The Radio Collector™

November, 1994

Collecting Radio Peripherals

Part 5 - Accessories

Collectible radio accessories are usually associated with the battery sets of the 1920's. Putting together a radio receiving setup then was a little like putting together a component stereo system now. Receiver and reproducing equipment were sold separately. Even if the receiver manufacturer offered his own brand of speakers and headphones, folks were just as likely to purchase some other make for its lower price, better styling or superior (real or perceived) sensitivity and fidelity.

At the peak of the radio craze in the mid 1920's, there was a bewildering variety of competing brands and models to choose from. Many are still around, waiting for you to find and collect today. Of course, you'll need at least one good speaker and pair of headphones if you plan to operate any of the 1920's battery sets in your collection.

Battery-set speakers add a dramatic touch to any radio display. Horn types are by Music Master (left) and Dictagraph (center). Cone unit (right) is by Crosley.

The old battery sets required other "accessories" that the modern component stereo fan doesn't have to be much concerned about, including outside antenna kits and sources of power. The latter included "A" batteries (or plug-in battery eliminators) to light the tubes; "B" and "C" batteries (or eliminators) to provide plate and (if required) grid bias voltages. These, too, make interesting and colorful collectibles.

Headphones

The earliest broadcast receivers were crystal sets, and these were followed by radios using just one or two tubes. Such receivers produced a limited amount of audio energy--especially from the weak signals of the era. So in order to hear intelligible sound, the listener had wear a pair of headphones firmly clamped over his or her ears.

Headphones (otherwise known as earphones, headsets or "phones") are still very easy to find at radio swap meets, and a good pair can sometimes be purchased for as little as five dollars. Some of the well-known brand names are Murdock, Brandes, Western Electric, Baldwin and Dictaphone.

A word to the wise, however. Phones in really good overall condition are rare. Check the cord for fraying at the points of attachment to the receivers and the phone tips. And make sure that all tips are still securely connected! Look for cracked caps, missing or bent diaphragms, loose headband hardware, frayed or soiled headbands.

Carry a flashlight cell in your pocket to use for testing. Hold one phone tip against the bottom of the cell and brush the other across the top button. If this doesn't produce a fairly loud click in both ears, you are dealing with a burned-out receiver or an open cord. There are a lot of points to check on a set of headphones; be picky at the swap meet so that you won't be disappointed after you get your trophy home!

Loudspeakers

As receivers became more powerful and radio signals became stronger, listeners no longer wanted to be tied to their sets by a headphone cord. One time-honored trick was to place the phones in a mixing bowl. This amplified the sounds enough so that (at least with loud signals) they could be heard all over a quiet room.

However, such expedients soon became unnecessary with the introduction of the horn speaker. Actually nothing more than a sophisticated version of the "headphones in the mixing bowl" reproducer, the new speakers contained a larger and more powerful version of the headphone receiver coupled to an acoustical horn that concentrated the sound and aimed it into the room.

The horns varied widely in appearance. The cliche "old radio horn" had a gooseneck flaring out into a large bell--looking a little bit like the business end of a tuba or an old-fashioned ear trumpet. Other horns were perched on top of straight necks. Still others had no necks at all, but sat atop box-like enclosures that housed the "earphone" driver unit. There were even units that bore no external resemblance to a horn, having the driver unit and "acoustical labyrinth" folded into a small table cabinet.

Although there were too many horn manufacturers for me even to make a stab at providing a representative list, a couple of well-known brands were Music Master, Dictagraph and Magnavox. Atwater Kent house-brand

The Radio Collector™

Volume 1, Number 11

The Radio Collector is published monthly by Marc F. Ellis. Editorial content copyright 1994 by Marc F. Ellis, except as noted. The Publisher is not responsible for transactions resulting from advertising published herein or for any applications of editorial content. Subscription and advertising rates, as well as magazine format, may be revised at any time.

How to Subscribe:

Annual subscription rates are as follows: via surface mail $20.00 (U.S.), $21.50 (Canada--U.S.funds); via air to other countries, $35.00 (U.S. Funds). Make out checks or money orders to *The Radio Collector* and mail to our post office box (see "How to Reach Us" below).

Back issues, when available, are $2.50 each, postpaid.

Classified Advertising

Subscribers may place classified ads in *The Radio Collector* at no cost. See classified section for instructions and limitations.

Display Advertising

Rates and size requirements for display advertising are posted elsewhere in this issue.

Contributions

The Radio Collector welcomes the submission of articles, tips, and/or photos covering any phase of radio collecting. We are particularly interested in contributions that will assist those who are just entering our hobby. Submissions will be printed at our discretion and may be edited. Unless special arrangements are made, submissions will not be returned and, if printed, become the property of this publication.

How to Reach Us

To order a subscription, or place an advertisement, write ***The Radio Collector*, P.O. Box 1306, Evanston, IL 60204-1306.** Please include full payment for financial transactions, including any fee for extra words. Classified ads should be submitted on a separate sheet from other correspondence. We can be reached by phone at (708) 869-5016 (answering machine picks up after 4th ring).

horns are also often seen at meets.

A little later, a different speaker design emerged. Instead of making a small diaphragm vibrate, the electromagnetic driver unit acted on a rod-like metal armature. This, in turn, was attached to the apex of a large paper cone. The cone was the equivalent of the old horn. But because the sound vibrations were directly transferred to the cone, fidelity and power were improved.

In the earliest speakers of this type, the cone was visible--though surrounded by a metal frame with or without grillwork. Sometimes the cone was decorated with elaborate silk-screened artwork. Examples of this type of speaker, which was the direct ancestor of the modern paper-cone unit, can be found in the Crosley *Musicone* line. Other common examples are the speakers supplied with the early Atwater Kent a.c.-operated receivers.

Unlike headphones, which all look more-or-less alike and are difficult to display properly, speakers come in a variety of flamboyant shapes that can be grouped in an eye-catching manner. When shopping for one, use the check-points already given for headphone cords--and don't forget to carry that flashlight cell in your pocket!

Battery eliminators and chargers were key accessories prior to the introduction of radios that operated from the a.c. line.

Batteries, Chargers and Eliminators

Not too many of the batteries used to power 1920's radios have survived. The non-rechargeable types were usually trashed when exhausted. However, sometimes a battery set was retired to the attic when replaced with a new plug-in radio. And if the set had storage compartments for batteries, sometimes the latter were left in place. Chemical corrosion destroyed most of these (and often made a mess of the sets they were left in). Yet, unaccountably, some survived in mint-looking (though quite dead, of course) condition. These are fun to look at and display because of their colorfully-lithographed jackets.

The rechargeable "A" batteries used to light the filaments of "3-dialer" sets were 6-volt lead-acid types similar to the auto batteries of the era. Sometimes they were enclosed in outer cases with carrying handles for ease of transportation to a recharging station. Though few have survived, one of these batteries might be an interesting addition to your collection and could possibly be rebuilt to as-new condition. There were also rechargeable "B" battery packs containing dozens of individual glass cells; these are even more rare than the "A" batteries.

To avoid lugging the heavy "A" battery to the corner gas station every time it was depleted, many homes were equipped with small plug-in charger units. There were also plug-in units (called battery

(Continued on p. 8)

COMMENTS FROM THE EDITOR

The Benefits of Participation!

You have probably already noticed the additional sheet in the center of this month's Radio Collector--increasing our page count from eight to ten. It's there because a number of readers responded to my appeal for increased participation, sending questions, comments, classified ads and stories along with their subscription renewals. You may remember that, in last month's editorial, I mentioned that I was ready to increase the page count whenever reader response warranted it.

This isn't a permanent change to a ten-page format--unless, that is, the quantity of incoming reader material continues to justify it. In fact, my first impulse was to keep this month's issue the usual size, holding back some of the letters to make sure next month's issue would have good variety and balance. But I decided to shoot the works in order to make a point.

The point is simply this: your editor, and the dedicated folks who contribute regular columns, can certainly give you an interesting publication; but it takes a high degree of reader interaction to really bring The Radio Collector to life. I think you'll agree with that as you browse through this expanded issue.

On the other hand, if I do drop back to eight pages next month, please don't feel disappointed or guilty. There are only a few hundred of you readers out there right now, and it may not yet be realistic for me to achieve the degree of participation I'd like to see.

Which brings me to my next point. I was really gratified to receive, over the past month, renewals from over 25% of our current subscribers. But I'm hoping to hear from an additional 25% before the end of the year. Because we began operations with last month's January issue, a great many of our original subscriptions will expire at year-end.

So if you like what we've done so far and are thinking of renewing, please don't hold back! Take advantage of one of the incentives we offered in the special flyer sent out with the last issue; the offer is only good until December 31! Those whose subscriptions expire with the December or January issues will find a special reminder enclosed with this magazine. **MFE**

PLAY IT AGAIN!

A No-Nonsense Course in Radio History, Evolution and Repair

THE GRID-LEAK DETECTOR

Radios can be divided into circuit "blocks," or stages, each having a specific function. Before we can fix radios, we must know how each block works. The first one we will study is the detector. Every radio has one, and the earliest radios consisted of nothing but a detector.

The first detector circuit employing the triode tube was the "grid-leak" detector of Fig. 1. DeForest used it with his Audion. Although rarely seen as a stand-alone receiver, as shown here, this circuit was used in nearly every radio made from 1921 to 1929. The circuit performs two independent functions: diode detector and audio amplifier.

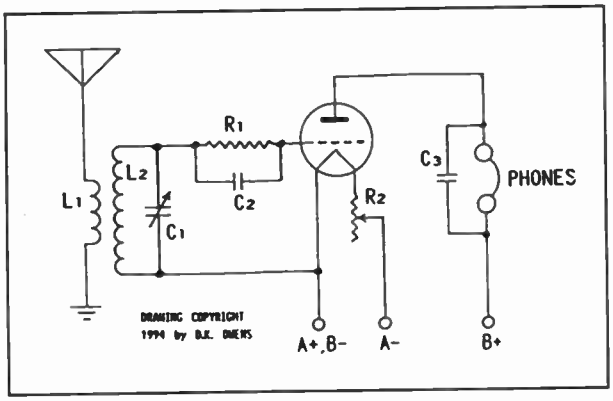


Fig. 1 Grid-leak detector circuit

To understand the function of the detector, look at the amplitude-modulated (AM) radio signal of Fig. 2A. The carrier has a constant frequency whose amplitude is varied (modulated) by the audio signal. Since the amplitude goes both positive and negative symmetrically around zero, the two cancel and the audio cannot be heard. The detector's job is to recover the modulation by removing either the positive or negative portion of the signal. A detector is therefore a rectifier.

Extracting the Audio

The signal passing from the antenna to ground through L1 (Fig. 1) induces a voltage in L2. At the left side of R1-C2 the signal looks like Fig. 2A. However, the grid of the tube acts as the plate of a diode rectifier and the filament as the cathode. Rectification occurs because the diode conducts during the positive-going signal excursion leaving only the negative-going excursion on the diode plate (grid) as in Fig. 2B. There is now a DC voltage on the grid varying in accordance with the audio modulation.

The tube then acts as a triode amplifier with the varying DC on the grid controlling the plate current to give an amplified signal at the plate. Remember from tube theory that the plate voltage is 180° out of phase with the grid so the signal on the plate looks like Fig. 2C. The rectified RF carrier is still present with the audio signal at this point. C3, called a "phone condenser", bypasses the RF, leaving only the audio as in Fig. 2D. When used as part of a receiver, the phones are replaced by the primary of an audio transformer.

The Grid Leak

We have just said that the diode function conducts during the positive signal excursion. A diode must conduct (pass current) in order to rectify. This is one of the few occasions when a tube draws grid current. R1 (the grid-leak) furnishes a path for this grid current to flow and is the diode load resistor. Moreover, although the grid has a very small area, a few electrons strike it on their way to the plate causing the grid to become negatively charged. This is called "contact potential". If the grid is insulated from ground, the accumulation of electrons will eventually make it so negative that the tube will cease to conduct and cut off. R1 provides a path for these electrons to "leak" from grid to ground. Fig. 1 shows R1 connected across C2. Many manufacturers connected it from grid to B-. It works the same either way. R1 must be large enough to avoid shunting the audio signal to ground. The usual value is 2-5MΩ.

C2 has a low impedance at radio frequencies and passes the RF freely to the grid. Its value is typically 100-250pF. If C2 is too large, it will shunt the audio signal to ground. C1 is a variable capacitor for tuning L2 to the signal frequency.

Grid Bias

To increase sensitivity to weak signals, the diode plate (tube grid) is given a positive forward bias obtained in the following way. The average (midpoint) potential on the filament is 5V/2 or 2.5V. If ground (B-) is connected to A+, the filament midpoint is at -2.5V with respect to ground. If we return the grid to A+, it will be biased 2.5V more positive than the filament midpoint.

When we discussed plate curves, we saw that a 201A acting as an amplifier with 22.5 volts on the plate will cut off when the grid is at -4V. A strong signal can drive the grid so negative that the tube cuts off. The tube hits bottom and cannot reproduce the entire signal. The signal is clipped at the plate as in Fig. 2E with severe distortion.

Next time we will discuss the regenerative detector and the audio amplifier.

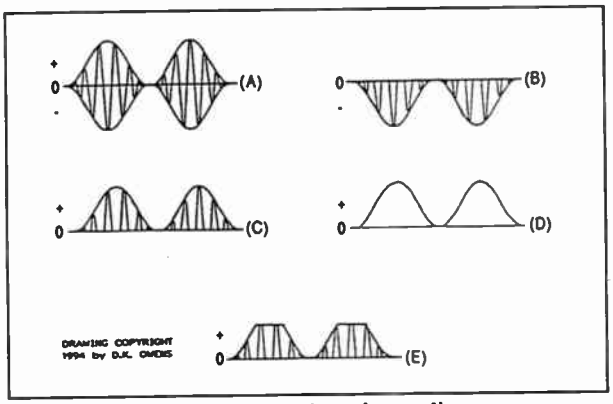


Fig. 2 Extracting the audio

Conducted by Ken Owens
478 Sycamore Dr.
Circleville, OH 45113

Ken Owens will he happy to correspond directly with readers who have questions about radio theory or repair. Please include a long SASE with your query. This correspondence will also be printed in R.C.'s "Information Exchange" column so that all readers can benefit from it.

Fox-Hole Radio

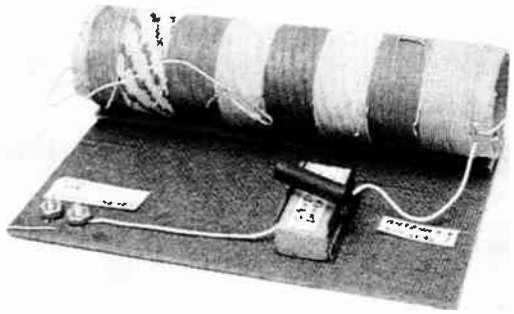
Adaptation of Legendary WWII Razor Blade Set Uses G.I. Design Philosophy, Modern Materials.

By Julian N. Jablin

This project started when Editor Marc Ellis asked me if I'd ever seen a fox-hole radio. Fox-hole sets were often mentioned in the hobby press during--and immediately after--World War II. These minimal radios were said to have been put together, from scavenged materials, by GI's hungry for entertainment or news. The heart of the fox-hole radio was a detector unit made from a razor blade. More on that later.

Would a GI really have needed or wanted a fox-hole radio? I'm highly skeptical about that. During my four years as a World War II army radio operator--three of them in combat--I never saw one. Even in combat, we usually had some access to radio news and entertainment via military communications gear, "morale" radios provided by special services, "liberated" civilian sets, and so on.

Of course, some guys with time on their hands may have built the little sets as handicraft projects. While on Anzio, I killed some spare time by making a "bug" (semi-automatic key) out of scrap parts. And I could imagine fox-hole radios being built in P.O.W. camp situations--where the detainees had a lot of spare time, very few resources, and a great need for contact with the outside world. If anyone has had first-hand experience with a fox-hole radio, I'd certainly like to hear about it!



Fox-hole radio in modern dress. Machine-screw binding posts are for phones and ground (see text).

Construction Philosophy

Despite my skepticism, Marc suggested that I put together a fox-hole radio for R.C. I thought it might be an interesting little project, and decided to approach it as a World War II G.I. might have. My set would be built entirely from "found" materials and with very little concern for good design practices. I definitely would not rely on any help from my friendly neighborhood Radio Shack!

A fox-hole radio is essentially a crystal set, utilizing a device for detecting radio signals, a coil for tuning, an earphone and a long antenna. In the early days the detector was usually a chunk of lead ore (galena), but such material would be in short supply in North Africa or on some Pacific atoll. Other materials could be made to work, however; all one needed was a lossy conductor--something one would now call a *semiconductor*, I guess.

The Detector

The detector in the traditional foxhole radio was a razor blade firmly tacked down to the wood "breadboard" on which the set was built. Best results were said to be obtained with a blue blade ("quench-blued" as one source puts it). This was used with a probe (equivalent to the "cat's whisker" in a standard crystal set) made from a short length of graphite pencil lead. The probe was moved around on the surface of the blade until the point of maximum signal strength was reached.

I couldn't easily locate a "blue blade" and, in fact, most of the modern blades I looked at appeared to have some sort of coating that acted as an insulator. Exercising my prerogatives as a scavenger, I modified the design to suit the materials at hand. The sharp edge of the blade which, presumably, would be reasonably free of coating would be used as a contact surface.

To that end, I fastened two single-edge blades (being more substantial, they were easier to work with than the double-edged kind) to my "baseboard" (a small scrap of Masonite) parallel to each other, about 3/4 inch apart, and with the edges up. Next, I salvaged a carbon rod from a dead carbon-zinc flashlight cell. The rod would rest atop the razor blade edges, bridging them and acting as a probe.

The Tuning Coil

To make the tuning coil, I needed wire and a coil form. For the latter, I used a paper towel core about 1 1/2" in diameter. Why that size? No good reason; that's what I happened to find! The wire was salvaged from a 10-foot length of telephone cable. With the outer insulation removed it yielded over forty strands of insulated, solid copper wire (about #22).

Close-spacing the wire, I wound on as much as the form would hold. The splices required to piece together the 10-foot lengths of wire provided convenient intervals for making tuning taps and for keeping track of the number of turns (I ended up with about 150).

The Phones

In the early days of radio a usable receiver was often "found" attached to the nearest coin-operated telephone. Of course, I have no personal knowledge of this. GI's in combat would find other sources of supply. Does the term "midnight requisition" awaken any memories?

The phones for this set have to be high impedance (2,000 ohms or more). The low-impedance (a few hundred ohms or so) receivers used in modern telephone circuits are not suitable. I took the easy (and legal) way out, using a pair of high-impedance Trimm phones that I already had on hand.

Wiring the Fox-Hole Set

A couple of binding posts made from machine screws and nuts serve as the headphone connections. One of these binding posts is connected to one of the razor blades. The other post, which also serves as the ground connector, is the connection point for the coil tap lead. The latter is a short wire terminated in a paper clip to be slipped over the chosen tap.

The other razor blade is connected to one end of the coil and to the antenna. I didn't use the free end of

(continued on p. 6)

Julian Jablin got his first taste of electronics with a school woodshop project--a one-tube radio built into a table lamp. The radio never worked, but he kept trying. During his teens, Julian built numerous radios and repaired others. Many of the latter, rescued from neighbors' junk heaps, became cheap record player amplifiers for friends who liked jazz.

He had no formal education in electronics, opting to study journalism in college. The latter was interrupted by World War II, during which Julian served as a Signal Corps radio operator. Although operators were supposed to leave repairs to technical personnel, "I fiddled with my radios whenever I thought they needed it."

Julian served in North Africa, Italy and France. Completing college after the war, he became professional writer. Now retired, he maintains his interest in radio as a hobby. He's an Extra Class radio ham (W9IWI), but doesn't do much operating. "My main activity continues to be tinkering.

INFORMATION EXCHANGE

This is an open forum for interaction among our readers. Here you can ask questions about some aspect of our hobby, answer a question that's been posed or pass along other information of general interest. Send your questions, answers and information to **The Radio Collector**, P.O. Box 1306, Evanston, IL 60204-1306. Submissions may be edited or paraphrased.

QUESTIONS TO BE ANSWERED

AK Wrinkle Problem

I am restoring an Atwater Kent Model #42 and will be doing more in the future. But I've run into problems repainting the wrinkle finish on the metal cabinet. Surface preparation was excellent: glass blasting followed by a good prime coat. The wrinkle paint was then applied following the accompanying instructions. On drying, some areas came out ok while others have an ordinary, non-wrinkle, finish. What am I doing wrong?--Marvin Stacy, Deltona, FL.

Checkers Without Charts

Ken Owens' Play it Again series is always interesting. And his recent article on tube problems (August, 1994) raised a question in my mind. What if you find a flea-market tube tester in good physical shape, but missing its charts of test settings. Is there a way of putting such an instrument to use, or is it better to pass it up, no matter how good the price?--S. Weller, Skokie, IL.

GENERAL INFORMATION

Shortchanged on Tubes

Your recent article on tubes (Oct. 1994 cover story) is a start, but I would guess it really takes more than a page and a half to get on top of this topic. I'd suggest referring people to *70 Years of Radio Tubes and Valves* by Stokes. Even this book falls short in covering some aspects of tube history: for instance Philco's coup in developing 6-volt tubes, making RCA say "uncle" on their 2.5-volt series.--Ray Larson, W. Los Angeles, CA.

The tube article wasn't really intended to be a definitive one, just an orientation on one aspect of collecting radio-related items. A cover series devoted specifically to tubes will be coming someday. I agree that 70 Years of Radio Tubes and Valves is an excellent reference. This book is available from many mail-order sources of radio books. Originally a Vestal Press book, it is now published by Sonoran Publishing, 1165 N. Roosevelt, Suite 121, Chandler, AZ 85226.

By the way, in the same letter Ray reports that he is continuing his research on the Kadette Junior design (see September, 1994 Information Exchange), and recently went through Rider's manuals 6-14 looking for sets using similar two-tube circuitry. He came up with three: The Emerson CF255; the Arvin 40 series (see schematic); and the Warwick 9-22.

Following are some comments on the Kadette, Jr. and Arvin sent to Ray by "Play it Again" author Ken Owens--ed.

. . .I looked up the Kadette, Jr. in Rider's and see that there were four variations in the circuit. Minor changes, but I was surprised that they spent that much engineering time on a cheap radio.

The 2-tube Arvin started in 1938-39. They were in metal cabinets and intended for children. The cabinets were painted various colors and the dial was printed on foil and glued to the front of the cabinet. I have seen several at flea markets, but they were in such poor shape that I didn't get them. It's impossible to replace or restore a missing or damaged dial.

Actually, in terms of function, this is a 4-tube set using dual-purpose tubes. Still it is a minimal set using a grid-leak detector. Note that the leak is in the return leg of the r.f. coil instead of the usual grid leg.--Ken Owens, Circleville, OH.

Book Reviews

THE CRYSTAL SET HANDBOOK and Volume III of the Xtal Set Society Newsletter by Philip N. Anderson. Published by The Xtal Set Society, Lawrence, KS 1994. 133 pages. Softbound.

Even collectors who normally concentrate on such things as Philco Cathedrals or Atwater Kent breadboards have a soft spot for crystal sets. There are mighty few antique radio nuts who have not had one somewhere in their past. Of course, there is also a solid and devoted group of crystal set specialists.

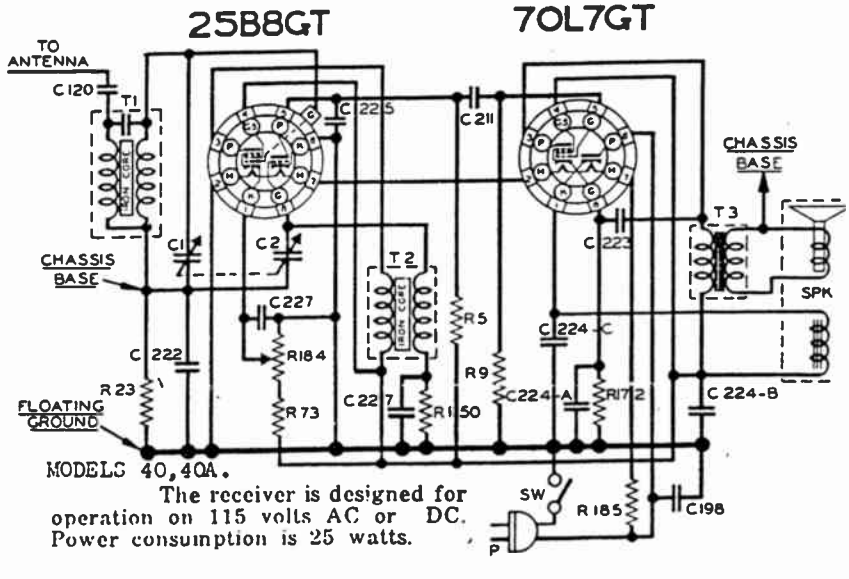
The Xtal Set Society offers publications for those who respond to the lure of the crystal set, and the *Crystal Set Handbook* is their first full-length book. The *handbook* is organized into three parts: a general introduction to the subject; the *Society* newsletters for July, September and November 1993; and several chapters of crystal set design theory. The book closes with a very useful bibliography listing more than 80 magazine articles, technical papers and publications--both vintage and contemporary.

The newsletter reprints include some meaty feature articles, including "Who Invented Crystal Radio?"; "The Simplest Crystal Set" and "A Simple Shortwave Crystal Set." There are also comments and contributions by the readers and other items of interest to crystal set hobbyists.

The Crystal Set Handbook is a useful addition to the radio collector's library. Crystal set buffs will welcome it as an additional source of information; collectors of tube sets will find that the *handbook* gives them a new perspective on "ancient solid state" devices.

You may order the *handbook* direct from the Xtal Set Society; they'll also be pleased to send you free information on how to join and receive the newsletters. Send $10.95, plus $2.00 for shipping/handling, to The Crystal Set Society, P.O. Box 3026, St. Louis, MO 63130.--Julian Jablin, Skokie, IL

(continued on page 8)



Schematic for Arvin Models 40 and 40A, one of several two-tube designs uncovered by Ray Larson in a recent browse through Rider's.

CORRESPONDENCE FROM OUR READERS

Letters may be paraphrased, shortened, or otherwise edited so that everyone gets a chance at the floor!

Simplex Unmasked

I recognized Stewart Humphreys' "All American Products Corp." set (August, 1994 correspondence column) as a Simplex Model NT. I have two of them and they are very good. Simplex was a small company, and was bought out by Philco about 1936. The factory existed in Sandusky until about 1962. I believe that the "NT" reflects Philco's engineering.

The output stages of my two Simplexes are different, even to the point of using different tube types. Since Simplex made a lot of different radios for private vendors, they provided a schematic for each set; this was usually glued to the bottom of the cabinet. However, the Simplex name never appeared on the schematic. But the supplied schematic does not always agree with the actual wiring of the radio! Minor differences were not considered important enough to print new schematics, I suppose.--Bill McGowan, Costa Mesa, CA.

Skychamp Info Needed

Thanks for the opportunity to subscribe to a publication about radio collecting and renovating. I'm already an avid reader of your column in *Popular Electronics*, and enjoy all of the projects you write about. I currently teach electronics at our local community college, having started my career in public service for a major retailer. I attended DeVry in Chicago in 1957-58.

I have been slowly collecting some interesting radios. Some I have restored, while others still await the day when I will have more time. One of my prizes is a Hallicrafters "Worldwide" model TW-1000 tube set from the early 50's, in good working order after a dial restring job. In addition, I have the two Sears table radios my parents and I purchased in 1946, when we finally got electric service to our farm.

I was recently fortunate enough to find a Hallicrafters Sky Champion at a garage sale. It needs replacement of a burned resistor. I'd appreciate any help I can get in locating service data and/or a schematic.--Dan Kirsch, 658 Periwinkle Turn, Bourbonnais, IL 60914.

Cutting Edge Test Equipment

Responding to Ken Owens' comments on test gear (September, 1994 *Play it Again*), I like traditional test equipment as much as the next guy (or even more: I actually collect it) and I owned a VTVM long before I got a VOM. But after I bought a Fluke 79 DVM last year, I hardly ever use anything else.

This is the height of decadence: touch the test probe to a tube socket pin, and the Fluke selects polarity and range instantly; if you want to watch trends, it displays a bar graph too. No more switching ranges when checking grid bias, cathode and plate voltages; no more pinned meters, no circuit loading, and it's accurate. DVM's really *have* improved in the last few years.

If you want to be further impressed, look inside the Fluke: industrial-size fuses, a 9-volt transistor battery rather than leak-prone flashlight cells, first-class construction. I put 5 kv from my Tek scope on the Fluke ohmmeter without fazing it (but I talked with a man at a swap meet who put 100 kv on *his* Fluke and that *was* a bit much for it.

You can get models that measure frequency (mine goes to several hundred khz, way beyond what the specs claim), millivolts, semiconductor junctions, capacitance (but not *leaky* capacitors) and a hundred other functions. But once you've used the autoranging voltmeter, I guarantee you will never turn on your VTVM again, ever. Oh yes, I forgot one of the Fluke's best features: if you forget to turn it off, it will shut itself down in an hour to save your battery. Check the discount ads in the back of the newsstand electronics magazines and get one!--Alan S. Douglas, Pocasset, MA.

R.C. Not Basic Enough?

I know that I may be in the minority, but I would like to see more articles about *basic* understanding of radio and radio repair. Most of the articles have been too advanced for me. Maybe other readers feel the same way. You may want to ask them.--Angelo Rocazella, Syracuse, NY.

Well, readers, consider yourself asked! Basic is what we intend to be (see our slogan on the cover page), but maybe we're not being basic enough. Write and let us know--ed.

Early Rider's Addenda

The information provided by A.G. Tannenbaum (August, 1994 cover story) on the original Rider's Manuals is very complete and should dispel any confusion about these early publications. I might also add that the binders of the early manuals were of different construction than those used in the later series.

The first binder was titled *1931 Troubleshooter's Manual*, and when the supplements exceeded the capacity of that binder, the second one was supplied with the title *Perpetual Troubleshooter's Manual*. The combined weight of the two volumes is between 13 and 14 pounds. The first binder holds material through "Philco" and the "Modern troubleshooting" section of nearly 100 pages followed with the "Practice and Theory of Modern Radio" by Arthur G. Morhaupt (16 pages) and a few miscellaneous pages. The second binder holds the balance.

Beginning in August, 1931, Rider published the house organ *Service* to supplement his "Perpetual" series. It catered not only to radio repairmen, but to servicers of other household appliances, including refrigerators.

It is also interesting to note that, at the same time, Gernsback was publishing the *Official Radio Service Manual* with nearly the same scheme, initial lot and supplements. (The reprinted version now on the market is incomplete; the 200+ pages added by supplements is missing.) As a matter of fact, John Rider was Service Editor for the Gernsback publication *Radio Craft* while publishing the *Troubleshooters* books.--C. Orval Parker, Pocono Summit, PA.

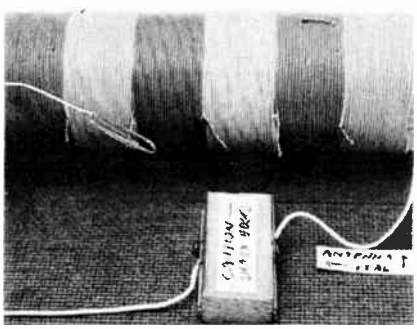
FOX-HOLE RADIO

(continued from p.4)

the coil, but it could be employed as an extra tap connection.

The Results

The moment of truth is always difficult for me when switching on a new piece of equipment; I fear the "smoke test." Of course, with the fox hole radio there was no chance of smoke; it was just a question of "Does it work?". It did. After trying the carbon rod in different positions across the two razor blades, I heard a station--faint but clearly. I could only get the one station, which came in at every coil tap position--but it *was* there. The adjustment of the razor blade was critical and a little vibration would lose the signal--but it could be brought back in quite easily.



Close-up view shows 3/4" wood blade spacer, paper-clip tap connector.

As far as I am concerned, then, the fox-hole radio was indeed in the realm of possibility. Of course, I'd have to make a number of improvements if the set were to *really* work--but that was not my aim.

VINTAGE BOOK REVIEWS

Books from the era when vintage radios were new! Look for them at swap meets, flea markets and used book stores.

MODERN RADIO RECEPTION by Charles R. Leutz. Published by C.R. Leutz, Inc., New York, NY 1928. 383 pages. Hardbound.

While the title and general appearance of this book are similar to those of the 1924 edition reviewed last month, it is much more than an overhaul of the earlier work. In four short years, the face of radio had completely changed. The use of house current to power sets was just beginning, batteries were on the way out and the family radio was moving into the living room. Programming had gone big-time, with many new stations on the air. And with relative prosperity, radio was becoming a possession of the masses.

Sets that had been state-of-the art just, a few years ago were now obsolete. Set building was on the wane, and the number of manufacturers of radios and related equipment dropped from thousands to hundreds. Moving away from its heady, and chaotic beginnings, radio was beginning to come of age.

Leutz's 1928 edition of *Modern Radio Reception* was written for this new world. Its format is quite different from that of the previous book. The first chapter, called "Radio Reception," is really a discussion of components: long antennas, loop antennas, grounds and counterpoises, inductances, condensers and resistors. Here the author clearly shows his preferences, expounding on the quality of the Vitrohm resistor and favoring the use of Weston meters and General Radio parts.

Leutz also discusses various types of power supplies, a trickle charger, a BFO and various receiver kits. He also condemns most of the techniques used by other manufacturers to shield their sets.

The second chapter deals primarily with test equipment (mostly General Radio), tungar chargers, interstage coupling, amplifiers and "A" battery eliminators. Information is given deals on both the theory and operation of these devices.

Radio receivers are covered in the third chapter. Some of the sets discussed were commercial models manufactured by others (such as the Western electric type CGR1 superheterodyne, the Grebe Synchrophase Seven and the Norden-Hauck Super 10). Others (including the Universal Transoceanic "Silver Ghost" and "Phantom," Universal Plio-6, Imperial Model Universal Super-8 and the (then) old Model C superhet) were his own designs. Interestingly enough, his newest designs, the Universal Transoceanics, were TRF sets--contrasting with the superheterodynes stressed in the 1924 edition. Patent restrictions, stated Leutz, were the reason for the change.

It is also interesting to note that Leutz was continuing to use older tubes for his sets (save for the power amplifiers). For instance, he liked the UX200 better than the UX200A. However, he did use the then-new 222 screen grid tube in the later versions of the Universal Transoceanics. Grebe speakers, battery eliminators and the CR-18 short wave receiver are also covered, and the chapter concludes with a discussion of phonograph pick-ups, power-supply dynamotors and electro-dynamic speakers.

Chapter four, which stresses radio tube data, begins with a section on tube reactivation. Then follows a thorough analysis of all of the Cunningham tubes then in common use. RCA, Western electric and other tube manufacturers are not mentioned.

The fifth chapter, called "Radio Standards and Definitions," gives a glossary of radio-related terms and lists the standards then in use. The schematic symbols of the day are presented, and the chapter concludes with a section on troubleshooting.

This book will interest those who appreciate the brief era when battery and home-built sets were on the wane and AC sets were just coming into popularity. The book would have been quite different had it been even a few months later. There is much for the owners of the sets included and for those who seek tube and short-wave reception information with a minimum of math. Sadly, there is no index and the table of contents lacks page numbers.

Conducted by Paul Joseph Bourbin

ACCESSORIES

(continued from p. 2)

Special cabinets kept clutter organized.

eliminators) that actually *replaced* the "A" and "B" batteries--making it possible to operate the set directly from the a.c. line. Period chargers and eliminators are interesting to look at and (if you are into that sort of thing) display well on shelving.

Some enthusiasts like to operate their battery sets from period eliminators, and the practice has a certain logic. However, these old units don't have the stiff voltage regulation offered by modern semiconductor "A" and "B" supplies. I'd hesitate to use one for fear of popping the filaments of hard-to-replace tubes, or burning out an exotic audio transformer, through unexpected voltage spikes. If you are wedded to the idea of using a vintage eliminator, be sure you check all resistance values--particularly in the circuits used to establish the set's operating voltages--and correct any that may have changed with age.

Miscellaneous

No brief article could begin to mention all of the radio accessories you might be tempted to collect. But there are a couple of more that are worth mentioning as we close. Most battery radio owners equipped themselves with small meters for checking the voltage (and sometimes the current) being delivered by their "A" and "B" batteries. The heavily chromed "watchcase" style was very popular, and many of the meters were equipped with multiple scales to test batteries of all types. Even if you don't choose to collect such meters, you might like to acquire a few just to round out your displays of battery set equipment.

The idea behind another type of collectible would be quite familiar to today's component stereo enthusiast. I'm talking about radio furniture: special cabinetry designed to house, organize and conceal the radio receiver along with its batteries, eliminators, chargers and connecting wiring. If you can locate a good-looking cabinet of this type, you might ba able to display a working battery set in your own living room without having it look like Frankenstein's laboratory!

In our final installment next month, we'll talk about vintage parts and test equipment.

Marc F. Ellis

INFORMATION EXCHANGE
(continued from p. 5)

THE RADIO AMATEUR'S HANDBOOK, published annually by the American Radio Relay League, Newington, CT 06111.

Readers of *The Radio Collector* who are also licensed radio amateurs will need no introduction to *The Radio Amateur's Handbook*. Described formally as "the Standard Manual of Amateur Radio Communications" by its publisher and as "The Ham's Bible" by everyone else, it may seem out of place for collectors of vintage radios.

The *Handbook* is not, however, a narrow-focus hobbyist publication. It finds use on the shelf (more usually, on the workbench) of anyone who even occasionally applies soldering iron to component.

While much of any year's *Handbook* is devoted to ham radio transmitters, receivers, and associated gear, it also includes a solid core of basic theory and practical techniques. This is the valuable part of *The Radio Amateur's Handbook* for the radio collector.

Thus the reader can find a section on electronics formulas and, in another chapter, the uses for which a VTVM may be needed. A basic list of useful tools for radio construction and repair guides the newcomer, who may later need to know how to figure the total resistance in a circuit. The *Handbook*, in its technical details is not keyed to simplified reading; the editors assume that they are dealing with literate people who have a sincere desire to gain information.

A copy of *The Radio Amateur's Handbook* in an older edition (ten years back or older) is a worthwhile addition to any collector's library. In its current editions, it's a daunting volume, rather larger and heavier than the phone book in many a fair-sized city. Used copies are more reasonable in size, weight and cost. They are apt to be a little worn, since this is a book that gets frequent use. Older *Handbooks* are usually available and reasonable at hamfest and radio collector swap meets.--Julian Jablin, Skokie, IL.

Bakelite Rebuttal

Regarding Paul Bourbin's comments on my Bakelite cleaning technique (October, 1994 *Information Exchange*). I have frequently used a mild solution of dishwashing detergent and warm water to clean dirty Bakelite panels with no apparent short-term or long-term damage. Palmolive, Joy and Ivory are a few of the products I consider "mild."

I checked with two of the largest plastics suppliers in my area. Both affirmed that this cleaning solution should not harm Bakelite. I believe such cleansers remove dirt by the emulsion method: that is, floating it off the surface. Cleaning a panel without using a technique to lift of the dirt will only result in grinding it into the surface.

I will stand by my advice until someone provides contrary information from DuPont or from one of the other companies with long-term experience in plastics.--Dick Mackiewicz, Coventry, CT.

Servicing Tips

I see that there is interest in how to install new parts to replace defective ones without disturbing the original wiring (Editor's note to Steps 7-10 in *A Pre-Power Workup For That Flea-Market Radio*, September, 1994 Issue, and Paul Bourbin's follow-up comment in the October, 1994 *Information Exchange*) and also in sources of isolation transformers (Step 2 of *Align as you Troubleshoot*, October, 1994 issue).

While it's true that *all* early Atwater Kent sets were wired by simply tacking the connections together with a blob of solder (the socket terminals didn't even have holes in them!) and have held up all these years, I have always believed in making a mechanically sound joint. Since it is tedious and risks damage to try to unsolder the old joint, I cut out the old component leaving as much of the original lead as possible. Then I bend the ends of the old lead and the new component lead into hooks with the needle-nose pliers, interlock the hooks and crimp them down. The resulting connection is sturdy and stays in place while I solder it.

As to isolation transformer sources--rather than make your readers wait until next November, when I cover the subject in my column, let them know that suitable transformers of 100va rating are available from Fair Radio Sales, P.O. Box 1105, Lima, OH 43952 (Cat. No. 56-276 or 56-246) for less than $15.00. This is cheaper than--and provides about double the power rating of--a couple of the heftiest Radio Shack units wired back-to-back.--Ken Owens, Circleville, OH.

DICK'S CORNER

Tips and Tidbits from the World of Antique Radio Collecting and Restoring

Quickie Tube Tester

In the August, 1994 issue, Ken Owens discussed emission and mutual conductance tube testers. There is another type often overlooked because of its simplicity, small size and unimpressive appearance. That is the filament continuity tester. It tests filament continuity only on 7- and 9-pin miniature tubes, octal tubes and sometimes common TV picture tubes.

These testers were originally developed as a service aid for the TV repair technician to carry in his tube caddy. At that time (early 1950's), inexpensive TV sets appeared with as many as 20 tubes having all filaments in series. When one burned out, every one went dark.

The service technician could then: (1) replace all 20 tubes, one at a time (note that this would not work if *two* tubes were burned out!); (2) test all tubes, one at a time, in a conventional tester--setting an elaborate control pattern for each one and waiting for each to warm up; (3) check the filament continuity of each with a VOM--a job requiring him to hold the tube in one hand and the two test leads, chopsticks style, in the other. An inexperienced technician might also have to look up the tubes to identify their filament connections.

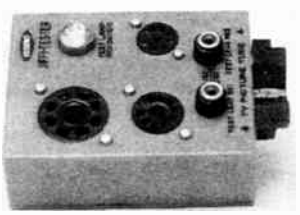
Since the filament pins on 7-. 8-, and 9-pin tubes are rather standardized, it wasn't long before several manufacturers introduced inexpensive miniature testers that would check for filament continuity only. They were sometimes a.c. powered, but mostly operated on batteries. Insert a tube - and zip - an indicator lamp lit to indicate a good filament. No switches to set or warm-up to wait for; no fussing with test leads; no checking through the tube manual. The open tube(s) in a long series string could be located very quickly indeed.

These testers can be of great value to the radio collector. They can quickly identify the open filaments in AC-DC sets. They can also weed out duds in that large box of tubes just purchased at a yard sale--offering a quick "go - no go" test prior to checking on a more sophisticated instrument.

Filament continuity testers are still plentiful. You may find them at swap meets for a few dollars or even in the "anything for a dollar" box. They are also commonly found at yard sales because they were very popular with home handymen during the era when repairing a set was sometimes as easy as replacing a tube.!

Here is one problem that these testers will not show. Rectifier tubes such as the 35Z5 can develop an open circuit in the filament pilot light tap. The tube will operate fine in the set, but the pilot light will never work. Only an ohmmeter or a quality tube tester will reveal this fault.

A word of caution: whenever a set has a rectifier tube with an open filament, do *not* replace this tube and turn the set on again without checking for a shorted filter capacitor. A shorted filter could destroy your new rectifier in less than 30 seconds!!



Tube filament continuity checker as found in a bargain bin.

COMPANY CHRONICLES

Brief Biographies of Classic Radio Manufacturers

Majestic ELECTRIC RADIO

The Majestic radio brand was originated by the Grigsby-Grunow-Hinds Company, which was incorporated near the end of 1921 and originally made automobile sun visors. In October, 1924, the company began to advertise speaker horns with bells made of Pyralin (celluloid), a material that had been used in the earlier sun visor product. Other speaker models were added in the following year, and in September, 1925 the company introduced its first *Majestic* product, an "A" and "B" battery eliminator. In March, 1926, the very popular Super-B Model eliminator was released. CGH's gross eliminator sales in 1927 were almost $5 million; this was more than most manufacturers of radio receivers made in that year.

But a.c.-operated radios were already on the radio manufacturer's drawing boards and, when released, would obviously ruin the battery eliminator business. Accordingly, the firm decided to enter the radio manufacturing business, reorganizing under the name of Grigsby-Grunow (partner Hinds having sold out) in March, 1928.

Grigsby-Grunow purchased Pfansteil Radio's RCA license, expanded its plant facilities, and began production of Majestic radios in mid-May--soon reaching 1500 sets per day in what was normally the slack season. The reason: Majestic sets were equipped with powerful dynamic speakers, but sold at prices similar to those of competitive sets equipped with much weaker magnetic speakers.

In 1929, the company went into tube production--and was manufacturing 30,000 per day by August of that year. Sales for June, 1928 through May, 1929 were $49 million, reaching $61 million in the following year.

But Majestic's business, based on expensive console sets, slumped during the Depression. "Relieved of the presidency" in 1931, partner Grunow started his own company, later (1933) merging it with the U.S. Radio and Television Corporation in Marion, Indiana. The firm name was then changed to General Household Utilities Company. It ceased manufacturing in 1937.

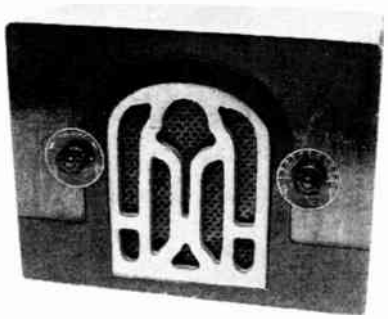
The Majestic firm diversified, adding refrigeration to its line and, in 1932, purchasing the Columbia phonograph company. But an inexorable slide into bankruptcy had begun. Grigsby-Grunow went into receivership in November, 1933 and all assets were advertised for sale in December, 1934. The Majestic name was revived in 1937, but the new company had no connection with the original one. Wilcox-Gay purchased the second Majestic company in 1950, discontinuing Majestic production in 1955--when it switched to marketing Grundig products under the name Grundig-Majestic.

The information for this company biography was obtained from Alan Douglas' three-volume encyclopedia "Radio Manufacturers of the 1920's," published by Sonoran Publishing, 116 N. Roosevelt, Suite 121, Chandler, AZ 85226.

EDITOR'S WORKBENCH

An Occasional Report on the Editor's Own Adventures in Collecting

Ray Larson's enthusiasm for the International Kadette and its derivatives (see July, August and September, 1994 *Information Exchange* columns) must be infectious. I found one of these earliest a.c.-d.c. sets at the AWA Rochester meet last September and paid too much for it even though it was an orphan (has RCA license sticker and serial number, but no brand name). Spotting the 1V rectifier tube and type 38 power amplifier, I figured the set was very similar to those previously discussed in R.C. -- possibly even a private brand set made by International Radio Corp., the manufacturers of the Kadette. In any case, the set came in a charming little "early depression" wood cabinet and I thought it would make a nice display piece. Checking it out later, I found that the 1-V had been substituted for the original factory 12Z3 and that a power resistor of two low a value (200 ohms) for the resulting 24-volt series string had been substituted for the original line cord resistor. The second r.f. amplifier is a 76 triode instead of the 35 tetrode usually found in this stage. The first r.f. amp is a 6D6--which is a little "hotter" equivalent of the 39 pentode usually found.



My "no name" Kadette clone.

Other differences: a factory-installed bandswitch (probably for "police calls") on a bracket mounted at the rear of the chassis and a dynamic speaker instead of the Kadette's magnetic. More on this later! **MFE**

CLASSIFIED ADVERTISING

Subscribers may place one free classified ad, up to 30 words long, in each issue. Count your name, ham call (if desired), complete address and one phone number as six words. Additional words are 15 cents each per issue. Non-subscribers pay 30 cents each per issue for all words. Free ads will be automatically run in two issues, but expire after their second insertion unless renewed by mail or phone. Those wishing to run the same ad for extended periods of time may want to use a "business card" space (see Display Advertising Dimensions and Prices table elsewhere in this issue). This is a boxed area in which we can print your business card or any advertising message that will reasonably fit (no charge for setting type). We reserve the right to make editorial adjustments in classified ads without advance notification and to refuse advertising at our discretion. We will reprint, without charge, any ad containing typographic errors, but assume no other financial responsibility.

Wanted Majestic 15A, Grundig 1041 and speaker for AR46. Carlos Martinez, #21 Colonel Irizarry St., Cayey PR 00736. (809) 263-2741.

Wanted Crest escutcheon for Zenith 7-H-921Z; good drawing/tracing of Hallicrafters winged logo (5-T Sky Buddy); Bunis one; Any info re. Eico Company. Bob Perry, 131 E. High St., Painted Post, NY 14870. (607) 962-1351.

Wanted 1944 Philco chassis with the 4 big wheels for tuning (floor model). Repairable and reasonably priced. F.E. Oswald, 711 Carl Ave., Altoona, PA 16602.

Wanted Schematic for Champion Spark Plug 9vdc radio Model SPR-810 made by RIC (Japan). Terry Schwartz, 340 Oakwood Dr., Shoreview, MN 55126-4821. (612) 483-4173.

Wanted old radio headphones and headphone plugs. Highest prices paid. Examples: I will pay $20 for BASCO headphones, $25 for Long Distance headphones, $25 for Bronston headphones. Will pay $10 each for Federal headphone plugs. I will buy bulk assortments of headphones, plugs and parts. Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

For Sale Cabinet only for a Franklin cathedral, $15.00, and for a Lark cathedral, $10.00. UPS extra. Victor Marett, 3201 NW 18th St., Miami, FL 33125. (305) 634-9569.

For Sale Superior TV-50 signal generator, $20.00. Chassis, power supply, speaker for Radiola 66, $40.00. RCA WR99A marker generator 18-216 mhz, $20.00. UTC A18 small, $20.00. Kevin L. Moe, 616 Lockrem, Ottawa, IL 61350. (815) 433-4598.

For Sale Two binders original Philco service information, 1946-1950. Covers about 140 radios and record changers, complete with all production changes. One binder original 30's service info covering 69 G.E. sets, 21 R.C.A. sets $45 plus postage for all three. Over 4 inches thick! Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

For Sale Gernsback magazines, Electrical Experimenter (1918), Radio News (1920's), others, plus over 100 books. SASE to Goldman, 3 Amy Lane, Queensbury, NY 12804.

For Sale Parting out Zenith 7S363. Send SASE for list of reel-to-reel audio tape recorders. Claude J. Dellevar, 13009 Maclay St., Sylmar, CA 91342 (818) 365-1629.

For Sale Capacitors, tubes, parts. Thousands in jam-packed illustrated catalog No. 49. Send $3.00 U.S./Canada ($5 overseas) for a heavy-paper limited edition copy. Don Diers, 4276 North 50th St., Dept R2, Milwaukee, WI 53216-1313.

For Sale excellent reproduction of 1920's S.S. Kresge crystal set blueprint $4.00 including postage. Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

For Sale Vintage radio parts, test equipment, crystal detectors. We have a new open type adjustable detector! SASE for list. Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

For Sale NC-57 w/ s meter, NC-100A, HRO-7, SK-24, NC-2-40-D w/speaker. Call for prices. Jack Iverson, N9KYT, 1110 Old Mill Dr., Palatine, IL. (708) 359-0941.

MONTHLY MINI QUIZ

Match wits with our quiz editor! See next month's issue for the answer, as well as the names of all readers who responded correctly.

In a career spanning over 60 years, this New york Engineer made major contributions to the art of radio communications with his work on the regenerative and superheterodyne principles. His later development of frequency modulation created a whole new technology for communications and broadcast radio.

As a teen-ager in Yonkers, NY, he operated one of the early amateur radio stations. After graduating from Columbia University, he carried out some of his pioneering work there as a member of the engineering faculty.

In 1921 he combines his engineering and ham radio interests as a leading member of a team that demonstrated how amateurs could communicate across the Atlantic using short wave.

Conducted by Julian N. Jablin

Answer to last month's quiz: Joshua Lionel Cowen (Lionel Lines).