



The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

May 2009

Volume 15 Issue 5



Reported by Marv Beeferman

THE ON-LINE BROADCASTER

The New Jersey Broadcaster is now on-line. To date, 97 of your fellow NJARC members have subscribed, saving the club over \$1900 a year. Interested? Send your e-mail address to: mbeeferman@cs.com Be sure to include your full name.

The NJARC rolls have been cleared of non-renewals for 2009 resulting in a total membership of 187. Of these, 52% have their *Broadcaster* delivered by e-mail. It would be nice if we could increase this amount by another 10%. Member Chuck Rownd seems pleased with his decision to switch:

"I had to tell you that I enjoyed the *Broadcaster* much more on-line. The pictures are in color; not so on the paper version. I had intended to ask for the on-line version before this and I'm sure that if others saw the difference, they would request it also. Maybe a sample version sent to all would be enough to convince others to change over? A lot of newspapers have done it. It sure makes sense."

It's been another active month; contests, awards and a major auction at InfoAge. All these are covered in this month's *Broadcaster*. The auction was quite an event and Ray would like to thank all NJARC members who offered their services:

"A big thanks to all of you who helped make the May 2nd auction a success. There are too many to mention by name. Thanks especially to those members who picked up the auction items, stored them in the hotel basement and brought them back up again. We won't make that mistake again; henceforth, all storage will be at



MEETING NOTICE

Please join us on Friday, May 15th at 7:30 PM for our final meeting at the David Sarnoff Library in Princeton, NJ. Visit us at <http://www.njarc.org> for directions. The month's program has not been finalized, so watch the club's web site or the Reflector for information.

ground level. Thanks to those who set up and ran the food concession, repaired ceiling lights at the eleventh hour, did an accurate and speedy job of clerking, registering and cashiering. Thanks to those who showed up bright and early on Saturday to be runners and parking lot attendants. And let's not forget those who brought money and hauled everything away."



NJARC member Ray Chase keeps a close watch over the proceedings at the May 2nd InfoAge auction. Ray's energy and motivation was a major impetus for a very well-run and profitable event.

"We also need to especially thank Richard and John Estes who came from Ohio to auctioneer. Finally, thanks to our InfoAge friends who provided all kinds of assistance in big and small ways. Just under 400 lots were sold in four hours and twenty minutes. The gross sales totaled just over \$10,000...wow!"

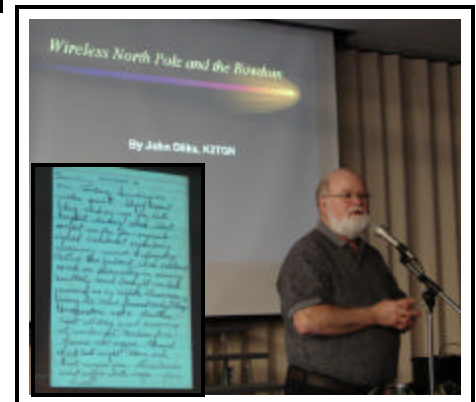
"It will take a few days to crunch all the numbers to figure out the distribution of the proceeds. Hope everybody had at

least a little fun and got some goodies to take home."

On May 5th, your editor had the pleasure of attending an open house hosted by the Old Barney Amateur Radio Club (OBARC). As part of the program, NJARC member John Dilks (the "Old Radio" columnist for QST) offered a wonderful slide presentation which could have been the first documented DXpedition.

John has put together an incredible adventure of a 1923 expedition to the North Pole on the schooner *Bowdain*. Our hero is Don Mix, a radio engineer who attempts to maintain wireless contact with the expedition's backers (one being Chicago Radio Labs which has just changed its name to Zenith) while attending to his "shipmate" chores.

The presentation is based on photograph albums and diaries that John has on loan from Don Mix's nephew and have already been the basis of four QST articles. John's insight and comments, supplemented by Mix's journal entries, takes us on a journey that is hard to reconcile with today's world. We're trying to get John to give a repeat performance at the May or future meeting.



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 \$20 per year and meetings are held the second Friday of each month.

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PRESIDENT:

Richard Lee
(914)-589-3751

VICE PRESIDENT:

Harry Klancer
(732)-238-1083

SECRETARY/EDITOR:

Marv Beeferman
(609)-693-9430

TREASURER:

Sal Brisindi
(732)-308-1748

SERGEANT-AT-ARMS (WEST):

Rotating

SERGEANT-AT-ARMS (EAST):

Rick Weingarten
(732)-370-8206

TRUSTEES:

Ray Chase (908)-757-9741
Phil Vourtsis (732)-446-2427
Tom Provost (609)-259-7634

TECHNICAL COORDINATOR:

Al Klase
(908)-782-4829

TUBE PROGRAM:

Gary D'Amico
(732)-271-0421

SCHEMATIC PROGRAM:

Aaron Hunter
(609)-267-3065

CAPACITOR PROGRAM:

John Rucolo
(609)-426-4568

RESISTOR PROGRAM:

Walt Heskes
(732)-205-9143

WEB COORDINATOR:

Dave Sica
(732)-382-0618
<http://www.njarc.org>

MEMBERSHIP SECRETARY:

Marsha Simkin
33 Lakeland Drive
Barneget, N.J. 08005
(609)-660-8160

THE INFOAGE LIBRARY

By Marv Beeferman

Information for this article was obtained via a recent interview with NJARC member Steve Rosenfeld...Ed.

Almost every Wednesday finds NJARC member Steve Rosenfeld hard at work at his InfoAge computer organizing a project that most members are unfamiliar with. Did you know that an extensive library of technical and historical resources is being established at InfoAge's "Marconi Hotel" and that the majority of which will be easily accessible to InfoAge and NJARC members? At present, the main library, on the second floor of the hotel will house some 2,000 books, with an additional 2,000 still waiting for a home.

The material comes from many sources including InfoAge, Fort Monmouth, individual donations, the National Broadcasters Hall of Fame and the NJARC. InfoAge has also purchased some 400-500 items relating to the history of the site and the developments and breakthroughs that can be directly or indirectly attributed to work done at Camp Evans and Fort Monmouth. With regard to the NJARC donations, a clean, protected and central location has finally been made available to allow access to these important club assets.

Some of the library's resource categories include the history of broadcasting (including tapes and transcription discs), electronic communications (including "wireless"), basic and technical electronics, radar development, the history of the Camp Evans/Fort Monmouth area including contributions to the war effort, service manuals, technical manuals, catalogs, amateur radio books and manuals and radio/electronics/communication magazines.

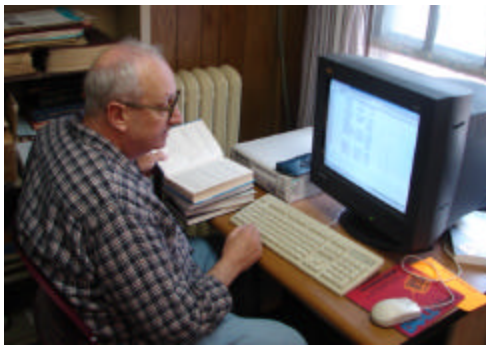
In addition, the library also includes some very unique items that are yet to be completely inventoried and scanned. Included is a portion of the Ed Raser

estate that includes photos, manuals, personal papers and 6,000 QSL cards from his wireless museum library in Trenton. Steve has already scanned some of larger, more historic photos in Ed's collection but there are 100's left to go. Also included are some 700 ink-on-velum drawings of transmitters and components manufactured between 1912 and 1920. These "pre-RCA" items include those manufactured for the Marconi Company of America, GE and the Navy Department and include such interesting titles as "Plan of Wireless Room on Steam Yacht Warrior," "Antenna, Cape May NJ," and "SCR-105 Regimental Brigade Radio Transmitter & Receiver (1919)." The "Marconi drawings" were saved from the attic of the Marconi transmitting station in New Brunswick prior to its demolition in 1999. Steve has inventoried 100 of these drawings and the list may be found at <http://www.infoage.org/MWCA-drawings-2.html>. Eventually, the entire collection will be inventoried and scanned and made available to members and the public for wireless research.

Steve has inventoried and segregated all the computer material and this will be moved to the Computer Museum; however, library access to these resources will also be made available. Besides the computer material, some of the additional items that Steve has categorized include:

- * All the books and tapes in the main library
- * 168 radio show transcription discs
- * 300 books on broadcasting history
- * 40 cylinder records
- * 100 equipment manuals
- * 125 military equipment manuals
- * Numerous magazines

As you can see, Steve's work to this point has been commendable, but there is still quite a bit left to do and he will appreciate all the help he can get. This presents a great, worthwhile job for anyone who wants to lend a hand but can't quite take part in the "heavy lifting" provided by other volunteers. For information, contact Steve Rosenfeld at 609-693-9320 or oceanate@comcast.net. And remember, besides providing a very important service, travel to InfoAge for volunteer work is tax deductible!



NJARC member Steve Rosenfeld has provided a major impetus and motivation for organizing the InfoAge library.



Part of the 2,000 (of 4,000) volume collection of the main library that has already been inventoried.



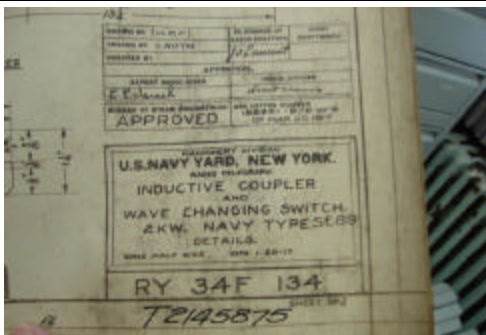
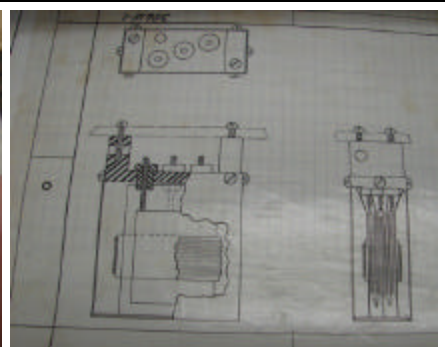
Some of the early periodicals in the collection.



Steve carefully stores and inventories some of the numerous ink-on-velum drawings from 1912 thru 1920.



General Electric drawing for a mica condenser for an early GE 1920 "Trench Set" built at their Roselle Park Works.



Left to right: Inductive coupler and wave changing switch from Navy SE89 2KW transmitter (1917); logbooks from Ed Raser's amateur station (1914-1920); Navy wavemeter manual (1917); part of New Brunswick antenna system; Ed Raser's Trenton station WOAX (1923); American DeForest wireless station on the Atlantic City (Young's Pier) boardwalk (1910).

2009 DX Contest Winners Receive their Awards



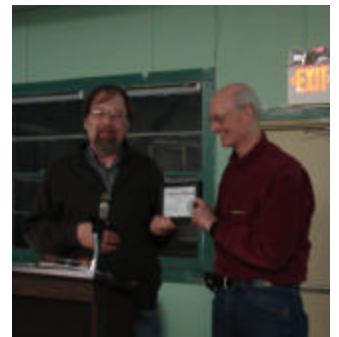
Walt Heskes



Jerry Dowgin

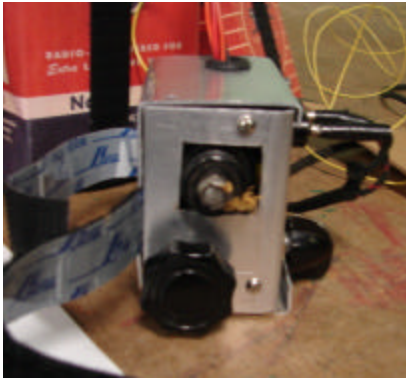


Tom Provost



Al Klase

2009 Homebrew Contest Entries



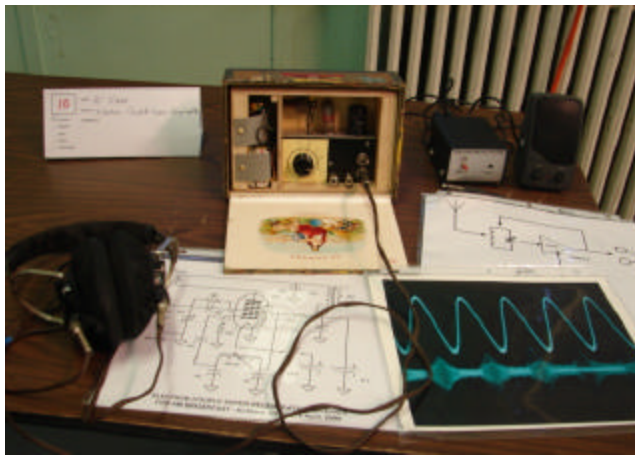
Wrist-Watch Radio: Harry Klancer based his entry on a 1936 article in a popular radio magazine of the time. He even went as far as dressing like the gentleman exhibiting the radio in the article, batteries included! The single tube (6A8) radio uses a standard reflex regenerative circuit, and, with a 15-foot antenna, receives two stations.



Signal Tracer: Angelo Napoli was looking for a high-end signal tracer for his workshop so he decided to build one for himself. Angelo combined circuits he found published by North Country Radio (attenuator section) and the ARRL. This unit features a 65 db gain, low noise, a signal strength meter, a noise generator and diode "in/out" selector switch for RF or audio use.



Sony SRF-59 "Safari": We first got a look at Walt Heskes' modified SRF-59 in the December 2008 *Broadcaster*. The SRF-59 is a low cost, high sensitivity/selectivity, ultra-light AM DX chaser. Some typical "Heskes" modifications include a 1922 vernier dial, a D-cell power supply, an improved volume control and a beautiful masonite cabinet. Added modifications include a lazy Susan base so that antenna directionality can null out unwanted stations and a nomograph type scale for locating stations.



Electron-Coupled Super-Regenerative Receiver (ECSR): For many years, super-regenerative circuits have been used for commercial applications such as garage-door openers, radar detectors and low cost walkie talkies. However, broadcast applications were non-existent, until Al Klase did some digging. See the article that follows.

CIGAR BOX RADIO

By
Al Klase

What is Super-Regeneration?

Super-regeneration was the third of Edwin Armstrong's great inventions, following regeneration and the superheterodyne circuit. It promised a high-performance radio receiver with a minimum of circuitry and power consumption. While super-regeneration never became a mainstay of the radio art, as did his other inventions, it is the one that made him wealthy. On June 30, 1922, RCA paid Armstrong \$200,000.00 plus 60,000 shares of RCA stock (then worth \$217,500.00) for his super-regeneration patent. The value of this stock grew wildly through the twenties, and Armstrong sold out before the crash.

One can be easily forgiven for not understanding super-regeneration; it's not an easy concept. Perhaps the best explanation comes from Armstrong himself in "Some Recent Developments of Regenerative Receivers," Proceedings of the IRE, Vol. 10, August 1922:

"The key point is that it's not a steady-state process, but actually a sampling system depending on the behavior of an RF oscillator transitioning from the non-oscillating to oscillating state. If no external input signal is applied to the oscillator's tuned circuit, it will take a while, on the order of a thousand cycles, for the random noise in the circuit to build up to

full amplitude oscillation at the circuit's resonate frequency. If, on the other hand, a coherent signal near the resonant frequency is injected into the tuned circuit, the oscillator will start up in a much shorter time."

The trick is to use a second oscillator to turn off or "quench" the RF oscillator after an appropriate time, and then allow the cycle to be repeated. The DC plate current of the RF oscillator will be a series of pulses at the quench frequency whose amplitude is proportional to, and much greater than the input signal.

To achieve maximum sensitivity, the quench frequency needs to be on the order of one one-thousandth of the signal frequency, and preferably in the ultrasonic range so as not to be heard by the listener. In practical terms, this usually relegates super-regenerative receivers to frequencies above 10 megahertz.

Before there was Tupperware, there were cigar boxes to hold all those loose odds and ends. They also became the enclosures for thousands of homemade radios.

The first tube radio I ever built was housed in a cigar box. I'd been reading radio books for a number of years, but really didn't understand tubes with more than one grid. Someone gave me a TV booster that yielded up a small power transformer, a selenium rectifier, and a three-section electrolytic. Best of all, there was a bracket with a 9-pin tube socket holding a 6BK7 dual triode that still had one good heater and I could see into the tube to determine it's pin-out.

I used a 365 mmF variable and ferrite loopstick, left over from an ill-fated *Boy's Life* solar-powered radio project, to

build a simple grid-leak detector circuit. (The local radio-store guy had supplied an NPN 2N170 instead of a PNP 2N107, and I wasn't sophisticated enough to turn the battery around. Hey, that was about 1958.) The earphone from my Remco one-transistor radio served as the audio load. This set did a good job on the strong locals, and managed to pull in some DX at bedtime. I discovered Joey Reynolds on WKBW, Buffalo, playing Surfin' Bird over and over: "A-well-a don't you know about the bird? Well, everybody knows that the bird is the word!"

Fast-forward almost half a century. It always seemed that a simple portable tube radio in a cigar box with a self-contained antenna would be a cool thing. However, even a reflex circuit doesn't supply enough gain to work with a small loop outside strong signal areas. I knew that some broadcast-band super-regens had been attempted, but apparently they either didn't work well enough or were too difficult to construct. Thus, there is virtually no sign of such a thing in the literature.

Then, about a month or so ago, I was perusing the March 1932 issue of the amateur radio magazine QST, hardly the place you'd expect to find a simple broadcast set. But there it was "A Cigar-Box Super-Regenerative Receiver" by Walter van B. Roberts. The author described a one-tube BCB super-regenerative receiver based on a type 30 tube.

I ginned up a rectangular loop that would fit in a cigar box, and breadboarded the circuit. The single tube served as a tickler feedback oscillator in the broadcast band, and a Colpitts oscillator in the audio range for quenching. It worked, but not very well. Also, Roberts had resorted to a 3 KHz quench fre-

quency, well within the audio range, and very annoying to the ear.

I've never been comfortable messing with circuits like this. There are just too many interactions, and it's never clear exactly how they actually work. So, I designed a new circuit of my own that separates the two basic functions, an **E**lectron-**C**oupled **S**uper-regenerative **R**eceiver, (ECSR) based on a 1R5 pentagrid converter tube.

The first grid and the screen grid are configured as a Colpitts oscillator based around a 100 mH slug-tuned coil (see schematic.) The signal grid, G3, and plate are configured as a standard regenerative receiver, except that the grid-leak resistor is a lower value generally associate with an RF oscillator. The plate circuit also

includes a 300K to 600-ohm audio transformer that feeds a sound-powered headset for maximum sensitivity. The Colpitts oscillator deeply modulates the electron flow through the tube, thus turning the RF oscillator on and off.

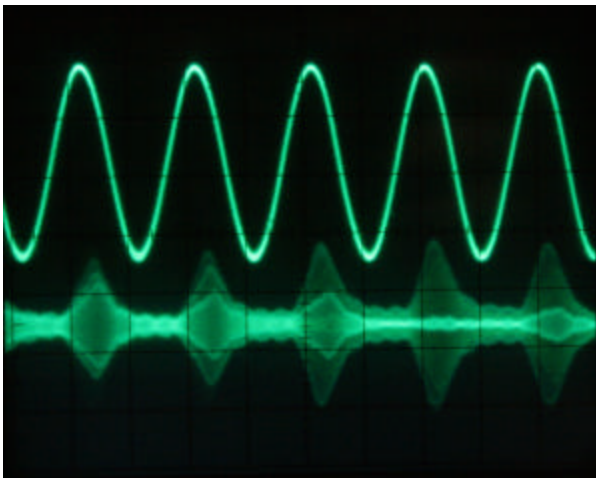
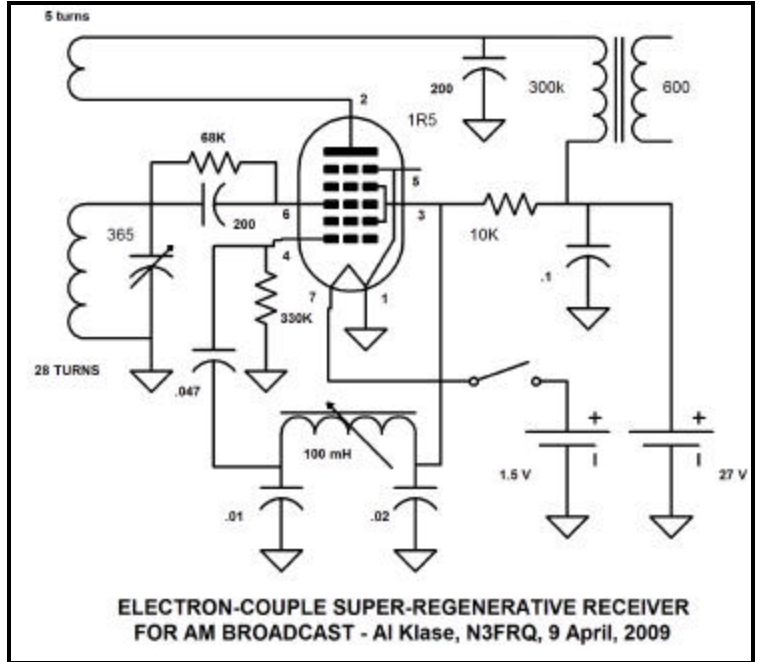
I initially set the quench frequency for approximately 10 KHz. The set worked reasonably well in the strong signal environment of Jersey City. The slug tuning allowed me to zero the beat note generated by the quench frequency and the incoming carrier of AM stations, a one-time adjustment.

After testing the radio at InfoAge and finding it nearly deaf, I reduced the quench frequency to 5 KHz. I found I could then receive three stations near the top of the broadcast band at InfoAge, and

14 stations, down to 570 KHz, back in city-mouse territory.

It seems the super-regenerative receiver only comes into it's own when the signal to quench-frequency ratio exceeds at least 300 to 1. My set is effectively deaf to moderate signals below 1000 KHz, 200 to 1. The quench frequency cannot be lowered much further, because, even if you can tolerate the tone in your ear, it's a sampling system, and the sample needs to be at least twice the highest frequency you expect to reproduce.

So, I'm declaring the project a qualified success. It's OK if sensitivity, portability, and minimum power consumption are of paramount importance, but it's pretty clear why the super-regenerative circuit was rarely used for AM broadcast.



Oscilloscope trace of the ECSR in operation:

The upper trace shows the grid signal of the quench oscillator, while the lower trace shows the signal on the RF tuned circuit. The changing amplitude of the incoming signal is clearly visible. This trace includes three sweeps of the oscilloscope.

INFOAGE AUCTION



**LONG LIVE
THE
VACUUM TUBE!**

"Long Live the Vacuum Tube" is the same title that appeared in an article in the Spring 2009 issue of *Invention & Technology*. It was written by Mara E. Vatz who teaches high school math and science. Although not highly technical, I felt that some of the intrinsic elements of the article would resonate with all of us.

While scavenging the curbside trash in her college town, the author came across what was at first an "unfamiliar contraption." Upon further examination and discovering it was a record player, its owner appeared at the front door and told her it belonged to her grandmother. She explained that it was still in excellent condition and worked perfectly, but scoffed "who listens to records anymore?"

Miss Vatz carried her Magnavox home and insisted that every visitor listen to the rich sound emanating from this decades-old technology.

"I knew my record player had tubes, because I turned the whole thing upside down to peek at the circuitry inside. Most of what I saw was familiar...and then there were tubes. I had never seen vac-

uum tubes before, but I recognized them immediately. There were four of them; glass cylinders that looked like light bulbs."

The author said she understood why it is almost impossible to find vacuum tubes in today's equipment, but what concerned her more was why it was so hard to find information about them. Even though they're not popular commercially, Miss Vatz felt they are still valid circuit elements. More than this, she felt that they are conceptually important to electroacoustics.

Feeling compelled to learn more about them (as a student, they were not part of her 1990 engineering curriculum), the author paged through every modern electrical engineering, circuit theory and electronics textbook she could find...with not a single mention of a vacuum tube. It wasn't until she consulted a textbook from 1937 that she found the answers:

"The textbook had belonged to my grandfather, who had handled it roughly and with familiarity; I handled it gingerly, cringing at the sound of the old glue cracking along the seams. Grandfather would probably been surprised to learn that modern engineering textbooks aren't written in prose, as his were; they are written in equations. While the ex-

planations in his book are seated appropriately in historical context, my books are overcrowded with uninformative color pictures and tedious practice problems. My engineering textbooks don't discuss the fundamentals or history of the science they invoke. Grandfather probably would not have understood that engineering was taught to me as a vocation, not an intellectual pursuit."

"I learned more from his textbook than I could ever have imagined; not just information about how the tubes worked, but also something about the fragility of knowledge. I had always thought information to be timeless, indestructible. But now I see that knowledge is no stronger than the attention and care we show it. We haven't been very careful."

"The textbook has now found a home in my living room, where it lies among vacuum tubes and vinyl; familiar friends, cherished and protected."

The NJARC museum and library at InfoAge echo the philosophy above. But being a participant and not just an observer is critical in giving them substance. What have you recently done to help "cherish and protect" some old, familiar friends?

SHOW AND TELL



Limited publicity did not bring in many show-and-tell items to the April meeting, but we did have a few to talk about. To the far left, Ray Chase demonstrates his REP Navy "morale" receiver that was featured in an article in the April *Broadcaster*. He is pointing to A Swan Electronics ADF-100 radio direction finder. Although by the year 2000, the last marine radio beacons were decommissioned, RDF's are still collectable. This one has beacon, BC and marine reception, a rotating drum scale and a lit "log" bar. Ray also showed a collection of 1925 Atwater Kent factory photos that he obtained for the museum.

At the near left, Phil Vourtsis shows some unique items in his "45" collection including an optional, after-market mahogany case for a 45 player and a Chesapeake game/bird call unit featuring a 45 RPM player.