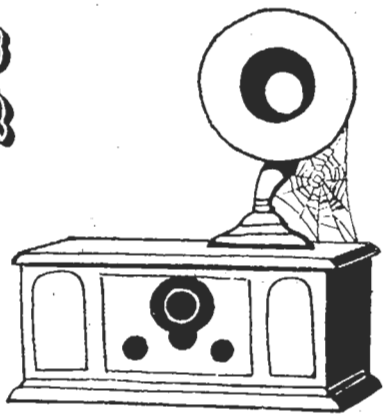
ANTIQUE RADIO CORNER



by James A. Fred

☐ Hello! out there in Radioland. If you haven't made plans to go to the AWA annual conference, now is the time to do so. It will be held in Canandaigua, NY on October 1 and 2. I am looking forward to being there this year and hope to see many of you there, too. You will meet over 300 other collectors, attend a flea market, hear speakers talk about radio and wireless history, and find out the best methods to use when restoring old radios. You can visit the AWA Museum in East Bloomfield (just a 15-minute drive away), and see more ancient radio and wireless gear than you ever dreamed of. Your visit to the National Historical AWA Conference will be an experience you will remember the rest of your life.

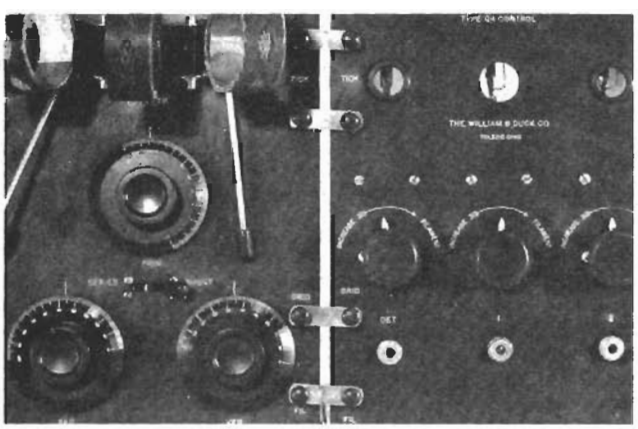
As you may already know the prices of Vintage Radio books, published by Morgan McMahon, have all increased. Costs for labor, paper, ink, and binding have increased, as has the cost of postage to mail the books.

A reprint of the 16-page users manual for the Radiola III, a radio receiver, is now available for $2.00 postpaid from Antique Radio Press, P.O. Box 42, Rossville, IN 46065. It will be very helpful to any owner of the Radiola III A and will increase your enjoyment of the radio set.

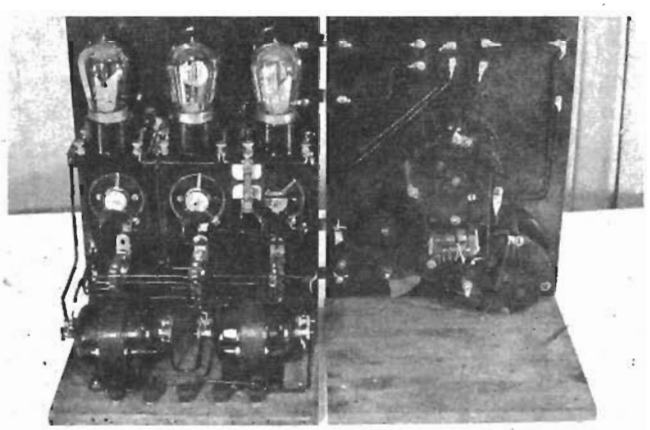
IHRS Establishes a Permanent Display. The Indiana Historical Radio Society has removed its display from the Indiana State Museum in Indianapolis and is in the process of setting up a permanent display in Auburn, Indiana. Auburn, Indiana, about 25 miles north of Fort Wayne, is the home of the Auburn - Cord - Dusenberg Automobile Museum. Here on display are over 30 of the most exotic automobiles ever made in the United Staets. The museum is established in the very same building that once housed the corporate offices and showroom of the Auburn-Cord Company. It is a well preserved building with beautiful chandeliers hanging from the ceiling of the main display room. A graceful marble staircase leads to the second floor where the IHRS display will be established. The IHRS will provide all the material as well as showcases to hold the radios and other artifacts from the "Golden Age of Radio". All visitors paying admission to the Auburn-Cord-Dusenberg Museum will be allowed *free* access to the radio display during regular museum visiting hours.

Troubleshooting Tips. Many readers have written to me requesting information on how to troubleshoot particular models of radios. I am sure this information would be useful only to the few owners of the radios in question. Instead I am going to write about troubleshooting old battery radios. This information will be general in nature and will benefit all collectors.

If you intend to be a serious collector you will want to learn how to do simple repairs to your radio equipment. You will first need some basic tools such as long-nosed pliers, side-cutting pliers, a 6-inch adjustable wrench, several sizes of screwdrivers, and a good pocketknife. You must learn to solder and buy a soldering iron. I do not own a soldering gun, never have, and probably never will. A pencil soldering iron with several replaceable tips suits me best. An inexpensive volt-ohm-meter is a must. Most of these items can be obtained at



A beautifully-restored W. B. Duck receiver. Left is tuner section, right contains detector and amplifier stages. Owned by George Hausske, Wheaton, Illinois.



This rear view of the William B. Duck three-tube receiver shows carefully routed bus-bar wiring. Note meter jacks under the filament controls at left center.

your local Radio Shack store or by mail from a Radio Shack catalog. You will find their advertisements in this issue of ELEMENTARY ELECTRONICS.

You will use the volt-ohm-meter (VOM) mainly for 2 purposes. One, to measure continuity (a continuous circuit) in tube filaments, speaker coils, transformer windings resistors, etc. Two, you can measure the voltages of batteries and power supplies, and tell if capacitors are good or bad.

Using the VOM. To measure continuity use the circuit shown. Set the meter selector switch to ohms, connect the leads from the meter to the wires or binding posts on the speaker, transformer, etc. The meter pointer should move upscale. Try the different resistance ranges until your meter tells you how much resistance you have in the device you are testing. If you get no reading on any resistance range, the circuit is open. If you get a zero resistance reading you have a very low resistance or a short circuit. Audio transformer windings will have resistance readings from a few hundred ohms to several thousand ohms. Tube filaments have very low resistances. Old radio speakers (1924-1928) will read 1000 to 2000 ohms. Headphones of the 20s and 30s will also read 1000 to 2000 ohms. If you find a recently-made pair of headphones that read three to six ohms, they are of the dynamic speaker type and aren't suitable for use with old radios. If you find a pair of recently made headphones with infinite resistance they are probably of the crystal type and not suitable for use with old radios.

To measure filament continuity refer to the drawings shown of tube bases. Normally the larger pins (if there are two diameters) are the filament pins. The exceptions are shown. The lower the filament operating voltage the lower the resistance. In fact some of the tubes may show zero resistance. Very seldom do you find a short circuited filament, the usual defective filament is open. There is one caution to be observed when checking tube filaments. Some tube filaments, namely the 30, 32, 34, V99, and X99 draw currents of only .06 amperes. Some ohmmeters draw current in excess of 0.1 amperes. This amount of current will burn out the filaments of the tubes listed above. If you cannot determine the current flowing in your ohmmeter circuit the safest thing to do is to use only the highest resistance range.

For the beginner I recommend a small VOM like the Radio Shack 22-027 which sells for $8.95. The meter will easily fit into your pocket since it is only 3½ by 2-5/16 by 1¼ inches in size. The meter has 8 ranges; AC & DC volts: 0-150, 0-1000; resistance: 0-100,000 ohms; and direct current of 0-150 milliamperes. The meter movement takes only 1 mA (.001 ampere) to deflect full scale. This would make it safe to use with any vacuum tube.

Another reason you need a VOM is to measure voltages of batteries and power supplies. Simply set the VOM to its highest voltage range and place the test prods across the voltage source, observing the correct polarity. If the meter doesn't deflect to half scale, change the range switch to the next lowest range. The meter will be more accurate near the center of each scale so take your reading in this region whenever possible. Remember that batteries deliver direct current (DC), and your home electrical receptacle delivers alternating current (AC). If you are in doubt as to what kind of current you are measuring, read the label on the power source very carefully.

Detect Faulty Capacitors. Another important use for your VOM is to de-

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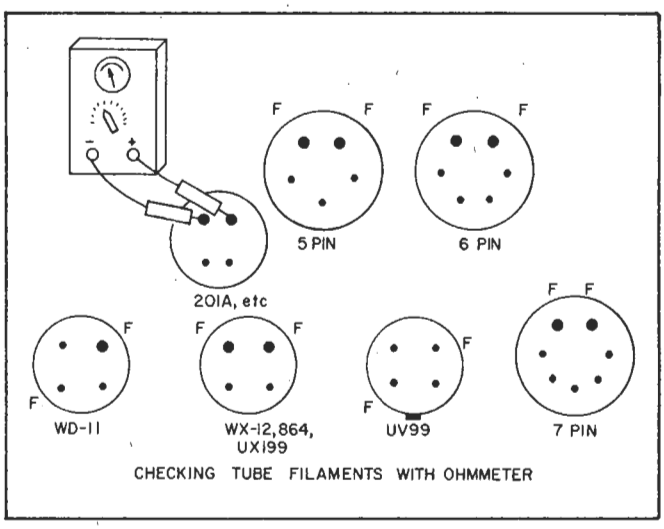
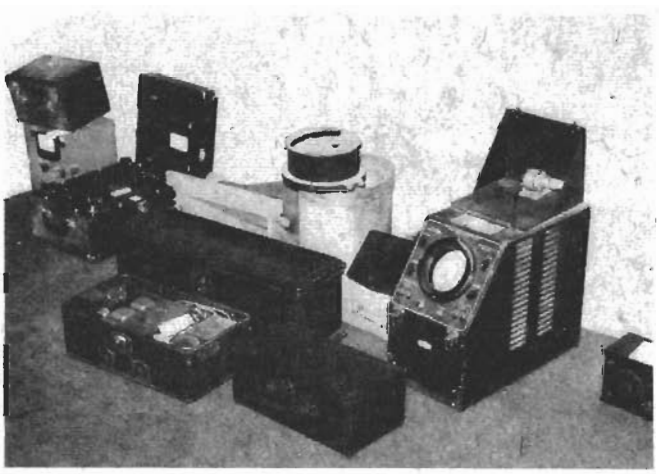
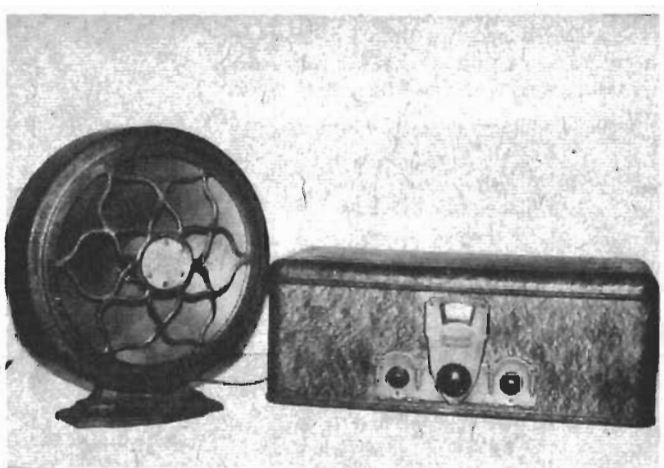


CHECKING TUBE FILAMENTS WITH OHMMETER

Diagram shows several popular antique tubes which cannot be checked in modern testers. Usual failure was burned-out filaments.



In addition to the antique radio gear usually seen at these meets, there was test equipment on sale at the Indiana Historical Radio Society's flea market.



This Crosley Gembox was one of the very earliest radios to be powered directly from the AC power line. The speaker was also very early—replacing earlier headphones.

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tect leaky or shorted electrostatic capacitors. There are two basic types of capacitors: electrolytic and electrostatic. Electrolytic capacitors are usually larger physically and have greater capacities. Their capacity usually runs from 4 to 10,000 mfd., and they will have positive (+) and negative (−) leads. Determining the good and bad electrolytic capacitors is beyond the scope of this article plus the fact that the old pre-1927 battery radio did not use them.

Electrostatic capacitors come in many sizes, shapes, and constructions. There are mica, ceramic, tubular, mylar (a registered trademark of the DuPont Company), and metallized foil, just to name some of them.

To measure leakage you will need a variable voltage power supply that puts out DC. First thing you should do is set the power supply voltage to the exact rated voltage of the capacitor under test, and then set the VOM DC voltage range to measure this voltage. Connect the capacitor in series with the positive terminal of the power supply and your VOM will read the power supply voltage. If you get any kind of a DC reading through the capacitor throw it away and use a new one. If you want peak performance from your radio. When we get to AC radio trouble shooting we will explain this procedure in detail.

Use Your Eyes. One of the best indicators to use when troubleshooting is your eyes. Observation will show up most of the problems found in the old battery radios. Start with the batteries or power supply. Are they delivering the proper voltages, are the connecting wires or cable in good condition, are the binding posts clean and tightened properly? If in doubt take your VOM and measure the voltages at the end of the cable or at the binding posts. If everything checks okay here, look at the tubes and see if the filaments are lighted. Most tubes are bright enough to see a glow in a darkened room. If there is no glow check the filaments for continuity. Check the tube pins and socket contacts for corrosion, and see that they are making good contact. If the tube filaments check out well, turn the filament rheostats and see if the voltages measured at the tube socket change as you rotate the rheostat knob. There should be at least a 1-volt change between minimum and maximum rotation.

If you cannot get a station with the filament rheostat turned to the clockwise end of rotation check your antenna and ground. When you touch the antenna wire to its binding post you should get a click in the speaker or headphones. If you get only a weak sound from a nearby station one or more of the tubes may be weak. If you have tubes that you know are good substitute them for the tubes in the radio. If you have no spare tubes then you must take them all out and have them tested. Don't waste your time going to the corner drugstore to use their tube tester. It is only made to test the more recent TV type tubes. You will need to find an old time radio repairman with an old tube tester. If you have any bad tubes you will have to get new or good used ones. Weak reception accompanied by a rasping, scratchy, fuzzy noise may be caused by a bad capacitor or a grid leak that has too little resistance. The grid leak should have a resistance of .5 to 5 megohms. The inexpensive VOM will not measure a resistance this high. If you doubt the grid leak take it to a TV set repairman he will have an ohmmeter that will measure it. The only other components to check are the tuning coils, audio transformers, and speaker. You can use the ohmmeter in your VOM to test those parts as described above.

Other VOM Applications. You can use your voltmeter to measure the voltage on the plate of each tube. Put the negative lead to B− and touch the positive lead to the plate terminal on each socket. If the plate voltage of the proper value is there, the set should be able to play. Another cause of a weak or non-playing radio can be shorted plates in the tuning condenser. Observation should detect a problem here. As a last resort disconnect all the leads to the stator (the plates that don't move) of the condenser, connect one lead of an ohmmeter to the stator and the other lead to the rotor. Rotate the condenser slowly, watching the meter carefully. If the plates touch anywhere the hand on the meter will deflect. A good condenser will measure infinity resistance between the fixed and movable plates. Plates that touch will cause static in the speaker and cause the stations to cut in and out.

There are a lot of obscure, once-in-a-lifetime troubles that pop up now and then. However the preceding instructions will allow you to find and correct 90% of the problems found in the old 3- to 6-tube battery radios.

Help Out Your Editor. Here is your chance to lend a helping hand to a fellow collector. Charles Graham, Technical Editor of ELEMENTARY ELECTRONICS magazine, is looking for a

Kaydette radio made by International Radio Corp., Ann Arbor, Michigan. The Kaydette Jr. was probably the first true portable. The advertisements showed it being placed in an overcoat pocket. I believe the radio used a 6F7 and a 12A7 in a reflex circuit. If any reader has a set of this type or knows where there is one please contact Mr. Graham in care of ELEMENTARY ELECTRONICS magazine.

So long for now, I'll see you next issue with more collector news, technical information, book reviews, and other interesting information to help you in your radio collecting hobby.

In July/August issue of ELEMENTARY ELECTRONICS Antique Radio Corner, on page 58 a few words were omitted, in the second paragraph of the third column. The complete sentence there should have read, "The thorium inside the filament is forced to the surface in a process called "boiling'."