

Vintage Radio

Special Pilot Issue

September 1993

Electrical Safety For Restorers

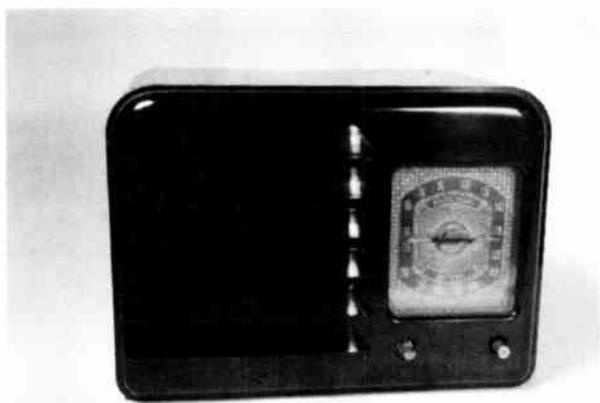
Those of us who cut our teeth as electronic experimenters during the heyday of the vacuum tube learned how to work safely around high voltages and currents as we acquired our technical know-how. The dangers were made known to us by our advisors and teachers, the more responsible hobby writers of the time, and sometimes by sad personal experience.

Today, though, a new radio hobbyist is unlikely to have that background. In this day of low-voltage, low current, semiconductor circuits, even people with electronics expertise may be unaware of the hazards lurking within a tube radio the moment its plug is inserted into a wall socket. Precautions our older types take automatically, without even thinking about it, really need to be explained to the new collectors and restorers so that they can enjoy our hobby without jeopardizing their safety. And that's just what I hope to accomplish here.

The shock hazards associated with a plug-in tube radio come from two sources: the a.c. power line and the high d.c. voltages developed within the set to operate its vacuum-tube circuitry. Let's take a look at the power line first.

Power Line Hazards

For most people the familiar household wall outlet inspires little awe. It's a convenient source of power for lamps, vacuum cleaners, tools, or whatever useful appliances we feel like plugging in at the moment. With few exceptions, the power is always there when we want it, always goes where it is needed and does the work we



Don't turn this one on until you get some knobs! Any metal surface on an a.c.-d.c. radio should be considered a serious shock hazard.

assign to it quietly and without incident.

Yet most of us are also aware that, improperly insulated and fused, the household power line can lash out with powerful and dangerous sparks or (perhaps even worse) quietly overheat the wiring within our walls until it reaches the point of ignition. So here are the first and most obvious precepts of a.c. line safety: (1) make sure that all of the electric wiring in your home is correctly fused or breakered for its current-carrying capacity and (2) make sure never to plug in devices with known short-

circuit hazards (such as radios having cracked or frayed line cords).

Besides being a fire hazard, the a.c. power-line can also dish out uncomfortable, and even fatal, shocks. In order to avoid being on the receiving end of one of these, it's important that you know a little bit about how power is distributed to your home. The key facts to keep in mind are that (1) one of the two wires in every 115-volt electrical circuit is connected to ground and (2) that the ground, especially when damp, is an excellent conductor of electricity.

If even slightly damp, the concrete in your basement floor is also an excellent electrical conductor of electricity. And, of course, the floor is in direct contact with ground. So if your workshop is in the basement, you have a special hazard to consider.

Placing a bare part of your anatomy in contact with the floor (or with a metal chair or workbench frame that stands on the floor) is the same as touching it to the grounded wire in a wall outlet. If you now come in

Vintage Radio

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Display Advertising

Rates and size requirements for display advertising will appear in the January, 1994 issue.

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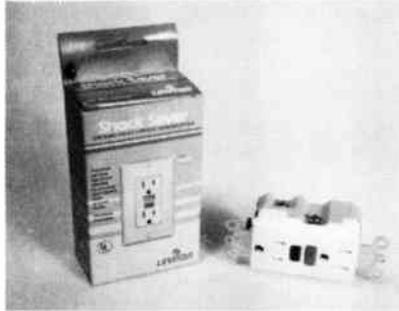
To order a subscription or send in an advertisement, write *Vintage Radio*, P.O. Box 1306, Evanston, IL 60204-1306. Please include full payment for your transaction, including any fee for extra words. Classified ads should be submitted on a separate sheet from other correspondence. We can be reached by phone at (708) 869-5016.

BE A CHARTER SUBSCRIBER!

We have great plans for *Vintage Radio*, but we can't be successful without some regular readers. For that, we need your help. So here's an inducement. If you send in a subscription to *Vintage Radio* between now and January 31, 1994 you're a charter subscriber. As such, you'll receive two coupons, each exchangeable for one "look-up" of schematic and servicing information by the *Vintage Radio* research service (see our ad in *Yellow Pages*). This is a \$10.00 value, equivalent to a rebate of half the U.S. subscription price. So let's hear from you soon!

contact with something connected to the ungrounded, or "hot", side of the line--say while probing the innards of a radio, your body will complete the circuit across the line and you will experience a nasty shock.

If the parts of your body completing the circuit are a foot and a hand, the shock will pass through your entire body--which can be extremely unhealthy, or worse.



Outlet with ground fault interruption is great safety feature, installs in place of standard outlet.

So the morals for the restorer are these: if you have a basement workshop, try to place yourself and any metal benches or chairs on an insulating surface such as a rubber mat or wood platform. And as a matter of principle, avoid poking around in a plugged-in radio with your bare hand--unless you're using an isolation transformer, which we'll discuss later.

Another good precaution for any workshop, basement or not, is to replace the electrical outlet on the bench with one equipped with ground fault interruption. Properly installed, such an outlet will automatically shut off the power as soon as any current begins to flow (through your body or otherwise) between the "hot" side of the line and any external ground. Connect an ordinary power strip (properly equipped with a grounding plug) to this outlet to obtain additional protected outlets. GFI outlets are available, at reasonable cost, at most hardware and home-center stores.

The AC-DC Set--A Safety Nightmare

And speaking of power-line hazards, the common "a.c.-d.c." set represents one of the worst. This type of radio is so named because, in addition to operating on a.c., it could run on the d.c. power lines that were prevalent decades ago in the downtown areas of our older cities. The dual operating capability was a side effect resulting from the fact that the a.c.-d.c. set, designed during cash-tight Depression days, gets along without a power transformer.

But the elimination of the transformer had another side effect, one creating a

very serious safety hazard. It meant that the set's d.c. plate-supply circuitry was no longer isolated from the power line. In fact, one side of the line became the negative connection for the plate supply and, as such, was usually wired directly to the radio's metal chassis.

As a result, depending on which way the radio's line cord was inserted into the wall socket, the metal chassis was either at ground potential (no great problem) or connected to the "hot" side of the line. In the latter case, the unwary user who touched the chassis, or any metal part associated with it, while also touching a grounded object or surface would definitely receive a serious shock.

Back in the 1930's, when transformerless sets were first introduced, consumer safety was not nearly as much of a societal concern as it is today. It was considered adequate to provide the radio with a back cover protecting the user from contact with the chassis. However that cover was usually made of a fragile fiber material, and it's the exception, rather than the rule, to find one still intact today.

Before you plug in any radio for the first time, particularly if it is a small table model, check to see if it's equipped with a power transformer. If not, be very careful once the plug goes into the wall. There will be a strong possibility that the chassis, not to mention the control-knob shafts and the chassis-mounting screws under the cabinet, are now hot to ground with the full line voltage. Actually, even transformer sets should be treated with respect; your chassis can sometimes become "hot" because of leaky bypass capacitors.

The only way to work on an a.c.-d.c. radio safely is to use an isolation transformer. The primary of such a transformer is connected to the 115-volt a.c. line, and the secondary puts out 115 volts to the radio under test. However the radio is now completely isolated from the a.c. line, no matter which way the plug is inserted into the wall, because there is no direct electrical connection between the primary and secondary of a transformer.

Isolation transformers are still available new from the larger electronics parts houses; they can also be found used at electronic flea markets and in surplus equipment catalogues. New ones are expensive, but whatever the cost, you'd be foolish

not to invest in one if you expect to do much work on a.c.-d.c. radios.

At the risk of being repetitious, here are a few specific cautions that will keep you from causing some spectacular short circuits when working with a.c.-d.c. sets. Never attempt to improve reception by attaching a ground lead (unless there is a specific connection labeled for that purpose). Never replace the a.c. cord with one having a safety ground pin. And (unless an isolation transformer is being used with the radio), never connect a piece of test equipment having a power plug with such a pin.

If your restored a.c.-d.c. radio is to be used regularly, don't leave any metal exposed. Make a replacement back, if needed, and don't operate the set with missing knobs. It might also be a good idea to put a small square of plastic electrical tape over each of the chassis mounting screw-heads.

Power-Supply Hazards

In addition to the safety problems associated with the a.c. line, the restorer of tube sets must also be concerned with the hazard potential connected with the radio's high-voltage d.c. power supply. Relatively high d.c. voltages are necessary for the operation of vacuum-tube circuitry, and these are obtained by rectifying and filtering the a.c. line voltage directly (in the case of a.c.-d.c. sets) or after it is stepped up by the radio's power transformer.

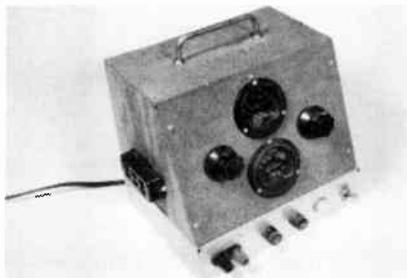
The d.c. voltages you'll encounter when working on tube radios will range from about 150 (for a.c.-d.c. sets) to a high of about 350 (for sets having power transformers). It should also be noted that the power transformer of a set operating in the 350-volt d.c. range is usually delivering about 800 a.c. volts to the radio's rectifier circuit.

All of these voltages are dangerous, even though they may be delivered at currents measured in tenths of an ampere. The effects of an electric shock depend on a person's individual susceptibility, his or her skin resistance (determined by surface moisture and other factors), and the path of the electric current flowing through the body. But under the right conditions, a shock of 150 volts or less can interfere with heart action, causing complications that could lead to death.

The basic principle of avoiding power supply shocks is similar to that for avoiding line voltage shocks: avoid contact with ground. In this case,

"ground" means the chassis and other metal parts of the set you are working on, which are always connected to one side (the negative one) of the d.c. power supply. If you happen to be touching the chassis as you contact one of the many positive high-voltage points in the set, you're going to get zapped!

Actually, you also need to be just as careful to avoid earth ground. A radio chassis can easily become connected to earth ground, either through a leaky bypass capacitor as already noted or via the shield lead of a piece of test equipment equipped with a plug having a grounding pin.



Home-made console contains isolation transformer for safe servicing of a.c. radios as well as charging circuit for small storage batteries.

Positive high-voltage points may be present anywhere in the radio, even in areas where you least expect them. For example, the i.f. transformer adjusting screws in older sets frequently are "hot," though this is not a problem if the proper non-metallic screwdriver is used to perform the i.f. adjustment. High-voltage can also appear in other surprising places through failure of bypass and/or coupling capacitors within the radio.

To fully protect yourself against accidental shock, it's best to assume that high voltage points might be found anywhere in the set. Make sure that any tools you may use to probe around in a powered-up chassis have insulated handles, and don't touch any part of the wiring with your bare hand until you've checked it first with a voltmeter.

Just one final suggestion. Even though you may have shut off a radio and removed its plug from the wall socket, the set is still capable of giving you a memorable shock. That's because the filter capacitors in the high-voltage power supply are capable of retaining a hefty electrical charge for some time after power is turned off.

These capacitors are easy to identify

WELCOME!

This pilot issue of *Vintage Radio* marks the beginning of a brand-new monthly publication for the radio collector and restorer, a publication designed to fill a very real need.

As antique radio columnist for *Popular Electronics Magazine*, I've received hundreds of letters from enthusiastic readers. These letters tell me not only that interest in our hobby has never been higher, but also that a great many of the folks now involved in vintage radio are avid for very basic information on radio history, theory and restoration practice.

Vintage Radio will be devoted to providing that information in a regular and systematic manner. Every month, we'll publish a detailed, clearly-written feature article covering some basic aspect of radio collecting or restoration. The content of these articles will be carefully planned so that the regular reader will gradually acquire a knowledge base that will enhance his or her understanding and enjoyment of our hobby.

We'll also be offering free classified ads for our readers, free club listings and an open forum for the discussion of questions and answers relating to the vintage radio hobby.

Vintage Radio comes to you punched for insertion into a standard three-ring binder. Save every issue, and you'll build up an invaluable encyclopedia of radio lore and data. From time to time we'll publish indexes that will help you access this valuable information whenever you need it.

We hope you enjoy the article on basic electrical safety in this pilot issue. It's a subject that no radio restorer can afford to ignore. Watch for our first regular issue (January, 1994), which will begin a series detailing the evolution of the broadcast radio. By showing how the design of radio receivers developed and changed over the years, these articles will help you relate to the "universe" of old radios you'll be likely to encounter on your forays to flea markets, garage sales and swap meets.

Good luck and happy collecting!

Marc Ellis, Publisher and Editor
Vintage Radio



Even a set that's unplugged can give you a nasty shock if you don't discharge filter capacitors before working on it.

because they are physically and electrically larger than the other capacitors in the radio. Look for a large cardboard or metal cylinder, or possibly a couple of them, mounted on end above the chassis or sideways underneath it. You can remove the danger by discharging the capacitors.

Connect a resistor having a value of a few thousand ohms or so to a pair of clip leads. Use the fairly high wattage resistor -- 5 watts or better would be nice -- if you can. Attach the clip lead from one of the resistor terminals to any point on the radio's metal chassis. Touch the lead

from the other terminal, in turn, to each positive terminal of each filter capacitor. Touch all the terminals if you are not sure, keeping the lead in contact with each one for a few seconds.

Now your filter capacitors should be discharged and safe to handle. By discharging them slowly, through a resistor, instead of via a direct short circuit, you've protected the capacitors from possible damage. You've also avoided the unsettling snapping spark that usually accompanies a short-circuit discharge.

MARC F. ELLIS

INFORMATION EXCHANGE

Need information about some aspect of our hobby? Ask your question here free. Got the answer? Please send it in! All correspondence will be conducted through this column so that it can be shared with other interested readers.

Answers to Questions

- Q Anyone care to share some information on how to replace broken or missing radio dials? (Marc Ellis, Evanston, IL)
- A If you need to replace a celluloid or paper dial and can borrow a similar one in good condition, have it copied at a color Xerox shop. The copy will duplicate all of the colors that may be on the original, as well as signs of age such as yellowing. Have your copy laminated to give it stiffness and a bit of sheen, then cut it to size.

Black-and-white glass dials can be duplicated by photocopying the original onto plastic overhead transparency stock. The result, now black on clear, can be backed with white paper and sandwiched between two pieces of 1/16" glass cut to size. Purchase hardware to clip the glass sheets together at an art-supply or framing store.

Incidentally, if you're looking for a replacement dial glass, try suppliers of clock parts. Clock glasses are similar, or identical, to those used in radios and come in a variety of diameters. (Paul Bourbin, San Francisco, CA)

Questions Awaiting Answers

- Q The volume of many antique a.c.-operated radios will abruptly increase or decrease when a lamp or appliance is turned on or off elsewhere in the house. Can anyone explain? (S. Weller, Skokie, IL)
- Q I know that the filament voltages of early battery tubes (such as 5 volts for the 01-A and 1.1 volts for the 11 and 12) were designed to be compatible with auto storage batteries or various combinations of dry cells. But how were the operating voltages for the heaters or filaments of early a.c. tubes determined? Many seem to have unusually low values (such as 1.5 volts for the 26; 2.5 volts for the 24A and 27) others (such as the 71-A and the 80) operate at 5 volts like the 01-A. The reason can't have much to do with the power source, since transformers can be made to give any desired voltage. And, in any case, why didn't the set designers make it easy on themselves and set all these tubes up for a single, standard voltage? (Harry Benzinger, Tampa, FL)

VINTAGE BOOK REVIEWS

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

RADIO TROUBLESHOOTER'S HANDBOOK, by Alfred A. Ghirardi. First Edition (1939) and Second Edition (1941) published by Radio and Technical Publishing Co. Third edition (1943) published by Radio and Technical Division, Murray Hill Books Inc. 700+ pages, Hardbound.

This book was written as a companion piece to Ghirardi's very widely read *Modern Radio Servicing*. The bulk of the book is devoted to "case histories" documenting typical repairs made to thousands of radios (and even television sets) manufactured from the beginning of the a.c. era almost to the time of publication. The case histories were gleaned from a large number of radio servicemen who had experienced recurring problems in the repair of certain sets.

The philosophy behind the book was that many radio models contained typical manufacturing flaws (such as weak components, unreliable wiring or poor circuit design). Such flaws eventually would cause similar problems in a great many examples of a given model.

Some of these problems could be quite perplexing, eluding detection by normal servicing techniques. By looking up a problem radio model in the book and (hopefully) finding the symptoms, the serviceman could immediately apply the cure, saving much valuable time.

The remainder of the book, much of it in tabular form, presents a wealth of valuable reference information covering resistors, ballasts, tubes (including substitution information), color codes, etc. There is also data on magazine and book publishers, manufacturers and their products, auto radios and radio "modernization."

Besides providing valuable clues to the troubleshooting of problem sets, this book will give the present-day restorer an insight into the types of modifications typically made to improve a radio or overcome a design flaw. When encountering such modifications, the restorer will be in a better position to decide whether or not to return the set to its original configuration.

Contributed by Paul Joseph Bourbin
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CLUB DIRECTORY

Send us basic information about your vintage radio club for free inclusion in our permanent directory. The directory will appear in Vintage Radio from time to time as space permits. Be sure to contact us when your listing requires updating!

NATIONAL ORGANIZATIONS

Antique Radio Club of America (ARCA). Quarterly publication: *The Antique Radio Gazette*. Regional chapters, regional and national conventions. Dues \$12.00. Contact ARCA, 300 Washington Trails, Washington, PA 15301.

Antique Wireless Association (AWA). Quarterly publication: *The Old Timer's Bulletin*. Regional and national conventions. Dues \$12.00. Contact AWA, Box E Breesport, NY 14816.

REGIONAL ORGANIZATIONS

California

California Historical Radio Society (CHRS). Two journals, one audiotape, membership directory and occasional newsletters yearly. Regular swap meets, exhibits and open houses. 24-hour hotline (415) 978-9100. Dues \$15.00. Contact CHRS, P.O. Box 31659, San Francisco, CA 94131.

Maryland

Mid-Atlantic Radio Club (MAARC). Monthly meetings; monthly newsletter. Dues \$15.00. Contact Joe Koester, 249 Spring Gap South, Laurel, MD 20724.

Oregon

Northwest Vintage Radio Society (NWVRS). Monthly meetings; monthly newsletter. Dues \$15.00. Contact the Society at P.O. Box 82379, Portland, OR 97282-0379.

Texas

Vintage Radio and Phonograph Society (VRPS). Monthly meetings; monthly and quarterly publications; annual auction, convention. Dues \$13.50. Contact VRPS, P.O. Box 165345, Irving, TX 75016.

Wisconsin

Western Wisconsin Antique Radio Collectors Club. Bi-monthly meetings; five newsletters, two swapmeets and two mall shows yearly. Dues \$12.00. Contact Dave Wiggert, 1611 Redfield St., La Crosse, WI 54601.

ATTENTION CLUB OFFICERS

WE'D LIKE TO MAKE BOTH THIS LIST AND THE FOLLOWING "CALENDAR OF EVENTS" AS COMPLETE AS POSSIBLE, SO BE SURE TO SEND US YOUR CLUB INFO AS WELL AS ANNOUNCEMENTS OF ANY UPCOMING FUNCTIONS!

CALENDAR OF EVENTS

Planning an auction, swap meet, convention or show? Send us a brief rundown for a free announcement. Be sure to include date, location and contact information for the event. Plan on getting the information to us two months in advance for timely insertion of your item.

October 15-17. Vintage Radio and Phonograph Society/Antique Wireless Association Annual Convention '93, Holiday Inn DFW South, Irving, TX. Contact VRPS, Inc. P.O. Box 165345, Irving, TX 75016.

November 6. California Historical Radio Society swap meet, Ampex parking lot, Redwood City, CA. Contact CHR5 Box 31659, San Francisco, CA 94131.

TRADING POST

A Clearinghouse for Buyers, Sellers and Swappers

WANTED

Rectifier and output tubes for early 30's German "Volksemfänger" VE30lw. Requires (6)354 and L41605/164. Also need RENS 1284 for 3 tube Mende. Would appreciate help in identifying and dating Mende and obtaining schematic. Set is very similar to Volksemfänger in appearance and size only made of wood. Other tubes are RGN1064 and RES964. Would like to hear from pre-war German radio enthusiasts. Don Nordenholt, 1509 Cliffbrook Dr., Plano, TX 75075. (214) 423-9175 (home); (214) 783-2784 (work).

Arvin "Hoppy radio" any condition, "as is" is fine; Philco type 80 "junior" cathedral. Scott MacGregor (503) 661-1294

Black Kurtz-Katch vernier dial (need the knob and shaft); Jewell pattern 135 d.c. voltmeter 0-5 or 0-8 volts, or any other two inch hole rear mount d.c. voltmeter. Paul Bourbin, 25 Greenview Ct., San Francisco, CA 94131.

Schematic prints and information on early 30's GEM cathedral set, 5 tubes (80, 24, 24, 45) sold by Meier & Frank. Field coils and output transformers missing too. Gordon Phillips (503) 234-3517

Chassis and speaker for a Lyric Model S-7 cathedral. I have a great cabinet and need the innards; Escutcheon and glass dial cover for E.H. Scott Philharmonic; Scott cabinet for all wave 23 Imperial or Philharmonic; Sparton chassis for my "Bluebird." Joe Koester, 249 Spring Gap South, Laurel, MD 20724. (301) 725-4229

If you can't mail me a Crosley 52 schematic or an AK33 cabinet, bring them to this October's VRUS Die Harder meet in Greensboro, NC. Thanks. Steven Vanderfinder, KC6YRB, 2123 Elizabeth Ave., Winston-Salem, NC 27103. (919) 727-1247

Promotional plastic car/AM radios from the mid-60's. Jerry Becker, 3331 Larry Drive, Plover, WI 54467. (715) 341-7610

Freshman radios, Polydyne radios and any related advertising. Will pay a reasonable price for nice sets. Dave Wiggert, 1611 Redfield St., La Crosse, WI 54601. (608) 784-2096

Early transistor radios. Regency TR-1, TR-1G, TR-4, Sony TR-55, TR-63, TR-72, TR-86. Raytheon T-100, T-150. Toshiba 6TR-186, 8TP-90, 9TM-40, 6TR-92, TR-193, 5TR-193. Also any solar powered transistor radio. I will pay book price or trade for radios in good condition. Marty Bunis, RR1 Box 36, Bradford, NH 03221. (603) 938-5051

DeForest D-7 receiver, antenna not needed. George Potter, 2069 Sienna Trail, Lewisville, TX 75067. (214) 315-2553

FOR SALE

E.H. Scott Model 800-B in nice original-finish Chippendale cabinet, 24 tubes, AM/FM/Phono, very good chrome, completely restored with all new capacitors, plays well, good record changer and cartridge. The last of the "real Scotts." \$500 or comparable trade; Pre-war Midwest console, 17-tubes, 5-bands, electric motor tuning, phono under top lid, multi-colored dial, good condition; 1938 Zenith model 12S266, robot dial, motor drive; 1939 Zenith Model 9S367, great art deco styling, louvered bottom; 1940 Zenith Model 7S462, rare bookcase cabinet, with 6 shelves and 2 drawers. Joe Koester, 249 Spring Gap South, Laurel, MD 20724. (301) 725-4229

Tubes: 26 - \$5, 27 - \$4, 24A - \$3, 71A - \$9, 80 - \$9, 81 - \$5, 112A - \$10, 807 - \$7, 1625 - \$3, 120 - \$12, DUD 201A's \$1.50 ea., DUD 99's UV & UX - \$1.00 each. George Potter, 2069 Sienna Trail, Lewisville, TX 75067. (214) 315-2553

1923 Martian "Big 4" crystal set on tripod base, good condition, \$325 OBO. Richard Kelly, 1945 Sugar Hill Rd., York, SC 29745. (803) 684-7433

Edison Upright Gramophone. Has some structural damage but plays fine. Paid \$225, but open to reasonable offers. Bob Ewing (503) 649-8695

TO SWAP

Majestic Charlie McCarthy, completely restored in excellent working condition, for Emerson Snow White or Mickey Mouse radio; 1921 Kennedy Model 281 for early Scott. Joe Koester, 249 Spring Gap South, Laurel, MD 20724. (301) 725-4229

Transistor radio collectors (not novelty)! I have been collecting transistors for a couple of years and have lots of extras and duplicates. I would like to get together with other collectors and do some trading. Sonny Clutter (503) 254-9296

YELLOW PAGES

Products, Publications and Services

Reproduction knobs: Zenith, Philco, Crosley, Atwater Kent. Send business size SASE for price list. Bill Harris, 1513 Bellechase Dr., Roanoke, TX 76262.

Regency TR-1 radio schematic. Reproduction of the original factory blue-line. \$3.75 postpaid in tube. Paul Bourbin, 25 Greenview Ct., San Francisco, CA 94131. (415) 648-8489

The Collectors Guide to Transistor Radios will be ready to ship in October. Provides complete descriptions and current values of over 2,000 models. 5 1/2" X 8 1/2" soft cover; 256 pages; over 400 full color photos. Special offer: save shipping charges by ordering directly from the authors (\$15.95 postpaid). Marty and Sue Bunis, RR1 Box 36, Bradford, NH 03221.

Schematics and servicing information for most radios through the early 1950's. \$5.00 per set, postpaid. Include make, model number and tube complement with your inquiry. *Vintage Radio Research Service*, P.O. Box 1306, Evanston, IL 60204-1306.



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The Radio Collector

TM

August, 1994

Collecting Radio Peripherals Part 2 - Service Literature (continued)

Last month, we kicked off our new series, *Collecting Radio Peripherals*, with a first installment on radio service literature. It featured the well-known and eminently useful *Perpetual Troubleshooter's Manuals* published by John F. Rider. Before we move on to other sources of service information, there are a few more points to be made about the Rider series.

Roadmaps to Rider's

Over the years, Rider published indexes to various individual volumes and groups of volumes in the *Perpetual Troubleshooters* series. But these don't seem to turn up as often as the books themselves. Without an index, you are reduced to a trial-and-error search for your radio of interest. The sets are alphabetized by manufacturer in each book and, by guessing the year of manufacture of your set, you can estimate the correct volume by from its copyright date. However, this is a ponderous, and not always successful, procedure.

Reproduction Rider's indexes are available, one source being Antique Electronic Supply, 6221 S. Maple Ave., Tempe AZ 85283. If you don't already have an AES catalogue drop them a line and request one.

If you can get your hands on a copy of *The P.R. Mallory Radio Service Encyclopedia, Sixth Edition* (1948), you'll have a very useful substitute for the official Rider indexes. This publication provides a very complete alphabetical listing of the radio receivers produced up to its publication date. A recommendation is provided for the correct replacement Mallory controls, capacitors and/or vibrator to be used with each one.

The proper Rider's reference is also shown for each set, as are two pieces



First volume in Supreme's "Most Often needed" series is commonly available, good starter book for beginners.

of information not included in the Rider's index: the i.f. peak--if the receiver is a superheterodyne-- and the tube complement. The latter is very useful in tracking down receivers with missing model number identification. I suspect that the Rider's references are from the Rider index to Volumes 1-15, which appeared in 1947.

Some time after purchasing the Mallory book, I acquired a serviceman's assortment of Mallory controls housed in a special metal storage cabinet. The cabinet has a rear compartment just the right size to accept the 6th Edition, which must have been included with the control deal. By the way, the Rider's Manual references may not be included in all editions of the *Encyclopedia*. A 1937 First Edition in my possession does not have them.

Early Rider's: Caveat Emptor

Before moving on to other sources of service data, I'd like to pass on some very interesting, and not commonly known, information about early

Rider's manuals. It's quoted almost verbatim from a letter sent in by A.G. Tannenbaum who, as a commercial provider of service data (see boxed ad on last page), is in a position to speak with authority:

"...The original Rider's manual was sold as the 1931 "Troubleshooter's Manual." At some point in 1931, the manual cover was marked "Perpetual." Updates to the "Perpetual" manual were sent out to monthly subscribers. To quote John Rider directly from the September, 1931 "Service Digest": "There shall be no announcements of yearly editions of the Perpetual Troubleshooter's Manual by John F.

Rider. The manual shall be the basic book for YEARS to come and will be kept up to date by means of the Monthly Supplementary Service." Apparently this policy lasted only two years. In 1933, the material was reorganized for publication via periodically-released volumes.

The pages in the 1931 edition were numbered consecutively from 1 to 804. The first supplement of about 50 pages was included with the manual. These pages had to be numbered 2-A, 24-A etc. for insertion into their appropriate locations in the book. Some time later, Rider abandoned this clumsy consecutive numbering scheme. Instead, service data was grouped by manufacturer and assigned a composite number consisting of a volume number and a sequential document number. This method was used right up to the end of the service.

Additions to the 1931 manual continued monthly for at least a year. Ultimately, more than 700 pages were added. Since it was up to the "troubleshooter" to insert the pages in the

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manual, and the binder did not have the capacity for the additional pages, updates were rarely entered.

During 1933, Rider went back and re-organized the original "Perpetual" manual for periodic release in volumes. Some of the data from that manual was put into volume I and some was put into volume II along with newly released material. According to information published in volume V, a complete Volume I should have at least 1000 pages. Volume II should have 800 pages and volume III should have 1185. A complete 1931 perpetual troubleshooter's manual with all updates will have approximately 1600 pages.

The 1931 perpetual, without updates, contains only 80% of the material in Rider's I. If all updates are included, you will receive all of the Volume I material and 70% of that contained in Volume II. When assessing the completeness of a 1931 Perpetual, remember that the page numbers cannot be used as a guide because update pages referenced the original page number. The only way to check is through estimates based on the measured thickness of the volume."



Mallory Radio Service Encyclopedia (6th Edition) slips into slot behind metal "control deal" box.

Other Sources of Manufacturer's Data

Other recently-received notes (from Alan Douglas and Dick Mackiewicz) suggests that you should also keep an eye out for a series of manuals (about seven) published by Gernsback that parallel the Rider's material, but sometimes contain additional information.

Yet another series out there to be discovered is the "Most Often Needed" collection marketed by Supreme Publications. Supreme, like Rider, published a new volume each year. But the Supreme books don't provide the exhaustive coverage offered by the Rider volumes. The relatively slim soft-cover Supreme books included only those sets considered by the editors to turn up most frequently on the radio serviceman's workbench.

The first volume, *Most-Often-Needed 1926-1938 Radio Diagrams and Servicing Information*, bears a 1941 copyright date. After that, a new manual was published every year, at least into the late 1960's, with a gap during World War II. Volume 1 was reprinted several times over the

years and is not hard to find at antique radio meets. It's certainly a good starter book for the newcomer, but will soon be found wanting once its purchaser becomes a serious collector. To visualize how much Volume 1 *doesn't* contain, keep in mind that this half-inch-thick book covers a time span represented by perhaps three feet of Rider volumes.

Another well-known source of at least occasional interest to the antique radio collector is the *Sams Photofact* folder collection, a service that went into operation in 1946. Each Sams folder contains the information for a small group of unrelated radios or TV's. To identify the proper folder, you need a copy of the annual index. Collecting these folders isn't practical, but the service is still offered by the Sams Company through distributors (usually electronic supply houses) or direct.

To obtain an index from Sams, send \$6.95 plus your local state tax to the Howard W. Sams Co., 2647 Waterfront Parkway East Drive, Suite 300, Indianapolis, IN 46214 (price includes shipping). The index will tell you whether the folder you want is still in print. If it is, that folder will cost you \$17.95 plus a \$2.50 handling charge, UPS and local tax. If not, Sams will send you a photocopy of the information on the specific set you want for \$24.95, plus handling, UPS and tax. For most of us this would be a service of last resort, since schematics are usually available for much less from almost any other source.

COMMENTS FROM THE EDITOR

Radiofest 1994



Editor Ellis relaxes at R.C. booth during Elgin show. (Courtesy Bob Baketz)

Last month, we reported on our adventures at Extravaganza 94 (The MARC-AWA meet at Lansing, MI), and this month we hit the road again to exhibit at Radiofest 1994, the big Elgin, IL meet sponsored by The Antique Radio club of Illinois. Things started off a bit slowly at the R.C. booth since we hadn't registered early enough to obtain a spot in the main flea-market area and had to locate on the outskirts of the action.

By the middle of the second day, though,

(continued on p. 4)

PLAY IT AGAIN!

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

TYPICAL VACUUM TUBE PROBLEMS

Prior to the coming of transistor sets, the average radio owner blamed most malfunctions on weak or dead tubes. In reality, tubes were at the root of only about 35% of the problems. Those of us in the repair business replaced weak tubes because the customer wanted and expected us to and there was profit in tube sales. In reality there is hardly any audible difference between new and weak tubes unless the latter are nearly dead. With tubes becoming scarce, we cannot now afford to discard usable ones just because they test weak.

Fatal Defects

Tubes can develop the following defects: open filaments, short circuits between elements, gas, noise or microphonics and low emission. The first 3 are fatal.

However, sometimes an apparently open filament is caused by poor connections at the base pins. It is worthwhile to try resoldering the filament pins of such a tube. If that doesn't cure the problem, the tube is useless.

Another variety of open filament is the "blinker". Such a tube has a broken filament which makes contact when cold, but opens when hot and thus cycles on and off. Some claim the break can be welded by applying a heavy current, but I've had no luck with this technique.

Short circuits usually occur between filament and grid or heater and cathode. The first results when the filament sags into contact with the grid and often shows up only when the tube is hot. This defect is common in certain early tubes like the UV199.

The heater-cathode short is due to a breakdown of the insulation between these two elements. It seems to be most common with tubes in AC/DC sets and usually appears only when the tube is hot. *Never use a shorted tube in any radio.*

Power output audio tubes seem to develop gas more frequently than other types. Gassy tubes often exhibit a blue glow within the elements. Don't confuse this with the blue glow sometimes seen on the inner surface of the bulb. That is caused by stray electrons striking fluorescent

materials on the glass and is harmless. Gassy tubes are dangerous because they draw excessive current and may damage transformers and other components. *Do not use them under any circumstances.*

Noise and Microphonics

Tubes can develop frying or crackling noises. You should try resoldering the base pins and grid cap to see if the tube can be salvaged. Also clean the base pins and tube socket contacts.

A *microphonic* tube is sensitive to vibrations. Its elements are loose and the change in their spacing due to vibration modulates the electron stream. Some microphonic tubes are so sensitive that the set howls from acoustic feedback between the tube and speaker. Early tubes are more apt to have this problem more often than modern ones because their elements are not well-braced.

Don't discard a microphonic tube if it is good otherwise. The tube may work fine in another position or another set. The detector stage is especially sensitive to microphonic tubes, and many manufacturers provided "shock mounting" for the detector tube socket on rubber cushions or springs.

Low Emission

The oxide coating on the filament or cathode eventually becomes exhausted and can no longer emit enough electrons to form a space charge. When this happens, the tube is worn out. Power amplifier and rectifier tubes are more critical in this regard because their emitters must supply large currents. Small voltage amplifier tubes are less affected by low emission problems.

Early tubes used tungsten filaments activated with thorium. When the emission declined due to depletion of thorium at the filament surface, more could be brought up by briefly applying an overvoltage to the filament. These tubes could be rejuvenated quite successfully. Many articles have been written claiming that oxide-coated filaments and cathodes can be rejuvenated in similar fashion. I

have tried it countless times with little success. When I did succeed, the rejuvenation lasted only a few hours.

Tube Testers

The first step in restoring or repairing a radio is to test the tubes. You can't proceed until you know the tubes are working. If you plan to repair many radios, you should have a tube tester, otherwise you may locate someone who will let you use theirs. There are two types of testers: one measures transconductance and the other emission. The first type is expensive, but it tests the tube under dynamic conditions. The emission test is a static test, however, emission testers are cheaper, more available and perfectly satisfactory for servicing work because emission and transconductance are related.

The emission tester measures plate current under a fairly heavy load and displays the result on an arbitrary 0-100 scale. The division between *Good* and *Bad* is usually at 50. Both types of tester will test for shorts and gas. If you buy a tester, get an older model that has the 4 and 5-pin sockets and lists the settings for antique tubes. Some testers made in the 1950's or later considered these tubes obsolete and didn't provide for testing them. Be sure you get the operating manual also.

Don't skip any tests, especially the shorts and gas tests. If a tube tests weak, don't discard it. The best test is to replace the suspect tube with a known good one to see if it makes a difference. If not, use the weak tube.

In fact, you should make a practice of saving *all* your bad tubes, even those that can no longer be used in radios. Some older ones make interesting displays, and the bases are good for making adapters and plugs.

Next time we will discuss the rest of the equipment you will need to get started in radio repair.

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

CORRESPONDENCE FROM OUR READERS

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

This N' That

I just received the June '94 issue of *The Radio Collector* and read the answers to my questions. Thanks to those who answered and gave their experiences.

Ken Owens said that my Philco could not be a 1926 model as the company did not manufacture radios until 1928. Using his tube chart published in the May issue, I now believe it to be a 1929 model. It is a floor-model 7-tube TRF set Model #77A. Any further information will be much appreciated.

Regarding Ken's chart, I wonder if he could provide the "obsolete date"? For example on page 6 he says that the Type 26 was first used in 1927 and nearly obsolete by 1929.

More on volume level changes. Just after I sent you my letter last month, my wife had one of my 60's vintage transistor portables out in the garden. It was located about three feet from the house. Over a period of time the volume levels changed. I then moved the radio farther away from the house. The volume level remained steady from that time onwards. I believe this to be further evidence of what I discussed in my previous letter. (Note: Here, Allan is referring to his theory that volume changes can result from variations, sometimes caused by varying load demands of household appliances, in the magnetic field generated by the house wiring. Ed.) — Allan Brown, Woodlawn, Ont., Canada.

According to a catalogue of radio receivers printed in my "RCA Radiotron complete" combined version of Rider's manuals one through three, the Philco 77A was released in 1930. Taking it upon myself to answer the tube question meant for Ken, "obsolete dates" for tubes are pretty hard to pin down. In the first place, set manufacturers didn't necessarily stop using a tube type after it was superseded by a better one — especially if they could purchase surplus stock or overruns at an advantageous price. For another, tube manufacturers continued to turn out "obsolete" types for replacement purposes long after progressive set designers had ceased specifying them in new radios.

Surrogate Diaphragm

In looking through my "junk" for something else, I came across a stack of those metal disks used by roofers to nail down tarpaper underlayment. They looked so much like headphone diaphragms that I tried some as replacements in headsets having dented or missing ones. They fit neatly, being almost the exact same diameter. Most hardware stores and lumber yards used to carry these disks. — Alton

A. Dubois, Jr., Queensbury, NY.

The sample Alton enclosed is a little over 2" in diameter and seems to be a somewhat heavier gauge than that of the usual headphone diaphragm. Though I didn't test it myself, I would guess that the disk might work as an emergency replacement — most likely with some loss in sensitivity or volume.

Info Needed on All American N.T.



Can anyone help reader Humphreys find info on this very neat looking All American Products Corp Model # N.T.?

Stewart Humphreys, 600-C Brookwood Ct., Blue Springs, MO 64014 is looking for schematic and servicing information for an All American Products Corp. All Wave Model # N.T as pictured here. Tube complement is 5Z3, 6K7, 6L7, 6N5, 6B6, 6D6, 76(3), 75, 6U5. The set is apparently not listed in Rider's.

Clandestine Radio Book

I am presently reading a fascinating book regarding "secret" radio apparatus as supplied to the French resistance during WW2 by the Brits. Includes transceivers, beacons, radar, cryptography, etc. It might be of interest to WW2 radio buffs. Title is SECRET WARFARE by Pierre Lorain, published by Orbis Publishing of London England, 1984 (English language edition) ISBN # 0-85613-586-0.

It is very hard to locate. I got mine via an inter-library loan from the University of Saskatchewan in western Canada, but I am sure there are other copies around. The book even has schematics of some of the gear.

I realize this is somewhat outside the

realm of "antique" radio, but it is a wonderful insight into another field, of an era when one could almost see the circuitry begin to work. — Bob Zinck, Halifax, N.S., Canada

Internet News Group

In another note received just before going to press, Bob Zinck informs us that a gentleman named Bill Robie is attempting to form an antique radio news group on USENET on the Internet. Those with Internet access can E-mail requests for info to robie@umbc.edu

COMMENTS FROM THE EDITOR

(continued from p. 2)

thanks to some no-shows who hadn't claimed their spots, we were allowed to move to a high-traffic area right opposite the Antique Electronic Supply table. This not only greatly improved the action at the booth, but also gave us an opportunity to renew our friendship with outgoing AES owner George Fathauer Sr. and meet two of the new principals, Joe Campanella and son-in-law Greg Cravener.

During the proceedings, we enjoyed the opportunity of chatting with subscribers Larry Horvath (Milford, MI), Don Hauff (Minneapolis, MN), Bob Baketz (Elgin, IL), Bruce Tjaden (Louisville, KY) and Dr. Aaron Field (Chicago, IL). In addition, we were pleased to welcome several new subscribers who signed up during Radiofest 94: Bill McGowan (Costa Mesa, CA), Mrs. Don Colbert (Dearborn, MD), Peter Nauseda (Palos Hills, IL), Ed Huether (Oak Park, IL), Bill Miedema (Tower Lakes, IL), Ed Bell (Raleigh, NC), Edward Eddy (Tempe, AZ), Daniel Carey (Glendale Heights, IL), Ty Gregory (Elkhart, IN), Bill Timoszyk (Livonia, MI) and J. Kolpa (Woodridge, IL).

Other high spots for me were getting to meet legendary Hallicrafters collector Chuck Dachis and to visit with my good friend Brother Patrick Dowd. I also enjoyed Chuck's slide show, featuring his remarkable collection, as well as Brother Pat's slide show on his world-famous vacuum tube exhibit at Manhattan College.

The exhibit of Atwater Kent radios and artifacts was impressive indeed, and there was the usual lively activity at the auction. Of personal interest to me was the sale of an International Kadette (the pioneering a.c.-d.c. set that has stimulated some lively discussion in our last couple of issues) for \$350.00 and a Mengel crystal set like that

(continued on p. 6)

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.

ANSWERS TO QUESTIONS

Tube Cement Tip

Regarding Tony Jacobi's question on cement for loose tube bases and grid caps: crazy glue seems to work very well. It is quite thin and easily runs down into small spaces.

To re-cement a tube base, make a "stand" for the tube by punching holes in a small cardboard box to match the pattern of the tube pins. After cleaning the tube, insert it into the "stand" in an upright position. Then allow the glue to drip into the space between the tube and the base, rotating the box so that the level of the glue rises evenly. If excess glue runs down the side of the base, allow it to dry overnight—then scrape it away with an X-acto knife.

When re-cementing a grid cap, find a cardboard box just large enough to hold the tube upright when the tube is placed in a corner. Hold the tube upside-down in your hand and allow the glue to run into the space between the glass and the cap. Rotate the tube, as necessary, to obtain even distribution. Try to avoid applying excess cement. Now place the tube upside-down in the box; the weight of the tube will hold the grid cap against the glass until the cement is thoroughly set. Then any excess can be scraped off with an X-acto knife.

Although most crazy glues adhere well in just a few seconds, I allow cemented tubes to sit overnight before moving them. I have heard that the crazy glue bond may deteriorate after a few years, but it is still strong in tubes I repaired at least that long ago.

Another preparation that might work well is watch crystal cement. This is available in small tubes from: S. LaRose, Inc., P.O. Box 21208, Greensboro, NC 27420. Their general catalogue is \$3.00, and contains mostly watch and clock supplies. However, there are several items that are useful for old radio restoration, including round dial glass in several sizes at very reasonable prices. Was there ever a commercial cement especially made for grid caps? Absolutely! Unfortunately, that has gone the way of the buggy whip! -- Dick Mackiewicz, Coventry, CT

QUESTIONS AWAITING ANSWERS

Mystery of the Dead S-38

I have a real problem that has baffled me for days. My Hallicrafters S-38 suddenly quit on me, so I made various checks and here is what I found.

The filters are all o.k. The bypasses are all o.k. The tubes test o.k. The voltage on the 35Z5 cathode is nil. After much lifting of feeds and capacitors from various circuits, I isolated the problem to the 35L6 screen.

With all the leads except the lead from the 35Z5, which consists of a 22 ohm resistor in series with a 680 ohm resistor that goes to the screen of the 35L6, the voltage is still nil. When the two resistors are lifted off the screen terminal, the voltage jumps to 150 v. There is nothing else attached to the screen terminal except the tube itself.

I checked the resistance on the screen terminal without anything attached to it and without the tube in the socket. I also substituted new resistors for the 680 ohm and the 22 ohm resistor. The screen pin reads in the high megs from the pin to ground and the other pins in the socket. Something is pulling down the stage at that point.

My only other alternative is to drill out the rivets and replace that socket, which I am reluctant to do because it doesn't read defective. What happens? -- Alton A. DuBois, Jr., Queensbury, NY

GENERAL INFORMATION

More Kadette Info

Ray Larson's letter on the International Kadette in last month's *Radio Collector* caught my eye. I wrote an article on the private and versions of the Kadette in the February, 1990 issue of the MAARC newsletter, in response to a reader inquiry. Some of the information on power supply variations among various versions of the Kadette may be of interest to RC readers.

It should be noted that there seemed to be four versions of that radio during the over-one-year production.

(a) Used type 37 tube for rectifier and

310 ohm resistor mounted on back of chassis for heater supply drop.

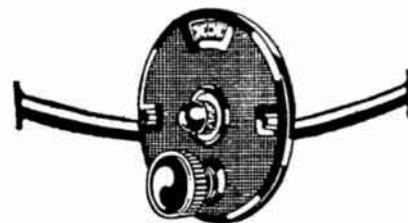
(b) Used type KR-1 mercury vapor rectifier tube with 310 ohm resistor.

(c) Used type 1V rectifier tube and resistor line cord.

(d) Connected to power source(s), via a socket, by a resistor line cord for power line operation or by alternate power cord to vehicular or marine source with (B) batteries for high voltage.

The problem with the heater dropping power began here. Almost 30 watts of power had to be dissipated with only four 6.3 v. / 300 ma. tubes in the circuit. That made for a very hot radio after continued operation. The resistor line cord made the radio less hot, but the hot cord was another bag of worms. The need for higher plate voltage than was available with the adapted triode rectifier began here and the KR-1 mercury vapor type was the initial solution for that problem. That was followed by the 1V and 12Z3 types and then the 25 volt or higher types came along. The circuit shown last month was for the second version.

There are some interesting solutions now available for the line cord and ballast resistor problem, and these should be discussed when appropriate. -- C. Orval Parker, Pocono Summit, PA



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DICK'S CORNER

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

New Book Explains 1920's Technology

BEHIND THE FRONT PANEL (*The Design and Development of 1920's Radios*) by David Rutland. 158 pages. Many black-and-white illustrations and schematics. Available from Wren Publishers, P.O. box 1084, Philomath OR 93750. \$18.95 plus postage. (ISBN 1-885391-00-500).

This book covers the technical details of early radio receivers, from crystal sets to eight tube superhets. If you've ever wondered what the difference was between a TRF and a Neutrodyne, this book will tell you. Regenerative, Reflex, even Calimityplex sets are covered!!

Please don't think you have to be a graduate engineer to understand this book. The author explains the various circuits in terms that even a beginning collector can understand! This is NOT another "pretty picture book." It IS a well written text that condenses a great deal of technical history into a book that never becomes boring. A few mistakes, such as listing TUSKA in New York, rather than Hartford, Connecticut, and the statement that a "cat's whisker should have a sharp point" can be forgiven. (FINE wire is o.k. A fine POINT will ruin a crystal!)

All in all, this book fills a void in the collector community as yet not addressed by any other publication. I highly recommend it!

Don't Wash Off Your Tube Numbers!

Most collectors will, sooner or later, acquire a large box of old tubes--all covered with several layers of dirt, dust and grime. Many times, the tubes in a newly-found radio will be in the same condition. DON'T obey your first impulse to immediately clean such tubes. Cleaning will often remove the type numbers!

Put a piece of masking tape--to be used to record the type number--on the base of the tube. Slowly rotate the tube under a strong light as you examine the surface under a three-power magnifying glass. If there's a number there, you should find it. Use a fine-tip felt marker to note the number on the masking tape.

NOW it is safe to clean the tube. Warm water applied carefully with a clean, soft rag should do the job, though some people use commercial glass cleaners. As I see it, using a detergent or other cleaning agent only increases the likelihood of removing the number. In any case rub very lightly where the number is located (*Note: I usually leave the area where the number is with the original dirt, cleaning all around it -- Ed.*)

If the number should disappear during cleaning, you might like to scratch it permanently into the base with a sharp awl and remove the temporary tape. In the case of miniature tubes, which have no base, the tape needs to stay on permanently. For this reason, use very narrow tape (such as the 1/4" size) on miniature tubes.

If you accidentally wipe off the tube number before recording it, or if the number had disappeared before the tube came into your possession, you can try some of the often-recommended methods for bringing it out again. Two of these are rubbing the tube briskly through the hair and dabbing the surface with rubbing alcohol. (*A third one is breathing on the tube so that moisture condenses on its surface. -- Ed.*) I've tried most of the recommended methods with little success. Much better to find the number before you lose it!

In a future column, I'll discuss ways of identifying certain pre-1920 tubes even if they have lost their type numbers. So don't toss a tube out just because its number is missing!

Conducted by Dick Mackiewicz

COMMENTS FROM THE EDITOR

(continued from p. 4)

featured on the cover of our first issue for over \$200.00 (I should have written down the exact figure). Never thought I'd see another one like it! A cheesy-looking palm-sized Japanese transistor set changed hands for a 4-figure sum, but my neighbors and I agreed that this was probably a prearranged buyback sale set up as a joke. Of course, we could be wrong. . .!

It was also much fun to get to know Mr. and Mrs. Phil Anderson, and daughter Rebecca Hewes, who were promoting *The Xtal Set Society*. The fates marooned us side-by-side on the fringes of the action for the first day and a half, so we had a lot of opportunity to talk.

Phil started the *Society*, and its newsletter for members, as a hobby about four years ago. Since he's in a high-tech business (the manufacture of modem equipment for the amateur radio community), Phil finds a lot of relaxation in designing and writing about the much simpler products of an earlier technology. Since its inception the *Society* has grown steadily, and the Andersons decided to put it on a more businesslike basis. Daughter Rebecca signed on to handle production and marketing at the beginning of this year.

Membership in the *Society*, which includes a subscription to the bi-monthly newsletter, is \$9.95 yearly (somewhat higher outside the U.S.). For more information, write Rebecca Hewes, PO Box 3026, St. Louis, MO 63130.

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.

The terms "Iconoscope" and "Kinescope" may not mean much to today's generation of TV viewers, but these devices started a revolution after World War II. The "Ike" was the television camera tube and the "Kinescope" was the picture tube that displayed the image. Both were the work of a Russian-born engineer who studied at the Leningrad Technical Institute and in 1912 joined the faculty there.

In Leningrad, he was involved in research aimed at translating electronic impulses into pictures, but took time out during World War I--when he turned his efforts to wireless communications. After the war, he traveled to the U.S., settling here in 1919. He went to work for Westinghouse, won a Ph.D., and resumed his interest in picture transmission--applying for a patent on the Iconoscope in 1928. But the patent was held up by various legalities.

In 1920 he joined the RCA research staff, and finally obtained the Iconoscope patent in 1938. He went on to work on the electron microscope and other devices.

Conducted by Julian N. Jablin

Answer to last month's quiz: Aleksandr Popov. Correct answer sent in by Alan Douglas.

VINTAGE BOOK REVIEWS

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

RADIO HANDBOOK, Compiled for The International Correspondence Schools, Published by the International Textbook Company, Scranton, PA. 1924. 514 pages. Small format. Hardbound.

This small book appears with a variety of covers and title pages, but all bear the International correspondence School name. Apparently the volume was packaged in different ways for different types of distribution.

Its first few chapters, like those of many books written during the infancy of radio, deal with basic electrical terms, circuits and equipment. Then follows a chapter which deals with "Miscellaneous Radio Devices," covering apparatus such as thermocouples, mineral and electrolytic detectors, spark gaps, generators, keys and buzzers, telephone apparatus and horn speakers. The next chapter covers electron tube theory and discusses various types of tubes.

A section on transmitting stations covers spark, arc, buzzer and vacuum tube equipment of the types popular in the early twenties. The chapters that follow deal with radio- and audio-frequency circuits and amplifiers. Next come interesting sections on the use of filters and on powering transmitters and receivers from the AC mains. After a short section on wave meters, there is a fairly long one devoted to the theory and operation of some of the then-popular commercial receiving sets.

The book closes with some radio experiments and the usual collection of charts, codes and definitions that concluded many texts of this era.

This volume was meant to serve as a textbook for those with little or no knowledge of electronics or radio. Since it was written by an electrical engineer, the presentation stresses general electrical principles. Much of the material is not directly related to radio. The many line drawings and schematics are, for the most part, generic in nature and (except for the section on commercial receivers) do not deal with practical applications.

The text is easy to read and understand, involving minimal use of math. Since it's small enough to slip into a shirt pocket, this is a nice book to carry around and read whenever you have a few minutes.

Radio Handbook accurately reflects the state of the art at the beginning of the broadcast era. It is recommended to anyone looking for an easy-to-read book from that period. Those seeking a more technical presentation should look elsewhere.

For those of you who would like to communicate with me via E-mail, my address is paulbourbin@delphi.com.

Conducted by Paul Joseph Bourbin
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COMPANY CHRONICLES

Brief Biographies of Classic Radio Manufacturers

Steinite

ELECTRIC RADIO

In the year 1922, Atchison, Kansas resident Fred W. Stein formed the Atchison Radio and Electric Company to engage in the sale of galena crystals. The crystals, marketed under the name *Steinite*, hit the market in 1923 -- complete with advertising puffery claiming 1000-mile reception. Mr. Stein, whose formal education had ended with the eighth grade, had been in the electrical contracting business prior to World War I and served in the Navy during that conflict.

Soon after going into the crystal business, Stein progressively

expanded his line to include crystal detector assemblies, complete crystal sets, and one-tube radios. These sets were all sold through the mail by means of newspaper advertising.

In mid-1925, the entrepreneur purchased Tri-City Radio Electric Supply Co. (Tresco) which, though foundering, was the possessor

of an Armstrong license. Sets manufactured during this period carried the Tri-City name and an Atchison, Kansas address. 1926 saw the introduction of a pioneering a.c.-operated set utilizing series-string '99 tubes. This popular radio went through three revisions, selling so briskly that the Company opened a Chicago sales office the following year.

Things continued to move quickly for Mr. Stein's little company. In 1928, an RCA license was acquired with the help--so the story goes--of fire-eating Missouri Senator Jim Reed. Reed is reported to have bearded a reluctant General Sarnoff in the latter's office, refusing to leave until a license was issued. The license made it possible for Steinite to market, that same year, a state-of-the-art a.c.-operated set (which was priced a couple of dollars less than the competitive Atwater Kent Model 40). Also in 1928, the Steinite company was sold to Chicago capitalists Jacob Abelson and Oscar Gertz.

In October of 1928, the Company purchased control of the Leslie

F. Muter Co., a radio parts manufacturer. By early 1929, stepped-up merchandising efforts raised sales to new peaks. Steinite soon acquired an additional

plant located in Auburn, Indiana and built a third one in Fort Wayne. By October of that year, the Company employed almost 1200 workers and was turning out a reported 2,000 sets per day.

THE RADIO COLLECTOR

Display Advertising Dimensions and Prices

TYPE	H" x W"	1 MONTH	3 MONTHS	6 MONTHS	1 YEAR
1 page	9 0/0 x 6 3/4	\$65.50	\$177.00	\$319.00	\$574.50
1/2 page	9 0/0 x 3 1/4	33.00	88.50	160.00	288.00
1/2 page	4 3/8 x 6 3/4	33.00	88.50	160.00	288.00
1/4 page	4 3/8 x 3 1/4	16.50	45.00	81.00	145.50
1/8 page	2 0/0 x 3 1/4	8.50	23.00	42.00	75.00
Bus Card	1 1/8 x 2 1/8	-----	12.00	21.50	38.50

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 Red dial pointer for Airline 62-274 as illustrated in Bunis II. Samuel Zuckerberg, 578 Fifth Ave., New York, NY 10036.

Wanted Antique radio headphones. Also want any junk Tuska radios or parts. Highest prices paid. Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

Wanted McMurdo Silver radios and brochures. Zenith or Scott chrome chassis radios. Don Hauff, Box 16351, Minneapolis, MN 55416. 1-800-769-9980.

Wanted Circuit diagram for Hallicrafters Model S-200 "Legionnaire" BC/SW set. Alton A. DuBois, Jr., 67 Peggy Ann Rd., Queensbury, NY 12804.

Wanted Old radio headphones. I will buy one set or a hundred! Please send list and your price. Dick Mackiewicz, 1549 N. River Rd., Coventry, CT 06238. (203) 742-8552.

Wanted Buyers and sellers of WWII military radio sets and accessories. America's WWII radio surplus leader. Sam Hevener W8KBF, "The Signal Corps," 3583 Everett Rd., Richfield, OH 44286-9723. (216) 659-3244 before 8PM.

For Sale Transistor novelty radios. Send a long SASE to Gary Arnold, 615 Oak St., Marion, NC 28752. (704) 652-6893

For Sale first user-friendly circuit on early BC-348's. Send \$2 and three 29-cent stamps. Ray Larson, 12241 1/2 Gorham, W. Los Angeles, CA 90049-5214.

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/Trade McMurdo Silver and Scott parts, brochures, etc. Don Hauff, Box 16351, Minneapolis, MN 55416. 1-800-769-9980.

Capacitor Sale Filters: fresh, clean, prime - 20mfd/150v (3/8 x 1 13/16" tubular); Mallory 2 mfd/450v (1/2 x 1 3/8" tubular); 68mfd/200v (5/8 x 1" radial) - use two to replace dual 150v for today's higher line voltage. Plastic molded Sprague "Black Beauty" .2 mfd/600v; Aerovox "Duranite" .25 mfd/600v (both 11/16 x 2 1/8" tubular) - plastic somewhat dusty/dirty from open bin storage, easily wiped clean. Any of above 5 types \$1.00 each (10/\$9). High voltage (replaces .005/6000v in small screen TV's): prime .0047 mfd/6000v butterscotch disc (3/4 x 1/4"), long 1 3/4" leads, moistureproof epoxy dipped \$2.75 ea. (10/\$25); Sprague .0068 mfd/8000v-10% mylar (3/8 x 1 7/8" tubular) \$4.75 ea. (5/\$23). Shipping \$3 (over \$25 post-paid). Don Diers, 4276 North 50 St. Dept. RI, Milwaukee, WI, 53216-1313.

SERVICE DATA

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24 hour FAX (516) 599-6523.

Radio Parts - New and Used Tubes Test Equipment - Service Data

1000's of parts. Write your wants. SASE for reply. Krantz, 100 Osage Ave., Somerdale, NJ 08083-1136.

Phone (609) 783-0400.

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to the world! Wear our distinctive logo printed in deep blue on a Hanes Heavyweight 50-50 T-shirt (XL only). \$12.50 (or \$7.50 with new subscription or 1-year extension) post-paid. **The Radio Collector**, P.O. Box 1306, Evanston, IL 60204-1306.

COMPANY CHRONICLES

(continued from previous page)

However, as with most companies of that era, the Depression eventually took its toll. Steinite was reorganized at the beginning of 1930 with Jim Tully (formerly of Bremer-Tully) in charge. By April, the Company was in receivership, with debts of 1.3 million. Magnavox bought the Fort Wayne plant in May; Steinite reorganized again in October to make private-brand radios, lasting another couple of years before going out of business.

The information for this Company biography was obtained from

Alan Douglas' three-volume encyclopedia "Radio Manufacturers of the 1920's," published by The Vestal Press, Ltd., Vestal, NY and copyrighted 1988, 1989 and 1991 by Alan Douglas.

CALENDAR OF EVENTS

Sept 21-24. Antique Wireless Association 33rd Annual Conference. Thruway Marriott, Rochester, NY. (reached from Exit 46 of I-90, The New York State Thruway). Flea market, seminars, contest, auction. This year's themes: Radio in WWII and 150 Years of the Telegraph. Watch for **The Radio Collector Booth!**



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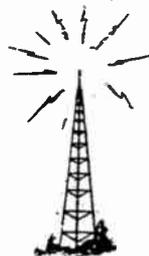
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