The Radio Collector

February, 1994

Evolution of the Broadcast Receiver

Part 2- From "Three-Dialers" to Superhets

In the last issue, we began our journey through the evolution of the broadcast receiver with a discussion of crystal and regenerative sets. At the conclusion of that story, we pointed out that the incredibly efficient regenerative circuit--brainchild of the legendary radio inventor Edwin Armstrong--would probably have become the dominant 1920's design had Westinghouse not purchased the patent rights and rigidly controlled the licensing.

TRF circuitry required the use of three r.f. coils, each tuned by a separate variable capacitor.

Enter the TRF!

It required three tubes (two r.f. amplifiers and a detector) to equal the performance of a single tube connected as a regenerative amplifier-detector. The two stages of r.f. amplification required three tuned circuits (coil/variable capacitor combinations) for proper operation--which meant that there were three tuning dials to be manipulated in order to locate a station and tune it in at maximum volume.

Such sets were called TRF (tuned radio frequency) receivers. Known familiarly to today's collectors as "3-dialers," they were manufactured in great quantity by manufacturers wishing to enter the lucrative radio manufacturing field without the benefit of a regenerative license.

Though three-dial tuning was certainly a clumsy procedure, the simpler regenerative sets were more cranky and difficult to keep in adjustment. And as it turned out, the TRF's additional tuned circuits provided extra selectivity, which became very desirable as the broadcasting industry expanded and the radio dial became more crowded.

The "3-dialers" offered speaker volume, improved selectivity. They were made in great quantities.

In addition to the basic three-tube circuit already described, most TRF sets had the additional two tubes required to provide good volume from the horn speakers of the era. This was, I'm sure, a cost/benefit issue. It didn't make much sense to support a power-hungry three-tube circuit providing only earphone volume. Better to add the extra two tubes that would make it possible for the whole family to listen at once via loudspeaker.

Eliminating the Batteries

As the 1920's wore on, the familiar coffin-shaped, three-dial TRF set, sporting a rechargeable auto-type "A" battery to power the glaring filaments of its five 01-A tubes, became a living-room fixture. Plate and, when necessary, grid bias voltages ("B" and "C" voltages, respectively) were provided by disposable dry batteries.

Those wishing to avoid the expense of regular battery recharge and/or replacement--not to mention the menace to living-room furnishings represented by the concentrated sulfuric acid in the "A" storage battery--could purchase battery eliminators. The eliminators converted standard a.c. house current into the variety of d.c. voltages required to operate the radio. They enhanced the safety and convenience of radio set operation while reducing long-term costs.

But battery eliminators didn't do much to simplify the radio installation. Usually, at least two separate eliminators were required to provide necessary

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Back issues of *The Radio Collector* are available for $2.50 each, postpaid.

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Subscribers may place one free *Trading Post* ad up to 30 words long in each issue. Ads not renewed or replaced will run in one additional issue prior to cancellation. Count your name, ham call (if desired), complete address and *one* phone number as six words. Additional words are 15 cents each per issue. *Trading Post* rate for nonsubscribers is 30 cents per word. Only non-commercial ads for radio-related items are eligible for inclusion in *Trading Post*.

Commercial classified advertising will appear in our *Yellow Pages* section. *Yellow Pages* space is priced at the rate of $25.00 per quarter (three months) for an ad of up to 30 words. Additional words are 90 cents each per issue. (See previous paragraph for word count standards.)

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Display Advertising

Rates and size requirements for display advertising will be announced in a forthcoming issue.

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).

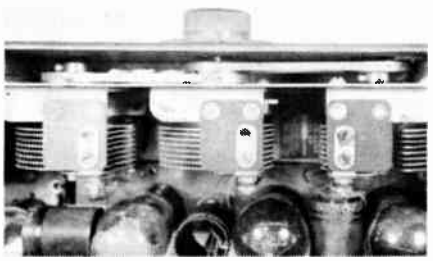
"A," "B," and "C" voltages. Whether the radio was running on eliminators or batteries, the power sources were still external to the radio and connected to it via a tangle of interconnecting leads.

Battery eliminators allowed operation from a.c. line, but didn't do much to reduce clutter of radio installation.

Freed-Eisemann and Atwater Kent were among the better known of the many manufacturers supplying TRF sets. And as you begin to collect examples of the "three-dialer," it won't be long before you encounter the term "Neutrodyne" on a set's nameplate or patent tag. That was Freed-Eisemann's name for a proprietary circuit scheme (also licensed to other manufacturers) to neutralize the unwanted feedback and oscillation that was a common problem in the TRF's triode r.f. amplifiers.

Plug-in Power!

Towards the end of the 1920's, two technical innovations: one mechanical and one electronic, were to streamline the appearance of the family broadcast receiver and vastly improve its "user friendliness." The mechanical innovation was single-dial tuning, accomplished by ganging (generally via belts and pulleys) the three individual tuning capacitors



Belting together the TRF's three variable capacitors made it possible to achieve one-knob tuning.

employed in most TRF receivers. Now stations could be tuned in by setting a single knob rather than adjusting three of them.

The electronic innovation was the development of amplifier tubes (such as the pioneering type 26) designed to be lit from an a.c. source. This paved the way for the design of efficient plug-in power supplies (usually employing the type 80 rectifier tube) that made the use of batteries unnecessary, except for portable applications.

Development of new tubes allowed integration of a.c. power pack (at bottom) with radio circuitry.

Also obsoleted were the rheostats (most battery TRF's had two or three) that had to be adjusted to keep tube filament voltage constant as the "A" battery became discharged. Thus the radio control panel, which formerly bristled with tuning knobs and rheostats, now required only three controls: on-off, tuning and volume. (The latter was a new control made necessary by the elimination of filament rheostats, which had been pressed into service to make volume adjustments in the older sets.)

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Contributions Invited!

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 be of assistance to 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.

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 PHYSICS COURSE, By Alfred A. Ghirardi. Second Edition, 1933. Published by Radio Technical Publishing Co., New York, NY. 972 pages. Hardbound.

This review completes our coverage of Ghirardi's famous trilogy on radio servicing. *(The other two: Radio Troubleshooter's Handbook and Modern Radio Servicing were covered in our pilot issue and in Vol. I No. 1, respectively -- Ed.). Radio Physics Course* might be thought of as the prerequisite to Ghirardi's *Modern Radio Servicing*. With its emphasis on basic theory, it was intended to be a textbook for formal courses in radio.

The early chapters of this book cover sound, electron theory and basic electrical units (such as resistance, capacitance, magnetism, etc.)--always with a radio emphasis. The middle chapters cover typical radio components and circuits. The final chapters are devoted to radio-related devices and specialized areas of radio--including auto and aircraft radios, photocells, antennas and grounds, television, sound motion pictures, etc. There is also a chapter on radio testing and servicing.

The eleven appendices contain a variety of data more or less useful to the radio hobbyist--including conversion tables, wire gauge charts, etc.

This book contains a wealth of material for the beginning collector who wants to learn some electronic theory so that he can better understand how his sets work. The explanations are fairly non-technical and the math is easily explained and understood.

In addition to enhancing his technical knowledge, the serious reader of *Radio Physics Course* will also acquire a better feel for the magic of radio in the mid-1930's. Thus, the book will not only be of great value to the collector who is already committed to learning more about the technical side of the hobby, but also should help to convert those who now think of their acquisitions only as financial investments in pretty cabinets!

Conducted by Paul Joseph Bourbin

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.*

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)

General Information

Plug-In Ground-Fault Protection

The safety article in our September, 1993 pilot issue strongly advised radio restorers to equip their workbenches with GFI (Ground Fault Interruption) outlets. In the article, we discussed a type of GFI outlet that could be installed in place of a standard duplex outlet.

We recently heard from reader **Tony du Bourg** *(Summit, NJ), who enclosed a catalogue sheet showing a GFI outlet (Pass & Seymour Model 1591-P) that installs simply by plugging into an existing standard outlet. Intended for commercial and light industrial applications, it's a bit expensive ($30.00 class), but the convenience might be worth it to those who don't care to do their own wiring.*

Check your local electrical supplier for availability.

Vintage Book Review

Reader Des. Higgs (Sidney, BC, Canada) felt that the Vintage Book Review of Ghirardi's "Modern Radio Servicing" (Jan., 1994 Issue) was worth-while reading, and contributes the following review of another useful vintage book:

. . .Another vintage book which would be most helpful, especially to the beginning collector, is "Elements of Radio" by Abraham Marcus and William Marcus (Ralph Horton, Editor), Prentice-Hall, Inc. 1943. The book was designed for a one-year course and the materials are very well presented. The copy I have is the "Complete Edition" (two volumes in one). The text develops a clear understanding of the four essential parts of every radio receiver: the aerial-ground system, the tuner, the detector and the reproducer. The processes are clearly explained in terms understandable to a beginner.

As a practical follow-up to the theoretical work, the reader is given sufficient information to construct a simple crystal receiver. Through successive modifications, the set is equipped first with a diode -- then a triode -- tube detector. At a more advanced stage, the set becomes regenerative through the addition of a "tickler" coil. Later chapters deal with development of the a.f. amplifier; elimination of the B battery, A battery and C battery; AC-DC power supply theory; the dynamic speaker and the r.f. amplifier.

Mallory Bias Cells

The following information was condensed from an article originally published in the Spring, 1993 issue of "Antique Radio Club of Illinois News." The ARCI article was written by Jack Iverson (Palatine, IL), who kindly sent in a copy so that the information could be shared with other Radio Collector readers.

Here's something to keep in mind when trouble-shooting one of the larger 1930's radio chasses -- particularly if hum and/or distortion is present. Some of these sets had small clip-mounted or wired-in button-type cells to supply grid bias voltage for tubes used in certain audio output and automatic volume control amplifier circuits.

In such applications, it was easier and cheaper to use the

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"EVOLUTION"

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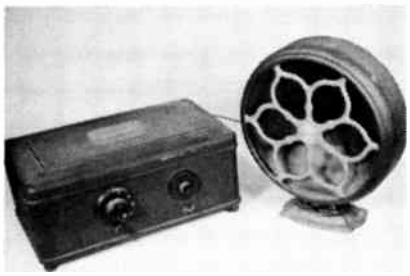
The shape of the cabinet changed, too, to accommodate the a.c. power unit which now nestled inside--typically behind the radio chassis. Losing its coffin shape, the cabinet took on a squarer "footprint."

And, perhaps to better dissipate the additional heat generated by the internal power supply and the hotter-burning tubes, the cabinet was now made more often of metal than of wood. On such cabinets, a snug, friction-fit, lift-off cover replaced the piano-hinged lid formerly used on the old "coffin" cabinets. The speaker was still external, but a more modern paper cone design (mounted in a metal housing that matched the cabinet) replaced the old horn unit used with earlier radios. Typical sets of this style were the Crosley Gembox and Atwater Kent Model 42.



Atwater Kent Model 42's simplified front panel, metal cabinet and square "footprint" typified design of early a.c. sets.

RCA and the Superheterodyne

The physical designs of RCA's radios were always a little advanced. During the battery-power era, when coffin-shaped 3-dialers with horn speakers dominated the market, RCA's offerings were served up in a variety of intriguing packages. There were the sloping front Radiola 20 and 25; there were sets with built-in speakers such as the Radiola 4, 26 and "Grand" (the latter looking more like a table-model phonograph of the era than a radio); and there were radios built into portable (or should we say "luggable") cases like the Radiola 24.

That's why it's a little startling that RCA's first couple of a.c.-operated receivers were offered in--have you guessed it?-- hinged-lid wood cabinets of the coffin-shaped variety! These sets were the models 17 and 60, but let me hasten to add that the cabinets were beautifully crafted furniture pieces made of fine woods, not the more utilitarian Bakelite-front units typical of the battery era.

Though the focus here is on RCA, we need a quick postscript to acknowledge that there were many other innovatively-packaged radios during the battery-set era. Among the ones that come to mind immediately are the thumbwheel-control Grebe sets, the Colin B. Kennedy sloping-panel exposed-tube jobs, the Atwater-Kent "open model" breadboard receivers and, certainly, the many interesting designs in the Zenith line.

Aside from the engaging physical design of its receivers, RCA was distinguished by its exclusive ownership of radio genius Edwin Armstrong's other masterpiece--the superheterodyne circuit. Though not common during the 1920's because of RCA's monopoly, the superheterodyne circuit would eventually become--and remain--the dominant design for receiving equipment of all types.

Unlike the TRF receiver (which amplifies the incoming r.f. signal at whatever frequency it happens to be received), the superheterodyne converts every incoming signal to a standard, much lower, frequency prior to amplification. By amplifying at this lower frequency (known as the intermediate frequency), greater gain can be obtained without danger of oscillation and greater selectivity can be achieved.

RCA's first plug-in superhet, the Model 60, had "throwback" coffin-shaped case.

Two well-known RCA superheterodynes of the mid twenties are the already-mentioned portable-cased Radiola 24 and sloping-front Radiola 25. Both of these sets sport large and flamboyantly-designed rotating loop antennas atop their cabinets. RCA's first plug-in superheterodyne was the previously-mentioned, coffin-shaped Radiola 60.

The Radio in Transition

By the late 1920's the basic circuitry of the modern broadcast radio receiver had been invented. Though circuit refinements would continue to be made, some of the most striking and important innovations of the next few years would involve the physical and mechanical design of the radio chassis. The family radio was moving out of the "breadboard" stage and taking on the look of a mass-produced appliance. We'll discuss the details of this interesting process next month, when we advance further along the path of broadcast receiver evolution.

MARC F. ELLIS

INFORMATION EXCHANGE

(continued from page 3)

little cells (which were developed by the P.R. Mallory Co.) than to derive bias voltages from the set's a.c. power supply. The voltages required were small (sometimes as low as one volt) and, since there was no current drain, the cells would last for several years.

The cells were made in 1 and 1.5-volt sizes, and you may find several wired in a series string. The symbol used for them on schematic drawings was a semicircle enclosing a bar (the bar is positive).

Since these units are intended to deliver only minute amounts of current, they will be damaged under the load of an ordinary multimeter. A vacuum-tube voltmeter or digital multimeter should be used for testing. You can also test by temporarily substituting flashlight cells of equivalent voltage.

For a permanent substitute, small watch batteries can be used, and these can sometimes be slipped into an original clip mounting by bending the spring slightly; add a drop of model cement to hold the battery in place. But be careful of the polarity: watch cells are usually case positive; bias cells are usually case negative.

PLAY IT AGAIN!

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

EARLY RADIO PIONEERS

The Basic Discoveries

Great inventions are seldom made by one person working alone in a vacuum. They are made by building on the work of others. Radio is no exception. Four famous names are linked with the discovery of radio and its commercialization: James Clerk Maxwell, Heinrich Hertz, Oliver Lodge and Guglielmo Marconi.

In 1865, Maxwell, a Scottish mathematician, building on the work of Michael Faraday, published a mathematical description of how electric and magnetic fields interacted to produce what he called "radiant energy." He predicted the existence of electromagnetic waves which traveled through space at the speed of light.

Hertz in Germany and Lodge in England independently set out to test Maxwell's theories. Hertz found that a spark discharge between two electrodes would cause a small spark to jump between the ends of a loop of wire held some distance away. Energy was passing between the spark discharge and the loop. He confirmed that this energy traveled at the speed of light and had a definite wavelength, just as Maxwell had predicted.

Lodge, meanwhile, had gotten similar results, but Hertz published his work first in 1887 and got the credit. At the time neither man suggested that these discoveries had any practical use.

Lodge kept working, and by 1894 was demonstrating his apparatus at meetings. His most important contribution to radio was the realization that both transmitter and receiver had to be tuned to the same frequency.. He called this concept "syntony," and patented the idea in 1897.

An Unsung Pioneer

About the same time Maxwell, Hertz and Lodge were beginning to develop their ideas, a little-known American radio pioneer was working along the same lines. Mahlon Loomis, a dentist by profession, had achieved a form of wireless communication as early as 1868. In that year, he flew two kites 18 miles apart. Both were held by wires. One kite had its wire insulated from ground while the other was connected to ground through a sensitive galvanometer. When the wire of the ungrounded kite was touched to the ground, there was a spark from the accumulated static charge on the kite--which caused the distant galvanometer to flicker.

Loomis did appreciate the commercial possibilities of his discovery and actually lined up a group of investors to exploit it. However, they had to pull out because of the financial panic of 1869.

The enterprising dentist patented his discovery in 1872 and was granted for a Federal charter for his "Loomis Aerial Telegraph Company" in 1873. Congress wouldn't give him any money, however, so once more he sought private financing. Again his hopes were dashed--this time by the financial panic of 1873--and that was the end of his dream. Moreover, since Loomis didn't publish his discovery in the scientific journals, the world remained ignorant of his work for many years.

Marconi Commercializes Radio

Guglielmo Marconi was the son of a prosperous Italian silk merchant and an English mother. He learned of Hertz's work during his studies with Professor Augusto Righi at the University of Bologna. Righi was one of the few men in Europe who understood what Hertz had accomplished.

Marconi decided to leave the university without graduating in order to begin experimenting with wireless at home. By 1895, he had developed equipment which he thought had good commercial and military possibilities. He offered it to the Italian government, but they weren't interested. So in 1896, the 22-year-old Marconi and his mother went to England to seek backing there.

The young inventor would have gotten nowhere on his own, but his mother had connections. She was the daughter of Andrew Jameson, maker of the famous Irish whiskey, and was also related to the Haig and Ballantyne families of Scotland. An interview was thus quickly arranged with William Preece, Chief Engineer of the Post Office--which operated the government-owned telephone and telegraph systems.

As it happens, Preece had been vainly trying to find a way to communicate with lighthouses and coastal islands without using wires. He was very receptive to Marconi's ideas and, after the equipment was demonstrated, became an ardent supporter. Preece urged Parliament to buy the results of Marconi's invention. But the government moved so slowly that, in 1897, the Jamesons and the Haigs formed a private company to exploit wireless.

With plenty of money at his disposal, Marconi rapidly improved his equipment and its range. Realizing the potential of maritime communication, he quickly negotiated contracts with Lloyd's, the marine insurer. By 1899 a ship-to-shore system was established, and transatlantic transmission was demonstrated in 1901. By 1905, Marconi had a virtual monopoly on marine wireless.

At this time, all transmitters used some form of spark as a source of broad-band radio waves. As more stations were installed, interference became a problem. Marconi realized the need for selective tuning and in 1900 patented a sending and receiving system containing all the elements of Lodge's 1897 patent.

Lodge subsequently went into business himself, competing with Marconi. Although Lodge knew that Marconi's patent infringed his, he took no action until 1911--when he filed suit. Marconi quickly surrendered and bought rights to the Lodge patent. In America, infringement suits were also filed and dragged on until 1943 (!), when the Supreme Court ruled in Lodge's favor.

Until the triode vacuum tube was invented, receivers couldn't amplify a signal. Little could be done to improve them, except to hunt for better and more reliable detectors. The main effort went into improving transmitters and antennas, and increasing power to get longer distance.

Science had not yet caught up with technology. The radio experimenters had no theory to guide them and just had to try different things to see what worked without knowing why.

Most people believe that Marconi invented radio when, in fact, he had very few original, creative ideas. His contribution was to take a laboratory curiosity and turn it into an industry.

Further developments in the radio art had to await the invention of the vacuum tube, which we will cover next time.

Ken Owens
478 Sycamore Dr.
Circleville, OH 43113

COMPANY CHRONICLES

Brief Biographies of Classic Radio Manufacturers.

ATWATER KENT RADIO

Last month we proposed that the prototypical living room radio brand of the 1930's was probably Philco. This month's brand, I'd say, fills the same role for the 1920's. Ask an average person with some knowledge of early technology to name the radio make that grandpa's parents might have purchased, and the answer will likely be "Atwater Kent."

Like the Philco organization, Atwater Kent was Philadelphia-based and had been engaged in the manufacture of automotive products before moving into the radio business. Mr. Atwater Kent, the founder, was actually the inventor of the mechanical ignition system (points, condenser and centrifugal advance) used in autos and trucks prior to the development of electronic ignition. His highly successful ignition unit, the "Unisparker," was sold for aftermarket installation in gas vehicles, and eventually the Atwater Kent line was expanded to include starting and lighting systems.

Because of the economic slump after World War I, and the fact that more and more vehicles were being supplied with factory-installed ignition, the company's business began to suffer. Kent saw the burgeoning radio market of the early 1920's as the perfect opportunity for diversification. He already had the equipment and know-how for metal forming, bakelite molding and coil winding--all essential operations in the manufacture of radio sets. He also had a national reputation as a manufacturer of quality electrical items, not to mention a network of dealers who would be quite comfortable handling radio equipment.

The first Atwater Kent products, advertised in mid-1922, were individual components: variometers and audio transformers. Later that year other components were added, as well as subassemblies such as detector and amplifier units. By the end of 1922, the company was building and advertising complete factory-wired breadboard-style radios.

By the mid-1920's, Atwater Kent was marketing more sophisticated breadboard, or "open model," receivers, including the models 5, 9, 10 and 12 so prized by today's collectors. Around that time, yielding to public demand for sets with less of a "laboratory apparatus" look, Kent also offered the model 20--which was enclosed in a mahogany cabinet with the now-familiar brown-crinkle-finished metal front panel.

Mr. Kent's marketing instincts were right on the money and his company became an industry leader. In 1924, having outgrown the previous quarters, he built a brand-new, two-million-dollar, five acre (eventually expanded to 32 acre) factory.

In 1926, Kent introduced a belt-ganged, one-dial-tuning set (the model 30) and--to stay price-competitive--switched to an all-metal cabinet. His first plug-in receiver incorporating the newly-developed a.c.-filament tubes (the model 37) also used a metal cabinet. It was an instant success and its updated successor of the following season (the model 40) sold over a million units.

During the years since Atwater Kent first entered the radio business, public acceptance of expensive sets had been increasing and radio price tags had been steadily growing. For the 1929-1930 season, Kent decided to downplay the table models that had been the backbone of his line and go after the higher-priced console market. He didn't anticipate the stock market crash and subsequent depression, however, and sales of his expensive model 55 and 60 screen-grid consoles plummeted.

Philco, which had been able to quickly convert to the manufacture of inexpensive midget sets, soared to dominance. But the Atwater Kent firm went into decline and eventually closed its doors in 1936.

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.

CLUB DIRECTORY

Send us basic information about your vintage radio club for free inclusion in our permanent directory. The directory will appear in The Radio Collector 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.

ILLINOIS
Antique Radio Club of Illinois (ARCI). Annual Radiofest; other meets throughout year. Newsletter. Dues $12.00. Contact Carl Knipfel, Rt. 3 - 200 Langham Rd., Morton, IL 61550.

INDIANA
Indiana Historical Radio Society (IHRS). Meets four times a year in different areas of Indiana. Quarterly bulletin. Dues $10.00. Contact Paul S. Gregg, 725 College Way, Carmel, IN 46032-2041.

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

MICHIGAN
Michigan Antique Radio Club (MARC). Quarterly newsletter. Quarterly Swap meets. Yearly convention. Contact MARC, P.O. Box 585, Okemos, MI 48864 or Jim Clark (517) 349-2249.

(continued on next page)

CLUB DIRECTORY (CONT.)

MISSOURI
Antique Radio Collectors and Historians of Greater St. Louis (ARCH). Monthly meetings. Monthly newsletter. Dues $10.00. Contact Charles Juedemann, 262 Churchill Ln., Ballwin, MO 63011.

NEW JERSEY
New Jersey Antique Radio Club (NJARC). Monthly meetings. Biannual swap meets. Dues $10.00. Contact Kathleen Flanagan, 92 Joysan Ter., Freehold, NJ 07728.

OHIO
Antique Radio Collectors of Ohio (ARCO). Monthly meetings. Quarterly newsletter. Annual show and auction. Dues $10.00. Contact Karl Koogle, 2929 Hazelwood Ave., Dayton, OH 45419-1945. Phone (513) 294-8960.

Society for Preservation of Antique Radio Knowledge (SPARK). Monthly meetings. Monthly bulletin. Quarterly newsletter. Quarterly swap meets. Dues $12.00. Contact Harold F. Parshall, 2673 South Dixie Dr., Dayton, OH 45409. Phone (513) 298-4044 days; (513) 268-2909 evenings.

OKLAHOMA
Oklahoma Vintage Radio Collectors (OKVRC). Monthly meetings. Monthly newsletter. Spring and fall swap meets. Write OKVRC, P.O. Box 72-1197, Oklahoma City, OK 73192-1197, or call Karen McCoy (405) 722-0595 or Jim Collings (405) 755-4139.

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.

WASHINGTON
Puget Sound Antique Radio Association (PSARA). Monthly meeting/tail gate swap meet. Monthly publication. Yearly "show and tell" contest. Yearly major swap meet. Permanent museum. Contact PSARA, P.O. Box 125, Snohomish, WA 98291-0125.

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

IF YOUR CLUB ISN'T REPRESENTED HERE, OR IN THE FOLLOWING "CALENDAR OF EVENTS," IT'S BECAUSE YOU HAVEN'T CONTACTED US! THE LISTINGS ARE FREE, 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. Plan on getting the information to us two months in advance for timely insertion of your item.

February 19. Indiana Historical Radio Society Winter Meet. 8 a.m.-3 p.m. EST., Holiday Inn, Southeast, 5120 Victory Lane, Indianapolis, IN. I-465 Emerson Exit 52. Contact Bob & Inez Shuck (317) 849-0381; Dr. Ed Taylor (317) 638-1641.

February 20. Antique Radio Club of Illinois Swap Meet. 7 a.m.-1 p.m., Regency Ballroom, Elgin Holiday Inn, 345 River Rd., Elgin, IL. (708) 695-5000. Limited table space - no reservations.

February 26. New Jersey Antique Radio Club Swap Meet/Flea Market, Hightstown Country Club Ballroom, Hightstown, NJ, 8 a.m.-1 p.m. NJ Turnpike Exit 8, then east on Rt. 33. Pre-registration required. Contact Jim or Ruth Whartenby (908) 271-7701.

TRADING POST

A Clearinghouse for Buyers, Sellers and Swappers

WANTED

Hallicrafters speakers: R-44 for SX-43; R-42 for SX-42; PM-23 for SX-28; black cabinet with wooden letter "h" on grill for SX-17. Charles Furtak, 241 Oak St., Elmhurst, IL 60126.

Crosley "book" radio, small leather book model, JM-8 series. Jim Warner, 75 Saybrook Rd., Essex Junction, VT 05452. (802) 879-7967.

Daven 1 1/2" x 1 1/2" neon TV tube (Kinolamp). Don Joyce, 8088 Whalen, Maineville, OH 45039. (513) 683-7013.

Dial glass, small knob for Zenith 7S633; plastic dial for Silvertone 9005; plastic dial window for Crosley 635; knobs for Airline 62-318 (P.E. 7/93 p. 67). Terry Schwartz, 340 Oakwood Dr., Shoreview, MN 55126-4821. (612) 483-4173.

Home-study radio course with demonstrations and experiments. Have test equipment and tubes to swap. See my ad under "For Sale." Claude Jordan.

Volume control for Philco 37-620. It is a 2-megohm with a 1-megohm tap. Carlos Martinez, #21 Colonel Irizarry St., Cayey PR 00736. (809) 263-2741.

Zenith 6D455 book case. Last on "most-wanted" list. George W. Carr, 5885 Wilson Rd., Lancaster, OH 43130-9510. (614) 687-6190 9-9 ET Machine 4th ring.

Zenith knob to complete restoration. Need center knob for shutter eye dial that drives motorised tuner model 12S265. Sam Zuckerberg, (212) 354-7407 (M-F 11 a.m.-4 p.m.).

General Television Model 534, looks like a grand piano, inner dial, lift top, 5 tubes. Marie Cyr, 162 Culbert St., Syracuse, NY 13208. (315) 476-8491.

(continued on next page)

TRADING POST (CONT.)

Speaker for Atwater Kent radios. Please send price info to R.W. Wondoloski-Eaton, RD4 Box 432 Lewis Rd., W. Pittston, PA 18643.

Canadian antique radio collector, interested in Hallicrafters, Hammerlund, Zenith, Sparton, Marconi, Emerson, Pilot, Crosley, Philco, National, RCA-Radiola, or any "good old radio." Rodger Henly, VE7DZD, 1635 Kings Rd., Victoria, BC CANADA V8R 2N7.

Need old Coca-Cola radio. Geary Boston, 4341 Tahitian Gardens Cir. #C., Holiday, FL 34691-3728. (813) 786-3061.

Power transformer for Jackson-Bell Model 62; antenna coil for Philco 625; electric tuning motor for RCA Model HF6. Harry Alenik, 14003 Judah Ave., Hawthorne, CA 90250.

Script for "Jimmy Wants a Jar of Electricity." Talk given to Ham Club early 1960's by J.D. Booth, W3IBW. (History of Ham Broadcast). David Booth, Jr., 831 Fairfield, Westminster, MD 21157. (410) 848-4025.

Looking for Instructograph code machines and/or tapes. Will consider any condition. Tony Bender, N8LDX, 7456 Annin St., Holland, OH. (419) 865-4723.

Rider Manual number 15 any condition. Would also like to find 21 and 22. Willy Young, Rt. 1 Box 171A, Smithville, TN 37166. (615) 597-1072.

1 & 2 tube superregenerative radios. Stephen Kalista, 9 Maple Dr., Jim Thorpe, PA 18229. (717) 325-4120.

Booklet (original or reproduction) detailing operating instructions-and any other information-for Grebe Synchrophase Seven. Des. Higgs, 8590 Sansum Park Dr., Sidney, B.C., Canada V8L 5B5. (604) 656-0675

Phono assembly for Zenith console (6-S-305). Same unit as in Rider's 10-32, Sears 4796. Owner's manual for "Conar" meter (Nat. Radio Inst.). Knob for Philco Transitone 53-564 (maroon center). Operational chassis for Pacific 321-36 or will purchase junk set for parts. F.V. Bernauer, 1503 Admiral Nelson Dr., Slidell, LA 70461. (504) 649-5453

Reward: I will pay $25.00 to the first person to call me with an original dust jacket for Alan Chapman's "Radio Boys on Signal Island." Tom Pamula (814) 864-9106 before 11 am or after 10 pm. Collect calls ok.

Cloth headphone cords. Charles Juedemann, 262 Churchill Ln., Ballwin, MO 63011. (314) 256-3727.

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.

FOR SALE

Fada Catalin 252; 652 chassis, no speaker cloth, $400. Dewald Catalin A501; yellow dial, glass not original, $350. Frank Brewster, P.O. Box 615, Baxter Springs, KS 66713.

HRO-M (5) with 9 coils, boxes, p.s.; NC 100A; Scott 23. Call. Jack Iverson, N9KYT, 1110 Old Mill Dr., Palatine, IL (708) 359-0941.

Assortment of test equipment to sell or swap, send SASE for list. Antique radio tubes, send needs. Claude Jordan, 3010 Acorn Rd., Augusta, GA 30906.

Sell or trade novelty radios. Send SASE for current list. Gary Arnold, 615 Oak St., Marion, NC 28752. (704) 652-6893.

Over 200 books and magazines from early 1900's to 1940's-1950's. SASE for lists. Also, ask for my want list. Goldman, 3 Amy Lane, Queensbury, NY 12804.

Radios, parts, literature, etc. Long SASE for list. Stan Lopes, KB6LGV, 1201-74 Monument Blvd., Concord, CA 94520. (510) 825-6865.

"BUD" trademarked metal file box for QSL cards; 3" x 3.5" x 5.5"; olive enamel w/yellow printing; pretty nice shape but no index cards; $8.00. HEADPHONES, "BUSH" with plastic shell & fabric cord, e/plug; excellent condx; $22.00. "CANNON-BALL" with nickel plate (?) and plastic shell; fabric cord with possibly later plug; very good condx; $22.00. R-F transformer "TRI-COL" (?); terminals marked "P C B F"; stamped "TYPE" AND "W"; all Bakelite (?) w/mounting base; $5.00. A-F transformer KELLOGG S. & S. CO. CHICAGO CODE 501-A; marked PRIM P - & SEC G F; as new; $8.00. TUBE SOCKET, 4-pin w/mounting, metal; "WALMART ELECT CO CHICAGO," terminals marked "P G - +";$5.00. J. Jablin, 9124 N. Crawford, Skokie, IL 60076.

Westinghouse H126 white refrigerator, $85.00; Zenith R7000-1 Transoceanic, three to choose from, $100.00, $150.00, $185.00. All plus UPS charges. Victor Marett, 3201 N.W. 18 St., Miami, FL 33125. (305) 634-9569

Original operator's manual for B.K. model 3020 sweep-function generator. Will sell or swap for "Conar" meter manual. (See my ad under "Wanted"). F. V. Bernauer.

YELLOW PAGES

Products, Publications and Services

SERVICE DATA AND HARD TO FIND PARTS Original SAMS photofacts, TSM, CB, MHF, TR and AR. Manufacturer's Data, FREE Catalogue. A.G. Tannenbaum, P.O Box 110, East Rockaway, 11518. Phone (516) 887-0057. 24 hour FAX (516) 599-6523.

Alpha-numeric index to Stokes' book "70 Years of Radio Tubes and Valves." $3.50 each, postpaid in USA only. Anthony Jacobi, 8053 Maywood St., Ralston, NE 68127-3729.

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. (609) 783-0400.

Buying WWII military surplus radio sets and accessories. Highest prices paid. Over $6,000 cash paid in 1993. America's WWII radio surplus leader. Sam Hevener, W8KBF, "The Signal Corps," 3853 Everett Rd., Richfield, OH 44286-97623. (216) 659-3244 before 8 p.m.

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