

The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

November 2005

Volume 11 Issue 11



MEETING/ ACTIVITY NOTES

Reported by Mary Beeferman

Some great pieces filled the auditorium of the David Sarnoff Library auditorium for October's show-and-tell. We captured most of them on film and here's a short description of each:

- Bob Bennett found another good use for a vintage radio dial face - mount it on a custom wood base, add a battery operated clock mechanism and voila!
- Mary Beeferman demonstrated the Mathiputer, a 70s child's learning aid made by Cybernetic Systems, Inc. Switches select the number range, the mode (add, subtract, multiply or divide) and the total number of math problems (10/25/50/100). Correct answers are tallied and rewarded with a happy face.
- Tom Provost showed some interesting NOS Philco replacement dial faces that he had obtained for an upcoming restoration project. One was the typical light brown that we are all familiar with but its exact mate was a bright white with maroon letters. It would be interesting to find out what drove this change by Philco.
- Walt Heskes read us a letter from Rich Shivers, son of silent key Alan Shivers who had a long career in the electronics industry. Rich has donated vintage spare parts from his father's estate to the club and the letter sent to Walt gave us an idea of Mr. Shiver's experiences in his hobby and the industry.
- Marty Friedman showed us that good looks don't fade as depicted by a 1963 picture of him in front of his 2 meter AM Gonset Communicator II alongside the same pose some 42 years later. Yup...the Gonset

MEETING NOTICE

The next meeting of the New Jersey Antique Radio Club will start at 7:30 PM on Friday, November 11th at the David Sarnoff Library in Princeton, New Jersey. Contact President Phil Vourtsis (732-446-2427) or Google "NJARC" for directions. This month's meeting will feature a demonstration of military field radios by Al Klase and Rob Flory. We'll also have a mini-auction of item's from the electronics workshop of master electrical engineer Dr. Richard C. Dehmel, including test equipment, components, and other assorted items.

looks just as good as it did in '63. The Gonset was affectionately known as the "Gooney Box" because of its somewhat ungainly appearance.

lamp tester that was used in the early days of lamp production to read their wattage.

- Most of us are familiar with the workhorse Simpson 260 multimeter. Darren Hoffman brought two from his collection, the original series 1 and 2 from 1939 to 1942.

Alex Magoun's 6L6 prototype was donated by the son of Otto Schade. Mr. Schade is well known by video enthusiasts for his modulation transfer functions which provided a common method for evaluating television, photographic, optical and visual system image properties. Mr. Schade worked in Germany during the 20s and later worked for Attwater Kent and RCA at the Harrison plant and was associated with developments in the



NJARC member Bob Pilcher and his band provided the music at an Infoage mixer on the night of October 29th.

- Nick Senker described a vintage piece of radio troubleshooting equipment. The Triplett Free-Point radio set analyzer used an umbilical that plugged into the radio's tube sockets (using various adapters) to monitor each stage's voltage and current parameters.
- Rob Flory showed a CRV-50254 speech amplifier for a Navy transmitter.
- A unique item was provided by Ray Chase - a dynamometer-based portable

beam power tube and return beam vidicon. Phil Vourtsis talked about one of RCA's developments that was quickly overtaken by the cassette recorder - a tape cartridge recorder that used 1/4" tape and ran at 3-3/4 ips but had poor sound quality.

By now you should have received your reservation form for our annual Holiday Party which will be held at the David Sarnoff Library on Saturday, December

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.

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

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10th at 5:30 PM. The instructions are self-explanatory but one important point is worth repeating...even if you are a member and coming alone, you must respond by returning the form no later than 11/21/05. We'll be repeating our popular Mystery Grab Bag so you'll need a wrapped, radio-related gift (new or used/approximate \$20 value) to participate. The basics involve "stealing" an already unwrapped gift already chosen in order to upgrade your own. For new members, we'll supply all the rules at the day of the party but the grab bag is guaranteed fun when you participate rather than watch.

The rules for the NJARC Homebrew AM Receiver contest were published in last month's Broadcaster. Judging will be at the January meeting and we'll provide a friendly reminder in December. If you didn't save the October issue or you just became a member, contact me at 609-693-9430 and I'll send you a copy of contest rules.

The Broadcast Band DX contest will take place between January 20-29 and the rules for this contest can be found in this month's issue.

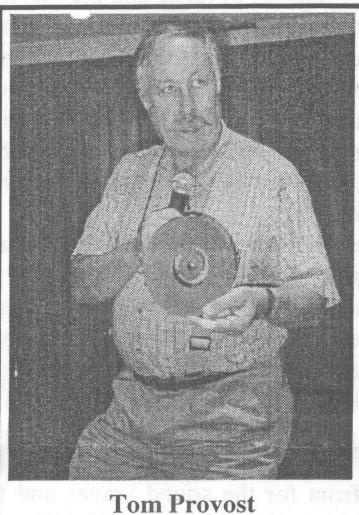
On October 29th, NJARC members provided support for two performances of a re-enactment of Orson Welles's classic radio broadcast "War of the Worlds." Thousands of listeners across the country mistook the original 1938 broadcast for news reports of an actual Martian invasion. What resulted was mass hysteria with residents fleeing their homes or joining to combat the "Martians." Our members provided vintage radios that surrounded the audience and broadcast the re-enactment, equipment to transmit the broadcast and to interface with the Hunterdon Radio Theatre's audio, vintage microphones and a vintage record cutter to save the broadcast on acetate. As Sarnoff Library Director Alex Magoun put it, "it couldn't happen without any and all of you, your sound minds, good hearts and strong backs." Thanks to Jerry and Marsha Simkin, Al Klase, Darren Hoffman, Dave Snellman, Marv Beeferman, Joe Bentrovato, Sal Brisind, Ray Chase, Joe Cro, Harry Klancer and Phil Vourtsis.

On October 29th, NJARC members attended a "mixer" at Infoage where Director Fred Carl opened the Marconi hotel to tours of the building and we got to meet many of the other contributors to the future

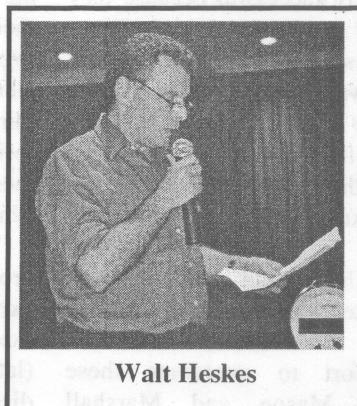
of this important enterprise. A nice touch was NJARC member Bob Pilcher's band which provided background music for the gathering. Your editor got a chance to tour the basement with Ray Chase and Phil Vourtsis; in summary, it's huge and we will never run out of space. Most of us were drawn to an exhibit of the Apollo Guidance Computer created by a former NASA engineer. Amazing! With 2K of erasable memory and 36K of read-only core "ropes," and all logic implemented in dual, triple-input NOR gate chips, this little 1960 gem assured the success of the Apollo lunar missions when most computers filled an entire room. Among its jobs was to provide autonomous navigation to/from the Moon, guidance and control for ascent/earth and lunar orbit/lunar landing (only one attempt - no second chances), rendezvous and earth entry, and digital autopilot for the command and lunar modules.

Bits and Pieces:

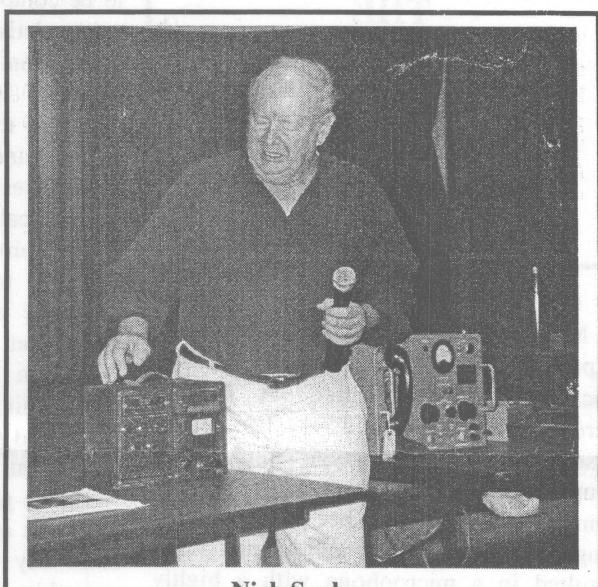
- Ray Chase reports that the 1947 Dumont Westminster Salon TV (tube automatically rises from the console) sold at auction for \$1912 and went to Florida, not to the TV museum in Ohio. In addition, the Zenith Radio Nurse and Monitor sold for \$2700.
- The club is looking for anyone that lives near or passes by the intersection of 130 and 571 when coming to NJARC meetings. We need your help in getting one of our fellow members to Sarnoff. If we get enough volunteers, your services would be required only once or twice during the year. Please contact Marv Beeferman at 609-693-9430.
- Evan Koblenz of MARCH (the vintage computer club that is establishing a museum at Infoage), is planning a work day on Saturday, November 12th at 10 AM. The objective is to catalog the existing Infoage computer collection and prioritize systems for restoration. An invitation is extended to NJARC members to help MARCH with this kick-off project; volunteers meet at the Marconi hotel. Evan hopes that someday our groups can co-host an event mixing vintage radios and vintage computers.

SHOW & TELL

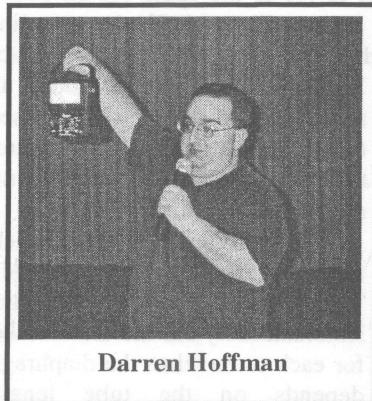
Tom Provost



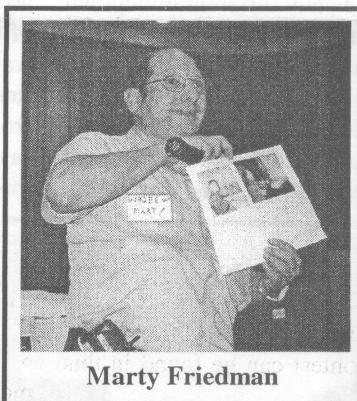
Walt Heskes



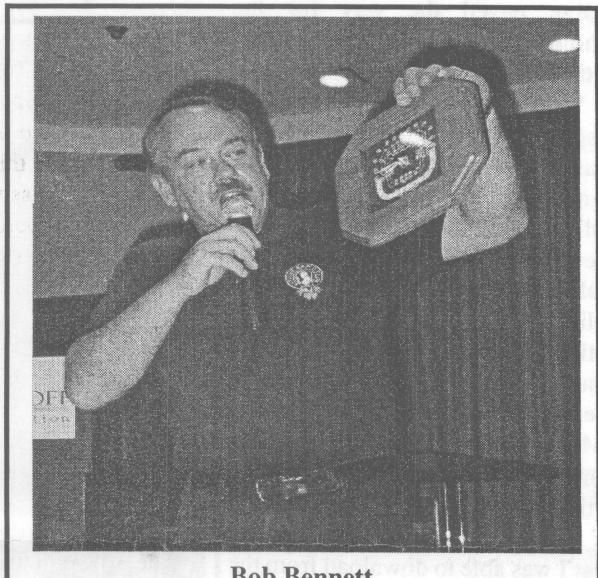
Nick Senker



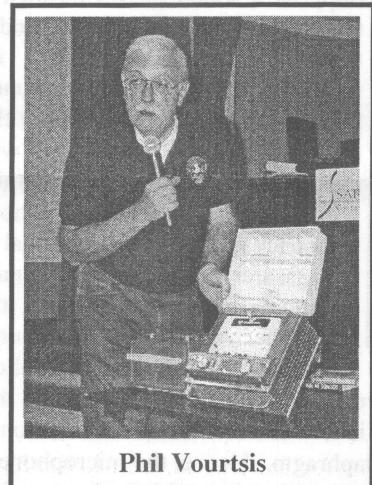
Darren Hoffman



Marty Friedman



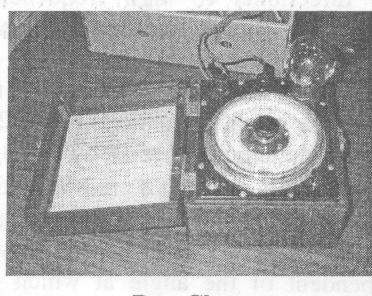
Bob Bennett



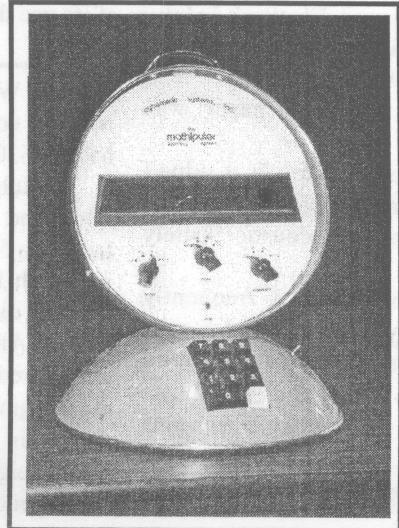
Phil Vourtsis



Alex Magoun



Ray Chase



Marv Beeferman's

MATHIPUTER

THE MACHINE-GUN MIKE

Edited by Marv Beeferman

On January 1939, W. P. Mason and R. N. Marshall of Bell Laboratories published a paper in the Journal of the Acoustic Society of America titled "A Tubular Directional Microphone." The paper described a pressure type microphone coupled to an acoustic impedance element composed of a large number of tubes whose lengths varied by equal increments. This resulted in a microphone with a highly directional pickup pattern and its tubular design paved the way for the "shotgun" mikes we are familiar with today.

When I first saw this microphone displayed in the corner of our museum at Infoage as part of the Broadcaster's Hall of Fame collection, I knew that it and the picture displayed on the adjacent wall looked vaguely familiar. After a little digging, I came up with an article from the December 1937 issue of Radio Craft sent to me by member Richard Lee titled "Machine-Gun Mike Shoots American Legion Parade." The article was a layman's condensation of what was a very technical paper that I was able to download from the Acoustic Society's website. The Radio Craft article described the introduction of Western Electric's commercial version of the microphone in 1937, one year before the formal technical paper was published.

The remainder of this article is edited from the Radio Craft article and the less technical portions of the Acoustic Society paper.

One of the problems that frequently arose in the early days of radio was broadcasting events outside of the studio with the ability to pick out voices or music at a distance while suppressing extraneous background noises. The parabolic microphone was developed with this problem in

mind. However, these early designs failed to be completely successful because they were relatively cumbersome to transport. In addition, as shown in Figure 2C, curve 1, when it was sharply focused, the parabolic mike had a 15 db rise at 5,000 cycles and thus favored the high frequencies at the expense of the lows. To be practical, extra equalization equipment was required. If the focal length was adjusted to flatten out response, the parabolic mike was no longer highly directional.

In an effort to overcome these shortcomings, Mason and Marshall developed a radically different directional mike that was popularly labeled the "machine-gun microphone." As the photo shows, it consisted of some 50 tubes of uniformly different lengths. This tube assembly was called an acoustical impedance element and was fitted with



The "machine-gun" mike at Infoage. To the right is a picture of its use during an American Legion parade in New York.

either a Western Electric 618A or 630A moving coil dynamic microphone...ours has the 630A.

The tubes were made of an aluminum alloy and ranged in length from 1-1/2 inches to 5 feet, with a uniform difference in length from one tube to the next; the overall diameter of the bundle was 3 inches. All of the tubes, open at both ends, terminated at one end flush with the diaphragm of the microphone, except for a slight air cavity as shown in Figure 1. Total weight of the unit was about 7 lbs.

Depending on tube length, each tube

resonated at a different frequency. Due to the large number of tubes and the fact that their resonance points were so close together, this acoustical impedance element was considered, for all practical purposes, non-resonant with an acoustic resistance equal to that of free air. Under these conditions, how then was directivity achieved?

The reason for the directional properties of the microphone can best be explained by referring to the attached sketches. Figure 2A shows sound waves (let's call them "rays" for the sake of discussion) as indicated by arrows arriving from a point in line with the axis of the unit. Consider the line XX as the wave front for the sound waves and the line X1X1 as the diaphragm. The distance from X to X1 is the same for all sound rays. Some will reach X1 by traveling through a long tube and others will reach X1 by traveling through open air and a shorter tube. But in all cases, the distance traveled is the same and the rays will strike the diaphragm simultaneously.

Now consider Figure 2B where the sound rays arrive from the side. They will strike the tube ends simultaneously but the time it takes for each to travel to the diaphragm depends on the tube length. Suppose a sound passes through a tube resonant at its frequency and a tube resonant at double its frequency (half-wave). The sounds from the two tubes will arrive at the diaphragm out of phase and will cancel each other out. Each tube will pass any sound whose frequency is approximately equal to or greater than the resonant frequency of the tube. Thus, the lower the frequency of the sound, the fewer the tubes which will allow

the frequency to pass. This means that there is less of a chance of cancellation at the diaphragm. Hence, the microphone is more directional to high frequencies. Figure 2C shows the microphone's response for different pick-up angles.

An interesting characteristic of the microphone is that frequencies below 200 cycles are not greatly affected by the angle at which they arrive. The reason is that the low frequency response of diaphragm-type microphones of the time was independent of the angle at which the

sound arrived from the forward axis of the mike for all angles less than 90 degrees (see curve 3 of Figure 2C).

As the curves show, the microphone had a flat response curve within 5 db from 35 to 18,000 cycles to sounds arriving within a 10 degree arc off either side of the forward axis of the microphone. This means that within a 20 degree arc, the response was quite flat. At a 60 degree arc, response was flat from 35 to 1500 cycles; above, there is a 20 db loss. At a 120 degree arc, all response above 350 cycles was attenuated 20 db. Since important voice frequencies are from about 30 to 3,000 (from the standpoint of intelligibility), the microphone almost completely excluded all voices 60 degrees off the forward axis.

The advantage of the microphone was based on the fact that most background noises on outdoor and auditorium pick-ups consist of the higher frequencies. Since the unit discriminated against high frequencies arriving from anywhere outside a 30 degree arc either side of center, such background noises were sharply attenuated while the desired source of sound was picked up with no frequency discrimination. In one test, six people were placed in a circle around the mike 60 degrees apart and they were asked to all talk at the same time. The mike successfully eliminated all but the person towards whom it was pointed. The mike was also tested by setting it up on the 6th floor roof of the Empire State building overlooking 5th Avenue during the 1937 American Legion Parade. At the time of the parade, three bands within range all played different music and it was possible to clearly pick up any one of the three.

Another advantage of this microphone was for use in an auditorium with excessive reverberation. An ordinary microphone of the time placed only 2 or 3 feet from a sound source would pick up the sound directly plus that reflected from an auditorium's walls and ceiling. If the acoustics were very bad, loss of intelligibility resulted. If the machine-gun mike was used, it would pick up only the sound source and exclude reflected high frequencies which are generally the cause of excessive reverberation.

The "machine-gun mike" is a very unique and rare piece of early broadcast equipment and the NJARC is proud to be its caretaker.

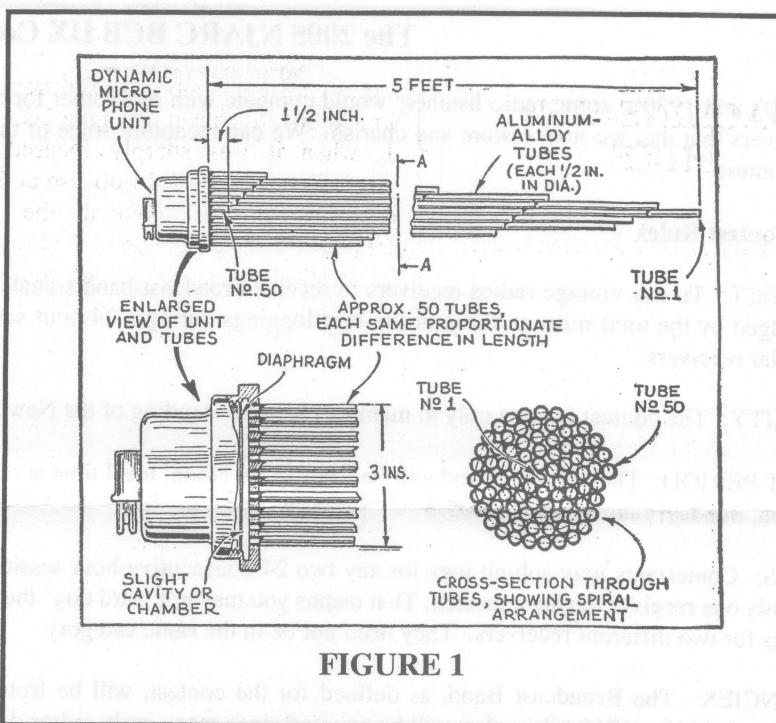


FIGURE 1

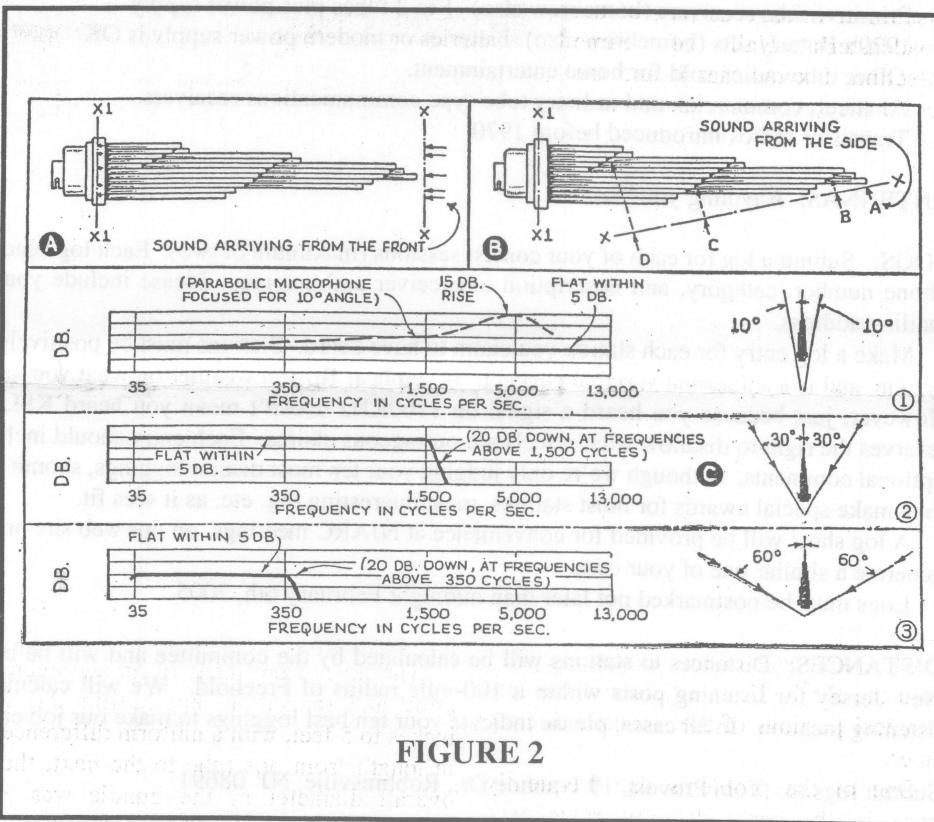


FIGURE 2

The 2005 NJARC BCB DX Contest

In the 1920's and 1930's, some radio listeners would compete with each other for the reception of the most distant stations using the same receivers that we now restore and cherish. We can recapture some of the excitement that the early DX'ers experienced in our own contest.

Official Contest Rules

THE OBJECT: To use vintage radios receivers to receive broadcast-band signals from the greatest possible distance. Performance will be judged by the total mileage for your ten best loggings during a 24-hour session. You will be competing against competitors using similar receivers.

ELIGIBILITY: The contest is open only to members in good standing of the New Jersey Antique Radio Club.

CONTEST PERIOD: The contest period will be from 12:00 Noon, local time at receiving location, Friday, January 20, 2005 through 12:00 Noon, Sunday, January 29th, 2005..

SESSIONS: Contestants may submit logs for any two 24-consecutive-hour sessions (noon to noon) during the contest period. You may use only one receiver during a session. That means you may not "bird dog" the simple radio with a more complex radio. You may submit logs for two different receivers. They need not be in the same category.

FREQUENCIES: The Broadcast Band, as defined for the contest, will be from 530 to 1600 kilocycles. No stations on the new extended band, 1610 to 1710 kilocycles, will be counted since many early radios did not cover those frequencies.

RECEIVER CATEGORIES:

- A - Crystal radios
- B - Primitive tube receivers (homebrew also) -1 to 2 tubes plus power supply
- C - 1920's Battery sets (homebrew also) -batteries or modern power supply is OK
- D - Other tube radios sold for home entertainment.
- E - Amateur, commercial, and military tube-type communications receivers.
- F - Transistor radios introduced before 1970.

ANTENNAS: Anything you like.

LOGS: Submit a log for each of your contest sessions (maximum of two). Each log header should include contestant's name, address, phone number, category, and description of receiver and antenna. Please include your listening address if it is different from your mailing address.

Make a log entry for each station you claim to have heard. Stations must be positively identified. (This is being done on the honor system, and is a somewhat variable concept. If you hear Boston weather on what you know is 1030KC, then go ahead and log WBZ. However, just because you heard a signal on 1160KHz doesn't mean you heard KSL in Salt Lake City.) The contest committee reserves the right to disallow what it feels are outrageous claims. Each entry should include time, frequency, call letters, location, and optional comments. Although we're only judging your ten most distant loggings, submit as complete a log as possible. The committee may make special awards for most stations, most interesting log, etc. as it sees fit.

A log sheet will be provided for convenience at NJARC meetings, on our web site or call 908-782-4829. You may reproduce it or generate a similar one of your own.

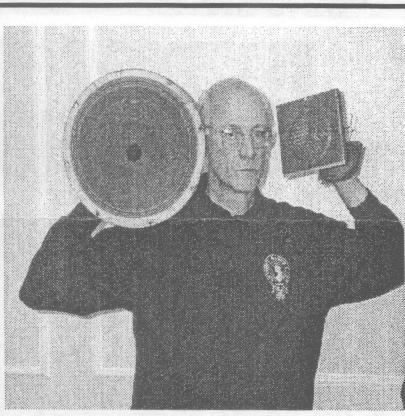
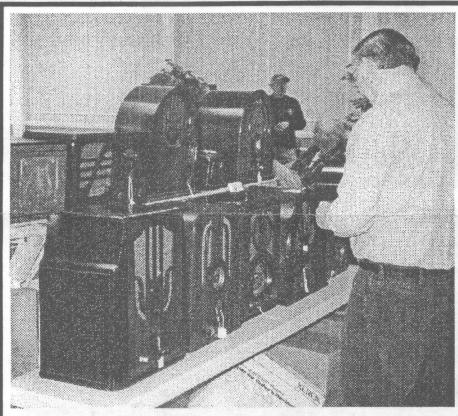
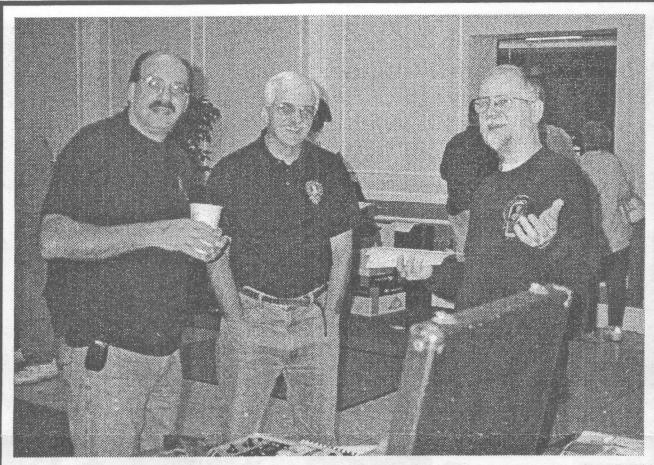
Logs must be postmarked not later than midnight February 6th, 2005.

DISTANCES: Distances to stations will be calculated by the committee and will be based on great circle distances from Freehold, New Jersey for listening posts within a 100-mile radius of Freehold. We will calculate mileage for other entries based on actual listening location. In all cases, please indicate your ten best loggings to make our job easier.

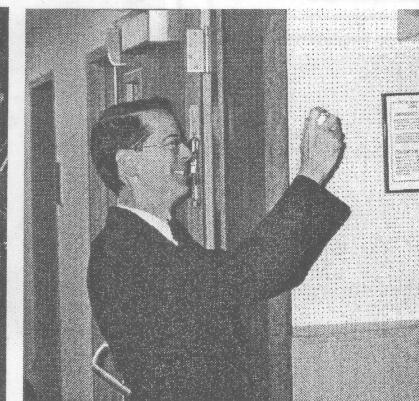
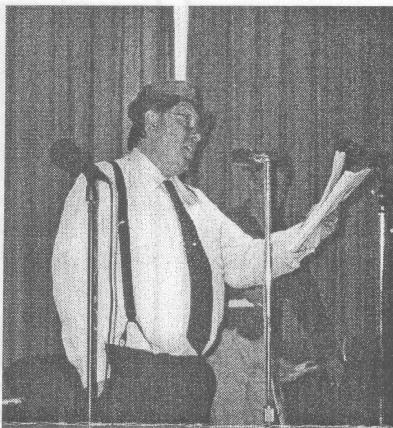
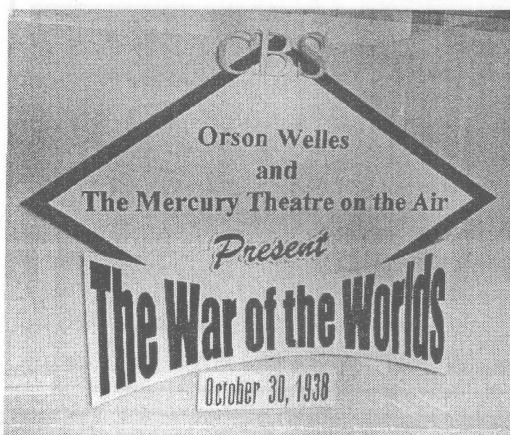
Submit logs to: Tom Provost, 19 Ivanhoe Dr., Robbinsville, NJ 08691

Questions: Al Klase - 908-782-4829, Tom Provost - 609-243-2508

OUR HAZLET SWAPMEET



WAR OF THE WORLDS



Dr. Alex Magoun, Director
David Sarnoff Library

