacement purposes and by removing the variable condenser gang and loosening the bolts holding the speaker it is possible to mount a five-lug terminal strip holding the condensers.

*n r i*

**ZENITH CHASSIS 5907 1206 DISTORTION**

This action sounds quite like A. V. C. blocking. It is usually due to an open filter section.

*n r i*

**ZENITH CHASSIS 1502 WON'T LOG**

Can be traced to loose PK screw in gang hub gear.

*n r i*

**ZENITH CHASSIS 5714 AUTOMATIC DEAD ON ONE OR MORE POSITIONS AUTOMATIC WEAK**

This may be due to open coils, usually broken leads or poor contact at switch. Open lead to R.F. section of automatic or leaky or open compensating condenser. Padder loose—out of adjustment or all plates not soldered.

*n r i*

**APEX MODEL 31 DEAD OR VERY WEAK**

Look for an open in one of the R.F. transformer windings (primary usually) which results in weak signals. Lack of screen volts is due to an open in the voltage dividing resistor which has a value of 8400 ohms. Replacement will restore operation. Lack of plate volts on any one of the 24 tubes might be due to an open in the primary of the R.F. transformer in the circuit feeding it.

HAROLD KOEPPE, New York.

*n r i*

**WELLS-GARDNER SERIES A1-MB CRACKLING**

Go over all soldered connections with a hot soldering iron.

*n r i*

**PILOT MODEL 93 VERY LOW VOLUME**

Open circuited speaker field winding; replace the speaker.

*n r i*

**PILOT MODEL X63B DEAD**

Shorted R. F. plate by-pass condenser, use a 600 volt .25 mfd. replacement.

*n r i*

**PILOT MODEL X65B LOUD HUM**

A loud hum as the set is turned on is due to a defective 75 tube (second-detector and first audio). Replace the tube.

*n r i*

**FAIRBANKS MORSE MODEL 72 LOW VOLUME**

Defective volume control (decreased in resistance). Replace with a new one which should be a 500,000 ohm unit with a tap at 50,000 ohms for bass compensation.

*n r i*

**ZENITH CHASSIS No. 5801 CRACKING AND LOW VOLUME**

Open circuited first I. F. coil primary winding. Replace the I. F. transformer.

(Page 27, please)

# Here and There Among Alumni Members

*H. C. Dodd of Toronto, Ont., Canada, had occasion to visit station CFRB to witness a program being put on the air. He spent most of the time in the control room, but was invited in on a quiz broadcast—and won an Underwood portable typewriter as a prize.*

———— *n r i* ————

Clarence W. Jackson of San Antonio, Texas, while working in his radio shop, tripped and broke his arm. Jackson is carrying on in spite of this handicap, but it's no fun, sez he.

———— *n r i* ————

*Frank Blackmon of Arkadelphia, Ark., has been appointed a Second Lieutenant, Signal Corps, United States Army, Reserves, by reason of his technical radio knowledge.*

———— *n r i* ————

F. A. Luning of Willoughby, Ohio, is back on the job after a serious operation. Luning says his expenses were plenty, but his radio earnings saw him through, the decks are now clear, and he is in A-1 shape again.

———— *n r i* ————

*Aaron Orenstein of New York not only is a radio man par excellence but he is also a talented musician. He plays the Piano, Accordion and Pipe Organ and right now is experimenting in building an electronic organ. The uses to which one can put a good technical radio training are many and varied.*

———— *n r i* ————

Heard at the dance conducted by Baltimore Chapter. Pete Dunn to his partner, "I'm a little stiff from bowling." To which the sweet thing replied, "I thought you boys were all from Baltimore." Hi ya, Pete!

———— *n r i* ————

*In a city with a name which sounds like ready money, Robert F. Kuhens has built a home, and in other ways is making life rosy for Mrs. Kuhens and two boys. The town is Hundred, W. Va.*

———— *n r i* ————

August Wagner of New York Chapter sends us a card from Lakeland, Fla. Some guys get all the breaks.

———— *n r i* ————

*New York friends of William C. Mogg will be shocked to know he passed away suddenly from heart failure. We mourn the loss of a loyal member.*

———— *n r i* ————

It is also sad to report that William J. Hanley of Helmuth, N. Y., passed away recently. Our deepest sympathies are extended to his family.

———— *n r i* ————

*The officers of the N. R. I. Alumni Association very much appreciate the many thoughtful messages which were received during the holidays. Our very best wishes go to every member for good health, sweet contentment and real progress in 1940.*

A year ago Jackson C. Ream and his good wife, Nadene, pulled up stakes in Kansas City and left for Albuquerque, N. Mex. They started a radio servicing business with nothing but a strong determination to succeed. The business has enjoyed a remarkable growth and Ream now is just about the King Bee Radio man in town.

———— *n r i* ————

Alison A. Lomax, who owns Southern Radio Service, Spencer, N. C., recently recovered from an operation. Lomax makes $45.00 to $50.00 a week from his Radio and Appliance business.

———— *n r i* ————

*Ray Barnett, formerly of Crosby, N. D., has opened a swell shop at Beulah, N. D. Incidentally, Ray holds amateur license W9EVP.*

———— *n r i* ————

And from Marked Tree, Ark., we hear that Frank Rickman is radio serviceman for Western Auto Associates Store at that place.

———— *n r i* ————

*Menne recently left Washington, by train, to attend a meeting in Baltimore. Straughn and McDermond agreed to follow later, by auto, and Menne was to return with them. From Laurel, Md. they wired, collect, "Can't make it. Better start walking." Then they drove on to Baltimore only to find the messenger boy had not showed up. They had to wait an hour outside the hall to have their joke—and it was cold, too.*

———— *n r i* ————

E. B. Ruiz is technical operator at Station KZGG, Cebu City, Philippines. This station is operated by the Philippines Long Distance Telephone Co.

———— *n r i* ————

*Lou Kunert of New York Chapter who silently, but most efficiently performs the duties of Secretary of our largest Local Chapter, is hereby extended a great big thanks for his prompt, complete and enthusiastic reports of the activities of his Chapter. Kunert can always be depended upon to faithfully carry out any job assigned to him.*

———— *n r i* ————

We saw a letterhead the other day which was original if nothing else. Said it, "We repair everything, but a broken heart or the break of day."

———— *n r i* ————

*K. S. V. Rajan of Tumkur, So. India has been elected an Associate Member of the Institute of Radio Engineers, New York.*

———— *n r i* ————

No wonder the dance in Baltimore was a success, with the support given to it by the wives and sweethearts of the Baltimore members. And did they look pretty!

# The Service Forum (Continued from page 25)

**ZENITH CHASSIS 5801 REGENERATION**
Open circuited second detector diode load bypass condenser, capacity 50 mmfd. mica.

———n r i———

**PHILCO MODEL 16 LOUD HUM**
Leaky power supply filter condenser. Capacity 8 mfd.

———n r i———

**PHILCO MODEL 38-2670 CRACKLING AS THE VOLUME IS TURNED FULL**
Defective speaker, center the cone, test the output transformer.

———n r i———

**ERLA MODEL 82A175E DEAD**
Shorted .05 audio coupling condenser.

———n r i———

**EMERSON CHASSIS U6C LOW VOLUME**
Open 2,500 ohm speaker field winding, replace the speaker.

———n r i———

**EMERSON CHASSIS U6C MODULATION HUM**
Defective 6116 second detector tube, replace the tube with a new one.

———n r i———

**AIRLINE MODELS 62-305, 62,385, 62-414 AND 62-495 SQUEAL AT HIGH VOLUME**
Check the 10 mfd. 25 volt electrolytic condenser. I have found this condenser open in several sets. Replace with at least 50 volt condenser of same capacity. Another thing is the output transformer of this model. I have found two of these radios with the output transformer open.

———n r i———

**GENERAL ELECTRIC MODELS E-91 AND E-95 WEAK RECEPTION AND LOW B VOLTAGE**
When a new type 5Z4 rectifier tube restores operation, check the two wet electrolytic condensers as these sometimes have a leakage current as high as 50 mills each, therefore destroying the tube after several hours service.

———n r i———

**DELCO MODELS 641 AND 643 HASH**
Remove set from container and expose the power pack, where will be found a twin .5 mfd. condenser No. 7231150. This is an A filter. Breaking wax off grounding end of condenser will reveal a loose or bad connection. If original replacement is not obtainable, substitute two .5 mfd. condensers. Don't forget to run new wire from A choke coil to vibrator socket.

———n r i———

**DELCO MODELS 641 AND 643 VIOLENT SCREECHING SIMILAR TO OSCILLATION**
This condition is not a case of open condensers or bad grounds, but a faulty 6X5G tube. Check tube very carefully for leakage between one cathode and plate.

**AUTO RADIO SERVICE HINT**
If the installation of a suppressor at the distributor does not clear up interference, try the suppressor at the coil end of the center distributor lead.

———n r i———

**PHILCO MODEL 38-8 CODE 121 INCREASE HIGH FREQUENCY AUDIO RESPONSE**
To increase the response of the audio system at the higher frequencies, reduce the capacity of condenser No. 40 (.008 mfd.) to .004 mfd.

———n r i———

**PHILCO MODEL 38-12 CODE 121 HUM**
Hum may be eliminated by dressing the wiring as follows: 1. Dress the green wire connecting the diodes of the 75 tube to the second I.F. transformer as far as possible away from the filament prongs of the 75 tube. 2. The brown wire connecting resistor 12 to the high side of the volume control should be dressed under the coil of I.F. transformer 12. 3. The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.

———n r i———

**PHILCO MODELS 38-22 AND 38-23 HUM**
To prevent hum when the volume control is on full, the red and brown leads from the second I.F. transformer (18) must be placed as far as possible away from the cable and pilot lamp leads at the rear of the chassis.

———n r i———

**PHILCO MODELS 38-22 AND 38-23 PILOT LIGHT BURNS OUT**
This trouble, caused by high line voltage, may be eliminated by shunting the 75 ohm resistor (Philco part No. 33-3027) across the pilot lamp.

———n r i———

**RCA MODELS C6-2, T6-1 WEAK**
A hiss similar to that obtained with no antenna or a dead oscillator stage together with weak reception may be due to an open in the 22 ohm flexible resistor in the 6A8 control grid lead. The open usually occurs at the lug but if it cannot be repaired try the receiver with the resistor shorted. If reception is satisfactory the resistor may be left out, otherwise a replacement should be installed.

———n r i———

**RCA 1939 ELECTRIC TUNING MOTOR RUMBLE**
Mechanical motor rumble may be eliminated by replacing the intermediate gear with a micarta type gear, RCA part number 31238 and the installation of a new fly-wheel RCA part number 31240. As changing the position of the receiver in the room may eliminate this noise do not expect it to always show up at the work bench.

# Baltimore Chapter Closes Year With Big Dance

Baltimore Chapter dances in the Main Ball Room of the Mount Royal Hotel. Giese and Hachmeister, prominently in the foreground in this picture, with their winsome partners, portray the happy spirit which prevailed throughout the evening.

AS a fitting climax, a very active year was brought to a close with the most outstanding event. That was our dance, held in the Main Ball Room, Mount Royal Hotel, Baltimore.

We have had some fine parties throughout the year, interspersed with our regular business meetings, but the dance proved most popular. The Ball Room was filled to capacity. It was easy to fall in with the lively spirit of the dancers because of the rythmic music rendered by the orchestra.

Prizes were given to the best dancers and, of course, the irrepressible Jitterbugs drew the greatest applause.

Chairman Dunn, and his committee which included Jensen, Gralley, Giese, Ruth, Gosnell, Biesi, Hachmeister and others, are entitled to much credit for the splendid arrangements and good program. A vote of thanks is also extended to the ladies for their fine cooperation.

A good representation from Washington Headquarters attended and contributed much to the gayety of the event. It is planned to make a winter dance an annual affair.

At our first January meeting the following officers were elected to serve through 1940.

Chairman—Peter J. Dunn
Vice Chairman—E. O. E. Gralley
Secretary-Treasurer—W. B. Giese
Librarian—J. S. Grasser
Ass't. Secretary-Treasurer—E. W. Gosnell
Sergeant-at-Arms—C. H. Hachmeister
Finance Committee—W. W. Jensen, W. B. Giese, R. Snyder

And now, back to business. Regular meetings every first and third Tuesday at Fishpaw's Hall, Baltimore and Gilmor Streets. Better drop in and get acquainted.

W. B. GIESE, *Secretary*

## Philadelphia-Camden Chapter

Our annual election has been held. The following will serve as officers for 1940.

Chairman—David S. Blackwell
Vice Chairman—Norman H. Kraft
Recording Secretary—John Biaselli, Jr.
Financial Secretary—Bert Champ
Treasurer—Charles J. Fehn
Librarian—Herman Doberstein
Sergeant-at-Arms—Charles Haraburda

We are very grateful to Mr. J. Kaufman, N. R. I. Director of Education, for a very interesting talk, which was both instructive and inspirational. Other successful meetings were conducted by Mr. Stokes, Mr. Doberstein and our new Chairman, Mr. Blackwell.

The Chapter, by the way, is to be congratulated for electing a staff of capable and enthusiastic officers who assure us a continuation of our constructive meetings.

New members are as follows: Skorpil, Gmerek, Kenney, Selvagn, Berberich, Terpolilli and Kohler.

Watch Philadelphia-Camden Chapter go places in 1940.

JOHN BIASELLI, JR., *Secretary.*

## Radio Amateurs

From time to time, as space permits, the Editor of NATIONAL RADIO NEWS is glad to publish a list of Radio "Hams" who have reported their call letters to us.

If you are a licensed amateur and if you have not had your call letters mentioned in these columns, send them in for listing in a forthcoming issue.

Local addresses are omitted, but if you should wish to correspond with any of those listed the local address will be supplied upon request.

The following amateur call letters were reported since the last listing.

W3ICG—Fred Newhoffer, Philadelphia, Penna.
W8TWV—F. L. Keisling, Scranton, Penna.
W6RGY—F. E. Lawrence, San Diego, Calif.
W9NUS—Raymond C. King, Creston, Iowa.
W7HVM—Henry S. Guichard, Everett, Wash.
W6QXF—George A. Sears, Jr., Porterville, Calif.
W7GVG—David O. Reichlein, The Dalles, Oreg.
W9EVP—Ray Barnett, Beulah, N. D.
W4GEY—W. R. Atkinson, Atlanta, Ga.
W8UFQ—Ronald B. Ingram, Wriston, W. Va.

## New York Chapter

So many good things have taken place at our recent meetings it is difficult to record them all in this brief account. So we will give you just the high-lights.

At a meeting conducted by our own member, I. Gordy, we had an attendance of fifty-three. Gordy gave us a fine meaty talk.

The following meeting was presided over by Mr. Bruce Burlingame of Supreme Instrument Corporation who talked on the Andolyzer and the Vedolyzer. This meeting was a dandy with ninety-seven present.

At a subsequent meeting Mr. Jack Grant of the Sun Radio Company spoke about a plan to enable radio servicemen to get more money for their work. Mr. Grant gave us some valuable suggestions.

Following this talk Mr. George W. Baker of the Tung-Sol Lamp Works (Radio Division) spoke on Frequency Modulation and still a third speaker, Mr. Hughes of the Hickok Instrument Company followed with an explanation of the special features of Hickok instruments.

After this very interesting meeting we served refreshments and the more than one hundred present declared the meeting one of our most successful.

It should be mentioned that another of our meetings was presided over by Mr. R. Mattison of Lubin Distributors. From these comments it will be understood that New York Chapter is giving its members something of real interest at each meeting. Our Executive Committee is entitled to much credit for these fine programs.

Again we invite all students and graduates in the New York Metropolitan area to pay us a visit on the first and third Thursday of the month, at Damanzek's Manor, 12 St. Marks Place, New York City. Do not confuse the address with a similar street in Brooklyn. We meet in New York City.

LOUIS J. KUNERT, *Secretary.*


Owing to the increase in our attendance we have arranged for a larger meeting place at Eckert Park Field House. The address, 1400 W. Chicago Avenue, remains the same. We simply have larger quarters at the same address.

Our annual election of officers was held. For 1940 the following members will serve, as indicated.

Chairman—Clarence Schultz
Vice Chairman—Edward Sorg
Secretary—Eric E. Johnson
Librarian—August H. Ketelhut
Sergeant-at-Arms—Frank Pesek

We welcome into our Chapter the following new members; W. Kozinski, W. Spiewak, J. Lukes, J. Luczak and Sam Mazaro.

Schultz, our new Chairman, has been one of our regulars for years and we know that he is the type of fellow who will plan his programs in advance to insure a good productive meeting every two weeks. He finds the affairs of the Chapter in tip-top shape because of a year of splendid leadership by our former Chairman, Ed. Sorg, who will, this year, serve as Vice Chairman.

Bennett, our past Chairman, while holding no office this year, can be depended upon to fulfill any special duties which may be assigned to him.

1940 is going to be a big year for Chicago Chapter.

CHARLES CADA, *Acting Secretary.*

———— *n r i* ————

## Detroit Chapter

We are now comfortably installed at our new headquarters at the Radio Specialties Co., 11800 Woodward Ave.

Beginning next meeting we will have explanations and demonstrations of the use of meters; the things to do and not to do with them. We continue to have practical demonstrations. That's what the fellows want.

Owing to the holidays the last regular meeting was postponed. At our next meeting we will elect officers for 1940. Sorry to be too late to have the 1940 officers listed in this issue.

F. EARL OLIVER, *Secretary.*

## Do You Want Speedy Service?

Whenever you use the N. R. I. technical consultation service to ask for diagrams or information on a radio receiver, be sure to give the name of the receiver, the manufacturer's name, the model number and a list of the tubes used in the set. Spaces for all this data are provided on the consultation service sheet which you have.

It is human to make mistakes, particularly when copying a model number which may be somewhere inside a dark chassis, partly worn off, or mixed in with a lot of other numbers on the label.

Scarcely a day passes without our receiving a request for information on a model which we know does not exist. With our elaborate cross-indexing system for radio receivers, however, we can almost always find the correct model number by checking against the list of tubes and the name of the receiver. Naturally, this delays the reply a bit, for it takes time to check over up to a hundred cards until we find the right combination of tubes; when the additional data is not supplied, however, we have to write to the student for it, thereby delaying the reply for several days.

Remember—if you want speedy consultation service, give all the information asked for on the consultation service sheet.

J. A. DOWIE, *Chief Instructor.*

———— *n r i* ————

## Roaming Radio Shop!

Three hundred radio receivers in fifty different towns have been repaired by a traveling radio repair shop in Yugoslavia.

————*n r i*————

Drawn for *National Radio Institute* by Jennings Berge. Idea from *Radio Today* magazine.

"It's the man who installed our auto radio. Nobody can get him out!"


## Liked Kaufman's Talk

Your Director of Education, Mr. Kaufman, gave a very fine lecture at the N. R. I. Alumni meeting held recently at Philadelphia, on "How to Get Practical Servicing Experience at Home." Everyone had so many questions to ask Mr. Kaufman on radio principles that I forgot to ask about extra data and detail of this idea.

JAMES SUNDAY,
Upper Darby, Penna.

———— *n r i* ————

## Who Else Wants More of Electronics, Inc.

The NATIONAL RADIO NEWS is ever better and better. The information in its pages is fine and the stories by Mr. Markus are tops. I look forward to more of his stories and to the continuation of the good work the N. R. I. Alumni is doing.

C. H. SIEFMAN,
E. Cleveland, Ohio.

———— *n r i* ————

## Wants San Francisco Chapter

I noticed in a recent issue of NATIONAL RADIO NEWS you mention that there was some idea of starting a Chapter here in San Francisco. I would be glad to cooperate to help form a Chapter out here.

WILLIAM SAWYER,
San Francisco, Calif.

———— *n r i* ————

## Met J. E. Smith In New York

I have nothing but praise for you, Mr. Smith, and your school. I had the opportunity to meet you in New York at a recent meeting of the Metropolitan Chapter of N. R. I. I trust you may long continue your good work as the head of my school--National Radio Institute.

AARON ORENSTEIN,
Brooklyn, N. Y.

## Graduate Keeps Pace Through News

The NEWS is tops and the articles dealing with the latest developments are just the things one needs after graduation to keep pace. The Service tips have been very helpful.

A. M. SUE,
Demerara, B. G.

———— *n r i* ————

## Saves All Service Sheets

NATIONAL RADIO NEWS is received regularly. I sure get a lot of pleasure out of reading it through as it gives me some valuable ideas on some new radio circuits. I save every service sheet.

ANDREW HAMORSKY,
Warren, Ohio.

———— *n r i* ————

## Please Mister, Don't

Why not call the NATIONAL RADIO NEWS the "National Radio Items." Then it would be N. R. I. all the way through.

HARRY J. WILLIAMS,
Zephyrhills, Fla.

———— *n r i* ————

## Working Your Way Up In Radio

I read Mr. Kaufman's recent article on "Working Your Way Up in Radio," and was impressed to say the least.

JAMES SULLIVAN,
New Baltimore, Mich.

———— *n r i* ————

## Frequency Modulation

Since I started to receive NATIONAL RADIO NEWS I have read every word of every issue. Are they interesting! Have read "Frequency Modulation System" and it sure is educational to me.

WILLIAM THOMPSON,
Horsefly, B. C., Canada.

## Taco Power Antenna Makes Small Receivers More Portable

Taco power antenna, made by Technical Appliance Corp., 17 East 16th Street, New York, N. Y., and sold by practically all radio supply houses.

THE electric wiring of a building is utilized as an antenna by a new Taco device which can be mounted inside the receiver cabinet. The line cord of the unit is plugged into a wall outlet, the receiver line cord is plugged into the device, a red wire is connected to the set antenna terminal, and a black wire is connected to the ground terminal. The set is then ready for use the moment it is plugged into an outlet. This antenna substitute is especially useful where an outdoor antenna is prohibited or not desired by a customer.

## A. C. Power Pack for 1½-Volt Sets

GTC Porta-Power unit, made by General Transformer Corp., 1250 W. Van Buren St., Chicago.

DURING the cooler months, a portable 1½ volt battery receiver can readily be converted into an additional home receiver operating from the A.C. power line instead of from expensive batteries, by means of new GTC Porta-Power unit now available at radio supply firms. The unit plugs into an A.C. outlet, and has universal sockets for all types of battery receiver plugs. Though no larger than the average B battery, it contains a power transformer, half-wave vacuum tube rectifier and filter for plate supply voltages, and a copper-oxide rectifier with filter for filament requirements.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L. L. MENNE, EDITOR
L. J. MARKUS, TECHNICAL EDITOR




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