THE A.W.A. GATEWAY

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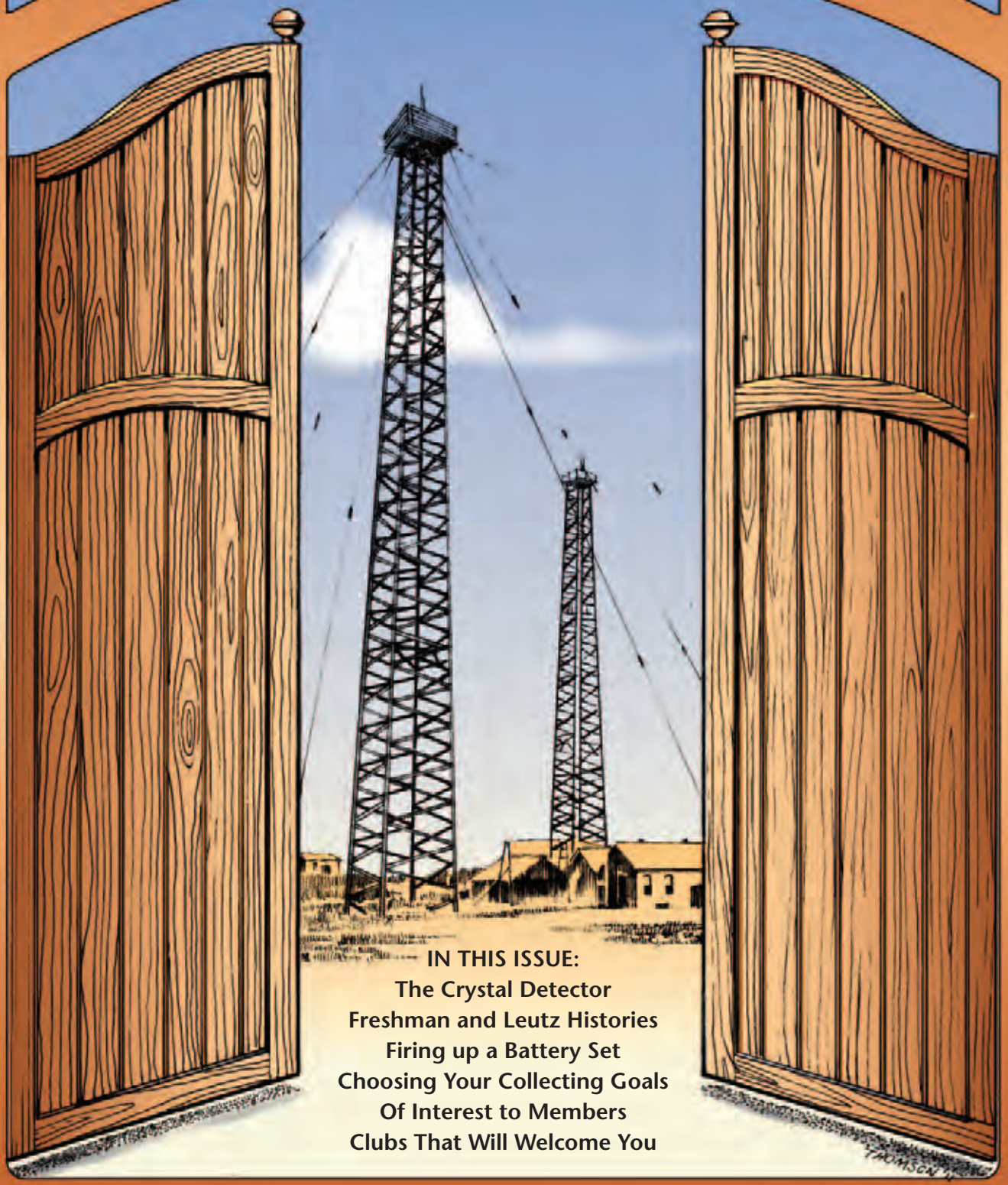

IN THIS ISSUE:

Your Entry to the Fascinating World of Vintage Communications

The *AWA Gateway* is an electronic publication of The Antique Wireless Association, downloadable without charge from the AWA website www.antiquewireless.org, to stimulate interest in vintage communications history, equipment restoration and collecting.

Marconi at his St. Johns receiving station. Courtesy David Read.

ABOUT OUR COVER

The scene that is partially revealed behind the gateway is the Marconi transmitter complex at Poldhu, southwest Cornwall, England, that sent the first transatlantic radio signal. The three dots, representing the Morse letter "s," were received by Marconi at St. John's, Newfoundland on December 12, 1901. Shown are two of the four sturdy towers that replaced the two antenna masts used in the original test.

The *AWA Gateway* cover was created by Will Thomson of Armadillo Arts, Iowa City, Iowa.

The AWA Gateway is published approximately four times a year by The Antique Wireless Association. AWA is a non-profit historical society founded in 1952 and incorporated in the State of New York. Antique Wireless Association is a trademark of the Antique Wireless Association.

Welcome to The AWA Gateway!

From The Editor

WE WELCOME A NEW AUTHOR

I'm very pleased to say that this opening issue of our second year of publication includes an article from our first volunteer author. He is Andy Ooms, a retired labor relations and human resources executive who has had lifelong interests in radio, including AM DXing, Short Wave Listening, Old Time Radio programs and antique radios. Andy has worked on the space shuttle project for Rockwell International, at one of the last RCA radio production facilities in the U.S., and on the construction phase of the Alyeska Pipeline Service Company in Alaska. Since retirement, he has done some writing, camp-hosted at various state and Federal forests and parks, and taught English, American Literature, and Employment Strategy in Viet Nam and the Philippines.

Andy will be contributing a column we're calling "Enjoying your Antique Radios"— a title we've kept deliberately broad in order to encourage him to draw on any facet of his interests in communicating to you his love of radio and things radio related. At first, Andy's columns will center on broadcast and short-wave radio listening, but he expects to expand into other areas as time goes on.

Welcome aboard, Andy. I know we're all going to enjoy your work!

INTRODUCING "CLASSIC RECEIVER CIRCUITS"

During our first year of publication, we ran a series of four articles providing basic information about vacuum tubes. Called "The Receiving Tube Story," the series concluded in the last (December, 2011) issue. During the coming year, beginning with this issue, we'll be publishing "Classic Receiver Circuits," another informative four-part series. The first article, "The Crystal Detector," appears in this issue. In the next issue, we'll look at "Grid leak and Regenerative Detectors." Appearing in the last

two issues of the year will be, respectively, "The TRF Receiver" and "The Superheterodyne Receiver."

WANTED: MORE AUTHORS!

Now that Andy Ooms has broken the ice, we're hoping that more of you wordsmiths out there will contribute articles or series of articles. Our goal is to make *The AWA Gateway* predominately a venue for reader contributions, slowly phasing out staff contributions as we receive more new material. And so, valued readers, please boot up your computers and get busy working on some new ideas for *Gateway*. if you'd like a sounding board for your ideas, please e-mail me at mfellis@alum.mit.edu and we can discuss them.

We're also looking for snapshots of interesting collections, so get your cameras out and e-mail a picture or pictures of some of your treasures along with a few paragraphs about yourself and your collection. Alternatively, if you have a web site to show off your collection, send us the URL. We'll be waiting to hear from you!

From The Deputy Director

ON ACQUIRING A NEW RADIO

With this issue of *The AWA Gateway*, we begin our second year of publication. I hope you are enjoying the *Gateway* series as much I am.

So, you have "decided" to collect radios (or telegraph equipment, or televisions, or whatever). I have placed the word "decided" in quotes because I do not think anyone consciously "decides" to collect. We see that one special radio that strikes our fancy or our curiosity or our sense of wonder; it doesn't cost too much; and we take it home. And, so it begins! Just like potato chips, you probably can't have just one.

What do you do next? In graduate school I learned the answer to that type of question was that "it depends." For the sake of simplicity in our discussion, let's assume that your prize purchase is a radio. If you just want to display it, a mild cleaning may be all that is necessary and then you can place the set on your shelf of honor. However, there are many pitfalls even with what might seem like a simple cleaning. Dial numbers and tube numbers might wipe off on the cleaning cloth, cabinet finishes can be ruined by the wrong soap or solvent.

The best immediate source of information for the newcomer to our hobby is the internet. Through careful searches with your favorite browser, you can uncover a wealth of material on such things as cleaning techniques, locating missing parts, radio specifications and schematics, and pictures of what your radio should look like.

But, let me offer some words of advice and caution, especially to those not technically trained in electronics. Ultimately, and probably sooner than later, the temptation to see if your newly acquired radio works will become very strong. Unless you are very certain it works, DO NOT PLUG IT IN OR TURN IT ON except with the guidance of a knowledgeable person. Otherwise, you will be risking serious damage to the radio and perhaps to the novice collector as well.

The very first thing I do with a radio I purchase is check the condition of the line cord (the electrical cord) to make certain that the insulation is not frayed or dried out and crumbling. If that is the case, cut the cord right off so you cannot make the mistake of plugging it in.

As a novice, you should resist the temptation to test or work with any turned-on radio out of its cabinet. There are voltages on the chassis that can shock, injure and even kill under certain circumstances. Save that kind of activity until you have acquired some familiarity and expertise with vacuum tube circuits.

Be careful with radios that are plugged in, even if turned off. Certain common small table radios known as "AC-DC sets" have one wire from the line cord connected directly to the metal chassis. Depending on which way the plug is inserted into the outlet, the "hot" side of the AC line can be present on the chassis and other metal parts of the radio. If you then touch any metal part while also in contact with a ground, such as a water pipe or damp basement floor, you will certainly receive a nasty shock.

In fact, even if the radio is unplugged, high voltages can still be stored in certain of the set's capacitors for long periods of time. I learned that lesson the hard way while I was in high school. I was repairing a table radio and my needle nose pliers slipped and shorted the filter capacitor to ground through yours truly. I am very lucky to be able to tell you the story. It took quite a few hours to find those pliers. My reaction to the shock made me toss them up and they were stuck in the ceiling. This is not the recommended method of learning about the potential for electrical shock while servicing a tube radio.

All this is not meant to discourage you from the pleasures to be had from troubleshooting and rehabilitating vintage radios. Instead, we'd like to encourage you to develop the knowledge needed to do this work safely. You can do this with the help of people you meet by joining a local antique radio club (you'll find a list of clubs elsewhere in this publication), by reading the articles aimed at beginners in this publication (such as the "Play it Again" series), and by looking up specific topics on the internet.

There are also many books on the market that will help you get the knowledge you need. One convenient on-line source is the book section of the website for *Antique Radio Classified* magazine (www.antiqueradio.com), but you will also find many useful references for sale at antique radio meets in your area. And don't forget to check your local library! You are also invited to join the Antique Wireless Association (visit www.antiquweireless.org) and receive our information-packed *AWA Journal*.

The information overload could be daunting at first, so the personal touch of a live person helping you is the easiest and safest way to learn the ropes. And, it is clearly more fun sharing your new found hobby with others. Don't get discouraged! Radio collecting is a great hobby with some super people that you will meet. We all started as newbies and managed to work our way through it. That is part of the challenge—to learn new things and to search and find that very "special radio" that you have to add to your collection.

Good radio hunting to you!

Bob Hobday, N2EVG, Deputy Director

Antique Wireless Association

Classical Receiver Circuits

Part 1: The Crystal Detector

By Marc F. Ellis, N9EWJ

If you were a radio listener during the dawn of public broadcasting—say in 1920 when Pittsburgh's station KDKA reported the Harding-Cox presidential election returns—mass production had not yet made radio tubes affordable and generally available. You were probably listening to the returns, through earphones, on a crystal set. Within a few years, however, tubes did enter the mass market and the crystal set quickly became obsolete. But the wonderful thing about the crystal set, the thing that captured the imagination of experimenters long after this mode of reception became obsolete, was that it required no power source.

WHAT A DETECTOR DOES

The operation of the early crystal sets depended on the ability of certain mineral crystals to detect AM radio signals. To understand what a radio detector does, you first need to know a little bit about such a signal. Its wave form is crudely represented in "a" of Fig. 1. The horizontal line, located at the zero voltage axis of the wave, represents the passage of time. The regularly spaced vertical lines represent the rapid oscillations of the radio frequency "carrier" generated by the broadcast station's transmitter. Notice that they change direction cyclically, swinging above and below the zero axis.

The slower undulations are the audio signal being transmitted by the station and superimposed onthe carrier. The superimposition of the audio signal on the radio signal is carried out by a process called modulation. Notice that every variation of the audio wave above the zero axis is mirrored by a similar variation of opposite polarity below the axis, a phenomenon inherent in the modulation process.

Detecting a radio transmission means separating the audio information from the radio frequency carrier. But only one of the two "mirror image" audio signals is wanted. Otherwise, every audio variation above the zero axis would be matched by a variation of equal amount and opposite polarity below the zero axis. The result would be cancellation of the audio; no sound would be heard.

Very early in the development of radio technology, it was discovered that the crystalline forms of some minerals could act as rectifiers, allowing current to pass through them in one direction but not in the other. Among the minerals having these properties are magnetite, carbon, molybdenum and galena. When a received radio signal is passed through one of these minerals, the result is a waveform similar to "b" of Figure 1. Note that the half of the signal below the zero axis has been suppressed, eliminating one of the "mirror images."

In today's terms we'd call the crystal a "semiconductor diode." Using it as a detector to extract the audio signal from the radio carrier was about the first application of solid state technology.

A SIMPLE CRYSTAL RECEIVER

The schematic of a very simple receiver utilizing a crystal detector, taken from a vintage hobby publication, is shown in Figure 2. Notice that the signal selected by the tuning coil and slider arrangement must pass through the crystal detector before reaching the headphones. A lead ore (galena) crystal was most commonly used for this application. The capacitor across the headphones (labeled "telephone shunting condenser") has the effect of filtering out the rapid radio frequency variations of the carrier while leaving the slower impressed audio variations unaffected. The result ("c" in Figure 1) is a reproduction of the original audio signal used to modulate the carrier at the radio station. In even simpler circuits, the "shunting condenser" is

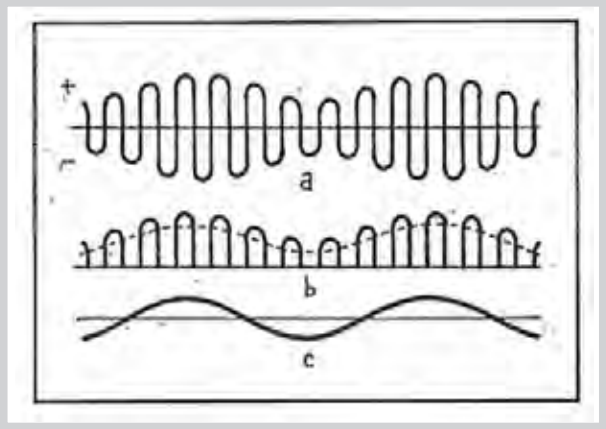

Fig. 1. Simplified waveforms illustrating the detection process.

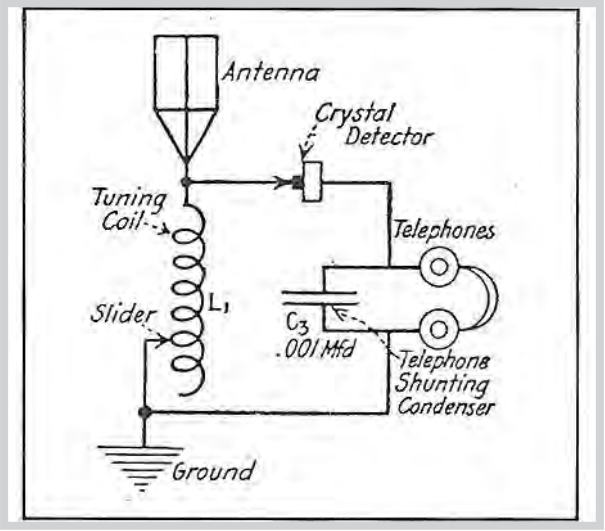

Fig. 2. Schematic of a simple crystal set.

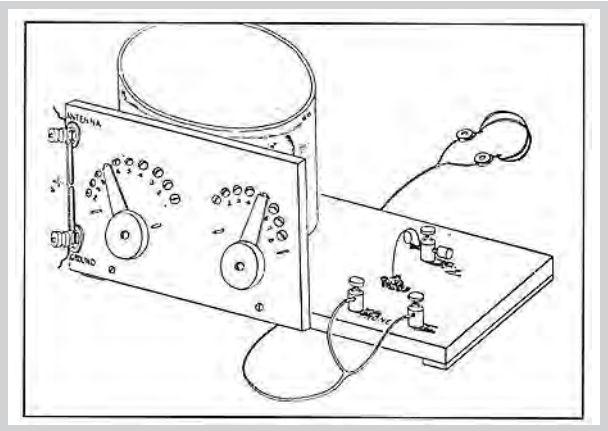

Fig. 3. Starter set designed by NBS sparked the radio broadcasting industry.

An RCA "Radiola" crystal set of the early 1920s.

eliminated; its role being played by the inherent capacitance of the headphone cord and the windings of the headphone coils.

To make it suitable for use as a crystal detector, the little mineral fragment first had to be mounted. Typically this was done by placing it in a small cylindrical mold and pouring a molten low-melting-point metal alloy around it. A little bit of the top of the mineral was left open for connection to the circuit.

The mounted mineral was then placed in a cuplike holder in a fixture called a detector stand. Also part of the stand was an adjustable arm on a ball joint or other type of swivel mount. Fitted at the end of the arm was a springy wire tip, usually referred to as "the cat's whisker," for making contact with the surface of mineral. The stand was equipped with Fahnestock clips or binding posts for connecting the arm and crystal holder into the radio circuit.

In practice, the radio listener touched the surface of the crystal at various points, looking for a spot that yielded the loudest signals.

The adjustment was a tricky one, and usually did not remain stable.

Even the slightest jarring of the radio table could cause the volume to plummet, whereupon the listener would have to search for a new "hot spot."

This early "Mengel Etherion Type M. R. 101" crystal set was built in a jewel-box type case. it was essentially a toy.

A BRIEF HEYDAY

Because of their simple construction. home-made crystal sets were very popular. And many a neighborhood tinkerer acquired god-like stature among friends and acquaintances because of his ability to "pluck sounds from the ether" using a roll of double cotton covered wire, a Quaker Oats canister and a few odd parts.

The National Bureau of Standards published a set of plans for an ingenious little set (Figure 3) requiring no store-bought parts other than the crystal. All of the hardware, including the crystal holder and the coil tap switches could be fabricated by anyone handy with tin snips and pliers. The little NBS set was enormously popular, and many credit it with catalyzing the broadcast boom of the 1920s.

Commercially made crystal sets were also available of course, but they were never made in great numbers. Not only was there competition from home-brew sets, but also, by the time the broadcasting industry had become big enough to create a mass market for radio receivers, the crystal set had become obsolete. Commercially made crystal sets of the early 1920s are highly-sought-after collectibles today.

What caused the demise of the crystal set was, of course, the vacuum tube. Tube technology had progressed rapidly in response to the communications demands of the First World War. By the early 1920s, with peace at hand, tubes were being mass-produced for the consumer market. They were much more expensive than crystals and, because they required battery power, cost a lot more to operate.

But there was really no contest. Not only was the tube a much more reliable detector then the crystal, it could also be hooked up to be an amplifier. Using tubes, the received signal could eventually be amplified to provide loudspeaker volume. Now listeners would no longer have to be tethered to their radios by headset cords.

Company Chronicles

New and Improved FRESHMAN MASTERPIECE

Charles Freshman had already made and lost several millions in various business operations when, in 1922, he founded the Charles Freshman Company to manufacture radio condensers and antennas.

Over the next couple of years he expanded operations, adding crystal detectors, variable grid leaks and other parts to the line.

During 1923 and early 1924, as sales of "3-dialer" sets began to soar, Freshman's engineers figured out a clever and inexpensive way to control the self-oscillation that plagued such designs. Depending only on ingenious placement of the RF transformers in relation to the tuning condensers, the Freshman design avoided the expensive Neutrodyne circuitry that was the conventional solution to the problem.

The result was the Freshman Masterpiece, a "3-dialer" that blew away the competition by selling for just $60.00 (or $17.50 in kit form). In production by August, 1924, enough Masterpieces were sold by the following February to gross almost $500,000—more than the figure for the entire year of 1923. Even though Freshman's relentless cost-cutting had begun to compromise quality (150 to 200 sets per day were being returned for repairs), the public was still buying.

In 1925, Freshman increased profits by cutting out his jobbers and selling dealers direct. He also undercut, and enraged, his dealers by introducing the cheaper "Polydyne" (really the previous season's Masterpiece) to be discounted by department stores. Sales were 7.3 million for 1925 and 7 million for 1926—but the 1926 profits were only about half of the previous year's.

By the end of 1926, sales were slumping because the 3-dial models had become obsolete. A new single-dial set was rushed into production the following March, but the firm broke its stride again when it was forced into accepting an RCA license in June. The required switchover to RCA tubes was expensive and, to make matters worse, power pack quality in a new AC set design was so poor that the return rate was said to be about 60 per cent.

By November, 1927, 900 employees had to be let go and, in that year, Freshman lost $461,000 on sales of 7.3 million. Walter Chrysler, who had become a major investor in the firm, now purchased a controlling interest and instituted a management shakeup. Freshman himself was kicked upstairs to be chairman of the board, and was totally out of the company by September, 1928.

Near the end of the year, Freshman absorbed Freed-Eisemann.

Freshman's low-priced line and Freed-Eisemann's quality one complemented each other nicely. The Freed-Eisemann brand name was retained, but the corporate name became Earl Radio Corporation and the Freshman brand became "Earl" (for Clarence Earl, Freshman's replacement as President).

Sales began to improve and the outlook looked good—until the stock market crash finished off the newly-revitalized company, which went into receivership in November, 1929.

GOLDEN-LEUTZ

Charles R. Leutz showed twin interests in radio and entrepreneurism early in life. He obtained his amateur license in 1913 at the age of fifteen. While still in high school in Boston, Massachusetts, he formed the Eastern Scientific Apparatus Company to sell radio equipment to yachtsmen. However, he almost immediately ran into trouble with the Marconi Wireless Telegraph Company of America, which wrote and told him to stop. This incident foreshadowed Leutz's later conflicts with RCA over the sale of Superheterodyne radio kits.

After high school, Leutz worked briefly for the Clapp-Eastham Company and the Fore River Shipyard, then left the Boston area to take a job with American Marconi in New Jersey. There he worked throughout World War I, gaining valuable experience in radio receiver design.

In 1921, he and Claude Golden formed the "Experimenter's Information Service" to sell plans for superheterodyne circuits designed by Leutz. The following year, Golden-Leutz, Incorporated was formed to sell parts and kits for some of the designs.

RCA tolerated this infringement on its patents for a while, but sued in 1924, about the time its own Radiola Superheterodyne was ready for market. Soon, the Leutz interests were enjoined from selling superhet kits, being restricted to plans and parts.

The Golden-Leutz superhet set business was taken over by Norden-Hauk, a Philadelphia concern that—for some reason—was never the target of an RCA suit. Perhaps it was too small; perhaps it was in a poor location for suit (Philadelphia judges were thought to be poorly-disposed towards RCA).

In the meantime, Golden-Leutz switched over to TRF models. In 1923 Leutz, together with Clair Farrand, had designed the Super-Pliodyne 9—which was first advertised in March, 1924. This was followed by a succession of bigger and more powerful TRF models, which were claimed to be far better than the superheterodynes the company

was forbidden to market.

Golden-Leutz changed its name to C.R. Leutz, Incorporated in 1929—moving to Altoona Pennsylvania. It was last heard from in late 1930. Leutz eventually went into radar and missile work for the U.S. Navy and retired from the Johns Hopkins Applied Physics Lab about 1963. He died the following year.

Those interested in obtaining technical data on Leutz' s designs can find quite a bit of information in his four books: Super-Heterodyne Receivers (paper, 1923), Modern Radio Reception (1924 and 1928 editions) and Short Wave (with Gable, 1930).

ABOUT THE ANTIQUE WIRELESS ASSOCIATION

The Antique Wireless Association is an organization of about 2000 international members linked by a common interest in the history of electrical and electronic communications. AWA members come from all walks of life and our ranks include teenagers, octogenarians, and beyond in both directions. At one of our meets, you might find yourself shaking hands with a retired broadcast executive or military electronics specialist, an engineer in a high-tech electronics firm, or an eager young person looking for advice on restoring his or her first radio.

The organization was started in 1952 by Bruce Kelley, George Batterson, and Linc Cundall—amateur radio operators and radio collectors from upstate New York. Their initial goal was to establish a museum where they could collect and preserve early wireless and radio equipment and historical information before it was lost to future generations. Decades later, their legacy continues to motivate our members.

Some of us are most interested in the technical background behind the epoch-making discoveries that now make it as easy to communicate across the globe as around the corner. Others enjoy the romance surrounding the men and institutions that put these discoveries to work: the maritime radio operators who averted disasters with their alert ears and quick thinking; the short-wave stations that radiated glimpses of exotic cultures and mindsets; the giant radio networks that delivered unparalleled entertainment and timely news to our homes while hawking toothpaste, cigarettes and soap flakes.

Though AWA members share this common interest, which many can trace back to early childhood, they express it in different ways. Some of us collect radio-related literature and manuals. Others collect and restore hardware: Morse keys and sounders, battery radios of the 1920s, telephones, advertising signs, cathedral and console radios—you name it! Collections can become very specialized, restricted to such things as radio components crafted of shiny Bakelite and gleaming brass or perhaps the fragile and intricate vacuum tubes that made the communications miracles possible.

Among our members are meticulous craftsmen who enjoy replicating vintage receivers and/or transmitters. Those who are licensed amateurs frequently operate such equipment in special communications events sponsored by the AWA.

In addition to the commitment to the preservation of historical artifacts and background materials at the Museum, AWA also publishes *The AWA Journal* and *The AWA Review*. The *Journal* is a quarterly publication that gives our multi-talented members an outlet to share their historical research, equipment restorations, troubleshooting and servicing tips and other information of common interest. *The AWA Review*, which also publishes member contributions, contains more extensive and scholarly papers. It is published once a year.

The AWA Gateway is the latest addition to the AWA family of publications. It's delivered electronically and free of charge—downloadable from our web site www.antiquewireless.org.

Our content is targeted at those who may not be familiar with the AWA and who perhaps are just becoming interested in the history, collecting or restoration of vintage communications gear. For that reason, our technical articles are more basic than those in our other publications and our articles about AWA generally do not assume knowledge that that only those familiar with our organization might have.

The AWA also sponsors a four day annual convention in August featuring technical presentations and forums, a large auction, an awards banquet, an equipment and artifact competition, a book sale, and an active flea market. The convention affords attendees plenty of time to renew and make friendships, time to engage in long conversations on collection, preservation and all other aspects of the hobby.

The AWA is chartered as a non-profit organization in New York State, an IRS 501(c)(3) tax-exempt corporation, and is a member of the American Association of Museums. To learn more about AWA or to join our organization, visit the AWA website at www.antiquewireless.org.

DONATING ARTIFACTS TO THE AWA

You may have artifacts that you are interested in donating to the AWA. We would be pleased to discuss any possible donation. Please call us at (585) 257-5119.

Play It Again

A No-Nonsense Guide to Vintage Radio Restoration

By Ken Owens
1932-2009

PART 5—APPLYING POWER TO A BATTERY SET

In the last issue, we took you through step five of a methodical procedure for troubleshooting and testing the Atwater Kent 20C, a simple radio of the mid 1920s. This month we'll complete the procedure, applying power to try out the radio.

Up to this point, we have tested all major components in our example radio including the audio transformers. But we haven't yet talked about what to do if one of these is found to be open. In the 20C, the audio transformers are housed in round cans. Repair is not practical, but a bad transformer can be removed from its can and a small, modern unit having a 3:1 or 4:1 turns ratio can be installed inside.

Suitable transformers are available from Antique Radios, Inc. Visit their site at www.arbeiii.com

6. TRANSFORMER REPLACEMENT

In order to avoid mistakes later, make a sketch of the original connections to the bad transformer. Then unsolder the leads, unbolt the can, and put it upside down in a pie pan. Heat in the oven at 250-300°F until the potting compound is soft enough to pull out the contents. Put your new transformer in the can and pour enough potting compound back in to hold it in place. When it has cooled, bolt it back on the chassis and connect the wires.

On modern transformers, the primary leads are red and blue. Red goes to B + and blue goes to the plate. The secondary leads are green and black. Green goes to the grid of the next tube and black to ground or C- depending on the circuit. This completes our component checking and we are almost ready to power up.

7. SPEAKERS

Table radios did not have built-in speakers until around 1930. Prior to that time, the speaker was sold separately as an "accessory." Most were high-impedance magnetic units, interchangeable among different brands of radios. You need a speaker to test your set. Even if you own a vintage horn or speaker, don't use it for testing. You risk damage if something unsuspected is wrong with the set.

Get an old tube-type AC/DC radio with a permanent magnet speaker. Remove the speaker and the output transformer connected to it (it's usually attached to the speaker). Build a box to house these items and attach a long 2-conductor cord to the primary leads from the transformer. I use lamp cord. Most old radios have binding posts or tip jacks for the speaker connections, so solder phone tips on the free ends of the cord. Now you have a good, high-impedance test speaker.

8. POWERING UP

To power up a vintage battery set, you need a source of the various DC voltages that, back in the day, were supplied by batteries that are now impossible or inconvenient to get. Most serious restorers of battery sets will have acquired a device called a battery eliminator. unfortunately, this is an expensive device, but it does convert the AC from your wall plug into required DC voltages. One popular unit of this kind is the ARBE-III, at this writing available at $159.95 plus shipping from Antique Radios, Inc. at www.arbeiii.com.

Now it's time to connect the set to your eliminator. Some sets use binding posts for the battery connections, but the 20C uses a permanently attached cable. Such cables are usually in poor condition with the wire colors faded.

Make sure the insulation on the cable leads is good. You may need to trim the end of the cable to get to good wire. Trace out each wire with your ohmmeter to determine where it connects to the set, then mark it with a paper tag. Use the 20C schematic given in the last issue to identify the various A, B and C voltage points. This set has 6 wires in the cable, and we'll begin by connecting up only the A + and A- leads (the ones running to the filaments). These are usually heavier than the other leads.

Measure the filament output of your eliminator and adjust it, if necessary, to 6V. Now connect the A + and A- filament wires to the appropriate terminals on your battery eliminator. Do not connect anything else at this time. Insert a set of good 01A tubes, turn on the eliminator and the radio's power switch, then advance the filament rheostats. The filaments should light.

If not, measure the voltage at each tube socket between the two large pins (1 and 4). If you do not read 5-6V, you may have misidentified the cable wires or there may be something wrong with the switch or rheostats. A broken cable wire or poor solder connection in the set may also be the cause.

If the filament circuit is OK, remove the tubes and connect the rest of the cable wires to the appropriate voltage terminals on the eliminator. Turn on the eliminator and use your meter to verify that the correct B and C voltages are present at the proper points in the set.

The reason for this elaborate procedure is simple: it is easy to accidentally connect the B+ to the tube filaments, especially when you are not familiar with the set. The result is the blowing of all the tubes. It happened all the time in the 1920s. Given the scarcity and price of antique tubes today, we can't be too careful.

Turn off the eliminator and the radio's power switch; turn the rheostats fully counterclockwise (off). Install the

The Arbe-III Battery Eliminator.

tubes and connect the antenna and speaker. If you don't have an outside antenna, string 10-20 feet of wire around the room. Sets operated from batteries required an earth ground to complete the antenna circuit, but battery eliminators usually have enough capacitance to power line ground to make an earth ground unnecessary.

Turn on the eliminator and the set, and advance the rheostats about 2/3 of full rotation. You should hear some noise in the speaker. Set the tuning dials at 0, then rotate the center and right hand dials together about 10 divisions. Now turn the left hand dial to the same setting. Continue doing this until you hear a station, then adjust each dial individually for maximum volume.

If the filament output of your battery eliminator is 6V (some give only 5V), do not turn the rheostats more than necessary to get 5V on the filaments. Use your meter to measure it and note the rheostat settings. Higher filament voltage shortens tube life without improving performance.

Remember that the rheostats also serve as volume controls, so use the Lowest rheostat settings which give adequate volume.

If your set still doesn't play after all this, you will have to employ the method we use with more complex sets—that of stage analysis. Next time we will show you how.

READER INTERNET SITES

In the April issue of *The AWA Journal*, we mentioned an idea proposed by reader Steven Johannessen. He felt that *Gateway* readers might find it interesting and stimulating to look at collections our readers might have posted on line. We agreed and solicited URLs. We received and included three of them last time. Here they are again along with some additions received since then. Four readers have responded so far. Additions to the list are always welcome!

Allie Lingo (radiodoc@windstream.net) sent two:
Radios: http://www.radioatticarchives.com/contributor.htm?code=499
Test Equipment: http://www.oldtestequipmentarchives.com/contributor.htm?code=26

Mike Adams (mike.adams@sjsu.edu) has recently redesigned his Lee de Forest website. Look it over at **www.leedeforest.org.**

Ron Lawrence sent several URLs featuring his collections and interests:
Radio Heaven Page
http://radioheaven.homestead.com/menu.htm
Clough-Brengle test equipment page
http://cloughbrengle.homestead.com/
Civilian Conservation Corp. page
http://radioheaven.homestead.com/CCCradio.html
Ron's YouTube channel—with video tours of his collections
http://www.youtube.com/user/w4ron

The Tube Collector's Association Tube Photo Gallery
http://radioheaven.homestead.com/TCA.html

Don Ignatius Collection
www.home.earthlink.net/~dmign/index.htm

Enjoying Antique Radio

Part 1: Introduction

By Andy Ooms
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There are many types of vintage (also known as antique or historical) electronic devices of interest to collectors. This interest may take the form of collecting, restoring, or learning about the equipment. Specialty interests include vacuum tubes, cabinet finishes, and circuitry diagrams. The equipment involved might be such things as radios, phonographs, recorders, television receivers, transmitters, broadcast station gear, test equipment, military units, telephones and telegraph gear.

In this column, we'll be dealing primarily with radios. And we want to help those of you who are new to the antique hobby increase your enjoyment by increasing your knowledge of early radios and radio history. We will go over some pretty basic details, and if at any time you come up with questions or comments, please e-mail them to me and I will do my best to respond.

THE BIRTH OF BROADCAST RADIO

It is not easy to imagine but, wherever we might be, we are surrounded by virtually countless invisible radio signals that can be captured and made audible and/or visible with the appropriate receivers. Radio waves were first sent and received about 1885 by German physicist Heinrich Hertz in connection with certain electrical experiments.

Early telephones and telegraphs depended on connecting wires to work. Radio waves differ in that they require no wires and basically need only a transmitter at one location and a receiver at another to move sounds or pictures between locations (yes, television also can utilize radio waves). Inventor Guglielmo Marconi demonstrated the practicality of using radio waves for point-to-point communications by sending a signal across the Atlantic from England to Newfoundland in 1901. Soon radio was being used for international communications and for communication with, and between, ships at sea

What we know today as radio broadcasting began in the early 1920s. Upon its arrival as a pop-culture medium and with increasingly user-friendly receivers, radio listening swept the United States as a hugely popular pastime and informational tool. Imagine evenings at home in the pre-broadcast days. No TV, maybe some family card or board games, maybe some singing or instrument playing, some reading, some chit-chat, probably much earlier bedtimes. All in all, these were perfectly acceptable ways to spend time. But you can see that there was plenty of potential room to enjoy the wonders of radio—music, drama, comedy, news and more available right in the living room.

It's likely that the changes in habits occurring because of the introduction of radio into American family life were at least as great as the changes that occurred at the beginning of the television era and, decades later, the Internet age.

Beginning in the 1920s, radio broadcasting brought entertainment of all kinds into family living rooms.

Now perceived as an old-school low-tech means of communication, the use of radio waves is, nevertheless, necessary for such things as satellite transmissions, Internet accessibility, and cell phone usage. Not only that, but in its earlier formats it is still very much alive; several thousand AM stations and even more FM stations are broadcasting daily in the United States and Canada alone. Virtually no country is entirely without an AM or FM station, and shortwave programming reaches every place on earth.

LISTENING ON A TUBE RADIO

Once you have a working tube radio (take note of the cautions in the AWA Deputy Director's comments at the beginning of this issue), you'll want to try it out. By the way, please don't delay your enjoyment of radio until you know more. You can easily start anytime by experimenting with your ability to capture distant AM broadcast signals at your location with any working set. Try for some of the big legacy stations not in your home area, those with lots of power and lots of history. Anywhere in the United States and in much of Canada, without specialized equipment, you should be able to get at least one of the following in the evening after sunset: WCBS, at 880 on the dial, New York; WLW, 700, Cincinnati; WGN, 720, Chicago; WBZ, 1030, Boston; WSM, 650, Nashville; KOA, 850, Denver; WBAP, 820, Fort Worth; KNX, 1070, Los Angeles; or KNBR, 680, San Francisco. Later we'll cover why these stations are listed here

The development of transistors greatly expanded the design possibilities of the field of electronics. Transistors are inexpensive, durable, and small, facilitating the manu-

Vintage tube radios in wood cabinets could produce very good sound indeed.

facture of many more innovative circuits than ever before for a huge number of purposes. It's true that transistor circuits can produce almost perfect sound, as demonstrated by modern home audio equipment and concert sound systems.

However, some antique radios also produce very good sound, especially those with well-designed circuitry, using quality parts, and with speakers five or more inches in diameter nestled in good cabinetry. Old consoles can sound terrific, but even some table models from the 30s and 40s acquit themselves very well.

Some audiophiles prefer vacuum tubes (also known as "hollow state" devices) to transistorized (solid state) equipment. They describe the tube audio as being more "mellow." I don't take sides in this opinion as I feel it is an unwinnable argument, similar to the vinyl versus CD discussions. It is not simple to determine via test equipment measurements whether one sound is "mellower" than another, since "mellow" is not a precisely measureable quality!

THE RADIO SPECTRUM

The radio spectrum is defined as the range of frequencies able to carry wireless signals. But what do we mean by "frequencies?" Well, radio waves are an oscillating phenomenon that can be compared to ocean waves. The distance between waves is known as the wavelength—which is measured in meters. The frequency of repetition of the waves is measured in hertz (Hz), kilohertz (kHz), or megahertz (MHz). "Hertz" is an abbreviation for "cycles per second," named in honor of radio wave discoverer Heinrich Hertz.

Wavelength and frequency are related quantities; one cannot be changed without changing the other. For example, halving the wavelength doubles the frequency and vice versa. Although I will refer to wavelengths at times in this series of articles, I will be primarily discussing frequencies. Amateur radio operators (hams) refer to the ranges of frequencies in which they operate in meters; short wave and broadcast listeners ofen think in terms of frequencies.

A little historical digression may be in order here. A few decades ago, station frequencies were described in kilocycles. Now they are described in kilohertz. The change was made not only to honor physicist Hertz, but also for economy of expression. For example, one kilohertz is one kilocycle per second—one word replacing three.

Legacy station, WLW, Cincinnati for example is licensed to broadcast at a frequency of 700 kilohertz, previously known as 700 kc (kilocycles per second)or 700 on the dial. This is also shown as 700 on the digital readout of modern radios, and is sometimes referred to as channel 700. TV channels on the other hand, at least for antenna TV stations, are now arbitrary numbers used to identify a station.

The radio spectrum runs from 0 hertz to a very great number of megahertz. An ad in a recent *Monitoring Times* magazine describes a communications receiver covering the spectrum from 9 kilohertz to 3.5 gigahertz (which is 3500 megahertz). Less exotic sets available today typically include long wave, medium wave, and short wave spectrums, which run from 100 kilohertz to 30 megahertz. Scanners are one way of listening to signals above 30 megahertz and there'll be more about that later, although it is a rare antique radio receiver that covers scanning territory.

For our purposes we will be working with the range from about 100 kilohertz to 30 megahertz, plus the FM portions of the spectrum, currently at about 87 to 108 megahertz. So, as announcers said in the Golden Age of radio broadcasting, stay tuned! Our next segment will get into the long wave portion of the spectrum, including what it is used for, and why more antique radios for home use had long wave capability than do today's sets.

Correction to "The Receiving Tube Story—Part 3" (September, 2011 issue)

In our discussion of single-ended receiving tubes, we mentioned that the 6SL7 was a single-ended version of the 6L7. Reader Jim Cross points out that the 6SL7 twin triode is totally unrelated to the 6L7 pentagrid converter. Thanks, Jim!

Members' Corner

News of Particular Interest to the AWA Membership

MEMBER SERVICES COMMITTEE REPORT

By Richard Neidich, Chairman

Winter Committee Activities

Prior to Christmas 2011, AWA sent out its first e-mailing to members as well as other individuals who have shown an interest in antique radios and related technologies. The content was primarily focused on notifying everyone of the availability of the latest *AWA Gateway* issue on our website, www.antiquewireless.org, as well as other items of interest on line such as news of the AWA Convention.

If you (member or non-member) wish to be added to this informational e-mail list, please forward your address to Richard Neidich, Membership Services Committee Chair, at rgneidich@aol.com. The list now contains about half of AWA's active members.

A separate e-mail account specifically for members' addresses is being maintained by Ed Gable at awaprofileinput@gmail.com. Contact him there if you haven't already provided him with yours. In the future, we hope to reduce postage costs significantly by e-mailing membership renewal notices.

Besides the continuous work of producing your *AWA Journal* and *AWA Gateway*, other "winter-related" activities for the committee include the many scheduling and planning efforts required to produce the AWA Annual Convention, continuing development of the membership database and the many hours required to collect, edit, peer review and produce articles for *The AWA Review*.

This issue of *The AWA Gateway* documents some of the first steps being taken to convert a former antiques mall into the future AWA Museum. Keep an eye on the *Gateway* for continuing news of the project.

Since this publication can include color pictures conveniently and at no cost premium, we'll be heavily relying on it to bring you the ongoing story.

MUSEUM NEWS

By Lynn Bisha, W2BSN
Associate Curator, AWA Museum

RIT Communications Class Tours Museum

The 10th annual museum tour for the Rochester Institute of Technology's Communications class was held on January 23, 2012. Dr. Rudy Pugliese runs this annual event despite the normally cold temperatures that are encountered in Bloomfield's January. The students are warned ahead of time that there is no heating system in the Museum, and they do come fully prepared. This year the weather was unexpectedly mild, with the daytime temperature hitting a balmy 49 degrees.

These young people are very interested in the history that is presented at the museum, as evidenced by their questions and their willingness to try things out. The crank telephones, the functioning Radiola II, and the hands-on Morse code displays were well tested. Discussions about the early radio store and the earliest tube radio inventions of Major Armstrong were also well received (pun intended).

Of course, the live demonstrations of the spark era transmitters on the third floor always result in lots of excitement and picture taking. Following the tour, Dr. Pugliese holds a reception at his house, and his wife Marianne does a wonderful job of making sure no one goes hungry. Our new museum will be heated and air conditioned, so next year's class will probably be the last cold one.

Work on New Museum Begins

It's Tuesday, January 24, 2012, a day that marks the beginning of the initial stages of the conversion of the "Peddler's Antiques" mall into the new AWA Museum. I've brought my camera with me to show you what this looks like. As you can see, what's going on right now is demolition. It involves removal of the existing office, kitchen, restroom, and storage areas, and the dumpster outside is filling up fast.

The object is to completely clear the floor for the con-

Demolition precedes museum construction, turning the former antiques mall into an empty shell.

RIT communications students take time out from their museum visit to pose for a group photo.

struction of a 12" berm of concrete along the inside perimeter of the entire building. With the berm in place, a moisture barrier will be added, and a 12" high wooden floor will be laid over the existing concrete slab. The object is to prevent any further occurrences of the problem we've had with water intrusion. The architect and engineers are confident that this will take care of it. We are also working with the town of East Bloomfield, the County of Ontario, and the New York State Department of Transportation, to reroute and improve the drainage on our property and as adjoining parcels.

Inventorying a Major Donation

In the last issue, we reported on a major donation to the museum, by an anonymous person, of a very large number of high quality and rare artifacts. The museum crew has since spent hundreds of man hours inventorying, photographing, and appraising this collection. The items include very early radios from the time of Marconi, console and tabletop radios from the 1920s thru the 1940s, many signs and posters from the same era, and a top notch amateur station.

There is some duplication of what we already have, but most of these items will compliment our current collection and add considerable value to displays planned for the new museum. Pulling all this together has been a monumental task, and our volunteers deserve a real pat on the back!

We have three other estates that are in various stages of being acquired. It is too early yet to discuss details, but we will keep our members informed as plans become finalized.

Clubs That Will Welcome You

• The Antique Radio Club of Illinois (ARCI)—Meets bimonthly. Meets generally held at the American Legion Hall, Carol Stream IL but meets in June in conjunction with the 6-Meter Club of Illinois at the Dupage County Fairgrounds and once per year for Radiofest at the Willowbrook Illinois Holiday Inn. Check website for schedules, details and maps.) Contacts: President, Olin Schuler oshuler@comcast.net; Club Public Contact, Art Bilski, 630-739-1060, clubinfo@antique-radios.org. Website www.antique-radios.org.

• Antique Radio Collectors of Ohio—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: $10.00 per year. For more info, contact Karl Koogle: mail to above address; phone (937) 294-8960; e-mail KARLKRAD@GEMAIR.COM.

• California Historical Radio Society—For info on current meetings, call the CHRS hotline: (415) 821-9800.

• CARS, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at Gray's History of Wireless Museum, which is part of The National Voice of America Museum of Broadcasting, Inc., located in a building that is now on the National Historic Register at 8070 Tylersville Road, Westchester, Ohio. 45069. For more information contact Bob Sands at (513) 858-1755.

• Carolinas Chapter of the AWA—Hosts four "mini-swap-meets" each year (in January, May, July and October) plus an annual conference, "Antique Radio Charlotte," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the website at CC-AWA.ORG or contact Ron Lawrence, W4RON, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail W4RON@carolina.rr.com.

• Central Ohio Antique Radio Assn.—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B.) Contact: Barry Gould (614) 777-8534.

• Delaware Valley Historic Radio Club—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a subscription to the club's monthly newsletter The Oscillator. For more info contact Delaware Valley Historic Radio Club, P.O. Box 5053, New Britain, PA 18901. Phone (215) 345-4248.

• Houston Vintage Radio Association (HVRA) meets the fourth Saturday (January thru October) at Bayland Park 6400 Bissonnet, 9 a.m. in SW Houston. Each meeting includes an auction and program. Annual two day convention held in February includes three auctions, old equipment contest, technical talks, swap meet, and awards banquet. One day MEGA auctions held in the spring and fall. A newsletter, The Grid Leak, is published bi-monthly. Event postings, announcements, photos and other features are available on HVRA web site: www.hvra.org. Membership is $20/yr. Address: HVRA, P.O. Box 31276, Houston TX 77231-1276 or call Bill Werzner, 713-721-2242; email: werz1943@gmail.com

• Hudson Valley Antique Radio & Phono Society—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

• Indiana Historical Radio Society—Meets quarterly in Feb., May, Aug. and Oct. Flea market, old equipment contest and auction at all events. The IHRS Bulletin has been published quarterly since 1971. For meet details and information about the club and our Indiana Historic Radio Museum in Ligonier, IN. see our website at www.indianahistoricalradio.org, contact Herman Gross, W9ITT, at 1705 Gordon Dr., Kokomo, IN 46902-5977 (765) 459-8308, or email w9itt@ sbcglobal.net.

• London Vintage Radio Club—This Ontario, Canada club meets in London on the first Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada N0B1A0. (519) 638-2827. E-mail

contact is Nathan Luo at lvrceditor@ yahoo.com.

• Mid-Atlantic Antique Radio Club (MAARC)—Meets monthly, usually on the third Sunday of the month at the Davidsonville Family Recreation Center in Davidsonville, MD. (But meets once or twice a year in Northern Virginia—check website for schedules, details and maps.) Contacts: President, Steve Hansman, 855 Arundel Drive, Arnold, MD 21012, (410) 974-0561, email: shans01a@ comcast.net; Membership Chair, Geoff Shearer, (703) 818-2686, email: gshearer2@verizon.net. Website www.maarc.org

• New Jersey Antique Radio Club—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Visit the website, www.njarc.org or contact Phil Vourtsis, 13 Cornell PI., Manalapan, NJ 07726, (732) 446-2427, pvourtsis@optonline.net.

• Northland Antique Radio Club (Minneapolis/St. Paul)—hosts four events with swap meets each year (in February, May, September and November) including an annual conference, "Radio Daze," for two days in mid-May. Annual dues are $12.00, which includes a subscription to the club's quarterly newsletter. For more info, visit our web site at www.northlandantiqueradioclub.com.

• Northwest Vintage Radio Society-meets the second Saturday of each month at Abernethy Grange Hall, 15745 S. Harley Ave. Oregon City, OR. Meeting starts at 10:00 a.m. Membership $25.00 per year. Guests welcome at all meetings and functions except board meetings. Spring show, the second Sat. in May. For more information, contact Mike McCrow 503-730-4639; e-mail: tranny53@comcast.net.

• Oklahoma Vintage Radio Collectors—Meets second Saturday of each month, (except for April, October, and December), at Hometown Buffet, 3900 NW 63rd St., Oklahoma City, OK. Visitors welcome. Dinner/Socializing, 6 p.m., meeting, 7 p.m. Swap meets on second Saturday in April and October at 8 a.m., Midwest City Community Center, 100 N. Midwest Blvd., Midwest City, OK. Membership $15/year including monthly Broadcast News. Info: contact Jim Collings at (405) 755-4139 or jrcradio@ cox.net. Website: www.okvrc.org.

• Ottawa Vintage Radio Club—Meets monthly (except June and July) in the Conference Room, Ottawa Citizen, 1101 Baxter Rd., Ottawa, Ontario, Canada. Contact: Lea Barker at (613) 829-1804 or check www. ovrc.org. Membership: $10 Canadian/yr.

• The Pittsburgh Antique Radio Society welcomes visitors to our Saturday flea markets, contests and clinics held at least four times yearly. A fall auction is included in September and our annual luncheon program is on the first Saturday in December. An annual Tri-State Radio Fest is held in April. Our journal, The Pittsburgh Oscillator, is mailed quarterly. For more information visit us at http://www.pittantiqueradios. org, email President Chris Wells at radioactive55man@comcast.net, or phone Treasurer Tom Dixon at 412-343-5326.

• Society for Preservation of Antique Radio Knowledge (SPARK)—Meets monthly at Donato's Pizzeria, 7912 Paragon Rd., Centerville, OH. Annual swap meet. Membership, $18/year. Write SPARK Inc., P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

• Texas Antique Radio Club—Meets alternate months in Kyle and Shertz, TX. Contact: Doug Wright, 625 Rolling Hills Dr., Canyon Lake, TX 78133. e-mail dwjw@gvtc.com; website www.gvtc.com/ ~edengel/TARC.htm

• Vintage Radio and Phonograph Society (VRPS) meets monthly on the third Saturday. Located in the Dallas, Fort Worth Metroplex, our current activities are annual convention, auctions, swap meets, repair training sessions and monthly programs. For details visit our website www.vrps.org, or by contacting VRPS President Jim Sargent at (817) 573-3546 or bsargent@swbell.net.

RADIO DAZE DISCOUNT FOR AWA MEMBERS

Radio Daze, a premier source of parts and supplies for radio restoration, now offers a special discount for AWA members. The discount is a generous 8% off of catalogue prices, and shipping on domestic orders is free (by ground service of Radio Daze's Choice) for orders of at least $50.00. Orders under $50.00 will still receive the discount, but a flat rate of $5.00 will be charged for shipping.

International orders also qualify for the discount, and shipping will be at a flat rate of $15.00. For orders that would ordinarily ship for less than $15.00, there will be a flat charge of $5.00. Expedited shipping, if requested, will be charged at normal rates.

Radio Daze will check the membership status of of each AWA customer for the first order placed in each calendar year, keeping the status on file for the balance of the year.

To shop on line or request a catalogue, go to www.radiodaze.com

TIPS AND TIDBITS

by Dick Mackiewicz

THE LURE OF THE CRYSTAL SET

How many of you readers have constructed a crystal set? Sure, most such sets don't look too imposing, and probably won't impress anybody—that is until you demonstrate that there is no battery or power supply contributing to the sound emanating from the headphones.

Crystal sets were very popular during the early 1920s. Back then, a clever and resourceful youngster could salvage ail of the necessary wire and miscellaneous hardware from some automotive junk. A good crystal could be obtained for about fifteen cents and a telephone receiver (earphone) cost a dollar or so. Compare that to the cost of a single vacuum tube at the time—five to seven dollars! Such a sum was a week's pay for many folks.

Because crystal sets don't require batteries, there was no ongoing expense associated with their operation. Since the sets tended to be very small, many young boys "smuggled" them into bed at night for surreptitious listening!

It's still quite feasible to construct your own crystal set from "junk box" parts. This can be a very satisfying project (perhaps a science fair exhibit) for the younger children in your family. If you are a Scout leader, Big Brother or Big Sister, some of the kids in your group might also enjoy doing a crystal set project. Most young people are fascinated by a radio receiver that seems to work without power, and will want to learn more about it.

The set illustrated here, made from inexpensive and scrap parts, follows a plan published by the National Bureau of Standards in the early 1920s (a little more on this in the crystal set article elsewhere in this issue). The set uses the traditional Quaker Oats container as a tuning coil form. The NBS publication was known as "Circular #120," and you can view a copy at http://www.scribd.com/doc/18577517/Construction-Simple

Simple crystal set built from National Bureau of Standards Plans (see text).

Crystal sets generally won't work very well without a good outside antenna and a good ground. But some cautions are in order. Don't put up your antenna where it might contact a power line should it break or blow down. And be sure to install a lightning arrestor (obtainable at Radio Shack) to protect any radio connected to the antenna. It's also a good idea to install a double-throw knife switch for disconnecting the "sky wire" from your radio and shorting it to ground when not in use.

CHOOSING YOUR COLLECTING GOALS

Like many Gateway readers, you may well be a newcomer to our hobby. If so, whatever your reasons for getting involved, you will probably start collecting with an abundance of enthusiasm.

However, not everyone has the storage space to accommodate all of his or her acquisitions. And when space limitations become apparent, your enthusiasm may abruptly decline. To protect yourself from this type of burn-out, make an early appraisal of your facilities.

If you are lucky enough to possess a large basement or barn, that's great! Just make sure that the area is dry enough, and secure enough, for storage of a valued collection. Those with limited space should choose a niche that will allow them to collect happily without becoming discouraged.

Here are a few ideas. How about trying to collect examples of the radios your parents or relatives had when you were young? This would be a challenging goal requiring time and research, but not necessarily a lot of room.

Another niche you might want to consider is the collecting of novelty transistor radios. These are still generally affordable and can be found in all sorts of places from yard sales to discount stores. A great many such sets will fill one bookshelf without overcrowding! A final space-saving suggestion might be to limit your collection to examples of radios made in your state.

There are many, many interesting collecting options besides the traditional "catalins and cathedrals." Whichever one you choose, I urge you to collect with the primary goals of preserving a bit of radio history and maintaining the integrity of this fine hobby.