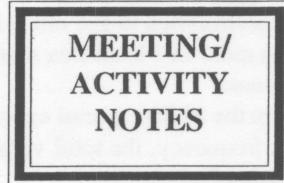


The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

AUGUST 2003

Volume 9 Issue 8



Reported by Marv Beeferman

The July meeting of NJARC featured our always popular show-and-tell session. Here's a short description of some of the great items that were displayed; the visuals start on page 2:

- Marsha and Jerry Simkin showed an original water color of an RCA affiliate recording studio in Madrid (late 60s?) and a lithograph of the former Tuckerton wireless station executed from a 1994 water color by local artist Cathleen Engelsen.
- John Dilks held high his recently acquired Pilot Wasp receiver, with coils, from the late 20s.
- What's a "Blabber Mouse"? - Walt Heskes' novelty radio in the form of a mouse whose mouth movement is synchronized to the radio's audio. While we're on the subject, you might want to catch Walt's article "The Hallicrafters S-38A - A Gift from RadioBob" in the August issue of *Antique Radio Classified*.
- Mike Hoffman's NAGRA III tape recorder is a high-end Swiss masterpiece that was used extensively by the news services. It sold for about \$2,000 in the early 60s and remained virtually unchanged up to 1984. The recorder has 4 independent heads for erasing, playback, recording and movie synchronization and Mike demonstrated its superb sound reproduction qualities.
- Ray Chase demonstrated a W.W.II code practice machine that uses a paper tape and photocell to help you bone up on your dots and dashes.
- Steve Collandra showed a Lionel acoustic phonograph and a Sharp "Mini Stereo



MEETING NOTICE

The next meeting of the NJARC will take place on Friday, August 8th at 7:30 PM at the David Sarnoff Library in Princeton NJ. Reference past *Broadcaster* issues, see the NJARC web site or contact Phil Vourtsis at 732-446-2427 for directions. This month's Tech Talk will feature a historical retrospective by Herb Hobler. Mr. Hobler has been active in radio and TV since the 1930s and will share reminiscences, accompanied by a slide show, of his pioneering involvement in the industry

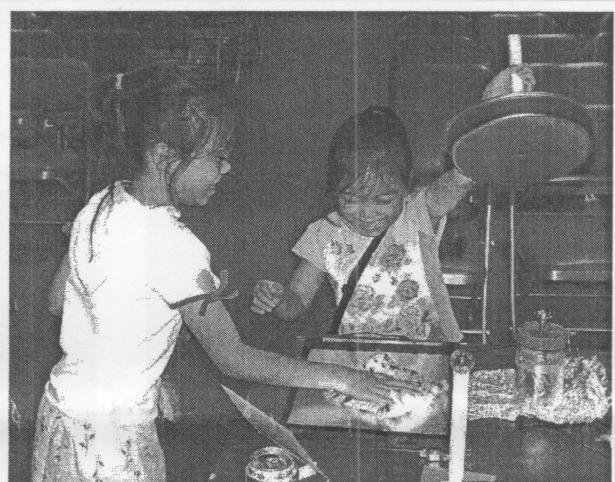
Phono." The Sharp phono looks like a portable radio on the outside but unfolds to reveal its true nature.

• Phil Vourtsis, always trying to recapture his youth, loved his friend's Voice of Mu-

seum (artifacts, including radios, that supported the W.W.II resistance movement) and the Telephone Museum.

On July 19th, NJARC members as guests of Director Alex Magoun participated in a combined educational program (Hands on History of Radio) and Radio Restoration Clinic at the David Sarnoff Library. Included in the event were various hands-on displays set up by Al Klase for future scientists to get a "feel" for electrons. Al also offered a slide show and lecture (Radio from A-Z) on the evolution of wireless communications. The auditorium was filled with the sounds of Scott Marshall's theremin and displays of battery sets, 45 RPM players, transistor radios, colorful plastic radios and radio culture realia in the form of books, magazines, toys, games, ads and puzzles. DVHRC member Dave Abramson recreated the early years of television by transmitting guest images to RCA's first color TV using his restored 1950 RCA TV camera.

Rob Flory said he had a good time chasing some of the 63 W.W.II ships preserved around the country. Rob ran a Drake T4xc to a 50-foot dipole to transmit by hand key on 40 and 20 meters and received on an RBC-1 and RBM that was copied on a manual typewriter. Rob said that he explained to visitors that this was how "e-mail" was received on a W.W.II



Future scientists get a feel for electrons at the Sarnoff Library's "Hands on History of Radio."

sic tape recorder but couldn't accumulate enough from his paper route to afford one. So Phil bought a Webcor which soon went South. Now that he's rich and famous, Phil finally found his dream machine and can complain about the trials and tribulations of restoring it (including the left-handed screws). Phil also showed us an Englishtown basket case (GE DG-41) which he lovingly restored.

• Jerry Dowgin described his trip to Norway where he visited the Resistance mu-

THE JERSEY BROADCASTER is the newsletter of the New Jersey Antique Radio Club (NJARC) which is dedicated to preserving the history and enhancing the knowledge of radio and related disciplines. Dues are \$15 per year and meetings are held the second Friday of each month.

The Editor or NJARC is not liable for any other use of the contents of this publication.

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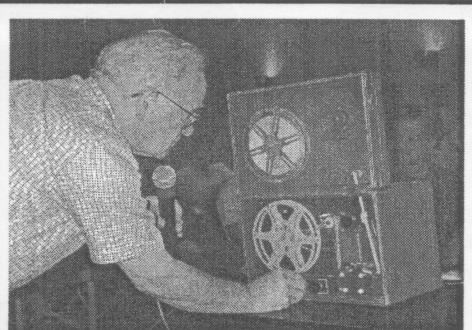
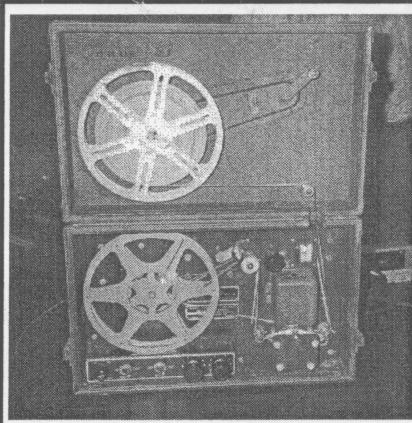
Marsha Simkin
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ship - with a radio receiver and human operator acting as the "modem." Some of the ships that were contacted included the USS New Jersey in Camden, the USS Wisconsin in Norfolk, LST-325 in Evansville, IN and a German 2-man Seehund sub in Quincy, MA.

The Repair Clinic was also well-attended and some snapshots of the activities are included in this issue. I personally had fun recapping Rick Weingarten's All-American Mohawk S-6 cathedral (with an assist from Marty Friedman who advised that it would be nice to connect the + side of the filter electrolytics to get out a horrendous hum). Rick, a juke box collector, was drawn to this radio in a local flea market since its cabinet was made by Wurlitzer under the Lyric name.

Correction: Sorry for the missing last line in the Philco special capacitor article in the July *Broadcaster*. It should read - "At this frequency, the total value of series inductance should be approximately 0.6 microhenries."

SHOW-AND-TELL



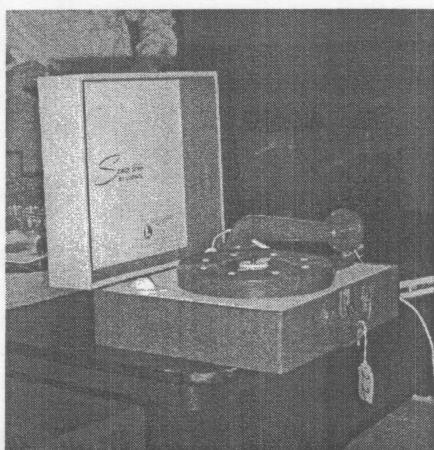
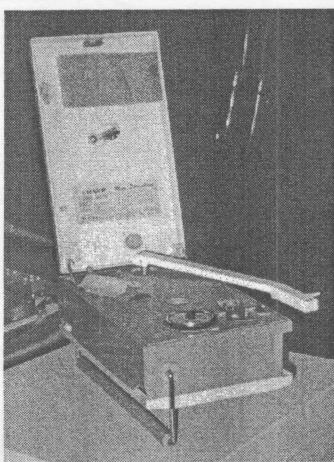
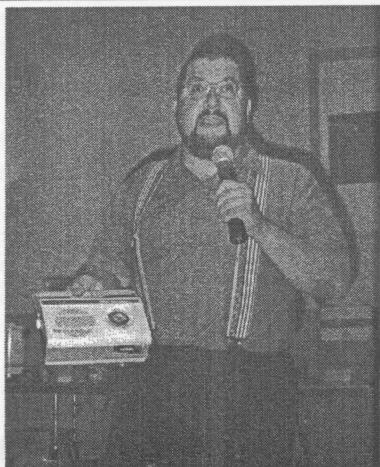
Ray Chase



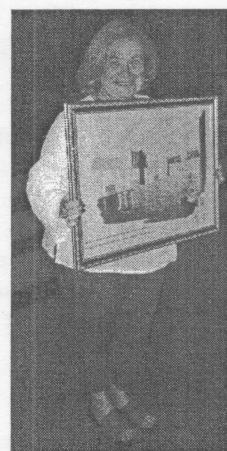
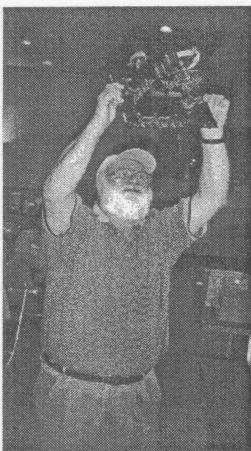
Mike Hoffman



Phil Vourtsis



Steve Collandra



Left to right:

**Walt Heskes
John Dilks
Marsha Simkin**

**DR. AUGUST HUND,
ELECTRIC UTILITIES
and the
COLD CATHODE TUBE**

An Interesting Connection

By Marv Beeferman

Most of us are somewhat familiar with what is generally known as the gas-filled cold cathode tube, that is, a tube that does not require a heated filament to maintain electron flow. Unlike its evacuated cousin, ionization of the gas within this tube (and ultimate neutralization of the tube's space charge) causes a voltage to be reached where the resistance of the tube practically

disappears and a luminous glow (the color depending on the kind of the gas in the envelope) appears at the surface of the cathode. When the tube is operated in this region, the rate of electron flow through the tube and its connected circuit depends almost entirely on the resistance in the external circuit and hardly at all on the tube itself.

The most familiar, cold cathode diodes (or "glow tubes"), were typically found as voltage regulators (RCA 991, VR90-30, WE 313C, etc.), stroboscopic light sources, relaxation oscillators, polarity indicators and surge protection devices. Cold cathode rectifiers were also used in early radio receiver d-c power supplies for their high current capacities in relation to their relatively small size, but their high breakdown voltage (300 volts) and noise soon made them unpopular. Cold cathode

triodes (or "grid-glow tubes") contained three elements - a cathode, an anode and a starter or control anode - and were used as a relay devices or trigger tubes. In this class of gas triodes and tetrodes were the thyratrons (although some thyratrons used indirectly heated cathodes). Thyratrons were used as grid controlled rectifiers, voltage regulators, sweep oscillators and for relay control.

Commercial applications of the cold cathode tube were technically mundane. The real Holy Grail for tube developers was to come up with a cold cathode tube that could be used as an efficient detector, modulator, amplifier and oscillator. One of the better known experimenters in this area was Philo T. Farnsworth of television fame who developed the "multipactor," a cold cathode current amplifier for his CRT. In its first public use as an oscillator

in 1934, the tube was used to drive a pair of 150 watt final amplifiers to transmit a 35-meter signal from San Francisco to Honolulu and New York.

Although there was considerable interest in the cold cathode tube, it wasn't until 1959 that a real breakthrough took place. While investigating field-enhanced secondary emission from magnesium oxide, Dr. Dobischek of the Army Signal Corps Labs at Fort Monmouth noted that electron emission continued even after the removal of all external stimuli. Tung-Sol of Newark, NJ eventually incorporated this development into receiving tubes and boldly announced that a cold cathode five-tube radio was expected by 1960. This fanfare immediately led to avid speculation on the tube's application to flat-screen TV tubes, instant starting radios, and electron guns for klystrons, traveling wave tubes and kinescopes.

Unfortunately, although this was a major advance in vacuum tube operation, it came too late to inject new life into vacuum tube applications. Transistor designs were snowballing with ever-increasing momentum and integrated circuits were just around the corner. The cold cathode tube would never develop beyond its humble beginnings. But that is not to say that it never had a chance.

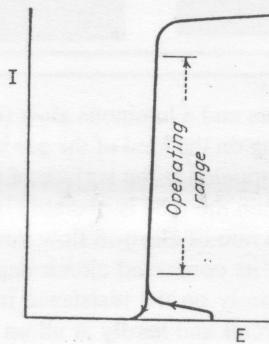
The North American Company was a huge public utility holding company that operated power companies in Cleveland, Detroit, Washington, St. Louis, Milwaukee and a number of other cities beginning in the early 1900s. It also owned Wired Radio, Inc. which had its laboratories in Ampere, NJ. The North American Company had created Wired Radio to develop a system to introduce radio programs over electric lines on a monthly rental basis. Programs would include all forms of entertainment and educational features but no advertising; support for the operation would come from monthly rentals of the receiving equipment.

A second article in this month's *Broadcaster* will discuss the first tests of this system in Staten Island in 1923. But for now, let's make the connection to the cold cathode tube. In the "light socket broadcasting" system that North American envisioned, service costs for maintaining the receivers could be reduced to a minimum by using a low cost tube that would also maximize the replacement interval. The cold cathode tube fit the bill perfectly, with its simple

construction, the possibility of using cheap gases and the absence of the necessity for careful and long exhaust. The company pinned its hopes on the work of Dr. August Hund, a noted tube researcher who worked at the Ampere laboratory.

Dr. Hund performed most of his work between the early and mid 1930s, and his advances paralleled those of Farnsworth. But, like Farnsworth, no major commercial applications took root. His initial successes were presented in an unpublished paper before the Institute of Radio Engineers on January 4, 1933.

Hund used a different approach than that of Dr. George Seibt of Germany, another pioneer in the development of tubes without filaments. Hund based his work on not using what he coined the "Seibt region" of gas discharge tubes, where Dr. Seibt concentrated his efforts on making a useful amplifier. The Seibt region begins the gas discharge tube's anode current/voltage plot where the increase in current is very slow and quite uniform - but total obtainable current is very small. Following the Seibt region is the typical abrupt increase in current with any small increase in anode voltage. At the end of this up-shooting curve is a much less steep increase in current giving a characteristic resembling that of a thermionic tube.



Current-voltage characteristics of a cold cathode diode.

According to Dr. Hund, he had made tubes in which the first two regions had been eliminated, giving characteristics very similar to that of more conventional tubes - 7,000 ohm plate resistance, 3,000 micromho mutual conductance and 1/3 megohm input impedance. In addition,

the tubes that he constructed were not critical with regard to construction or pumping - air at 8mm. pressure seemed to have about the same characteristics as helium at 40mm.

Hund was able to demonstrate use of his tubes as oscillators and as amplifiers in the audio, rf and uhf range. He was also able to construct a receiver out of glow discharge tubes which employed a detector, a single audio amplifier and a push-pull amplifier with an output of several hundred milliwatts.

Unfortunately, there is nothing that I could locate in the literature that describes further progress by Hund after 1933, and the cold cathode tube probably met another dead end. Further investigation into the fate of Wired Radio's Ampere laboratory and Wired Radio itself might answer the question. One of the possibilities of the tube's general abandonment, suggested by Ludwell Sibley of *Tube Lore* fame, could have been the inability to solve the tube's notorious noise problem. Or perhaps, if you believe in conspiracy theories, the North American Company felt that the profit from providing power to heat the filaments of millions of vacuum tubes was much more than could ever be realized from a wired radio service.

References:

1. Electronics, January 1933, "Tubes with Cold Cathodes"
2. Business Week, Nov. 25, 1931, "Cold Tube Developed for Use in Wired Radio"
3. Electronic Design, March 8, 1999, "40 Years Ago - Cold-Cathode Vacuum Tube"
4. Radio, October 1934, "The Farnsworth Multipactor Tube"
5. Applied Practical Radio, 1934, Coyne Electrical School, Chapter 8
6. Terman, Radio Engineers' Handbook, 1943, pp. 350-352

The story
continues....

LIGHT SOCKET RADIO - THE STATEN ISLAND EXPERIMENT

By Marv Beeferman

Suppose you had a compact little unit which you plugged into any convenient outlet and received, at specified times, the latest world and local news, music of all kinds, play-by-play reports of sporting events, extension courses in whatever area was of interest, information regarding where to shop for everything from footwear to furniture and authoritative talks on the theater, books, health and cooking and all with a minimum of interference, 365 days a year? Not impressed? But suppose you were living in Staten Island in 1923 when the service was first offered?

The previous *Broadcaster* article established the link between the North American Company (which controlled "lighting" companies in Cleveland, Detroit, Washington, St. Louis, Milwaukee and a number of other cities), cold cathode tubes and "wired radio." The fact that an electric power company was interested in financing a wired radio service is not as odd as it might look - for years, power companies had utilized "wired wireless" transmissions along their lines for internal communication and control. To set up a commercial service, ideally all the company had to do was feed low-power radio signals into the power grid, then charge subscribers for the special receivers needed to pick up the transmissions. Feeding radio signals into the power grid meant there was no need to construct additional lines, since the signals could be picked up by everyone who lived near the wires.

Universal access had one potential problem - because the signals covered an entire area, people with enough technical knowledge to build a simple radio receiver might be able to pick up the programs without paying (sounds a little familiar?). Initially, the frequencies used by North American's subsidiary Wired Radio, Inc. were far outside of those used for regular over-the-air broadcasting, so they couldn't be heard by standard radio receivers purchased by the general public. But based on the simplicity

of the receiver (which will be described later) and the growing sophistication of "home-brewers," this barrier could be easily overcome. Perhaps this is one of the reasons why the service was eventually abandoned.

North American's Staten Island service was based on a license obtained from General George Owen Squier (1865 - 1934) of the U.S. Army Signal Corps. Squier's invention of multiplexing in 1910 allowed telephone lines to carry multiple messages for the first time; the carrier frequency principle involved was later adapted to other types of transmission, including FM radio. Shortly before his retirement in 1924, Squier turned his attention to a new application of the transmission technologies he helped to develop: piped-in music. (Piped-in music is much better known by its present name, *Muzak*, established in the early 30s. But Squier's innovation came into its widest use when the original open wire connections were replaced by shielded coaxial cables and adapted to TV signals, resulting in Cable TV.)



MAJOR-GENERAL GEORGE OWEN SQUIER

General Squier

The Staten Island "station" was located in West Brighton. On the first floor of a three-story stucco house was a studio used for direct broadcasting. On the second floor were the "transmitters" which delivered rf transmissions directly to the 2,300-volt power lines; an oil switch was used for isolation. Three distinct sources of broadcast were available - rebroadcasted "space radio," news from the United Press Association and direct broadcasts from the studio.

Rebroadcasting "space radio" was accomplished using a standard 5-tube receiver and power amplifier. News summaries were received directly from the United Press Association's offices in the World Building in New York City and could be broadcast the same time they were sent to some seven hundred newspapers all over the country.

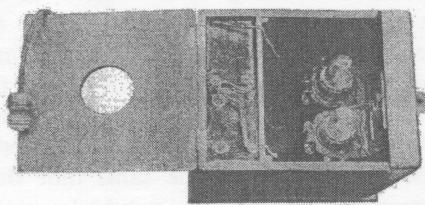
Wired Radio had designed various "receivers" which were leased to subscribers at prices ranging from two to five dollars a month. Compared to today's adjusted Internet provider prices, this was a significant amount. The charge was tacked on to the subscriber's electric bill. All sets had crystal detectors, the simplest one using a single tuning control, a set of headphones and what was termed a "semi-permanent" crystal:

"The crystal is of a type which is less sensitive to weak signals than the ordinary mineral, but equally good on strong signals; and since all signals received over the lighting lines are as strong as necessary, this type of crystal is just the thing! The beauty of it is that after you have adjusted it by tuning a thumb-screw slightly, it stays set for an indefinite period, in spite of jarring the table, moving the set from place to place, and other actions fatal to the adjustment of the ordinary crystal."

Another set, with integral load speaker, used two WD-12 tubes (one was reflexed) and two small B batteries. The result was one R.F. stage, a detector and two A.F. stages.



Note the light socket connector on this WD-12 set.



Inside the WD-12 set...note the batteries to the left.

A third set, which had not yet been placed in service by 1923, was designed for use in stores, theaters and other locations where a louder broadcast required; in this set, filament current would come directly from the power line.

The Staten Island station "transmitted" all programs on the same wavelength, about 8,000 meters, but Wired Radio expected to eventually operate a dance wavelength, an advertising wavelength and an educational wavelength simultaneously. The company's philosophy was that anything that the subscribers indicated they wanted in the way of programming could be eventually supplied.

Although AT&T and the radio group companies (G.E., RCA and Westinghouse) watched the Staten Island experiment with interest, they weren't particularly worried about the competition to regular broadcasting. Also, these companies felt that even if wired wireless were to prove practical at this time, the power company could be easily taken to task for infringing on their basic radio patents.

Interest in "light-socket broadcasting" was still active up until the mid 30s and Wired Radio Inc. was still pursuing its commercialization. But early radio shortcomings that first forecasted its potential and future radio advances were to eventually prevent its realization:

- The number and power of radio stations and the depth of programming was limited. It would take a few more years for broadcasting to reach its full potential.

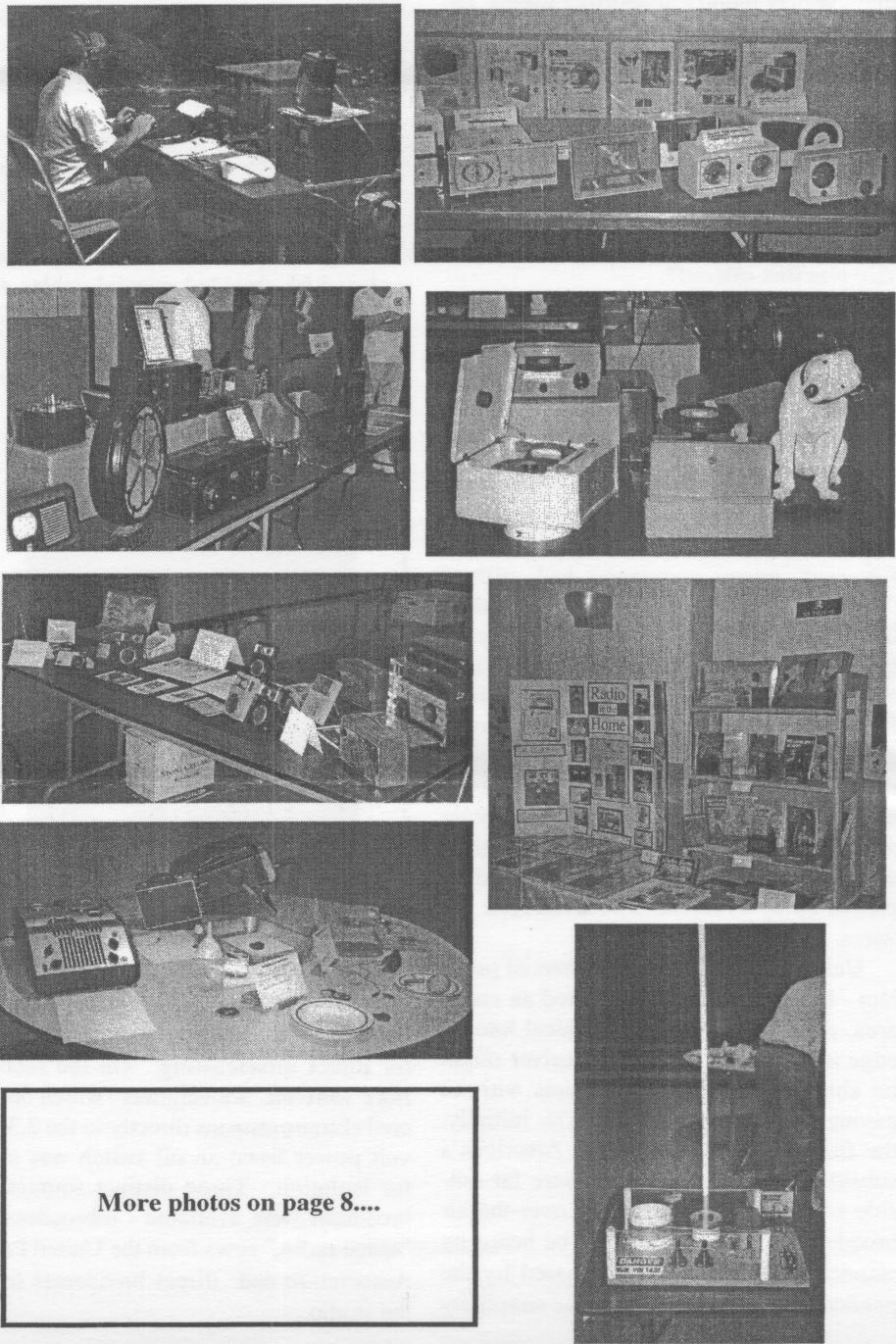
- Early receivers were temperamental, expensive to purchase and operate and much of the population did not want to "fuss" with them. Interference and poor signal strength were still a problem and many people were still dealing with the limitations of crystal sets. Eventually, receivers would evolve to a point where they were no longer technically challenging.

- People were more interested in entertainment rather than the "worthwhile" programming that wired radio intended to offer.
- FM had not been anticipated.

References:

1. Radio Broadcast, October 1923, "Giving the Public a Light-Socket Broadcasting Service"
2. <http://earlyradiohistory.us/1923wir.htm>
3. <http://www.nas.edu/history/members/squier.html>

HANDS-ON HISTORY OF RADIO



**New Jersey Antique Radio Club
Delaware Valley Radio Association
Antique Radio Swap Meet, Hamfest/Computerfest, Flea Market**

Sunday, September 14, 8:00 AM*

National Guard Armory, Lawrenceville, N.J.



* Open to sellers at 6:00 AM. Tailgate: \$10.00 (includes 1 admission). Indoor next to wall (w/electricity): \$20.00 (includes 1 admission). Indoor vendors will need to supply their own table not to exceed 10 feet in length. Extra indoor space: \$10.00.

- Admission: \$6.00 (free for children under 12 years old) - free parking.
- Refreshments available
- ARRL
- Talk-in on 146.67 W2ZQ
- Door prizes
- Special attractions: John Dilks (editor of the Old Radio column in QST) Mobile Radio Museum - Jim Millner (WB2REM) talks about ECHOLINK boards.

Advance registration: Mail your check to DVRA, PO Box 7024, West Trenton, NJ 06628 or NJARC, Marv Beeferman, 2265 Emerald Park Drive, Forked River, NJ 08731.

Contacts:

Glen Costello, N2RPM, abbot0903@hotmail.com. (609) 822-2240
Marv Beeferman, mbeeferman@cs.com. (609) 693-9430
Phil Vourtis, pvoirtis@att.com. (732) 446-2427

How to get there? It's easy - you don't even need a map!

Take Exit 7 (Route 206 South/Rider University) off I-95. Drive about 1.5 miles and make a right at Eggert Crossing Road - the armory is on the left.

**151 Eggert Crossing Road
Lawrenceville, NJ**

Fall 2003 Kutztown Radio Meet

Friday, September 12 & Saturday, September 13

(dealer setup Friday afternoon)

Rain or shine at Renningers Antique and Farmers Market on Noble Street in Kutztown, PA. Exit Rte. 78 or 222 at Rte. 737 S/Kutztown. Proceed into Kutztown; take a right at the 1st light and a left at the next light (Noble Street). Renningers is 1 mile on the right.

THIS MEET IS HELD UNDER A ROOF, so don't let the weather keep you away. Overnight camping is free. Accommodations available at the Campus Inn, 3 miles from the meet - (610) 683-8721. Mention the Radio Meet and the room rate is \$50 plus tax.

Friday evening

- Get-together
- Picnic, early trading
- Camping, beverages, snacks

Saturday

- Flea market at dawn
- Afternoon auction by the DVHRC
- Renningers indoor and outdoor antique markets

Free admission for buyers. Vendor charges: \$15/space w/1 table, extra tables \$3 ea. and booth electric \$5. For pre-registration (recommended but not required), call Renningers at (570) 385-0104. For other questions contact Lewie Newhard (610) 262-3255. E-mail: lewallie@aol.com.

SPONSORED BY KUTZTOWN RADIO STORE

Jersey Shore Amateur Radio Society

HAMFEST By The Shore



**Sunday
August 15, 1999**

**TALK IN FREQUENCY 146.910
P.L. 127.3**

Bayville Firehouse, Route 9, Bayville, N.J.



**Doors Open
Venders at 6:00 am - General Admission 8:00am**

Door Prize Winners Need Not Be Present To Win

CONNECTIONS

Free exposure for buyers and sellers! Unless requested otherwise, each ad will run for two months in both the *Jersey Broadcaster* and the *Delaware Valley Oscillator*. All buying and selling transactions are the responsibility of the parties involved.

FOR SALE

Check out NJARC's capacitor program for those most commonly needed replacements. Contact John Ruccolo at any club meeting or call him at home (609)-426-4568 to find out what's available. All proceeds go to the club.

Nice working consoles. All cabinets are nice and clean! Atwater Kent Model 74 lowboy - \$200. Grunow model 1151 - \$200. RCA 810-K (good eye tube) - \$225. Zenith 8S-463, black dial, good eye tube, wave magnet - \$250. Contact Joe Murphy at (856)-228-0585

The NJARC tube program offers clean, tested, boxed tubes at very reasonable prices with availability at any club meeting (no dealers, please...not for resale). Proceeds go to the club. Of course, donations of radio-type tubes in any condition are welcome. See Gary D'Amico at the next meeting.

Blaupunkt "Arkansas 59" type 532/4533 for sale in the Red Bank, NJ area. Radio was shipped from Europe and never used in US. Best offer ... (732) 530-9832, jwattvo@email.com

RCA Radioola model 80/82, 1929, working with good tubes but needs capacitors, value \$170-\$190, asking \$100. George Argila, 15 Bayberry Rd, Princeton, NJ, (609) 818-9595, czandga@aol.com

Bob Pilcher notified the club that a friend of his came across an AK 55-C in a Kiel cabinet in excellent to near mint shape. He thought someone in the club might be interested for a price of at least \$250. Contact Bob Pilcher at RPilc99206@aol.com.

WANTED

Magnavox Sportsman model AW-24, all wave, 7 transistor, 2-band portable, in good condition and working. Joe Bentrovato, 84 E. Munson Ave., Dover, NJ 07801. (973) 361-7392 JBentrovat@msn.com

"Radio in the Home" magazine, December 1925. Other issues also considered. Also looking for Sparton radio ads from 1928-1929 Liberty magazines. John Okolowicz, 624 Cedar Hill Rd., Ambler, PA 19002, john@grillecloth.com

YOUR AD HERE!**REPAIR CLINIC**