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Your Entry to the Fascinating World of Vintage Communications
I’m pleased to announce the latest addition to The AWA Gateway’s staff of regular columnists. He is AWA Museum volunteer Ronald N. Yeaple. The idea for his column had its genesis after Dr. Yeaple arranged to contribute a regular historical column, based on collections of the AWA Museum, to the Canandaigua, NY Daily Messenger and several weekly local papers. It was soon apparent that such a column, with some adjustments, would also be of great value to Gateway, whose stated mission is to introduce readers to “The Fascinating World of Vintage Communications.” Hence, Communications History at the AWA Museum was born. Ron begins his series of columns in this issue, tracing the development of communications
technology “From Telegrams to Texting,” by discussing the beginnings of Western Union. Ron is retired from the faculty of the Simon Business School at the University of Rochester. He holds a doctorate in electrical engineering and has been awarded seven patents in acoustics, biomedical instrumentation, and electronic publishing. We’re all looking forward to his insights into communications history as illustrated through selected artifacts from the Museum’s collection.

—Marc Ellis, N9EW

From The Deputy Director

Hello Everyone. Welcome to 2014. For the AWA, 2013 was a landmark year with the opening our fourth generation museum and we have welcomed nearly 900 visitors since May. It is very gratifying to present the new Museum to our visitors’ amazement and enjoyment after countless years of planning and often back breaking work to bring the new museum to fruition. It has been wonderful to take a modest rest break and just show it off.

As we look forward to 2014 and beyond, we are again in the planning mode. We are arranging to add two more buildings and another 2 acres of land to the campus. This will provide much needed storage and work space that will allow the AWA Staff to focus on organization and care of the collections.

In November 2013, I was proud to present the Radio Club of America Ralph Batcher Memorial Award to Bruce Roloson, AWA Curator, for his lifetime of preserving the history of radio and electronic communications. When I think of the many AWA members who have dedicated themselves to preserving and sharing the history of the technologies used in communications and preservation of the artifacts and ephemera, I am very proud to have been an AWA member for 30 years. It is a very special group always willing to share and especially willing to mentor newcomers to our hobby.

At the AWA, we very fortunate to have a knowledgeable committed Museum staff that supports the Museum operations and our AWA members. The accumulation of knowledge and the years of experience are amazing. And, if you add the unbelievable knowledge base of the whole international membership of nearly 2,000 members, membership in AWA offers an outstanding opportunity to learn more about collecting and the history of the technology used communications and entertainment. If you are not already a member, we would welcome and encourage you to join the AWA.

Also we would welcome more volunteers at the Museum. It is great way to learn about collecting and the history of communication technology while you have fun doing it. Please contact me at n2evg@arrl.net.

Join the AWA today and you are on your way to a lifetime of learning and fellowship. If you have not seen the Museum, plan a trip to the Antique Wireless Museum. You will not be disappointed.

—Bob Hobday, Deputy Director, The AWA Museum


A Flick of the Switch was originally published by Morgan McMahon under the Vintage Radio name in 1975, and was later reprinted by Antique Electronic Supply of Tempe, Arizona. There were five printings but only one edition; consequently all books, whether published by McMahon or Antique Electronic Supply have the same content.

This book, covering radio, television, ham radio apparatus, and World War II military equipment from the period 1930-1950 is much like McMahon’s book Vintage Radio (reviewed in the last issue of Gateway), which covered wireless apparatus from the time Hertzian waves were discovered in 1887 to the year 1929. This pair of McMahon books seamlessly covers the entire period from 1887 to 1950, complete with hundreds of equipment photographs and supporting narrative — quite an accomplishment.

The title of the introductory chapter “Welcome to Yesteryear,” immediately evokes the phrase “Return with us now to those thrilling days of yesteryear, when from out of the past come the thundering hoofbeats of the great horse Silver! The Lone Ranger rides again!” Indeed, McMahon begins the book with the
sentence: “A Flick of the Switch—that’s all it took to summon the new genie of radio entertainment.” He goes on to say that “We’ll help you meet old friends, like Just Plain Bill, The Lone Ranger and Jack Benny. We’ll see lovely old radio sets. We’ll meet the radioman, the ‘ham,’ and the radio collector. We’ll see electronic wonders of World War II. Fascinating!”

These subjects accurately describe the organization of the book and the order in which the chapters appear. Missing from the list is a reference to the final chapter entitled “How it Works,” which briefly describes the different types of circuits used in the receivers appearing in the book (regenerative, Neutrodyn, superheterodyne, etc).

McMahon says that he envisioned this book to be a valuable pictorial reference for home radio and TV, ham equipment, and World War II electronics from the period 1930-1950. Indeed, most of the book consists of photographs with a few pages of introductory material at the beginning of each chapter. Clearly McMahon was most interested in electronics for the home because almost half of the book is devoted to photographs of radios and televisions.

The longest of the three chapters (III), entitled “Home Radio and TV,” begins with ten introductory pages providing hints on what to look for in the remaining 134 pages. I strongly recommend reading these pages before browsing through the multitude of photographs, which otherwise would appear to be a sea of seemingly unrelated sets.

The sets are arranged by manufacturer for each of the thirty-three manufacturers that McMahon judged to be the most popular. The sets for each manufacturer are arranged by the year they first appeared in national advertisements rather than by model number. McMahon says he arranged it in this fashion so the reader would be able to understand how set designs evolved from large consoles that were popular in the early 1930s to the smaller table-top sets that were more affordable and therefore more popular as the 1930s progressed, the depression deepened and purses grew thinner.

The photographs include many individual sets as well as reproductions of advertisements prepared by manufacturers who grouped their sets to present their product lines in a single image. Most of the individual sets are identified by make, model number, year and original list price. While the title of this chapter mentions only radio and televisions, also included are pictures of stand-alone phonographs and radio-phonograph combinations.

Chapter IV, entitled “Amateur Radio,” contains examples of ham radio sets and radio shacks from the 1930s and 1940s. Several introductory pages describing the development of ham radio are followed by twenty-eight pages of photographs of ham radio equipment organized by ham shacks, amateur receivers, and amateur transmitters. Images of ham shacks are reproduced from collages that appeared in issues of QST magazine published both before and after WWII.

McMahon says that he selected photographs of amateur receivers made by the most popular manufacturers of the period: Collins, Hallicrafters, Hammarlund, National, Patterson, RCA and RME (Radio Manufacturers Engineering). He also included photographs of receivers from lesser-known manufacturers and grouped them under the title “Various Amateur Receivers.” The chapter ends with nine pages of photographs of amateur transmitters produced by selected manufacturers.

The third and last chapter devoted to equipment photographs (Chapter V) is entitled “World War II Radio-Electronics.” In the introductory paragraphs of this chapter, McMahon describes the key developments in radio and other electronic apparatus during WWII. Specifically, he notes the development communication equipment, radar and sonar, proximity fuses, “Loran” and “Shoran” to aid in locating ship positions, and electronic countermeasures and “Elint” or electronic intelligence.

While the main focus of this book is clearly on the three chapters of photographs, the remaining chapters cover a potpourri of topics including the evolution of broadcast radio, a salute to the radioman and woman who operated and repaired the equipment, and tips on collecting that should be of interest to the novice collector.

In Chapter II, entitled “Broadcasting,” McMahon takes the reader on a journey down memory lane by recalling popular radio personalities, performers, newscasters, memorable news events, soap operas, situation comedies and dramas that became staples in the home during the golden age of broadcast radio. Names like Bing Crosby, Jack Benny, Edward R. Murrow and many others are mentioned as well as programs like Ma Perkins, Helen Trent and Stella Dallas. There is plenty of nostalgia to go around, at least for the older generations.

In Chapter VI, entitled “The Radioman,” McMahon notes ship-to-shore radio operators such as Jack Binns employed by Marconi on passenger ships, Bud Waite who was Admiral Byrd’s radioman on most of his Antarctic expeditions, and of course the many unsung heroes who knew how to operate and repair them. McMahon says the Society of Wireless Pioneers (SOWP), an organization founded for wireless operators, is replete with names of men who led illustrious careers as radiomen. (SOWP was merged into the California Historical Radio Society in 2012).

In Chapter VII, entitled “Collecting,” McMahon gives a number of collecting tips, most of which are familiar to the veteran collector but will be useful to the novice.
Disregard the advice by McMahon on what one might expect to pay for the various categories of sets (e.g., battery-operated, AC-operated, early televisions) — the prices quoted are hopelessly outdated.

*A Flick of the Switch* is printed in black and white and the photographs are relatively small, matching the size and quality of those in McMahon’s book, *Vintage Radio*. The book has been out of print for a few years, but it is widely available at swap meets and from used book websites on the Internet such as AbeBooks.com in a wide range of prices. A number of sources currently price it at less than $6—a veritable bargain.

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**Company Chronicles**

*See copyright statement at end of article.*

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The Magnavox Company had its beginnings in 1910, when Peter L. Jensen (who had originally come to this country from Denmark to operate Poulson arc equipment) and engineer Edwin S. Pridham joined forces to form the Commercial Wireless and Development Company of Napa, CA. Their mission: to make a more sensitive telephone receiver (about the only way to increase the range of a radio receiver in those days before vacuum tube amplifiers). They succeeded by making use of very powerful electromagnets, but the resulting instrument was so heavy it couldn’t be worn. It rested on the table, hooked to the listener’s ears with rubber tubing.

The unit turned out to be too cumbersome to succeed as a telephone headset, but it was discovered that it made a rather good loudspeaker when coupled to a phonograph horn. This composite device was named the “Magna Vox” (Latin for “great voice”) and was promoted in a number of public demonstrations over the next few years.

Eventually, a phonograph pickup was developed for use with the Magna Vox. This attracted the attention of the Sonora company, and in 1917 that company’s western distributorship merged with Commercial Wireless and Development to form Magnavox Company.

Lt. Commander George C. Sweet, who was in charge of radio at the Mare Island Naval Shipyard (located near the Company’s Napa, CA location), had become interested in the fledgling firm. He asked Pridham and Jensen to apply their audio expertise to the improvement of aircraft intercoms. This led to the development of the SE4000S noise-canceling microphone. Later, during the World War, the microphone and a moving-coil receiver designed at Magnavox were used in telephone systems on some 1200 Navy and merchant marine vessels.

In 1919, Magnavox (now located in Oakland, CA) began making vacuum tube power amplifiers, and the following year introduced a loudspeaker for radio work. By the end of 1923, the company was in a very healthy position, having accumulated a surplus of almost a million dollars.

Magnavox now branched out into tubes and sets. By mid 1926, over 200,00 tubes were said to have been made. But plagued by design problems, the tube line was eventually dropped. The first Magnavox radio, nicely designed and one of the pioneering single-dial models, was released around 1924.

But the company began losing money in 1925 and, after some design changes to reduce production costs on its 1924-1925 radio model, finally gave up radio manufacture altogether in 1926. After that, the firm concentrated on the manufacture of dynamic speakers, on which they held some key patents. This specialization was the key to the company’s long-term survival. Magnavox became a part of North American Phillips in 1981.

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The Birth of Western Union

Rochester, New York has a long tradition of being a great place to start a major company based on innovative technology. Many years before Xerox and Kodak, another major technology company was launched from Rochester. The Western Union Telegraph Company was organized in the Reynolds Arcade on West Main Street on April 4, 1856. By 1900 the company was operating a million miles of telegraph lines and two international undersea cables.

In 1856, Samuel Morse and Alfred Vail patented a practical electrical telegraph, the invention that provided the technology for Western Union.

Since the late-1700s, experimenters had tried to find ways to use electricity for a telegraph device. But the electrostatic generators of that era had to be hand-cranked and produced spurts of high voltage but only very weak current.

A solution was found when Alessandro Volta (after whom the “volt” was named) invented the electric battery in 1800. The new battery gave experimenters a steady and reliable source of electric current suitable for an electrical telegraph.

Morse began his professional life as a painter of portraits and landscapes. In 1832, he became intrigued with the idea of an electrical telegraph after meeting an expert in electromagnetism, Charles Jackson of Boston.

While there were a number of competing designs of early electrical telegraphs, Morse and Vail’s 1837 invention had two major advantages: 1.) It required just a single wire to connect stations, and 2.) Messages could be sent quickly by a simple dot-dash code that Alfred Vail and William Baxter invented and perfected. The dots and dashes were printed out on a paper tape, as shown in the photograph.

A more powerful version of the Volta battery gave Morse’s invention a range of several miles between stations. But it seemed that no one could think of any practical uses for the electrical telegraph. In 1838 he demonstrated his invention to Congress and then throughout Europe, but attracted no supporters. The electrical telegraph appeared to be a technology that nobody wanted.

In 1842, Morse traveled for a third time to Washington to request funding for an experimental line, this time accompanied by Hiram Sibley, a successful Rochester businessman and entrepreneur. Looking for new challenges, Sibley’s interest was piqued by the recently developed telegraph device invented by Morse.
This time, with Sibley’s help and coaching, Morse’s appeal to Congress was successful, and he was awarded $30,000 to build a test line from Washington, D.C. to Baltimore. Now Morse needed someone to actually build the line, and that person was Ezra Cornell.

Ezra Cornell was born on January 11, 1807 in the town of Westchester, New York. He arrived in Ithaca, New York at age 21 and worked for several years as a mechanic and in construction until he was laid off during the Panic of 1837. Subsequently he purchased the patent rights to sell a new plow design in the territories of Maine and Georgia.

While traveling in Maine, Cornell met F.O.J. Smith, who had a contract from Samuel Morse to lay lead pipes enclosing telegraph wires for the test telegraph line between Washington and Baltimore. Smith was struggling to design a machine to lay the cable underground.

At Smith’s request, Cornell designed a plow that would both dig the trench and lay the cable. Morse came to Maine for a demonstration, approved it, and hired Cornell to lay the underground cable alongside the rails of the Baltimore & Ohio Railroad line connecting Washington and Baltimore.

But as the work proceeded, Cornell became concerned that the insulation of the wires would break down in underground use. He decided instead to build an overhead line from Washington to Baltimore with the wires strung on poles having glass insulators.

On May 24, 1844, Morse inaugurated the test line by transmitting the first telegraph message from Washington to Baltimore: “What Hath God Wrought.”

In 1851, Hiram Sibley organized the New York & Mississippi Valley Printing Telegraph Company in the Reynolds Arcade in Rochester to acquire and consolidate many of the regional telegraph companies that had sprung up. Cornell agreed to merge a telegraph company he owned with Sibley’s company. The merged company was named The Western Union Telegraph Company at Cornell’s insistence. Cornell received $2,000,000 in Western Union stock. Sibley was the first acting president.

Cornell held on to his Western Union stock and for more than fifteen years was the company’s largest stockholder. Over the first sixteen years, the company grew to four thousand telegraph offices and was valued at almost fifty million dollars.

Cornell purchased a 300-acre farm between Fall Creek Gorge and Cascadilla Gorge in Ithaca, land that would become the campus of Cornell University. A few years later, he announced his offer to donate his farm and $300,000 (soon to be increased to $500,000) to establish a land grant college in Ithaca.

His dream was to found a university that would teach practical subjects such as agriculture and engineering on an equal basis with the classics favored by more traditional universities of the time. Hiram Sibley provided funds for the establishment of the Sibley College of Engineering at Cornell University and for the Sibley Library building at the University of Rochester. On October 7, 1868, Cornell University welcomed its first class of 412 students with the words of Ezra Cornell, “...an institution where any person can find instruction in any study.”

Western Union exhibit includes some century-old artifacts.

ABOUT THE EXHIBITS

The exhibits pictured in this column are from the collections of The AWA Museum.

The museum is located at 6925 Routes 5 & 20 just east of the intersection with Route 444 on the south side. Our hours are Tuesday 10 a.m. to 3 p.m., and Saturdays and Sundays 2 to 5 p.m. The Adult Admission Fee is $7, Kids and Teens are free, AWA Members are free. The AWA Museum is closed holiday weekends and on Tuesdays, if that day is a holiday.

To learn more about The Antiques Wireless Association and The AWA Museum please visit www.antiquewireless.org
Clubs That Will Welcome You

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

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

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

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

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

• Central Ohio Antique Radio Assn. — Meets on the third Wednesday of March, June and September at 7:30 p.m. at DeVry Institute of Technology, 1350 Alum Creek Rd., Columbus (I-70 Exit 103B). Swap meets: “Cabin Fever” in January and outdoor tailgate in July. December Christmas party. For more info contact Barry Gould at 614-442-1518 or Dave Poland at 614-890-5422 or dcp944@yahoo.com.

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

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

• Hudson Valley Antique Radio and Phono Society [HARPS] — Meets the 3rd Friday of the month 7:30PM at the Episcopal Church of Suffern Annex, 65 Washington Ave., Suffern N.Y. 10901 for info contact Rev. Dale Cranston at (845) 357-1615 or dale.cranston@gmail.com.

• Indiana Historical Radio Society — Active since 1971. Meets in Feb. (Lawrence), May (2-days, Kokomo) and Oct. (Greenfield). Flea market, old equipment contest, and auction at all events. Meet details and club info at website www.indianahistoricalradio.org. $15.00 annual dues includes the IHRS Bulletin published quarterly. Contact Herman Gross, W9ITT, 1705 Gordon Dr., Kokomo, IN 46902, 765-459-8308, email w9itt@comcast.net.

• London Vintage Radio Club — This Ontario, Canada club meets in London on the first Saturday of January, March, May, and November. Annual flea market held in Guelph, Ontario in June. Contact: Dave Noon, VA3DN, 19 Honeysuckle Cr., London, ON N5Y 4P3, Canada. Email: va3dn@execulink.co. Website: http://lvrc.homestead.com/index.html.

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

• The New Jersey Antique Radio Club — Meets the 2nd Friday of the month 7:30 p.m. at either Info Age
Enjoying Antique Radio
Some Radio Hobbies, Associations, and Publications

Radio, whether as science, business, or hobby, is a vast and complex subject with many subsets. Your interest in antique radios and electronic gear has brought you to this publication. Now I am going to write about some, but not all, other radio hobbies. 

Probably the radio hobby with the largest number of active and interested participants is amateur radio (ham radio). Many persons collecting antique radios are hams, as are many writers of articles for Gateway, the AWA Journal, and other antique electronics books and publications. Many hams enjoy using antique equipment for their radio contacts and contests. But it seems that the majority of hams are not much involved with antique radios. More than once I have been at a hamvention sharing publicity and space with an antique radio swap meet, and it seemed that a relatively small percentage of the hams wandered over to look at the old AM sets. 

I am not a ham although I listen to hams on short wave sets and scanners. Other than antique radio collecting and appreciation, I have three other radio hob-
bies; short wave listening, old radio programs, and AM DXing. I receive quite a few radio-related publications via the Internet or the mail.

**SHORT WAVE LISTENING**

In earlier issues of *Gateway*, I discussed short wave listening in some detail, so I won’t go into it again now except to mention some related associations and publications. I am a member of the North American Shortwave Association, described as America’s Shortwave Broadcast Club. The *NASWA Journal* is their fine publication, a monthly containing station news and members’ recent loggings.

Some good publications covering almost anything radio-related have been *Popular Communications* and *Monitoring Times*. The last issue of *Monitoring Times* was issued in December 2013; it is ceasing publication not because it is unappreciated or of limited interest, but because the founding publishers are retiring after turning out a great work for several decades. (Note: As of this writing [2/3/14] major changes are taking place at *Popular Communications*. See their web site at www.popular-communications.com/—ed)

The *NASB Newsletter* is free via Internet, and is produced by the National Association of Shortwave Broadcasters. It is published after their annual meetings, and at various intervals throughout the year. The newsletter usually invites readers to attend their meetings at no charge, and attendees are provided with food as well. NASB is an organization of privately owned broadcasting companies, religious, commercial, or both.

**ANTIQUE RADIO**

Antique radio clubs, publications, swap meets/flea markets, and websites are abundant. Until recently, I was a member of six antique radio clubs. I belong to each club for slightly different reasons, usually residence related. Two years ago, I moved out of Arizona, and am no longer a member of the Arizona Antique Radio Club. I joined SCARS, the Southern California Antique Radio Society when I moved to that location. Of course, I am a member of the national club, Antique Wireless Association.

My Indiana Historical Radio Society membership comes from having worked for RCA in Indianapolis for 9 years and my expectation that I will interact with some other former RCA people through that club. My membership in the Michigan Antique Radio Club relates to my many years living in Michigan, working at an FM station there and listening to a lot of radio on a lot of sets in that state. My membership in the Antique Radio Club of Illinois is based on a lifelong deep interest in Chicago radio broadcasting and manufacturing started by having listened to $0,000 watt clear channel stations in the wide open prairies of South Dakota, as well as to Chicago radio for many decades while living in Illinois, Michigan, Indiana and South Dakota and because of my family roots in Chicago.

In addition to the club and associations publications referred to above, I receive *Antique Radio Classified*. That publication began in the 1980s but has fallen on difficult times. It used to contain dozens of pages of antique electronics ads posted by buyers and sellers, and also had pictures of, and articles about, antique radios. A wonderful feature was the auction reports, listing equipment sold at price ranges from $5 up to several thousand dollars at auctions of collectors’ estates, club meets, and sale companies.

Unfortunately the Internet, with collectors’ web sites, Craigslist, and eBay has dramatically reduced the popularity for a monthly publication, even though the magazine itself has a web site. About two years ago, the long-time publishers retired and the magazine was bought by its current publisher, who moved it from Massachusetts to New York. The new owner then was hit by Hurricane Sandy last year, which ruined much of his facility. He is still publishing but has fallen behind several issues, which is particularly detrimental in a classified ad publication. We wish him the best because it is an interesting magazine and a worthwhile endeavor. (Note: As of this writing [2/3/14] *Antique Radio Classified* has resumed publication in a mixed print/digital mode. See their web site at www.antique-radio.com/—ed)

*Electric Radio* is an excellent monthly publication. It has several articles each month usually involving antique radio rehab experiences or the history of a particular antique model or equipment manufacturer. Many of the items covered are ham or military equipment, although any type of vintage electronic gear might be covered. The articles are well researched, and include footnotes, diagrams, and photos.

**OLD-TIME RADIO PROGRAMS**

Another radio hobby involves old-time radio (OTR) programs and history. It is another surprise to me that old radio programs and old radios do not share more enthusiasts. Antique radio collectors do frequently refer to the programs originally heard on the items that they have collected, but I belong to several OTR organizations and have detected very little interest in antique electronics among the members of those groups. Use of cathedral and other classic vintage cabinets as logos for publications and nostalgia convention programs is more common. Nevertheless, I have a lot of interest in both the golden age programs and the sets used to receive them.

Good OTR groups or publications include SPERDVAC (Society for the Preservation and Encouragement of Radio Drama Variety and Comedy) based in Southern California. Its magazine is *Radiogram*. *Radio Recall* is the publication of the Washington D. C. area OTR club. *OTR Digest* and *Nostalgia Digest* present interesting ar-
articles about radio programs, including some that you may have forgotten or never heard.

**DXING**

Moving on to the DXing hobby — DXing refers the act of trying to receive programs transmitted from very far away in long wave, medium wave, short wave or very high frequencies. The transmissions might be in AM, FM, TV, CW (Morse code) or various digital forms. My particular interest is in AM (medium wave) DXing. The National Radio Club with its DX News and the International Radio Club of America with DX Monitor are the major U.S. clubs. Several regional groups and several international groups are also active.

DXers may keep precise records of the stations that they have captured. Tools include various antenna systems including experimental ones, knowledge of sunset, sunrise, and darkness factors affecting reception, sharing of information, tracking of formats, reference books with frequency, power, broadcast hours, and network data, and recording equipment to capture the elusive top of the hour station identification announcements. Lists of stations which carry various sports teams are published so that the DXer can try to identify the catch by the play by play broadcast carried.

My interest in AM DXing is not so much in the technical aspects of reception, but I have long had an interest in radio program content, historical and current. So in future articles, I plan to delve in that part of the wonderful hobby of radio.

All of the radio hobbies I have mentioned, short wave listening, old time radio programs, and medium wave reception/program content are a good fit with the antique radio collecting hobby. Using vintage equipment in each of these doubles the satisfaction.

Of course, all of these hobbies have huge amounts of related resources available on the Internet. Questions or suggestions or coverage requests? Let me know.

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**Play It Again**

A No-Nonsense Guide to Vintage Radio Restoration

**PART 12—THE SUPERHETERODYNE: IF AMPLIFIER, DETECTOR AND AVC**

**THE IF AMPLIFIER**

Last time we learned how the superhet converts the incoming station frequency to an intermediate frequency (IF). The IF is then fed to the circuit of Figure IA (left of the dotted line) for amplification. This is a straightforward RF amplifier with one exception: it is tuned to a single frequency, the IF, by the trimmers CT. With four tuned circuits, this amplifier is very selective and rejects all frequencies but the IF.

The grid is returned to the AVC bus instead of ground. Ignore that for the moment; I’ll explain it later. One IF stage is normally sufficient for the AM band, although expensive sets sometimes had two. Designing more than two IF stages is very difficult. Only makers like Scott used more. V1 is a remote cutoff (super control) pentode used for its ability to handle a wide range of signal strength without overloading.

The grid-leak detector reigned supreme until about 1929 when the high-gain screen grid tube made the “power” or “plate” detector practical. This detector consists of a tetrode biased almost to cutoff so that it doesn’t respond to the negative cycle of the RF wave. This non-linearity makes it a rectifier. Its advantage is its large output requiring less subsequent amplification. Both types of detector suffer from high distortion and inability to handle strong signals.

![Fig. 1. Signal from IF amplifier (V1) is fed to detector/AF amplifier (V2). Courtesy of Pat Owens.](image)
DETECTOR CIRCUITS

Around 1930, designers resurrected the diode detector. It can handle large signals with low distortion, but won’t amplify like the other detectors. There had been no diode tube since the days of Fleming, so designers tied the grid and plate of a triode together to make a diode. They also realized that, unlike other detectors, the diode produces a DC voltage proportional to signal strength, which can be used for gain control.

The tube industry responded in 1932 with the Type 55, which combined a pair of diodes and a triode amplifier in one tube. The diodes and triode shared a common cathode. The circuit of Figure 1B immediately became popular. Note that Figures 1A and 1B connect together as shown by the arrows.

The diode detector functions the same as we learned earlier. The IF transformer output goes to the diode plates which are tied together as a half-wave rectifier. As with any rectifier, the cathode is positive and the bottom of the coil winding is negative. A negative DC voltage modulated by the audio appears at this point. C2 blocks the DC component, but passes the audio to the volume control, VC. From VC the audio goes to the grid of the triode section for amplification. R2 provides self-bias for the triode. The audio signal also appears on the cathode and must be bypassed to ground with C3 which is in the range of 8-10 µF. If your set plays at fair volume even with the volume control turned all the way down, check C3. If it is open or dried out, it will cause this condition. R3 is the diode load resistor.

AUTOMATIC VOLUME CONTROL

The negative voltage at the bottom of the IFT winding still has an RF component which is filtered out by C4. The audio pulsations are filtered out by RI and Cl. The filtered DC which varies with signal strength is used to bias the grid of the IF amplifier. A strong signal results in a larger negative voltage which reduces the gain of the IF amplifier. This process was named “automatic volume control” (AVC) by Philco, which is credited with first using it in the Model 9S of 1930. If C1 is open, the set may squeal due to RF feedback. If it is shorted, there will be no voltage on the AVC bus.

AVC doesn’t mean you never have to touch the volume control. The action is not perfect, but it’s a vast improvement over sets without AVC. The control is sufficient to keep strong stations from blasting out when you tune across them, and AVC will compensate for slow fading. Note that the AVC bus is shown continuing to other stages.

In sets without an RF amplifier (the antenna goes directly into the mixer/ converter), the mixer/converter is normally under AVC. If there is an RF amplifier, it is put under AVC, but the mixer/converter normally is not. The mixer/converter performs better if its voltages do not vary. Only more expensive sets have RF amplifiers.

Many circuit and tube developments in the 1930s were the result of economic pressures. The Great Depression drastically reduced the public’s disposable income. To stay alive, the radio industry had to cut costs and selling prices without sacrificing the performance which the radio listener had come to expect. Use of the superhet circuit and the development of multi-function tubes like the pentagrid converter and the diode-triode cut costs by reducing tube and parts count while maintaining set performance.

Further cost reductions were achieved by eliminating the audio and power transformers.

READER INTERNET SITES

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

Allie Lingo (radiodoc@windstream.net) sent two:

Radios: http://www.radioatticarchives.com/contributor.htm?code=499

Test Equipment: http://www.oldtestequipmentarchives.com/contributor.htm?code=26

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

www.leedeforest.org.

The Tube Collector’s Association Tube Photo Gallery

http://radioheaven.homestead.com/TCA.html

Don Ignatius Collection

www.radionutzantiqueradios.com

Ron Lawrence sent several URLs featuring his collections and interests:

Radio Heaven page

http://radioheaven.homestead.com/menu.htm

Clough-Brengle test equipment page

http://cloughbrengle.homestead.com/

Civilian Conservation Corp. page

http://radioheaven.homestead.com/CCCradio.html

Ron’s YouTube channel—with video tours of his collections

http://www.youtube.com/user/w4ron
In the previous installment of this series on the evolution of the broadcast receiver, we saw how the imposing living-room radio of the late 1920s was scaled down to create the “AC-DC” set, a type of compact, affordable receiver better suited to the lean years of the 1930s. These radios were a wonderful entertainment investment for families on tight, depression-era budgets, and many thousands were sold. Over the years, this popular design continued to evolve both technically and aesthetically, and by the early 1940s, the AC/DC set had changed quite a bit.

STREAMLINING THE CABINETS

Cabinets were now more often made of plastic — molded into the rounded, “streamlined” forms so strongly favored during the era — rather than wood. Generally that plastic was Bakelite, either left in its natural deep-brown color or with a painted finish applied. Catalin plastics, which could be produced in a variety of glowing colors, were also used. Relatively few Catalin sets have survived to the present day. They are now much prized by collectors, and good examples sell for hundreds of dollars.

NEW CIRCUITRY AND TUBES

Whereas the earlier AC-DC radios could be found in both TRF (tuned radio frequency) as well as superheterodyne versions, the TRF was now rarely built. The typical AC-DC set now incorporated the more efficient superheterodyne circuit, its chassis sporting the two square-topped aluminum IF transformers that are a hallmark of this design. And, thanks to the development of a whole new family of high-voltage heater tubes designed for series-string work, ballasts and line-cord resistors went the way of the dinosaur.

One particular set of the new tubes: the 12SA7, 12SK7, 12SQ7, 35Z5 and 35L6, was so commonly used that it became known as the “All-American Five.” Note that the heater voltages (first two digits of the type number) add up to 106, a value close enough to the nominal 110-volt line voltage of the time so that no series resistor was needed.

These new glass and/or metal tubes were much more compact than their tall glass predecessors. Height was reduced by about 50%, and the envelope itself was also slimmed down, now taking a straight tubular shape in contrast to the former bulging curved profile.

With the development of more efficient permanent magnets, the loudspeaker no longer needed a DC-powered electromagnet and therefore lost its field coil. The coil’s function in the power supply filter circuit was taken over by a heavy-duty resistor, which served well enough as a choke thanks to the much larger filter capacitors that had now become available.

Finally, it was no longer necessary to deploy a hank of antenna wire under the rug or toss it out the window. Thanks to improved
design, increased sensitivity and more powerful radio stations, most receivers picked up a more than adequate signal from a neat self-contained loop antenna mounted in the back of the cabinet.

**THE 3-WAY PORTABLE**

The development of yet another tube family made it possible to free the AC-DC set from the power line and place it in a portable case that could be carried anywhere. The new tubes were similar physically to the glass types in the “high voltage” family just mentioned, but had reduced power requirements as well as 1.4-volt filaments that could be lit from dry batteries. Common types were the IA5, IA6, IA7, IH5 and IN5.

Though the tubes in the two new families just mentioned were certainly compact for their era, they shouldn’t be confused with the still-further-scaled-down glass types that appeared a few years later. The latter have much smaller envelopes and are baseless, the connecting pins passing directly out through the tube’s glass bottom. The former have an attached metal or plastic base equipped with an octal (eight-prong) plug.

The new portables began appearing in the late 1930s. There were even radio-phonograph models incorporating a spring-wound turntable. Most could be operated from the AC or DC line as well as from a compact internal battery pack, and hence were called “3-way portables.”

These sets, enormously popular with teen-agers, soon became ever-present at picnics and beach parties. Adults liked them too. Housed in their distinctive airline luggage cases, the little radios lent a romantic image to their owners. The carrier of such a set was obviously a person who needed to stay wired in while traveling the city or the world on mysterious and important errands.

The portables of this era are fun to study today because they often incorporate interesting mechanical features such as flip-up dials, removable loop antennas and cleverly-designed compartments for holding batteries and stowing line cords. Many were marvels of space utilization, housing the radio chassis and a set of filament and plate batteries in a cabinet comparable in size to (or maybe even smaller than) an ordinary AC-DC table model.

It’s important to keep in mind that, though AC-DC sets and 3-way portables were being made in great numbers during the 1930s and 1940s, plenty of full-featured table models and consoles were also being produced. Next time, we’ll discuss some developments of the 1930s and early 1940s centering around the more expensive sets.
When the new AWA Museum was dedicated on August 20, 2013, Curator Bruce Roloson opened his remarks with this question: “Can You Imagine a World without Communications?” Except for a few people who live in extremely remote parts of the world, everyone alive today has access to some type of modern communications, and the choices continue to expand. A survey by the United Nations in March, 2013, found that among the estimated 7 billion people in the world, 6 billion have access to mobile telephones while only 4.5 billion have access to working toilets.

But for our ancestors who lived more than two centuries ago, rapid communications beyond the range of hearing or seeing did not exist. This not only made life more difficult but was sometimes fatal. Men died in battles that were fought after peace treaties were signed. Ships sank without any hope of rescue unless another ship was nearby. People could only conclude that the ship was “lost at sea.”

Modern communications began with the development of the telegraph in the mid-19th century. The telephone made its appearance later that century, and radio was developed in the early 20th century. But it was not until the 1920s that radio broadcasting began to have a significant impact on most people.

Radio had a liberating effect on society. For the first time people could listen to information from other parts of the world. They could hear news, weather reports, music, and sporting events as they happened. When important news occurred, it could be shared instantly with the rest of the world.

Early radios were expensive. The crystal set was the least expensive radio receiver available to listeners in the 1920s. It used no vacuum tubes and required no source of power except from the radio waves themselves. But it was not very sensitive and had poor selectivity. Audio levels were determined by the strength of the radio signal.

The most economical radio receiver that provided reasonable performance was the regenerative detector, a circuit invented and patented by Edwin Howard Armstrong. By operating a vacuum tube detector on the threshold of oscillation, it could provide both improved sensitivity as well as good selectivity. Most receiver designs followed the regenerative detector with an audio amplifier stage to provide more adequate audio levels, allowing more than one listener to use headphones or to use one of the early loudspeakers developed during that decade.

A typical two-tube radio of this type was the Crosley 51 Special, shown in an ad, pictured here, from the May 1925 issue of Radio News magazine. It was priced at $23.50, equivalent to more than one week’s pay for most people in the mid-1920s. Vacuum tubes sold for $3 each, and these radios also required expensive batteries for operation. But radios provided a unique window to the outside world and sold well.

During the 1950s, my family inherited a similar Crosley radio from the estate of a family member. My father found some batteries to operate this radio. We ran a wire out a window to a tree, connected a ground wire to a water pipe, and were able to listen to this interesting radio that was more than 30 years old at the time. I remember that its performance was surprisingly good for a simple two-tube set. When properly adjusted, it provided good audio levels and was selective enough to separate two broadcasting stations that were only 50 KHz apart.

Unfortunately, that old radio was packed away in a cardboard box and stored in a garage that had a leaky roof. By the time I inherited it from my father, the cabinet was in poor condition. The wood was warped, and the veneer was peeling off. My woodworking skills are poor, so I sold it to a radio collector who planned to rebuild the cabinet.

In 1927, a significant aviation news event occurred that captured the imagination of people all over the world. A New York hotel owner, Raymond Orteig, offered a $25,000 prize to anyone who could fly
non-stop from New York to Paris. Charles Lindbergh, a young pilot, heard about this prize and decided to pursue it. Lindbergh was already an experienced pilot. He was flying the Air Mail route between Saint Louis and Chicago, often in poor weather conditions.

Business leaders in Saint Louis raised funds to build an airplane that could make this trip. Lindbergh worked with the Ryan Aircraft Company in San Diego, California, to design a modern single-engine monoplane that was specifically suited for this challenging flight. He named the plane “The Spirit of Saint Louis.”

People asked him if he was planning to take a radio with him. But the battery-powered radios available then were heavy. Lindbergh explained that a few more gallons of gasoline were more important to him than a radio. He even trimmed the edges of his maps to reduce weight.

After many test flights and a transcontinental flight from California to New York, Charles Lindbergh filled his plane with 451 gallons of gasoline and took off from Roosevelt Field on Long Island, New York, on the rainy morning of May 21. The soggy runway slowed his departure, and he barely cleared obstacles at the end of the runway with his heavy fuel load. If his takeoff had been unsuccessful, he would have probably died in a fiery crash, as other pilots competing for the Orteig prize had already done. For the first few hours of the flight, Lindbergh flew over land. But after he left eastern Canada, no one knew where he was or if he was still alive.

Lindbergh faced many potential obstacles during this epic flight. Even though he was flying the best airplane available at the time, there was always the possibility of mechanical trouble. Ice over the North Atlantic built up on the wings and threatened to force the plane into the ocean. Unexpected winds might blow him off course. And the fatigue of staying awake and alert for more than 33 hours was also a major concern.

People around the world knew that Lindbergh was probably in the air over the Atlantic Ocean, and they were eager to hear any reports about his progress. The airplane worked flawlessly, Lindbergh’s navigation was good, his fuel reserves were adequate. Lindbergh landed on Sunday, May 21, at Le Bourget Field at 10:22 p.m. Paris time.

As Lindbergh was landing in Paris, it was late afternoon for families around Winchester, Kansas, who were preparing to attend a Sunday evening church service. My father, who was eight years old that year, was attending church with his parents. As the family approached the church, they noticed that members of the congregation were excitedly talking about something. They quickly learned that one of the men in that crowd had been listening to his radio just before he left for church. He had heard the important news: Lindbergh had landed safely in Paris!

It is doubtful that anyone in that congregation remembered anything else about that church service. But my father remembered the excitement of hearing that Lindbergh had landed in Paris and the fact that the news came by radio. He told me this story 30 years later when our family attended the movie, “The Spirit of St. Louis,” starring Jimmy Stewart, which was released in 1957.

Lindbergh received a hero’s welcome when he returned home, just as astronauts did when they returned from their historic space voyages in the 1960s. *Time* magazine named Lindbergh their “Man of the Year” for 1927. The photo from the cover of that magazine is included in this article. The Spirit of St. Louis was donated to the Smithsonian Institution.

Lindbergh was impressed with the development of the German Air Force in the 1930s and made controversial statements that caused some people to question his patriotism. However, he worked as a civilian advisor for the U.S. military in the South Pacific during World War II to help pilots extend the range of their airplanes. Later in life, Lindbergh became a conservationist and environmentalist.

Lindbergh’s historic flight in 1927 had additional significance. The fact that it was reported almost instantly by radio underscored the importance of modern communications. Sales of radios increased in the late 1920s. By the 1930s, nearly everyone had access to some type of receiver.
Members’ Corner

News of Particular Interest to the AWA Membership

SUSTAINING MEMBERSHIP – A NEW WAY FOR YOU TO SUPPORT AND ENHANCE AWA

When you join or renew your AWA membership, please consider doing so at the Sustaining Membership level! The $110.00 fee includes regular dues of $35.00 plus a $75 tax deductible donation to AWA. Most of the regular dues goes toward the expenses related to publishing and mailing The AWA Journal, which is sent out quarterly to all members. But with the opening of the new AWA Museum in August 2013 came additional financial requirements. We must find ways to increase revenues to defray the costs of the expansion, operations, maintenance, and enhancement of our museum facilities and displays.

In order to achieve the goal of making the AWA Museum a world class facility, we have been soliciting and receiving donations, large and small. The Sustaining Membership level was established last year in connection with this initiative. It would be ideal if you could renew your membership at this Sustaining level each year. However, any contribution you might make over and above the $35.00 regular dues will help AWA expand the facilities and displays as we share our magnificent collections and history with AWA members and the general public.

Incidentally, our other special form of membership, the Lifetime Membership, does not include a tax deductible contribution. The entire fee is allocated to providing The AWA Journal and other benefits over the lifetime of the member.

Richard Neidich
Chairman, Membership Services Committee


ABOUT THE ANTIQUE WIRELESS ASSOCIATION

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

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

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

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

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

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

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

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

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

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

**DONATING ARTIFACTS TO THE AWA**

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