RADIO AGE

The Vintage Radio Journal of the Mid-Atlantic Antique Radio Club

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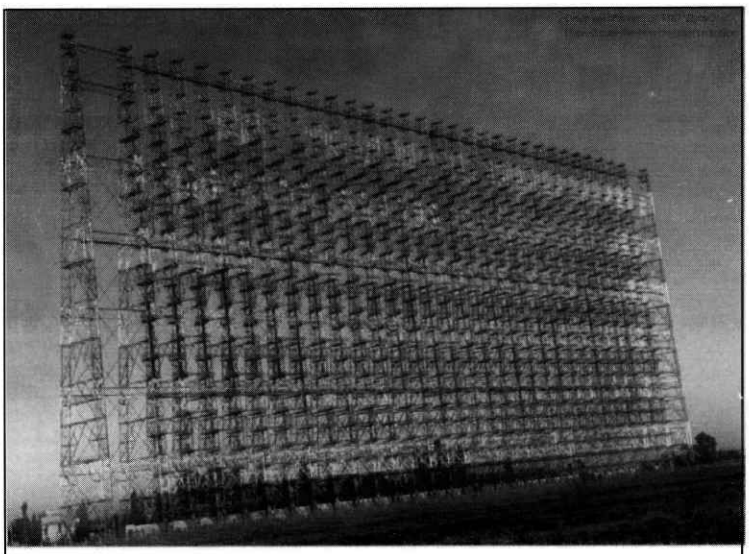
THE WOODPECKER WATCH

BY ED LYON

The entire decade of the 1980s saw this author spending about half his waking hours in Columbia Falls, ME, Bedford, MA, and Syracuse, NY, working with the Air Force and General Electric in the development of the AN/FPS-118 Over-the-Horizon (OTH) radar system. The design of this radar was supposed to incorporate nearly all the technological advances learned in OTH radar research that had been conducted since approximately 1956, when the Naval Research Laboratory, Stanford University, and this author's workplace (ACF Industries) pioneered much of the investigative work.

THE Air Force's decision in the late 1970s to build the AN/FPS-118 was a very big deal (totaling almost one and a half billion dollars in GE contracts) in comparison with all the foundational research and development, which totaled maybe 100 million dollars spent over all the prior 24 years at a half-dozen research and academic institutions. Beginning in 1979, the Air Force had to go through all the post-WW2 checks and balances, such as full environmental impact (EI) hearings and a services-wide defense of the technology. In the Environmental Assessment process, one of the most pressing issues developed during the public hearings was that of potential interference of the OTH radar transmitter signals to other users of the shortwave spectrum. Two groups of citizens dominated the opposition to the military use of shortwave frequencies for this radar: the radio amateurs (hams) and the shortwave listeners.



The Russian OTH radar transmitter that was dubbed "the Woodpecker," by hams and shortwave listeners all over the world.

The amateurs were relatively easily persuaded that the technical design of the Air Force's radar transmitters was such that insignificant levels of radar signal energy would fall into ham bands, and most of the hams who attended the EI hearings could understand the anti-interference design principles that were

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ABOUT MAARC and *RADIO AGE*. *Radio Age* became the monthly newsletter of the Mid-Atlantic Antique Radio Club in June 1994. Prior to that date, the *MAARC Newsletter* and *Radio Age* were separate publications.

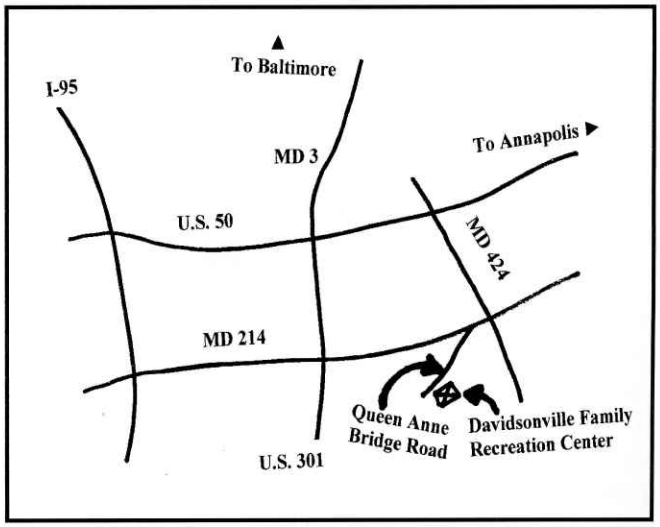
Subscription to *Radio Age* begins with the next available issue after the membership application and dues are received. Dues are $24per year in the US, $36 in Canada, and $60 elsewhere, all payable in US dollars. Two-year, three-year, and life memberships are available; contact the Membership Chair . All checks are payable to MAARC and, for new members, must accompany the membership application, which is available from the Membership Chair or the MAARC website (www.maarc.org). If you change your mailing address, email, or phone number, please notify the Membership Chair immediately so corrections can be made to *Radio Age's* mailing list. The Post Office will not forward your newsletters.

Back issues of the *MAARC Newsletter* from Vol. I, No. 1 (August 1984) and most issues of *Radio Age* from Vol. 1, No. 1 (October 1975) are available for $3.50 each postpaid from the Membership Chair. 10 percent discount on orders of 12 or more back issues and 15 percent on orders of 60 or more back issues. Make checks payable to MAARC.

Submissions to *Radio Age* are welcomed. Typewritten copy is preferred to handwritten. Articles should be submitted in PC format, preferably via email or on a CD or flash drive, in MS Word, Word Perfect, Wordpad, or RTF format, without fancy formatting, because the editors will have to modify it anyway. Photographs, if hardcopy, should be high quality black and white or color. Softcopy graphics files should be in TIFF or JPEG formats; contact the editors for further guidance. Send your submission to either editor and include your name, address, phone, and email.

MAARC MONTHLY MEETINGS. Most months MAARC meetings are held at the Davidsonville Family Recreation Center, 3789 Queen Anne Bridge Rd., Davidsonville, MD (map below). From U.S. 50, take MD 424 south for 2.5 miles. Turn right on MD 214 for 0.6 miles, and angle left on Queen Anne Bridge Road for 1.1 miles. The entrance will be on your left. April and December meetings are usually held at the Sully Station Community Center in Northern Virginia. Check the calendar on page 16 for details.

Map — Davidsonville Family Recreation Center (not to scale)



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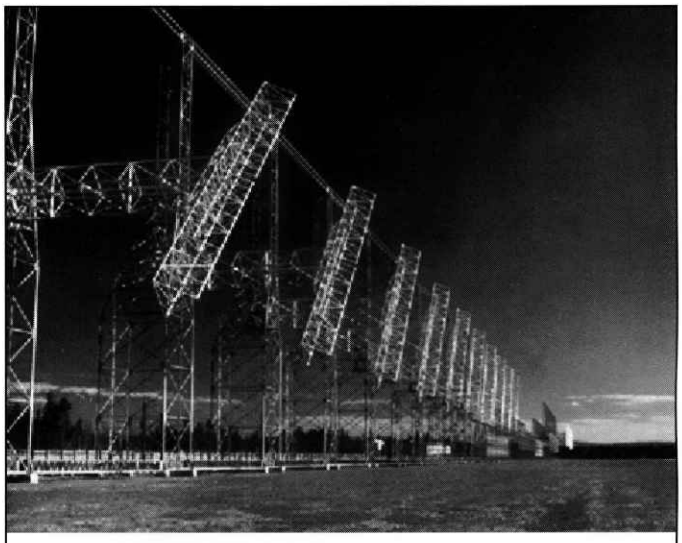
explained by radar experts in these forums. The hams were invited to participate in the initial year-long technical trials of the prototype radar sector which was being constructed in Maine, through listening tests and reporting routines which would bring immediate remedial response from the radar operators, from frequency changes to complete shut-down, if need be.

It came as sort of a surprise, though, that the shortwave listeners would also be among the objectors in these meetings, and most of them cited something called the Russian "Woodpecker" as a "typical OTH radar signal" which devastated their listening pleasure [1]. On careful but polite investigation, it turned out that most of the objectors had never listened to shortwave signals, or to the "Woodpecker." These were the paid professional objectors who were collaborating with the true shortwave listeners to bolster their message, since there were so few of the true listeners ever present at the hearings, compared with the numbers of hams who were well organized through clubs, and who showed up regularly at EI meetings of this sort.

But the shortwave listeners and their mouthpieces had a point. The Russian "Woodpecker" was truly a nuisance in the shortwave bands. The "Woodpecker" term derived from the sound made when this Russian OTH radar signal operated on a frequency to which a shortwave receiver was tuned: a rapid "knock-knock-knock" that abruptly started and continued for several seconds, then seemingly disappeared for a minute or two, only to reappear, perhaps not exactly on the same frequency, but close enough to spill into the receiver's tuning skirts, and start its "knick-knick-knick..." for another several seconds. We had quite a time with these listeners and their helpers, finally convincing them that we would not bother them in the bands in which they spent most of their listening time – the shortwave broadcast bands. But they had allies in the shortwave broadcasting business. One of these allies was the Netherlands shortwave broadcast system with a transmitter located in Hilversum, Netherlands. An engineer at that station wanted to obtain an audio tape recording of the U.S. Air Force OTH radar, as heard on a standard shortwave receiver, so he could re-broadcast the signal to all his shortwave listeners as "typical" of the American "Woodpecker." Despite the sympathetic and kindly demeanor of the USAF bird-colonel who chaired these EI hearings, we advisors steadfastly refused to give any such recordings to a broadcaster whose objective was to make our radar signals seem to be very much like those of the Russians.



The USAF's AN/FPS-118 OTH radar transmitter antenna in Maine was about 150 feet high and 1200 feet in span. The Woodpecker antenna on page 1 was over 700 feet high and over 2500 feet wide.

These hearings plus a natural curiosity about the Woodpecker signals persuaded me to put together two shortwave listening posts in my home in the early 1980s. One was in the basement, well away from spaces where the reception would irritate other family members, especially during prime-time TV, and the other was in the family room in the form of my trusty Zenith 9S244 Chairside radio. The former was for serious listening and measurement-taking, and the latter was for any quick check I wanted to make as I passed through the family room, such as just before leaving for work in Arlington or enroute to Maine again. The basement setup included a long-wire antenna strung out from the house to a tree about 150 feet away, feeding a Racal RA-17C

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In This Issue

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receiver and its oscilloscope, plus a Hewlett-Packard 3585A spectrum analyzer.

Quite early I discovered that the "knock-knock-knock" signal had the "knocks" timed to occur at 0.10 second intervals, exactly. Further, each individual pulse making up a "knock" of the Woodpecker signal was not a plain pulse of radio-frequency signal, but was complex, each made up of segments of alternating plus and minus phases. That is, if the receiver IF signal was passed through a phase detector it would show alternating + and – outputs throughout the duration of each "knock." Some segments were short, some were longer, and some were yet longer. Careful measurements showed that the basic (shortest) segment was about 0.1 millisecond in length, and each entire pulse (knock) was 3.1 milliseconds in length, this length allowing for 31 basic segments, or some lesser quantity of combinations of segments of 100, 200, 300, etc., microseconds length. The pattern of segment lengths seemed to be the same for each pulse, and the pattern looked familiar, because it turned out to be exactly the same segmentation pattern I had used some 15 years earlier in one of the overseas OTH radars our company had built and operated. The reason we did not change the pattern in 1966, and the probable reason the Russians didn't change it in 1981, was that the chosen pattern was found to produce a very clean "autocorrelation function."

What that means is that if the entire pulse were to be passed through a "matched filter," it would emerge with all 31 possible segments piled up on top of each other just as the entire pulse fitted into the filter on its journey through the filter with the passage of time. This is one form of a pulse-compression scheme, designed to increase the amplitude of pulse echoes in radars, such as from targets sought by the radar. In a 31-segment filter, there are "good" patterns of pluses and minuses, and there are "bad" patterns. Good patterns are those which yield singular high amplitude compressed pulse outputs with very low amplitude levels at all other times as the pulse passes through the filter. Bad patterns have auxiliary peaks in amplitude caused by short sections of repeating pattern or other pattern faults. Some well-known good patterns are those classed as "Barker" codes, but Barker codes have been discovered only for short pulse patterns, with 13 segments being the longest found so far. Patterns of 31- segment length, as we found with the Woodpecker (and earlier in our own radar) are not quite as ideal as Barker codes (they have auxiliary little peaks or sidelobes), but yield higher output amplitudes than the longest Barker code found.

I wondered, after working up this pattern in the Woodpecker signals, if the Russians had found the advantages of a 31-segment pattern just as we had, or if they intercepted our own radar signals some 10 or 15 years earlier, and simply copied them. But after discovering the pulse phase-switching pattern in the Woodpecker signal, I found a peculiar thing about the frequency-route taken as it moved about from frequency to frequency. The spectrum analyzer showed that there were several Woodpecker signals operating simultaneously, on separate frequencies. The frequencies in use always seemed to be clustered near each other, and changed every four or five seconds. On many occasions, it could be clearly seen that there were four Woodpecker signals, each following its own frequency-time plan inside an overall frequency boundary perhaps three or four MHz in span. The four pulses produced on the four frequencies, respectively, were timed to follow one another in rapid succession, and the group of four recurred at exactly 10 groups per second, so that on any given frequency, the pulses recurred each 100 milliseconds. It was as though there were four separate radars, each working a random path through all the shortwave frequencies of interest, each blasting out a terrifically powerful pulsed signal, yet each never interfering with the others. The pulse amplitudes were usually all about the same, indicating that if these were four different radars, they were all located near each other, sharing the same general shortwave path to my home. The fact that they never seemed to cross through each others' frequencies indicated that they were all programmed by a common frequency-time planning device or circuit. Furthermore, the fact that they all seemed to be assigned to particular time slots in the 100-millisecond repetition pattern would indicate that a single transmitter could be producing all the signals, driven by either a very agile exciter, or four independent exciters.

The realization that there were four powerful Woodpecker signals on the air at any given time made me feel a little empathy for those shortwave listeners who had berated us so much in the EI hearings. I repeated the signal measurements several more times in the ensuing several weeks, and then simply checked for them with the Zenith chairside

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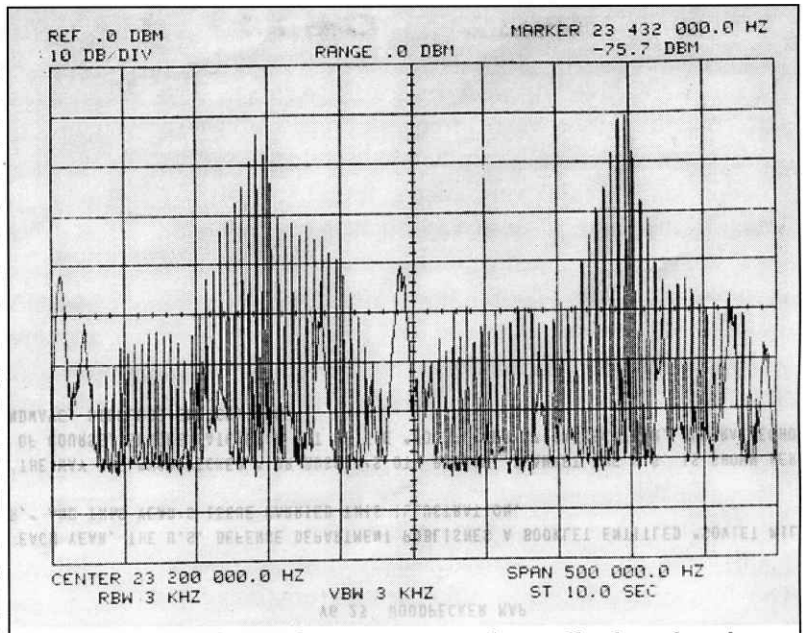
about once a week or so. In Maine, while working through the very structured Air Force system tests of the prototype OTH radar, there were periods when we would shut down the system for measurements pertinent only to the distant transmitter site [2], and could employ the spectrum analyzer at the receiving/control site, and tie it in to the enormous OTH radar receiving antenna. This would be a far better receiving arrangement than I had at home. The Woodpecker signals came roaring in, and I showed some of the Air Force and GE engineers some of the characteristics I had seen in the signals at home months before. They were usually puzzled about why the Woodpecker signals seemed to trample all over the signals seen in the international broadcast bands, and many of the engineers asked how the Russian radar could possibly hope to see tiny targets far away with the strong shortwave broadcast signals present on the radar frequency (or actually, vice-versa). It seemed so simple for the Russian operators (or, better yet, control computer), upon selecting a frequency at random on which to operate, to sense the co-channel presence of the existing shortwave broadcast signal, and then simply not transmit the pulses assigned to that frequency, but simply move onward with the other three radar signals. The one that was stood down could pick up again on its next frequency, if it happened to be free of interfering signals. That way neither the radar nor the broadcasters would be bothered by the other [3].



Hewlett-Packard 3585A spectrum analyzer display showing two of the four Woodpecker signals generally filling the half-MegaHertz span between 22.950 MHz and 23.450 MHz. Two international broadcasters escape serious interference here, one at 22.955 MHz on the left and one near 22.195 MHz near the center. Six others are buried in Woodpecker knocking.

Or maybe it was some sort of "power play." Which signal would yield? Meanwhile the shortwave listeners were getting irritated, and some went so far as to have it brought up in the UN General Assembly sessions in New York. In their complaints to the UN, they often simply classed all OTH radars in the same light; all were called Woodpeckers. Meanwhile, in the shortwave listeners' magazines (one of which I had been subscribing to for at least two years, *RIB, the Review of International Broadcasting*) shortwave listeners who wrote in to the editors asked over and over again if anybody definitely heard the U.S. Air Force radar signals thus far. Their other concern was the "...(expletive deleted) Woodpecker signal. Since these listeners never directed their questions to the Air Force offices that had been set up to receive possible complaints of interference, the magazine readers would answer their own questions. The answers about the Air Force radar signal kept coming back very confused, with more questions about what they should sound like, and what times of day they were on the air. Actually our radar was on the air 16 to 20 hours a day, five or six days a week. The writers would also ask each other what frequencies we would be using, and finally, after about eight months of this confusion about whether the Air Force radar signals were at all audible or not, the Air Force System development office at Hanscom Field (Bedford, MA) received letters directly from Glenn Hauser, the editor of *RIB*, asking if we were on the air, and asking for a schedule of our times and frequencies for the coming weeks. Colonel Lewark, the System Program Officer, wrote back that he could give them times, but the frequencies depended on God's control of the ionosphere, and that Hauser would have to contact Him to find accurate frequency predictions.

Meanwhile the Woodpecker signal persisted, keeping the same general pattern all the time, 24 hours a day. Four separate pulse trains, each following its own frequency-time plan, and all locked together in time, each pulsing at exactly 10 pulses per second. I had got into the habit of checking the Zenith chairside

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each evening before retiring, and each morning as I got ready to leave for work or for the airport. The part of the shortwave frequency spectrum of operation was generally predictable, but at any rate, Woodpecker signals were easily found, simply by reducing the radio's sensitivity so that other signals were not hearable, and spinning the dial until the "knock-knock-knock" of the Woodpecker came through. Often several of the four pulse trains could be heard near each other on the dial, but it was never clear that there were four; it just took too many spins of the knob and they only stood still for a few seconds, anyway. Seemed like one or more was always in the process of changing frequency. Only the Hewlett Packard spectrum analyzer downstairs (or the one in Maine) could see the four distinctly. The full-scale Air Force radar system continued its construction and installation, interspersed with complex experiments to test capabilities limits.

Then on a Monday morning in late April 1986, while the Air Force radar testing was on hold while they concentrated on building the full scale system, I flipped on the Zenith before going to work and heard the Woodpecker hammering away near 10 MHz, and when I advanced the receiver gain a tad, there was the faint voice of an unlucky BBC newscaster struggling to be heard on his 31-meter broadcast underneath the hammering of the Woodpecker. After almost a minute, I suddenly realized that Woodpecker's frequency did not change. I scanned the tuning knob up and down, and found two other Woodpecker pulse trains, each also fixed on a frequency. I could not find the fourth one. A few minutes passed, and all three were still on the same frequencies. I shut off the Zenith and went downstairs to the Racal. All three were quickly found on the Racal, and were easily visible on the spectrum analyzer. At work that day I mentioned this to one of my colleagues who was interested in the probable technology of this Soviet radar. That evening the Zenith, still on the same frequency, was switched on, and the hammering picked up immediately, never having moved in frequency. The Racal downstairs and the HP spectrum analyzer showed the same three Woodpecker pulse groups as seen earlier, all on the same frequencies. I wondered if these guys finally were heeding the complaints about Woodpecker interference to the international broadcasting community (which had been promoted to a UN topic), and were starting to clean up their act. But, on the other hand, operating an OTH radar on a fixed set of frequencies, fairly tightly grouped (within a half-MHz of each other) was a disastrous way of operating, guaranteed to fail to detect whatever targets it was aimed at most of the time [4].

On Wednesday evening, the last day of April, on listening to the news, I heard that a nuclear power plant somewhere in the Ukraine had blown up, as reported by the Swedes, who discovered radioactive fallout around one of their own nuclear power plants, and had dug into the matter promptly, against the possibility they had some sort of problem with their own plant [5]. Over the next several days, more and more news of the destruction of the Chernobyl, Ukraine, power plant and surrounding structures was leaking out and the devastation level was being gradually realized by the rest of the world. Early reports mentioned the evacuation of some very local workers and citizens of the nearby town of Pripyat, but as time progressed, the evacuation was being described as affecting hundreds of thousands of citizens. Somehow, this had to be related to the freezing of the operating settings of the Soviet radar.

I returned to the Zenith several times during the next few days, finding the three pulse trains still on the same frequencies, as though the control system had become stuck. It seemed more than a coincidence that this problem happened at the same time as the Chernobyl accident. News reports regarding Chernobyl were grim, and the Soviets were beginning to admit that some of their military who were stationed at or near the power plant had been killed or seriously sickened by radiation as they tried to contain the contamination by nuclear debris. We had many times tried to backtrack the location of the Woodpecker signals while at the Maine radar sites, but the enormous distances from Maine to the central part of the Soviet Union made direction-finding very tentative [6]. We had concluded, though, that the sources of all four Woodpecker pulse trains were common; it seemed to be one transmitter site, somewhere near Kiev. Maps of the Ukraine disaster area and the ensuing spread of radioactive debris began appearing in the news, and, although not easily found in my *Times Atlas*, Chernobyl turned out to be just north of Kiev, on the Pripyat River. It became quite suspicious that the Woodpecker radar site might be involved somehow, perhaps abandoned because of radioactive contamination, or because the operators were pressed into more urgent rescue work. At any rate, it appeared that the radar control system had been left in a fixed condition.

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About four days after Chernobyl, the Woodpecker signals had reduced to two pulse trains, and they were considerably weaker than they had been, but that could have been a shortwave signal propagation problem. Left fixed in frequency, the Woodpecker was no longer utilizing the optimum frequency bands to get to our part of the world. By Sunday, 4 May, eight days after Chernobyl, the Woodpecker signal was so weak that only one pulse train could be heard, using the Racal RA17C in the evening, and by Monday morning, none could be heard. Later that week, a visit to the Air Force receiving site in Columbia Falls, Maine, permitted a few minutes' time searching for the signal, and nothing was heard there, either. An issue of *RIB*, received in August 1986, remarked on the absence of interfering Woodpecker signals, and the relative freedom from its harmful interference with the listeners' pleasure at discovery of obscure international broadcast signals all over the world. Almost a year later, testing began again in earnest in Maine, and the big new radar system swung into full operation, while its capabilities for detecting new potential threats, like cruise missiles, concerned the Air Force management. The Maine transmitting site, located near mountainous Moscow, ME, now had three one-megawatt transmitters on the air 24 hours a day, and no complaints of interference with shortwave listening had yet been reported. A second radar system, located on the Oregon-California border area was also coming along, and would soon be in testing, adding another 3 megawatts of signals to the shortwave spectrum.

My job became one of devising a concise but definitive test for the Maine radar's capabilities against typical cruise missiles, finding a clear method of measuring the actual shortwave radiated power emitted from these radar transmitters and their antennas, and teaching courses in electronic countermeasures and counter-countermeasures to the USAF operators of these radars. The recordings of the Woodpecker signals made in Maine during the initial radar tests there became a basis for teaching how *not* to operate an early-warning system that had to keep a low profile in the crowded shortwave spectrum of the 1990s.

The Woodpecker signals never again showed up as nuisances to shortwave listeners or hams, and the radar sites, easily found on Google Earth views, seem abandoned and overgrown with brush and weeds. Indeed, only half of a radar site complex (only the transmitting site but not the nearby receiving site) is still standing; all the rest have been dismantled and turned into remelted steel for domestic use. The one still standing is the Pripyat transmitter site, left standing probably because the site is in a contaminated exclusion zone in which only very short visits are allowed. The Woodpecker watch was ended.

End Notes:

[1] After growing up during the WW2 era, when shortwave broadcasts of news stories, often patched into regular domestic newscasts, were listened-to with almost painful concentration, trying to understand a voice that was riddled with static crashes, fading, and distortion, most of us were surprised that people still listened to shortwave broadcasts for pleasure.

[2] The Maine radar transmitter site was west of Bangor, near Skowhegan, in the mountainous part of the state.

[3] U.S., Australian, and Canadian OTH radars never transmit on frequencies that are occupied by other signals.

[4] OTH radars, operating in the shortwave band, must change frequency to maintain operation at the optimum propagation conditions, relative to the area they survey.

[5] A Swedish power plant was quickly cleared of any reason for the radioactive rain falling in Sweden.

[6] We had located the Woodpecker signals as arriving from a direction that was at 45° E of N.

FOR THE RECORD

The January meeting of the Mid-Atlantic Antique Radio Club was held on 20 January at the Davidsonville site, with approximately 53 souls present, four of them new members. Willie Sessoms had his annual well-run Super Show-'n'-Tell session that brought out a number of oddities. These included a Clapp-Eastham short Navy tuner, a larger EICo slide-type loose coupler, Eric Stenberg's Emerson 161wood-cabinet set, Domi Sanchez's Stromberg-Carlson "doll house" radio repair shop, shaped exactly like the S-C 130H radio it was sitting on, John Begg's huge Air Chrome membrane speaker, and Steve Hansman's Packard Bell west-coast radio. Mike Baird got into the act with an explanation of the makeup of his austere-model of an enormous boom box, and Willie displayed a nice Mae West. The auction was large, and actually netted a couple Cs to the treasury.

THE MIGRATION TO VHF

BY ED LYON

Every belligerent in World War II moved some communications links from traditional shortwave frequencies (HF) to the VHF spectrum, where there was more room for voice-modulated signals. Most of these VHF novices considered frequencies from 20 MHz to perhaps 60 MHz as "good enough" to gain the advantages of VHF, but the British saw far more payoff in yet higher frequencies—those above 100 MHz.

As World War 2 ratcheted up in intensity in Europe, and America began taking seriously a role as the world's "Arsenal of Democracy," our military camps and factories found themselves hosting visits from British and Canadian military and industrial representatives. Now that Roosevelt's Lend-Lease agreement with Britain was out in the open, these shopping visits became commonplace. High on the list of wartime needs was radio – and organizations like the Army's Aviation Research Lab (ARL) and the Naval Aircraft Lab (NAL) welcomed the idea of getting American industry acquainted with the joint British requirements of military specifications and urgency, usually mutually exclusive. Both ARL in Dayton and NAL in Anacostia had long despaired over the snail's pace development practices of their parent organizations (Army Signal Corps and Naval Bureau of Aeronautics, respectively), and admired the *ad hoc* corner-cutting by the British military, when it mattered.

In the case of ARL, their engineers at Wright Field had started unprecedented negotiations with the Navy and the Aircraft Radio Corporation in New Jersey to finalize the family of command radios needed for warplanes. These were small radios used for plane-to-plane and short-range plane-to-base communications. The former were intended to enable aircraft to coordinate their attacks, and the latter was for close control in the departure and return phases of aircraft sorties. The NAL had been quietly developing this type of radio (which they called ARA/ATA) to replace the venerable RU-GF [1] series of radios still rolling off the production lines at Western Electric, and needed to get the Army Air Forces to join them, if the new command radios were to be a successful venture. Critique of the development by the Army's Signal Corps, who would have to finance the mass production of the radios, was not entirely favorable, finding many parts that were not in the approved inventory of military electronic components, and finding, generally, that the radios were too lightly built and too compact for easy maintenance. And in this particular case, the British were of no help, seeming to show no interest whatsoever in these little radios.

These Navy/ARL command radios, to be nomenclatured SCR-274N [2] by the Signal Corps, were novel in that each model covered a specific shortwave (or medium-wave) band, and to change bands, one simply changed radios. Larger aircraft would carry three or four radios, all plugged into a common rack together, allowing the radio operator to select the proper one for each phase of his mission, perhaps a low-shortwave frequency set for departure and later return to base, and another higher frequency set for plane-to-plane coordination, and yet another for homing or navigation. Fighter planes might carry only one or two such command sets. These radios were manually tuned, and used relatively high quality tuning components to maintain tuning accuracy and stability despite wildly varying operating temperatures and intense vibration. Still, tuning stability was a shortcoming that had to be endured; the order had come down that there was not enough quartz in inventory to allow crystal control in these radios. The reason British military visitors declined interest in the command sets was that the RAF was in the process of leaving the shortwave bands altogether in favor of a new VHF band, and their VHF TR-1143 radio.

What surprised the ARL and NRL representatives was the actual frequency band to be used by the Brits in their TR-1143, 100-130 MHz, considered by most to be UHF, even though it was technically VHF. For the Army Signal Corps, the basic concept of VHF was not new, as they also had a large project underway to outfit tanks and other ground vehicles with SCR-508 radios operating in the 20-30 MHz regime (just at the lower edge of VHF), and these radios would be operating on FM, not traditional AM. This was a project not fully endorsed by the stodgy Signal Corps management, but was being pushed by Edwin Armstrong and some of his leading FM contractors, REL, Western Electric, and Fred Link, at relatively little development cost to the Signal Corps. The big risk in this radio was its huge appetite for quartz crystals. The Signal Corps tended to agree with the British idea of using VHF for aircraft command func-

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RadioActivity 2013

Thursday Evening, June 20, Through Saturday, June 22

RadioActivity, the premier East Coast radio meet, will be held once again at the Sheraton Washington North Hotel in Beltsville, Maryland—located at Exit 29B (Rt. 212) off I-95 between Washington and Baltimore. The hotel is on the southwest corner of the interchange.

Hotel reservations are *separate* from meet registrations. To reserve a room, use the hotel reservation card on the last page of this pull-out, or call the hotel toll-free at (800) 325-3535 (local number: 301-937-4422). Be sure to specify the Mid-Atlantic Antique Radio Club. For reservations you may also go to the special website for this event, given on the hotel reservation form on the last page of this insert. **Hotel reservations must be received by May 20 for the discount rate.** Book early—last year discounted rooms filled up even before the cut-off date! (And, late reservations cost more.) The hotel's special conference rate is $89 per night, single or double. (Suites are available for an additional charge—contact the hotel for details.) Washington/Baltimore area hotels are expensive, and this is a *very* attractive rate for a hotel of this caliber.

Meet registration is required to participate in the auctions and Old Equipment Contest, attend seminars, and sell in the flea market. Name badges should be worn at all times. There is a discount for those who pre-register for the meet, and MAARC members get an additional break. **Pre-registrations must be received by MAARC by June 7 for the discounted rate**. (The registration fee includes your family, but banquet tickets and flea market spaces are extra.) Note that for those who plan to attend ONLY on Saturday, there is a one-day registration fee option.

This year's theme is Scott—both E.H. Scott and H.H. Scott. Seminar topics and contest categories will feature both companies. E.H. Scott radio expert Kent King will be there to present a technical seminar about Scott radios and will also be the banquet speaker, with a historical presentation about the company. Steve McAllister will present a seminar about H.H. Scott equipment and that company's contributions to postwar high fidelity. Tom Houghtaling will offer a seminar on television repair. Ed Lyon will present his annual radio repair class.

The registration desk will be open between 6:30 and 7:30 p.m. Thursday night, **but there will be no flea market selling until Friday morning.**

Last year a tube, literature, and ephemera auction was held Thursday evening and, because it was so successful, it will be offered again this year. That is the place to sell tubes, books, catalogs, magazines, advertising brochures, etc.

The registration desk re-opens at 6 a.m. Friday, June 21, when the Radio Trader's Mart (flea market) also opens. Each space is one standard parking space into which you must fit your vehicle plus the items you have for sale. Reserve as many spaces as you think you need. Spaces are not marked and are taken on a first-come, first-served basis. If you and a friend wish to have adjacent spaces, coordinate your arrival times. If you vacate your space, someone else may take it before you return. Sellers must display the flea market registration card where it is visible to buyers.

We strongly encourage attendees to enter items in the Old Equipment Contest (OEC). The contest categories, guidelines, and criteria are listed on pages 2 and 3 of this insert.

The main auction will be Saturday, during which there is a minimum opening bid of $15 per item. **Non-members of MAARC will pay a higher auction commission (15 percent) than members (who pay only 10 percent).** This is yet another good reason to join if you are not already a MAARC member. At the Thursday evening tube and ephemera auction, the $15 minimum bid requirement is waived, and there will be no charge for no-sale items, but the commission charges will be the same as at the main auction. Check page 3 for a complete explanation of auction policies.

A no-reserve walk-around auction in the flea market parking area is scheduled for 8:30 a.m. Saturday morning. This is the place to get rid of those boxes of junk or other items that are unlikely to bring $15 or more in the main auction. (But not all walk-around offerings are junk! Last year a NOS 6T5 tube was sold in the walk-around auction for about $100.) The auctioneer walks through the parking lot auctioning items from tailgates. No commission will be charged during the walk-around auction and no paperwork will be kept. The buyer pays the seller immediately upon having the winning bid. (The walk-around auction will be held unless the weather makes that impossible.) Food and drink items will be available for purchase in the flea market area for lunch on Friday and Saturday, weather permitting, as well as breakfast items Friday and Saturday mornings.

The Friday night buffet banquet will feature door prizes and a special display emphasizing this year's themes. And, attendees will have an opportunity to learn all about E.H. Scott. Banquet tickets are $35 each. A cash bar/social hour precedes the banquet. We anticipate that only a few banquet tickets will be for sale at the door. Pre-register so you won't miss this event.

MAARC and its officers are not responsible for any accident, injury, or loss that occurs at this meet.

RadioActivity 2013 Schedule

Date	Time	Event	Location
June 20 (Thursday)	6:30 to 7:30 p.m.	Registration desk opens. See page 3 for complete list of registration desk hours.	Rear of hotel
	7:30 to 9 p.m.	Tube, literature, and ephemera auction	Ballroom
June 21 (Friday)	6 a.m.	Conference registration desk opens, flea market begins.	Rear of hotel
	9 a.m. to 11 a.m.	Old Equipment Contest entry log-in	Severn-Lochraven Room
	Noon	Seminar: *H.H. Scott Equipment*, by Steve McAllister	Potomac Room
	11 a.m. to 2 p.m.	Old Equipment Contest judging (contest room closed)	Severn-Lochraven Room
	1:30 p.m.	Seminar: *Accessorizing your Scott Set*, by Kent King	Potomac Room
	3 to 5 p.m.	Contest Viewing	Severn-Lochraven Room
	3 p.m.	Ed Lyon's *Radio Repair Clinic*	Potomac Room
	6 p.m.	Social Hour, cash bar	Rear of hotel
	7 p.m.	Banquet, Speaker—Kent King, *E.H. Scott History*	Ballroom
	For 1 hour following the banquet	Old Equipment Contest Viewing	Severn-Lochraven Room
June 22 (Saturday)	7 a.m.	Registration desk and flea market re-open.	Rear of hotel
	7 to 9 a.m.	Remove contest entries.	Severn-Lochraven Room
	8:30 a.m.	Walk-around auction in parking lot	Rear parking lot
	8:30 to 11:30 a.m.	Auction consignment check-in	Registration area
	10 a.m.	Seminar: *Television Set Restoration*, by Tom Houghtaling	Ballroom
	11:30 a.m.	Auction consignment closes. All entries must be logged in.	
	Noon	Main Auction	Ballroom

Old Equipment Contest Categories for RadioActivity 2013

Theme: E.H. and H.H. Scott Equipment

Theme Categories:

1. E.H. Scott complete radios (in cabinets)
2. E.H. Scott radios (complete, no cabinets)
3. H.H. Scott complete audio sets (tuner and/or phono/tape deck, preamp/mixer, amp, speaker)
4. H.H. Scott units (one or more—tuner, preamp, amp, DNS, etc.), showing uniqueness or progression of capabilities

Other Categories:

5. Passive receivers (e.g., crystal, magnetic, coherer, electrolytic)
6. One-tube factory-built radios
7. TRF receivers, no reflexing
8. TRF regenerative receivers, with reflexing
9. 1929 to 1939 cathedral radios
10. All-American Five radios from any era, using five tubes common to at least 30 percent of the radios of the period
11. Loudspeakers, any type
12. Audio equipment (except H.H. Scott)

13. Advertising material, literature
14. European radios
15. Pacific rim radios (from Asia, Australia, Oceania, California, Alaska, B.C. Yukon, Mexico, etc.)
16. Lazarus radio (restored from utter junk-state) Note that the winner from this category may be selected for international competition in Montreal.
17. "As seen in *Radio Age*" equipment (any equipment featured in a *Radio Age* article from 2012-2013)
18. Open category. Bring in that rare or special item that does not fit into any of the other categories.

Remember that documentation, especially noting any restoration or repair, and provenance for the item is essential for an entry to be competitive.

Special Awards

1. Best of Show. The entry that, in the opinion of the judges, best represents the contest criteria.

2. People's Choice. The OEC entry voted most popular by those who view the contest.

3. Significant Historical Merit. The entry(ies) that, in the opinion of the judges, has the most historical significance (for example, first of a kind, extreme rarity, influence on the industry, milestone event, etc.)

4. Preservation Award. Given to the entry that best emphasizes keeping the item original—no modern replacement parts, refinishing, etc.

Special awards 3 and 4 will not be given if the judges feel that no entry meets the criteria.

Contest Guidelines. The OEC judges use the following scoring weights:

A. [0-20 pts] General Appearance. Is item restored, cleaned, and generally presentable, or just "as-found"?
B. [0-10 pts] Item Rarity. Not as important as authenticity, but it counts for the item to be relatively hard to find.
C. [0-20 pts] Authenticity. How much of the item is demonstrably authentic and not modified? Documentation may be crucial.
D. [0-20 pts] Documentation. Ads, journal articles, books, schematics, news clips, description of historical significance of the item all help.
E. [0-20 pts] Entrant Effort. How much was done by entrant, based on item appearance and documentation?
F. [0-10 pts] Qualitative Bonus. The bonus is based on judges' judgment and experience.

Entries (except consoles) must be able to fit on a table and take up no more than 3' x 5' of table space. If your entry requires a display stand, you need to provide it yourself. No mountings may be fastened to the walls. Should the contest room fill to overcrowding, the contest officials reserve the right to limit the items submitted.

MAARC's Auction and Flea Market Policies

You may not participate in the auctions as a buyer or seller unless you are registered for the meet. For the main auction (Saturday) there is a minimum opening bid of $15 per item. Batch inexpensive items in box lots so that each lot will bring more than $15. Sell boxes of junk during the walk-around auction Saturday morning. **Items that (in the judgment of the auction officials) are unlikely to sell for at least $15 during the main auction will not be accepted.** Please limit consignments to antique radio/TV/audio items--no outboard motors! At the main auction, MAARC's commission for members is 10 percent of the selling price, with a minimum of $1 and an upper limit of $25. For non-members the commission is 15 percent, with a minimum of $2 and no upper limit. Any item that does not reach its reserve (a minimum selling price) or any item that does not receive the $15 opening bid will incur a no-sale fee of $1 for MAARC members or $2 for non-members. While sellers may specify a reserve price, lest we inhibit bidding, we do not announce the reserve price, mentioning it only in cases where the last bid has nearly reached the reserve, in which case we give the highest bidder an opportunity to up the bid (or let the seller drop the reserve selling price).

MAARC reserves the right to terminate consignment early if the number of items becomes too large to handle in the time and space available. Otherwise, consignment cut-off will be one-half hour before the start of the auction, at which time all paperwork must be turned in and all items tagged and in the pre-auction room. MAARC also reserves the right to limit the number of items consigned by one individual if the total number of items consigned is becoming too large.

If you are the seller, do NOT leave the auction before all of your items are sold! If you consign an item that does not sell, and you leave before the end of the auction, the item becomes the property of MAARC and may be sold at a future auction, with the proceeds going to MAARC, or disposed of, as MAARC sees fit. ■

National Capital Radio & Television Museum

The National Capital Radio & Television Museum (www.ncrtv.org) is 20 miles from the Sheraton Washington North Hotel. The Museum will be open Friday (10 to 5) and Saturday and Sunday (1 to 5), if you would like to visit on your own. Brochures with a map will be available at the registration desk.

Registration Desk Hours:

Thursday (20th): 6:30 to 7:30 p.m.
Friday (21st): 6 a.m. to 2 p.m., 5:30 to 6 p.m.
Saturday (22nd): 7 to 10:30 a.m.

On or prior to June 7, 2013, mail the upper part of this preregistration form, with your check payable to MAARC, to:

Chris Kocsis 7315 Oriole Avenue Springfield, VA 22150-4302
Phone 703-913-9143, email: chrisk33@cox.net

Use a separate form for each registrant. You will NOT receive a registration confirmation in the mail. **After June 7** just register at the conference. (But you will pay a higher price at the meet.) Spouses/children do not need to register.

Item	Fee	Amount Enclosed
MAARC **member** family registration mailed **on or before June 7** (MAARC member registration at the meet will be $20)	$15	
Non-member family registration mailed **on or before June 7** (Non-member registration at the meet will be $30)	$20	
Registration (member or non-member) for Saturday ONLY	$10	
Banquet tickets: Number of tickets [_____] (Tickets may or may not be available at the meet.)	$35 per ticket	
Flea market spaces (no assigned spaces) Number of spaces wanted [_____]	$15 first space, $10 per each additional space	
Total enclosed. Make check payable to MAARC.		

Name _____ Email Address _____
(Print name neatly as you want it on your name tag.)

Names of other family members attending _____

Address _____

City _____ State _____ Zip _____ Phone (_____) _____

Hotel where you will stay for RadioActivity 2013 _____

↑ **Send the upper part of this sheet to Chris Kocsis, address above.**

----------**Detach Here**----------

↓ **Return this lower part of the form (hotel registration form) to:** ***(Hotel reservation cutoff date: May 20)***

Sheraton Washington North—Group Reservations
4095 Powder Mill Road, Beltsville, MD 20705
(800) 325-3535 or (301) 937-4422

Early booking rates: Single or double: $89, plus 10% tax. Group: Mid-Atlantic Antique Radio Club,
Special website: http://tinyurl.com/MaarcRA

Name _____ Phone (_____) _____

Address _____

City _____ State _____ Zip _____

Arrival Date _____ Total # Rooms _____ # Nights _____ # People _____

2-double-bed rooms _____ 1-king-bed rooms _____ Smoking _____ Non-smoking _____

Credit Card # _____ Expiration Date _____

Cardholder Name _____

Reservations require credit card number or one night's deposit.

(Continued from page 8)

tions, based mainly on the extensive tests of their SCR-508 (and its prototype, the SCR-293/294) they had witnessed, tests in which the voice clarity and interference-freedom of wideband FM made a huge difference. But the Signal Corps' version of "VHF" meant "something near 30 MHz," and they were dumbfounded at the British concept of VHF: "Egads, well over 100 MHz!" Suddenly intense interest in the Hallicrafters S-27 receiver grew, this being the most prominent piece of electronics working these frequencies. Memoranda indicating worry that the German diplomatic corps would be raiding the amateur radio outlets for these receivers circulated in the Signal Corps, if the Brits' secret negotiations got out. The FBI put a watch on several major radio stores, but the big purchaser of S-27s was the British delegation!

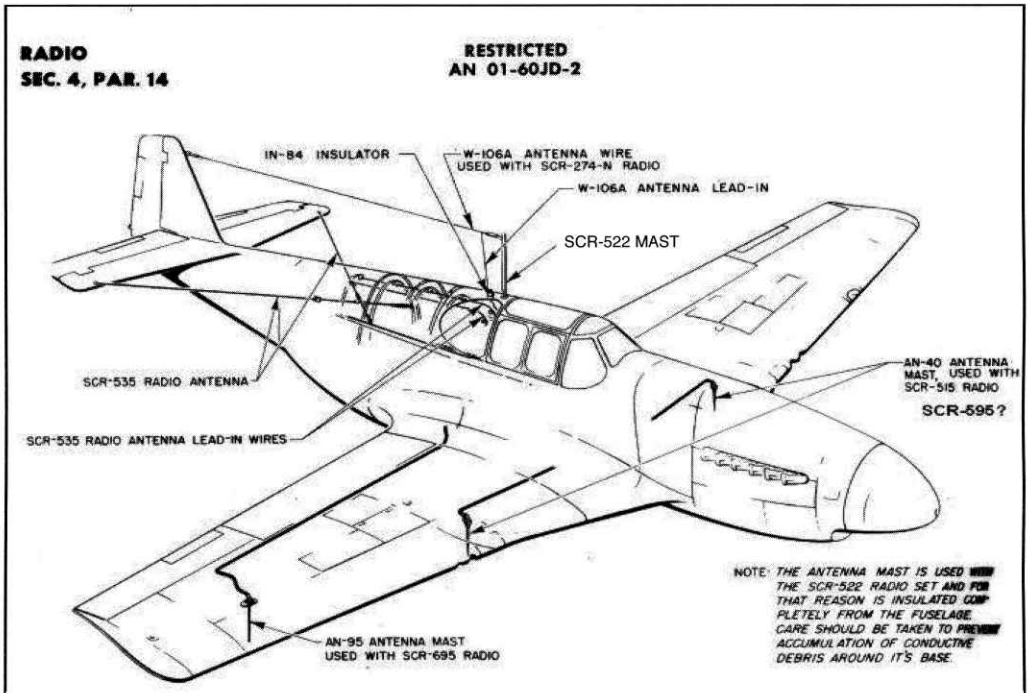


Figure 1. Page from training manual showing VHF antenna mast on P-51A aircraft.

The only objection the American military had with the British contracting for American mass production of their TR-1143 was the possible competition for development and manufacturing capabilities at Western Electric (WE), considered by them to be the acme of sophisticated (and clandestine) electronics development labs. And WE was already busy with continuing Navy RU/GF production and engineering of the Signal Corps' SCR-508 series. But here the Brits surprised them and asked if they could approach Bendix Aviation to do the work, possibly based on earlier direction-finder work by Bendix. The Signal Corps and Navy had hardly heard of Bendix. "Weren't they the low-frequency loop antenna people?" When the details of the TR-1143 were thrashed out with Bendix and the Signal Corps, it appeared that the RAF wanted two models of VHF radio, one for 100-127 MHz and one for 127-156 MHz, to allow the selection of the full span of planned operating frequencies, using four push-button-selected frequencies at a time, all crystal controlled. The Bendix version of the TR-1143 became the SCR-522, and to their credit, they managed to cram the entire 100-156 MHz span into one radio, nearly cutting in half the overall weight and bulk. Bendix essentially used the British circuit design, but substituted American components and tubes, American manufacturing tools, and procedures, but copied British interconnecting cables and plugs, enabling substitution in current British aircraft for existing damaged or inoperative units.

The basic reason the RAF opted in favor of VHF was that it worked better in small aircraft than did HF (shortwave). At 125 MHz, about the center of the SCR-522 frequency band, an extremely efficient half-wavelength antenna would be less than 4 feet long, so that an omnidirectional "whip," or monopole, would be about half that length, perhaps sticking straight upward from the "backbone" of the fighter aircraft just behind the cockpit, as in Fig.1, a drawing of the installation in a P-51A aircraft. By way of contrast, at the shortwave frequencies used by the SCR-274-N series of radios, a half-wavelength antenna would be about 45 or 50 feet in length, and a whip or monopole for this frequency would have to be of the order of 20-25 feet in height, clearly impossible. Thus the antennas used in American fighter aircraft using the SCR-274-N, generally comprising a wire stretched between cockpit top and the top of the tail fin, might total less than half that length, maybe 10 or 11 feet in overall length. A short antenna like that, aside from being inefficient, might have objectionable direc-

(Continued on page 11)

Tidbits

1. A 1960s radio with a built-in horn speaker.

Horn speakers have gone through several epochs since their first appearance in radios of the early-1920s. Back then they consisted of a driver and a horn; the driver often being simply a single headphone having a restricted output aperture, and this aperture was mated to the horn inlet. It was a natural extension from the design of phonograph horns developed during the previous 30 or 40 years. The sound quality delivered from these radio horns was seldom very good, as the tapered acoustic tube used was too short to accommodate the lower register of frequencies. As a result they usually sounded "tinny," with most of their high-efficiency operation confined to the 300-1000 Hz range of frequencies. When paper cone speakers became popular later in the 1920s, and became real hi-fi components in the 40s and 50s, nobody ever used horn speakers for radios, except for those specialized high-power re-entrant public address speakers used on vehicles and in large halls. These horns did have better frequency responses than the early-radio horns, mainly through their extended horn lengths and logarithmic horn taper control, which stabilized the acoustic loading on the driver, making it broadbanded.

At a Virginia Beach hamfest back in the 1990s I was sifting through some Vietnam-war-era surplus, searching for oscilloscope probes and such, when I stumbled across a small olive-drab (OD) unit labeled AN/PRT-4, which looked like a miniature "walkie-talkie." The vendor wanted $5 for it, and it looked like NOS, so I bought it. Then I realized that "PRT-" indicates it is a transmitter, only, so there might be a companion receiver there, as well. More digging through OD plasticized, aluminized fabric bags revealed a couple different-shaped packs labeled AN/PRR-9, so I got a couple of those as well, same price, five bucks each. He would not let me open these until I had bought them, and afterwards he admitted that most of the hams that got them wanted their money back after they opened the packs.

That was the signal for me to rip mine open and see what was so terrible about these PRR-9s. Well, they didn't look like hand-held radios at all, but like little flat-pack things with a spiral cornucopia-shaped chamber under the skin on one side, making that side look a little like an OD aluminum conch-shell. It turned out to be a single-frequency radio with a whip antenna on one end and a horn speaker whose exit bell was a long, narrow opening along one side of the little radio, as in the picture here. How about that, back to horn speakers on radios again.

The receiver was made to clip on the edge of a soldier's helmet, where the horn exit would play directly into the soldier's ear. The PRT-4 transmitter would have been operated by the squad leader, and each rifleman would have one of these helmet receivers. Most signaling would be by short tones transmitted by the leader. The idea was to keep the riflemen alert to enemy activity that the squad leader was being apprised of, without them chattering back all the time.

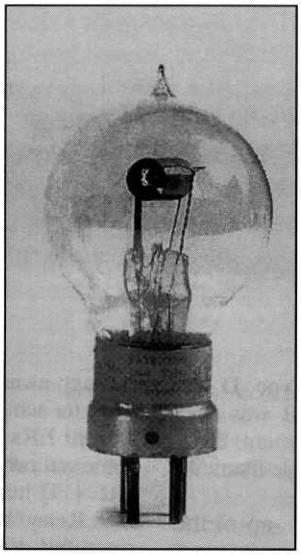
2. Back in January, *Radio Age* had a story about a World War 1 aircraft radio (Mark II) made for the

(Continued on page 11)

(*Tidbits*, *continued from page 10*)
fledgling RAF by General Electric in Schenectady. Since then, a representative from the National Air and Space Museum has photographed the radio's transmitter unit that this author has, and more info has turned up on the tubes that it uses. Inside the transmitter unit are two tube sockets, typical British four-contact type, and the label beside each socket indicates it requires a Type B valve. A couple weeks ago, someone asked if it was possible that the tubes were also made in America, so I began rummaging through tube data from the 1916-1918 era, and found Bill Condon's classic article in *Tube Collector*, "The Moorhead Story" [1]. In this article, Condon describes the military tubes produced by Moorhead, one of them matching closely the photo of the transmitter found in the British *Yearbook of Wireless Telegraphy and Telephony (1920)*. It is pictured in Condon's article, as well, and is called by Moorhead a Type B. In the *Yearbook* photo the companion receiver is also shown, using somewhat different tubes. These also match Moorhead receiving tubes described by Condon as Type R valves, being close copies of the French TM tube by Metál. Condon's article notes that a third British valve was also made by Moorhead, the RAF Type VT-32. The time period here would have been when the Navy was buying Western Electric VT-1, VT-2, VT-4 and VT-5 tubes as well as GE VT-11 tubes. The official VT listings skip over VT-32, seemingly leaving a place-marker for this Moorhead tube. Apparently, unlike the civilian Moorhead tubes mostly typified by the fragile and "soft vacuum" ER models, these militarized tubes and valves by Moorhead were of quite high quality, not as rugged as the VT-1s and VT-2s, but probably as good as any out of Europe at the time.

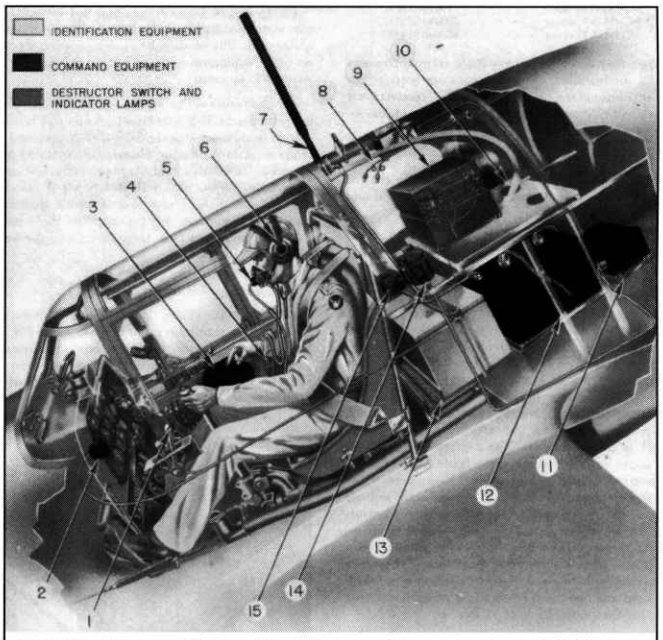
Meanwhile the search for a Mark II companion three-tube receiver continues, and more information on the whole Mark II set is also sought.

[1] Condon, Bill, "Moorhead and His Tubes," *Tube Collector*, **5**, *2*, April 2003, pp 3, ff.



A Moorhead version of the British Type B valve, from Condon's article in *Tube Collector*.

(***Migration to VHF***, *Continued from page 9*)
tional characteristics as well, making communications less reliable. Measurements showed that a stubby monopole designed for 125 MHz would be about 75% efficient on the average all-metal fighter plane, whereas the best one could hope for with wire antennas from cockpit to tailfin, operating at HF, was about 2% efficiency, mainly because the antenna was electrically small and would be so close to the metal fuselage. Thus, a 5-watt transmitter at 125 MHz would produce a stronger signal than a 50-watt short-wave transmitter using the wire antenna. The penalty for using frequencies as high as those used by this new radio was that crystal control was an absolute necessity – and quartz was in short supply.



Another page from the Army Air Forces training manual, showing a P-51A with the location of the IFF (identification to friendly radars) electronics (9) and the SCR-522 command radio (12).

Meanwhile the hand-built prototype British VHF command set, the TR-1133, was having production troubles, and these problems prompted the RAF to look for outside manufacturing help, anyway. Then, as further aggravation, the Dunkirk evacuation of the end of May 1940 intervened, and during that episode, about 100 RAF fighter planes were lost, TR-1133s and all. Air Marshal Sir Hugh Dowding studied the situation and ordered all the VHF sets taken off the existing aircraft and replaced with the former command sets operating at HF. The reason was sound;

(*Continued on page 12*)

there were simply not enough VHF sets to enable the RAF to survive the German blitz that was developing, later termed the "Battle of Britain." To have good communications with only a fraction of the fighting force was simply not acceptable. HF would have to carry the brunt of air-to-air and air-to-base communications during the forthcoming battle.

At that crucial point in time, the RAF delegation received the news from Bendix Aviation that they could, indeed, combine the upper- and lower-half-spectrum TR-1143 units into a single full-spectrum transmitter-receiver, and could commence production on the British schedule. However, Bendix wasn't sure they could get the production numbers up to the desired 2000 sets in six months, for they were undergoing some degree of turmoil at this time, trying to consolidate their scattered operating plants in Baltimore into a new facility being built in Towson, MD.

The original TR-1143 or SCR-522 VHF monopole antennas for fighter aircraft was a 28-inch metal-clad wooden mast, as can be seen here in this picture of one mounted on the backbone of a Beech.

So in September 1940 the RAF again began converting from HF command sets to the TR-1133 VHF set and the TR1143 radios that were expected soon.

The RAF was also seeking other weapons of war, not just radios. Topmost among their needs were aircraft, They needed long-range heavy patrol craft to seek out German U-boats and mine-layers, and they needed medium bombers, fighter aircraft, and photo-reconnaissance aircraft. And all these aircraft had to be delivered with SCR-522 command radios already installed. To simplify the aircraft antenna installations, most single-place and other smaller aircraft had the SCR-522 antenna, the stubby monopole (AN-104) installed aft of the cockpit, and equipped with an extra hole near the top of the monopole. The monopole, then, could be used as a pylon to anchor the cockpit end of a shortwave wire antenna, the other end of which was anchored to the top of the dorsal fin/rudder assembly. This way the aircraft could be outfitted during production with either the SCR-522 or the SCR-274N series of command radios, depending on its destination.

Planes destined for the Pacific war had the SCR-274-N HF series of command sets installed, along with a standard complement of navigation and homing radios [3]. But those headed for England, North Africa, or the Caribbean had to make room for the SCR-522, if only to be able to land and take off from British bases. And, of course, those being taken in by the British had to use the SCR-522 as the "import" version of their beloved TR-1143. To help satisfy requirements being solidified by Colonel (later, General) Quesada, who became Patton's air chief, the 12-volt version of the SCR-522, called the SCR-542, was crammed into Jeeps and tanks, enabling fighter-bombers to talk directly to tank commanders, all this using borrowed British VHF frequency assignments. It marked a revolution in Allied air-ground coordination, enabling the first effective Allied use of close air support to the infantry and armored corps [4]. The Germans had coordinated their version of VHF between air and ground forces earlier, enabling their use of the Stuka dive bomber as an extension of the foot-soldier's artillery.

References:

[1] The RU series of radios were TRF receivers using plug-in coil sets like the HRO, and 0-100 dial calibrations, necessitating using charts to find frequencies. The GF transmitter also used plug-in coils

[2] The nomenclature included the letter N for Navy, just in case the radios failed utterly, and did not bring credit to the Corps.

[3] See, for example the Zed Baker story in *Radio Age*, March 2012 issue, describing a homing system using the existing command radios.

[4] Quesada's diary, with rules for close air support to infantry and armor, was reviewed, and re-used, almost verbatim, in the *Desert Storm* invasion of Iraq, through the efforts of Col. John Rothrock, USAF (from private correspondence, Rothrock to Lyon).

SUPER SHOW-'N'-TELL—2013

BY ED LYON

Each January, the MAARC monthly meeting features Willie Sessoms' Super Show-'n'-Tell. Here are the 2013 highlights from that session, held, as usual, at the MAARC Davidsonville, MD, meeting venue.

EACH January the MAARC meeting features a larger-than-usual Show-'n'-Tell session. Here, members bring in items from their collections or things they've bought, borrowed, or stolen that caught their attention, and perhaps surprised them when the identity or background of the item was revealed. We try to perform these revelations at Show-'n'-Tell time each monthly meeting, and the January session brings out the best, usually.

Our 20 January meeting met most all expectations in this regard. Three old tuners dating from 1917 to 1922 showed up, including a shortened version of the "Navy" tuner or loose coupler, thought by most of the audience to be by Clapp-Eastham, although the decal and/or paper label were missing, apparently victims of the woodwork refinishing job it had endured quite some time ago. A second one was branded with Gernsback's E.I.Co logo, it being a standard sized unit with slider-tuned primary and tap-select-tuned secondary. A third one was quite small, looked more recent, and was likely something from the small ads in *Radio News* from the 1920s. Later in the session Dan Sohn volunteered to tell the members some ways to detect reproductions in these old tuners, and declared the short Navy tuner and the E.I.Co loose coupler as very likely authentic.

Doc Hansman showed a west-coast radio by Packard-Bell having what looked like a timer bell mounted on the side, but which turned out to be an under-pillow speaker. That model Packard-Bell was made for hospital or convalescent home beds, and had no regular speaker in the cabinet. He also brought a pair of old tubes (VT-1 and VT-11) that were called to mind as he read the January article in *Radio Age* in which those two types were described.

Joe Colick walked the members through the process of finding, preparing, and winding various substitutes for the raffia used in wrapping portable radio handles, and showed some of the results he had achieved. Then Walt Barziak described and showed his rare Washington console radio. That's a brand from the late 1920s that we had not heard of, and there was considerable speculation as to the actual manufacturer, with no consensus.

For rarity, the votes went to (1) Eric Stenberg's nicely refinished (by Eric, no less) Emerson 161 tall tombstone, a model not found in the literature, and to (2) John Begg and his huge Air Chrome double-linen-coned speaker, which he connected to a little cassette recorder to show off the speaker's fine tone balance. These are two items not found in many radio meets.

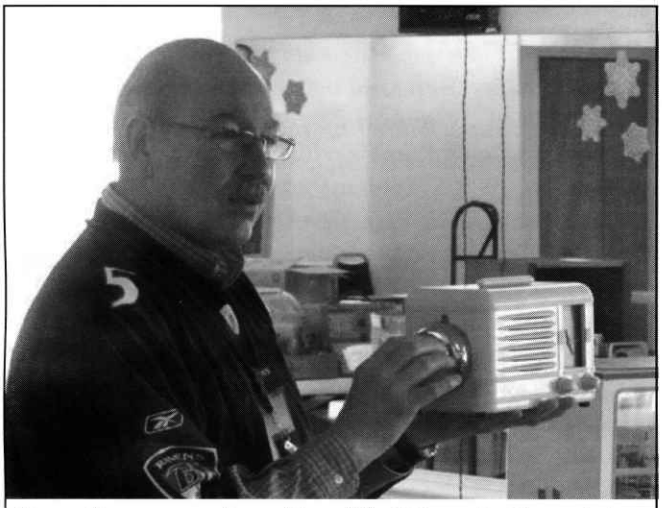
Even Mike Baird got in on the fun, showing his enormous Lasonic TRC-975 boom box, that model marking the end of the Lasonic boom box line, apparently, because they made it by superficially reworking an earlier TRC-935 model, the steps outlined clearly by Mike.

But everyone's favorite was Domi Sanchez's Stromberg-Carlson 130H radio a cabinet from which model becoming a "doll-house" sized Stromberg-Carlson radio store, complete with models of radios, cabinets, counters, and all.

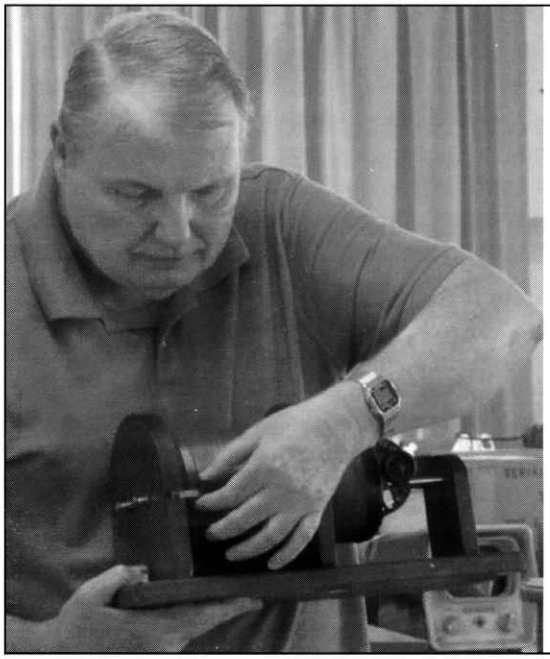
Willie wrapped up the session by describing and showing his Mae West radio, a model he . Being a perfect gentleman, Willie declined to demonstrate how that model is tuned.

Ed Lyon appears to be beside himself as he answers questions about his Navy tuner by C-E. (Actually there's a mirror on the wall.)

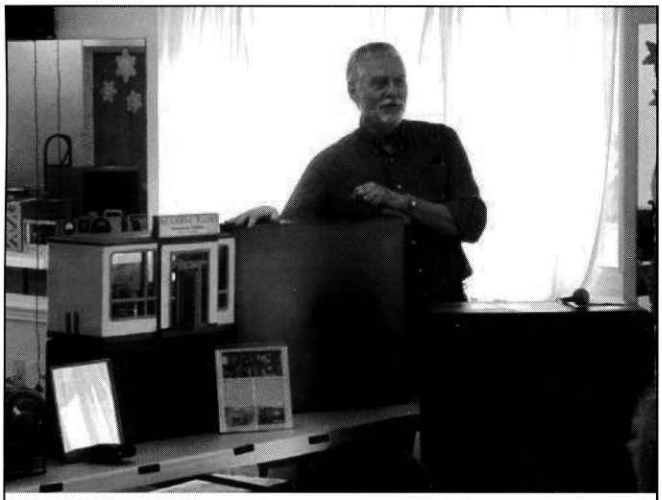
More pictures from the January Show-'n'-Tell are shown on the next page. Thanks to Eric Stenberg for the photography.



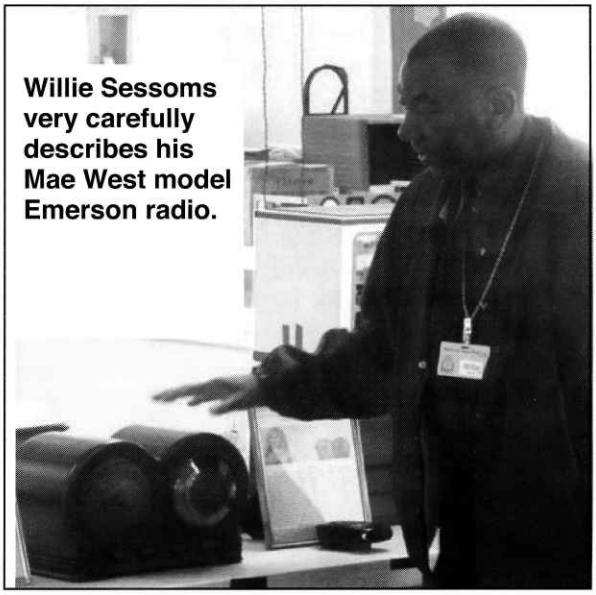
Steve Hansman describes his "Hospital" model Packard-Bell with its pillow speaker.



Dan Sohn shows where KDKA would be located on the slider of this E.I.Co. loose coupler from about 1918 or so. The tuner was brought to the meeting by its owner, Willie himself.



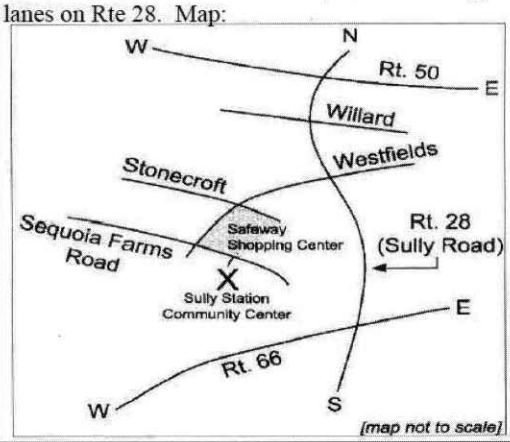
John Begg prepares to demonstrate the tonal quality of his huge Air Chrome linen speaker.



Willie Sessoms very carefully describes his Mae West model Emerson radio.

Domi Sanchez prepares to open the front door of his Stromberg-Carlson Radio Store, built into the cabinet of an S-C Model 130H radio, an example of which the store is sitting on.

Remember, the **December** and **April** MAARC meetings are held at Sully Station, near Dulles Airport. Also note that the intersection of Rte 28 and Westfields is a full cloverleaf, with local bypass lanes on Rte 28. Map:



Classified Ads

Ads are free of charge to club members. Please, one ad per member per month, limited to 100 words. All ads are subject to editing. Ads will not be repeated unless resubmitted. Send ads to editors, whose addresses are on page 2. The usual deadline for **receipt** of ads is the 1st of the month **preceding** publication.

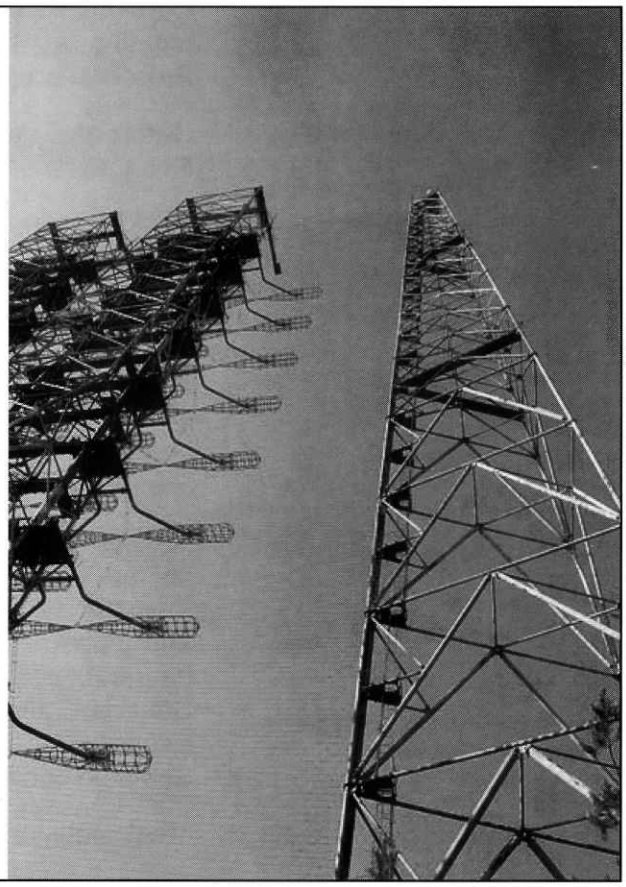
FOR SALE: ANTIQUE RADIO RESTORATION & REPAIR http://www.oldradiodoc.com A Unique opportunity in a niche market. America's premier shop for a quarter century. An ongoing year round very busy business with an excellent world-wide reputation. Online since April 1994 (the early days). In business 35+ years. Going strong with enough work to support 3+ technicians all year long. The volume of work can be ramped up/down to suit your desire. I, KR1U, am nearing retirement and wish to pass the business on to a younger generation. Training is available. The business includes two internet domains, an absolutely massive highly organized parts department including inventory from the acquisition of 27 closed radio shops and nearly 50 years of collecting. Almost nothing else to buy for years....it's all here. Riders/Gernsback/Sams Photofacts/Beitman-Supreme schematics and factory documentation from all the major players. My lead technician will seriously consider relocation if asked. He is the best there is. My large antique radio collection can also be a part of the package. Price is negotiable. Bob Eslinger/KR1U, 20 Gary School Rd., Pomfret Center, CT 06259 860-928-2628 bob@oldradiodoc.com

Antique Radio Repair : 30 years experience in repair of antique radios and tube equipment. Reasonable Rates. Jay Forbes, 21128 Stonecrop Pl, Ashburn, VA, 20147. 703-729-9432. Email: JFRADIO@aol.com

Book: Mahlon Loomis, who experimented and demonstrated Wireless in 1864, by sending signals 18 miles using 400-foot wire antennas, and keying same to ground using free power available at 2000 foot elevations on top of mountains in northern Virginia. Loomis received a patent in 1872 and Corporation Charter by US Congress in 1873. Describing his work and the File in the US Library of Congress is the book by Thomas Appleby, **Mahlon Loomis Inventor of Radio**, (c) Copyright 1967, 188 pages, now available for $35 + s&h $5; Contact Svanholm Research Laboratories, 1604 Elson St., Adelphi, MD 20783 , n3rf@earthlink.net , http://N3RF.home.netcom.com

Wanted: Crank type phonographs and parts. Sev Dvorsky, 380 Morrison Dr., Pittsburgh, PA 15216 ph: (412) 344-6633 stdvorsky@gmail.com

Wanted: Information (schematics, etc.) on Publix brand radios. I have found a couple of them and need data. Tim Dietz, 730 Clintonville Road, Paris, KY. 40361 859-987-5933 timtoy21@aol.com



This view, looking up from behind the Russian Woodpecker transmitter array at Pripyat, shows some of the hundreds of Nadnenko cage dipole antenna elements.

Mid-Atlantic Antique Radio Club
c/o Steve McAllister
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Bowie, MD 20716-1047

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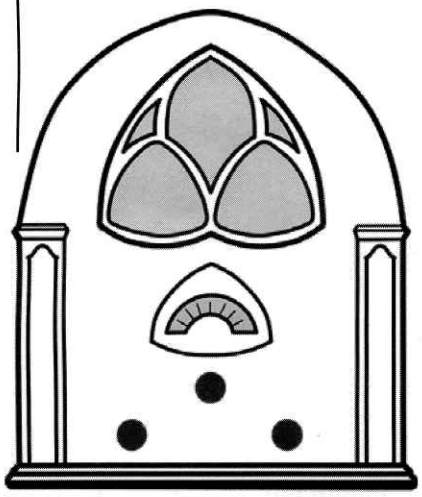

MAARC Your Calendar!

Sun. Mar. 17	MAARC meeting at the Davidsonville Family Recreation Center. See p. 2 for map and directions. Tailgating at 11:30, meeting at 1:30. Display table radio years = 1958-59, Presentation: Brian Belanger: Bay Area Radio Museum Tour.
Thu.-Sat. Mar 21-23	Carolinas Chapter AWA Conference at Charlotte, NC; contact Ron Lawrence, 704-289-1166 or w4ron@carolina.rr.com.
Sun., Apr. 21	MAARC meeting in Northern Virginia, at Sully Community Center, directions on page 14 of this issue. Tailgating starts about 11:00, meeting starts 1:30. Display table years = 1960s; Presentation: Ed Lyon: Antennas
Sun., May 19	MAARC meeting at the Davidsonville Family Recreation Center. See p. 2 for map and directions. Tailgating at 11:30, meeting at 1:30. Display table radio years = 1900-20, Presentation: Henry Lee: Car Radios.
Thu.-Sat., Jun 20-22	RADIOACTIVITY 2013, The premier mid-Atlantic radio meet, at the Sheraton-Washington North, southwest corner of Interstate 95 and MD Rte 212. Features a huge tube, estate, and ephemera auction, old equipment contest, seminars, banquet, and main auction, all in a Thursday afternoon-to-Saturday afternoon jam-packed schedule. Theme: Two Scotts, E.H. and H.H., Their Radio and Audio Masterpieces. See blue centerfold, next month's *Radio Age*.

Hamfests: —check the ARRL website, www.ARRL.org