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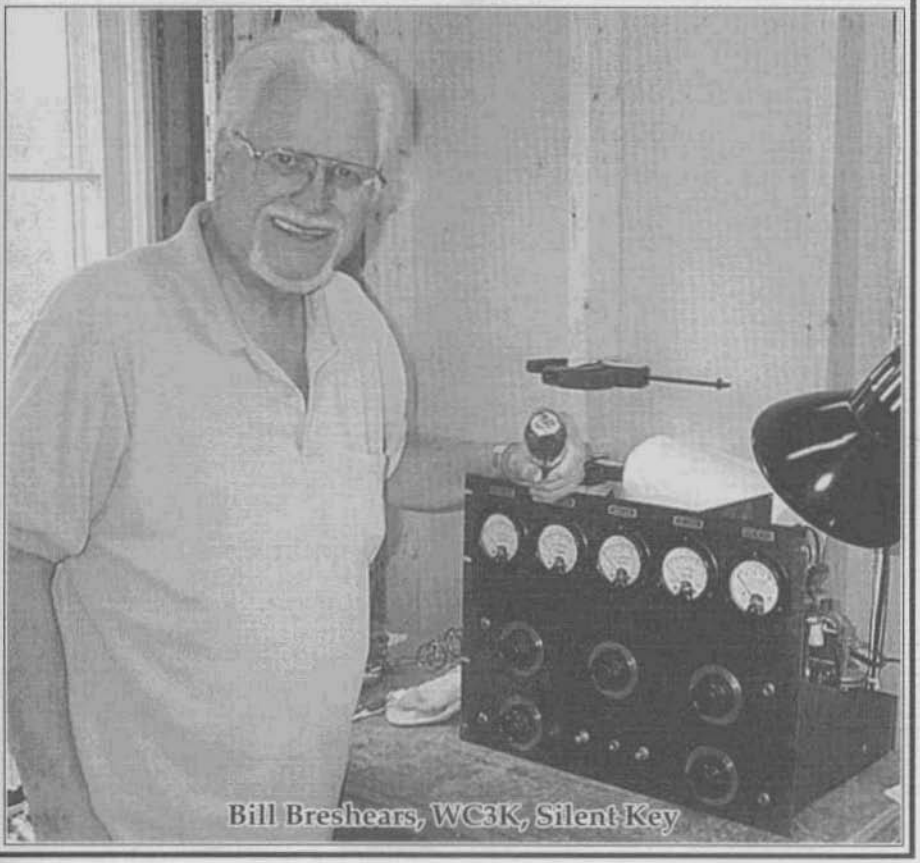
ELECTRIC RADIO

celebrating a bygone era

Number 157 June 2002



Bill Breshears, WC3K, Silent Key

ELECTRIC RADIO

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Electric Radio is published primarily for those who appreciate vintage gear and those who are interested in the history of radio. It is hoped that the magazine will provide inspiration and encouragement to collectors, restorers and builders.

We depend on our readers to supply material for ER. Our primary interest is in articles that pertain to vintage equipment/operating with an emphasis on AM, but articles on CW and SSB are also needed. Photos of hams in their hamshacks are always appreciated. We invite those interested in writing for ER to write or call.

Regular contributors include:
Bill Breshears, WC3K; Bob Dennison, W2HBE; Dale Gagnon, KWll; Bob Grinder, K7AK; Jim Hanlon, W8KGI; Brian Harris, WA5UEK; Tom Marcellino, W3BYM; Ray Osterwald, NØDMS; Chuck Teeters, W4MEW; Bruce Vaughan, NR5Q.

Editor's Comments

The Book Idea

I received a lot of positive feedback regarding the photo book that I described here in last month's ER. As a result I've decided to go full-speed ahead with the project and I'm now inviting everyone to send in their photo and 2-400 words of text for a caption. When we have 500 submissions we'll publish the book. I'd like to have the book for sale by Christmas.

The photo we want should be of the person in front of their operating position or most prized gear. It can be either black and white or color. It can be submitted via e-mail or in hardcopy through the regular mail. Size is not important but it should be clear and sharp. Photos taken with a digital camera should arrive here at about 300 pixels per inch. If you're scanning a photo, please scan it at 300 dpi.

The sort of information we want for the caption is as follows: Where and when you were born, where you grew up, something about your childhood, your education, when/how you got interested in amateur radio,something about your career, your family and how you feel about vintage radio, and anything else that is appropriate. I suggest that those who don't own cameras or don't feel they want to write about themselves get someone to help.

Many people have told me that they would be willing to help out by taking photos and writing captions for others. I know that the only way we're going to get this project completed is with a lot of help from a lot of people. The final result will be worthy or all the effort. The book will be something we can treasure to the end of our days. N6CSW

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Bill Breshears, WC3K, Silent Key

Memories of a Gentleman

by Tom Marcellino, W3BYM
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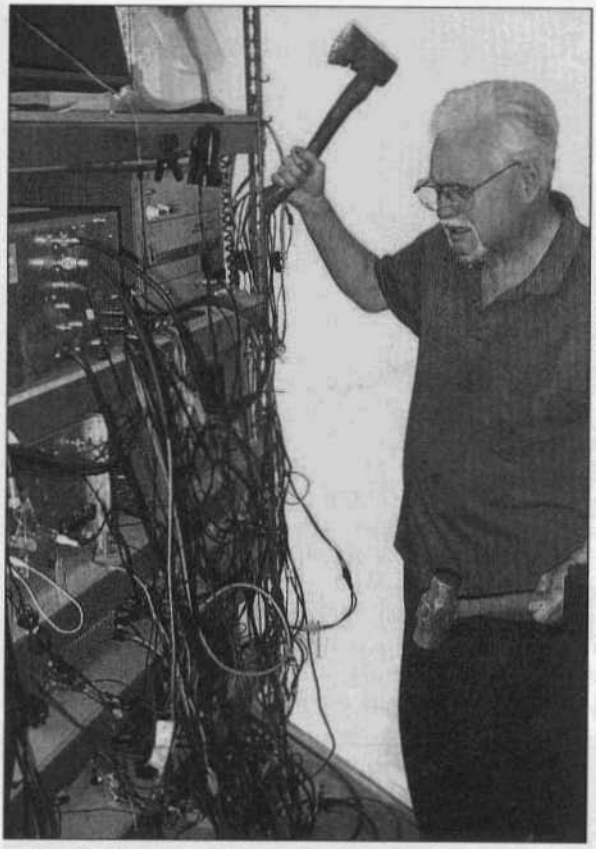
Early last month I learned of the passing of WC3K, Bowie Bill Breshears. Many will recognize this call from the numerous articles he wrote for ER. If you operated AM in the 40 meter window you will remember Whiskey Charlie Three Kilo as one of the cornerstones on the band. He could often be heard using his favorite mode while screen modulating a vintage tube rig or even a hybrid Japanese rig. He had the magic touch with screen modulation as they all had a superior sound. He originated the phrase "Teckno-Compulsive" meaning going that little bit extra in a project. Bill's strong presence on 40 meters AM provided, and leaves a legacy of, personable and gentlemanly AM operation. Whenever you heard his call in a round table there was certain to be interesting topics discussed with Bill's added humor and wit in both the technical know how he displayed and his solutions to every day life situations.

After getting this disturbing news from Bill's XYL Mary and with her permission I spread the word by telephone and E-mail to all the hams in my address book. Never before had I received such immediate and heart warming responses. Within the hour my in-box was beeping with replies from all over the country. During this day I was monitoring 7290 and there was not one QSO to be heard for the entire day. It was like everyone was paying their final tribute to Amateur Radio's recent loss.

About four years ago I became again interested in AM and Bill was one of my prime mentors. I knew from the start that here was a fellow that was extremely knowledgeable in the technical aspects of this hobby. Those first QSOs developed into a lasting friendship. Bill's career was spent in space electronics as mine was and this just gave us more fuel to old buzzard and bore others with. I often visited Bill's shack to get first hand help with a project or just have a great eyeball QSO.

Bill was an avid hamfester. He rarely missed one and of course Mary tagged along to mind the store while Bill was off buying more treasures and rag chewing with the guys. The East Coast area is blessed with many hamfests to attend so I had many opportunities to find Bill in the flea market and just pal around with him going from table to table. You couldn't miss seeing him wearing his magicians hi-top hat. These were great times as we both enjoyed razzing each other about our purchases.

He had just finished a six month total rebuild of his basement ham shack. This was no ordinary small room shack. I would estimate the size as 30' x 40' complete with beautiful hardwood floors, recessed lighting, and a built-in workbench. All the coax and power cables were within the walls. This was no shack, it was a ham's paradise. He was planning several stand-alone stations. They included a complete authentic 1930s station. A recent hamfest find from the York hamfest in April was a complete homebrew, late



Bill's shack was leading in the informal rat's nest contest currently being held by Larry, W9MDX. www.w9mdx.com

1930s AM transmitter using a pair of TZ40s modulated by a pair of TZ40s.

Bill had such a passion and love for vintage gear that I think the following excerpts from his E-mail to Scott, WA3FFC on May 6th expressed it in true Bowie Bill fashion. This was typical of the jargon Bill used over the air waves.

"Ho Scott, Yes, I too feel you are much more of a kindred soul in loving these old radios and in enjoying and appreciating the masterpieces of yesteryear. And that our zainy and sometimes weird endeavors and thinking are similar too. Some only see a collection of components, but some of us know the joys and tribulations that constitute the designers and builders of these art objects; just as much emotion went into each one as the finest from Michelangelo. 73 Bill."

After Bill announced over the air of this rare find I went over the next day with my digital camera to document the rig. Bill was like a kid in the candy store beaming from ear to ear as he explained all the fine home brew craftsmanship in the rig. This was going to be the basis of his 1930s setup.

Bill's shack was also leading in the informal rats nest contest currently being held by Larry, W9MDX. You can see this prized mess along with other contestant entries on Larry's WEB site - WWW.W9MDX.com. For several weeks I was getting many votes but when Bill submitted his entry, the contest was virtually over.

There are so many great stories that can be told but they would fill the entire issue. This last story that deserves telling is Bill and his BC-610. This transmitter had sat in his garage for several years. Others knew of its existence and urged Bill to get it on the air. The one obstacle was getting it down into the basement shack. Well, finally that was solved with the help of Mike, WN3B and Frank, WC3E and myself. Mike and Frank drove 5 hours through the night arriving in Bill's driveway in the wee morning hours. In fact they were sitting in the truck when Bill came downstairs heading for the shack. Bill never saw them outside. The three of us descended on Bill's QTH and moved the -610 into the shack. The truth be told, Mike single handed walked the dolly with this monster transmitter down a steep hill and into

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Annual Military Radio Collectors Group Meet

by Dennis DuVall, W7QHO
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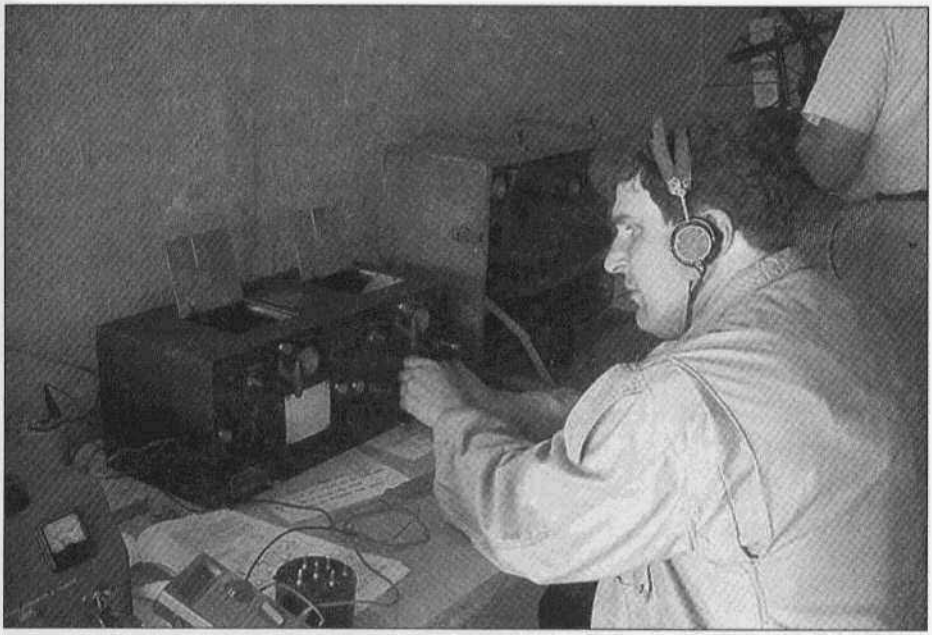
The seventh annual meeting of the Military Radio Collectors Group (MRCG) was held on Friday and Saturday, May 3rd and 4th, hosted by the Fort MacArthur Museum in San Pedro, Calif. San Pedro is located on the far south side of Los Angeles adjacent to the LA and Long Beach harbors. The change in venue this year from San Luis Obispo was done out of concern for post 9/11 access restrictions at the latter location and also because of severe RFI problems encountered there in 2001.

Fort MacArthur was originally constructed to protect the harbor and was named after General Arthur MacArthur, a Civil War Medal of Honor winner who was the father of General Douglas MacArthur. The section of the old fort occupied by the Museum was vacated by the Army in 1977 and is now part of the Los Angeles City park system. For a complete rundown on Fort MacArthur and the Museum see *ER* #123, July 1999.

This year's event was designated as the KD6KWH Memorial Meeting in memory of the late Henry Engstrom, a widely respected westcoast military radio collector and enthusiast. The meeting followed the same general format as in previous years. Early

Saturday morning swap session.



William Donzelli operating his 1929 Navy RG-1.

arrivals began setting up camp on Museum grounds Thursday afternoon. The emphasis this year was on equipment operation and by the end of the day several stations were up and running.

Friday

Activities began in earnest Friday morning with the arrival of the main body of participants and their equipment. Of special note was the impressive 'green radio' PRC-117(D) and HST-4 setups provided respectively by Mike Fry, KM6AB, and Dudley Emer, KK7IF. Mike's premier Harris PRC-117(D) also served as the meet's communication center and was mounted at the registration table. Dudley also had a mint PRC-1099 on display.

Al Tipsword, W6GER was back again with his RTTY gear, URC-92 and PRC-47 based this time around. Al was busy all three days keeping schedules with his 'Clatter Net' buddies, mainly Dave Ross, N7EPI up in Washington state. Thirty and forty meters seemed to provide the best propagation for this purpose during the meet. Al had a 32 ft. AT-1011 whip attached to his truck, but a 40 ft. vertical erected on a rise near his camp site worked out better. He alternately operated from batteries and his 28-volt, 50-amp military gasoline generator. Meanwhile, Ed Zeranski and Doug Dilley, WA6VOV, had a GRC-109 and a TCS-12 operating nearby on CW. The latter rig and its companion dual dynamotor PS are slated to become a part of the LST-325 restoration.

Tom Horsfall, WA6OPE, was operating a mint SCR-284-A across the way from Al. Tom's set up included the BC-654 transmitter and receiver with the original legs, key, antenna mount, mast sections, cables, counterpoise and GN-45 hand cranked generator. My own similarly complete GRC-9 setup was fielded a short distance away and many participants took the opportunity to experience the effort required to crank the generators while these systems were in operation.

An indoor display area with commercial power was set up inside one of

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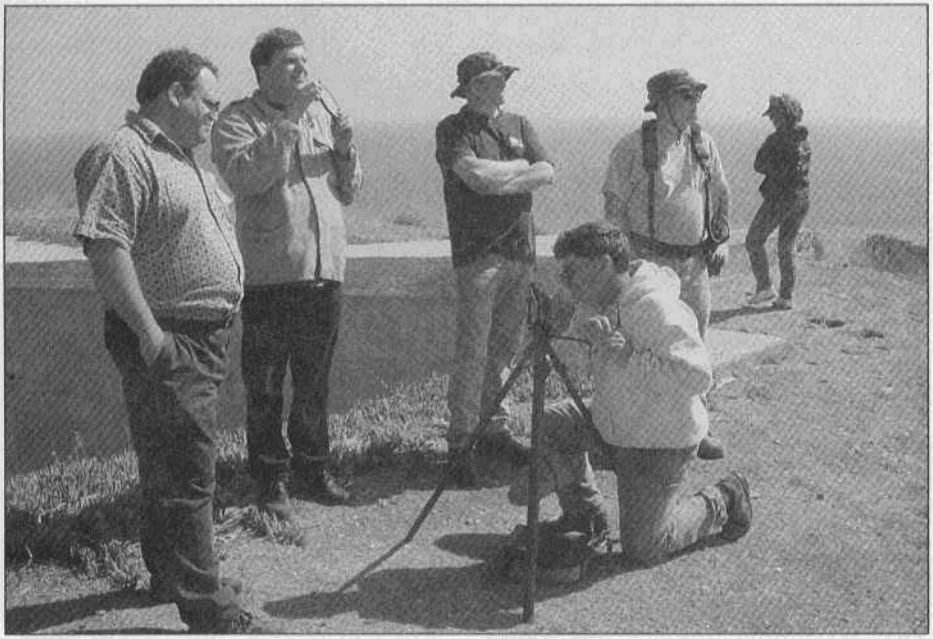


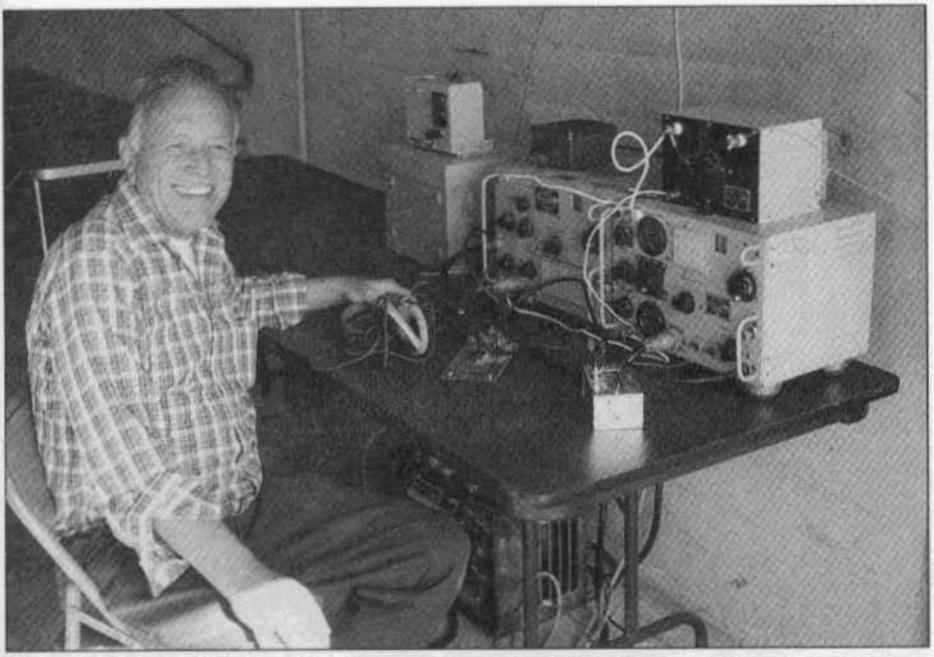
Bart Rowlett, WB6HQK, aims his heliograph with the help of William Donzelli and others.

the Fort's tunnels and Hank Brown, W6DJX, had his TCS transmitter and receiver operating from there. Hank was using a long wire antenna strung over a tree adjacent to the tunnel entrance and numerous phone and CW contacts were made from this station over the course of the meet. Hank also had his LS-147 intercom set operating from this position connected to a companion unit at the registration table out on the museum grounds and a pair of T-43 telephones were added to this communications link later in the day. Numerous non operating equipment displays were set up here as well, including William Donzelli's 1928 RG-1 Navy receiver and 1931 BC-157 Army transmitter/receiver. The former set used a pair of WE-215A tubes and covered 100 kc to 20 mc using plug in coils. The BC-157 covered 3.8 to 4.2 mc and used VT-4 and VT-25 tubes.

Also on display in the tunnel were the TT-4 page printer and IM-37-A/PRM interference meter brought in by Mark Blair, KE6MYK. Tony Lissona, N7APL, had RT-176A/PRC-10, Russian R-326, and BC-375 equipment on static display along with an RCA Radiomarine ET-8035 lifeboat transmitter. Ron Allison, K6QJY's table includes an SCR-300 (BC-1000), a BC-611/BC-721-B Glider set up, RT-44/PPN-1A 'Eureka' beacon equipment, and a very nice TBX-6.

Friday afternoon saw a 6 meter fox hunt and signal light demonstrations. Bart Rowlett's impressive collection of signal lights and heliographs were on display throughout the meet (see below).

The Fort's permanent radio exhibit was, of course, open throughout the meet. The primary thrust of this project has been to acquire and restore radios known to have been in use at Ft. MacArthur during WW II. To this end operating examples of BC-441 and BC-669 equipment are on permanent dis-



Hank Brown, W6DJX, in the tunnel operating his TCS.

play. These were used to communicate with vessels operating in the adjacent San Pedro Channel as well as with shore stations along the coast and on Santa Catalina island. We also have a yet-to-be restored SCR-808 which was used by military police units during the War years, and a recently acquired Collins 32-RA transmitter which was used along with a BC-779 receiver to maintain a link with a headquarters unit in San Bernardino. The 32-RA was picked up in northern Indiana by William Donzelli on his way out to attend the meet. Again, William, many thanks for the transportation help.

Lunch on Friday was covered by a takeout call to a local sandwich shop. The sit-down meal this year took place on Friday evening. Chicken, vegetables, salad and desert were served on original WW II mess trays in the Fort's courtyard.

Friday activities concluded with a flashlight tour of the Fort and surviving WW II installations in the immediate area conducted by Bart Rowlett, WB6HQK.

Saturday

Saturday morning was set aside for equipment swapping. Spirited trading activities were observed during this period and, as in previous years, a number of attendees showed up primarily to participate in this part of the event. I personally swapped an ARC-5 two-transmitter rack with Trevor Sanderson, PA3BOH, for a WS-19 control box and interconnecting cable. The Museum Director, Mr. Steve Nelson, was pleased to find and acquire some old shoes and magneto desk telephones of historic significance to the Fort.

This year's meet was dedicated to the memory of Henry Engstrom, KD6KWH, as mentioned above. Just before lunch on Saturday Hank Brown formally dedicated the event to Henry's memory before a packed crowd in the Fort's auditorium, and Richard Mol lberg, K6PWF,

continued next page

Friday evening dinner in the courtyard.

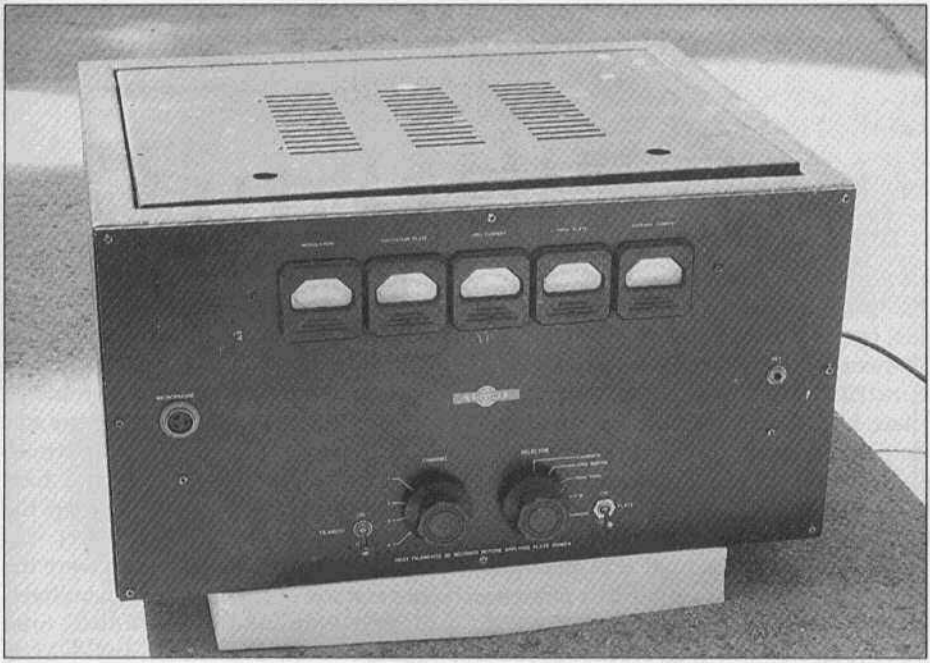
shared reminiscences from his long association with him. The session was concluded with a presentation on rebuilding command set capacitors by Paul Bernhardt, KF4FOR.

Bart Rowlett's heliograph demonstration in the early afternoon, following a pizza and salad lunch, attracted wide spread interest. Communications were established between antique instruments over a two-mile distance. Bart's collection of U.S. and foreign made visual signaling equipment spanning the Indian wars through WW II and later attracted serious attention throughout the meet. Equipment on display included EE-8X, NAF-1081 and SE-11 signal lights, the latter being used up into the Viet Nam period, and an 1890's heliograph.

Equipment Judging

This year's attendees were again offered the opportunity to register their equipment setups to be judged in one of three categories: (a) Operating, 1950 and Earlier; (b) Operating, 1951 and Later; (c) Display Only, 1950 and Earlier and (e) Display Only, 1951 and later. Blue, Red and White ribbons were awarded in each of these categories by a panel of judges. Judges were also allowed to register equipment, but no judge evaluated his own entry.

In the first category Tom Horsfall's SCR-284 came in first followed by Bart Rowlett's visual signaling display, and Ed Zeranski and Doug Dilley's TCS-12. In Category (b) Mike Fry was first with his PRC-117 followed by Al Tipsward's RTTY station and Dudley Emer's HST-4 SATCOM set up. Category (c) was headed by Ron Allison's overall display which included SCR-300 (BC-1000), BC-611/BC-721-B Glider, RT-44/PPN-1A 'Eureka' and TBX equipment (see above). William Donzelli came in second with his RG-1 and BC-157, and Paul Bernhardt's capacitor display was third. There were



The Fort's newly acquired Collins 32RA transmitter delivered by Willian Donzelli.

only two entrants in Category (e). KK7IF's RS-8 came in first here followed by Mike Fry's HST-4A.

Congratulations to all the winners and our thanks to the judges, Tony Lissona, Ludwell Sibley, Mark Blair and Rian Robison. The event was organized this year by Tony Lissona, N7APL.

Finally

This year's event at the new location was a great all around success with participants from VA, AZ, OR, NY, CT, NV, CA and two foreign countries in attendance. Trevor Sanderson, PA3BOH, from The Netherlands returned again this year with his wife. Our sincere thanks to Hank Brown, Lynn Fielding, Bart Rowlett, Bob Heusser, Neal Hudson, Tom Grove, and all the others who helped make this year's meet a success.

A special thanks to Steve Nelson, Director, Fort MacArthur Museum for his support and hospitality.

A VHS video covering the event is available now, contact Bob Heusser at (818) 790-3670 or k6tuy@mindspring.com for a copy.

Announcements and background music from the WW II era were provided throughout the meet via an AN/TIQ-2 PA system provided by the Museum. ER

Points of contact:

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Hank Brown, W6DJX, htbrown@earthlink.com

Bart Rowlett, WB6HQK, bart@wb6hqk.ampr.org

Web Site:

http://www.syzen.com/users/milradio/

Clatternet: 850 shift RTTY roundtable, on 10137 kcs USB Saturday, starts 0930-1000 Pacific time.

Stancor, the Heathkit of the Thirties and Forties

by Chuck Teeters, W4MEW
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The Standard Transformer Corporation of Chicago, Stancor, best known for transformers, sold ham transmitter kits from 1938 to 1952. Unlike Heathkit, Stancor would sell the chassis only, kit construction instructions, parts or complete kits. To popularize the kits and amplify their advertising they published the Stancor Hamanual. The Hamanual was a kit catalog, specifications and construction manual all rolled into one. The Hamanual was detailed enough that you could build a Stancor transmitter without buying anything if your junk box was well stocked.

Other transformer manufactures such as Jefferson and Thordarson sold kits but theirs were mostly audio amplifiers. The Taylor Tube Company and National Radio Company published manuals like the Hamanual and sold pre-punched chassis for their transmitter designs, but no kits. In 1938 Thordarson teamed up with National. The National transmitter plans and chassis were changed to use Thordarson transformers. Then Thordarson offered the Taylor Tube Company 100 watt transmitter as a kit with their transformers. Stancor immediately countered with their version of the Taylor 100 watt transmitter using Stancor transformers. This was the first of a 14 year run of Stancor transmitter kits. Thordarson built one more kit in 1941, a copy of a Stancor, and left the transmitter kit market at the start of WW II, never to return.

The 100 watt Taylor transmitter that started Stancor into the kit business was popular as the tubes were cheap, it was easy to build, and it worked well. Also Taylor offered a consulting, and trouble-shooting service on 75 phone. In the days before 800 phone numbers and web sites, Taylor secretary, Frank Hajek, W9ECA, held court on 3961 kHz Saturday nights. Haystack, as he was called on the air, would answer questions, offer suggestions, and would send replacement tubes when a ham told him his Taylor tube gave up the ghost. The public relation effect was tremendous and Taylor tubes were the cornerstone of many ham transmitters. A write up about a Taylor tube transmitter by Jim Taylor, W4PNM, is in ER #80.

Stancor went on to offer a wide range of kit products after the Taylor 100, from chassis to complete kits for ham transmitters as well as power supplies and audio systems. By 1940 they had 11 transmitters, 1 modulator, 1 transceiver, and 5 audio amplifiers in their kit line. In 1941 they added two more transmitters before WW II shut down production. After the war they offered a 100 watt transmitter and a modulator later. Their last kit was a 25 watt mobile transmitter, on the market from 1948 till 1952. Coincidentally, 1952 was the same year Heathkit introduced their first transmitter kit, the AT-1.

In 1949 my buddy Al Burson, W8WXV, asked me to pick up a Stancor ST-202A, 100 watt transmitter kit for him in New York, so my introduction to Stancor kits was carrying that 87 pound box back to Fort Monmouth N.J. on the train. Al never opened the box before he left the Fort to return to Ohio, so I never even got to see it. In 1952 I bought a used Stancor 10P 12 watt AM phone

STANCOR Kits-

These are but a few of the many popular kits which appeared in the Fourth Edition Hamanual. All have been revised to incorporate new features found in a year's advancement of the art. Although the prices are extremely attractive, no compromise of design or quality has been tolerated.

10-P TRANSMITTER

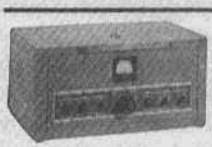
A compact 12-watt phone, 20-watt CW Transmitter for five band operation. Novel design involves but one tuned circuit. Price and features extremely attractive.

25-B TRANSMITTER

Beginner's 25-watt crystal oscillator for CW. Internal antenna tuning. Flexibility permits experimentation. Very low price.

12-E TRANSMITTER

Phone-CW emergency Transmitter. Works from a 6 volt storage battery. Features self-contained universal antenna coupling. No battery drain during standby. Easy band shifting.

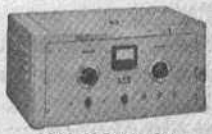


100-MB TRANSMITTER

A real 100-watt Transmitter with front panel band switching, priced remarkably low. Also crystal and meter switching. Easily constructed. Works all bands from 1.7 to 14.4 MC.

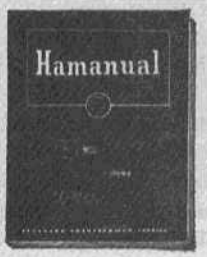
440-M MODULATOR

Companion unit to the 100-MB for radiotelephony. Many other applications. 40 watts of high fidelity audio.



20-N, 60-P, 110-CM TRANSMITTERS

Representative of all three which are complete phone-CW rigs. 20-N for 20-watt and 60-P for 60-watt multi-band operation. 110-CM for Cathode-Modulation multi-band operation.



NOW! THE FIFTH EDITION HAMANUAL

The Fifth Edition Hamanual contains complete information on all of the units shown above plus many more. All transmitters and amplifiers in the Hamanual have been thoroughly tested under actual working conditions for long periods of time to assure maximum performance.

In addition, the Hamanual contains a section on Audio amplifiers, Gadgets, Power Supply kits and many other subjects of interest and value.

We recommend that every user of amateur, commercial or P. A. transformers secure a copy of this valuable book.

Price 15c—available from your regular Stancor jobber.

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ASK YOUR NEAREST STANCOR DISTRIBUTOR OR WRITE FOR HIS NAME

STANCOR

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continued next page

transmitter from W2CE to work the locals on 75 phone. I had switched to SSB in 1950 and none of my local ham friends would or could talk to me. The 10P took care of that very nicely and I was back in the good graces of the local AMers. Last year I was looking at my 1940 Stancor Hamanual and it stirred up a desire to find a 10P. Several ads in ER and I had 2 10Ps, a 25B, a 112T, a 202A with modulator, and a 203A and I found myself a Stancor collector/restorer.

The Stancor 10P that started this collection was introduced in November 1939. It was probably the most popular of their kits as it was complete in one small 11" by 6" by 7" cabinet, worked on 160 through 10, and only cost $21. It was a good-looking transmitter, gray, black, and chrome, with 20 watts of CW and 12 watts of AM phone. The 10P probably got its start from a symposium of small transmitter designs in the August 1939 QST. Stancor used the W8NCM circuit with a few small modifications. The 10P has a 6J5 Pierce crystal oscillator driving a 6L6 PA, modulated by a 6L6 and an 80 rectifier. A carbon mic transformer, modulation transformer, power transformer and choke put four hunks of Stancor iron in the 10P. It weighs in at 23 lbs, so it cost under a dollar per pound.

A 10P doesn't have much audio. The 10P I got from K8GM had an extra 6J5 speech amp added between the mic transformer and the 6L6 modulator. The 10P from HB9DTA was unmodified and would only modulate about 40%. Stancor had eliminated W8NCMs carbon mic battery by tapping the 6L6 modulator cathode resistor. This gave them 6 volts DC but the tap was not bypassed, which put 200 ohms in series with the 50 ohm mic transformer primary. Four fifths of the mic audio was not getting to the transformer primary. A 50 mFd by pass and raising the 6L6 screen voltage to 285 volts brought the modulation up to 100% plus. The other 10P responded to the same treatment and the extra tube was removed.

The first contact with the 10P was with Andy, WA4KCY, on 3885 kHz and he gave it a good report. I also have coils and crystals for 160, 40, 20, and 10 and it performs well there also according to W1SUJ and KØEOO. Changing frequency on the 10P requires changing the crystal from the back of the cabinet and retuning the one tank circuit. Changing bands requires the crystal change and a plug-in coil change. This is done by removing the 6L6 PA tube (wow-hot) to get at the coil. The cabinet does not have any opening on the top, so you work carefully through the back. The coils are 5-pin junior end link by B & W, BUD or Johnson.

There were three big AM/CW brothers to the 10P, the 20N, the 60P and the 110C. These were; a 20 watt transmitter with a 6L6 modulated by a 6N7; a 60 watt unit with a 24G modulated by P-P 6L6s; and a 110 watt cathode modulated set with an 812 modulated by P-P 6V6s. These three transmitters, like all of the Stancor kits, were designs copied from ham publications. The 20N and 60P were from the Frank Jones Radio Handbook, and the 110C was from the E & E Radio Handbook. All three plus a 125 watt CW transmitter, a 44 watt modulator, a 50 watt PA, a 25 watt PA, and a 15 watt Public address amplifier were built on 17" by 10" chassis with an 8-1/2 " panel mounted in a table rack cabinet. If any of these have survived, I have not been able to locate them. I am collecting parts to build a replica of the 110CM as the cathode modulated unit looks the most interesting.

The little 10P, along with the 25B, a 6L6 crystal oscillator CW transmitter, the 112T, a 2-1/2 meter UHF mobile transceiver, and the model 510 10 watt PA amplifier all used the same B-1 standardized chassis mounted in the H-1

standardized cabinet. The 8 bigger transmitters, modulators, and audio amplifiers were assembled on a common chassis, a Stancor B-2 standardized chassis. One of the most interesting things about Stancor is that they used only two different chassis and cabinets for all their kits. While Stancor took the circuits from published material, they did some ingenious layout work using the two different chassis, and panels for all 12 of their 1940 kits. The 110C transmitter used 8 tubes, and 6 transformers. The 20N had 7 tubes, and 4 transformers. Stancor filled the extra tube socket hole in the 20N with a can type filter cap, and put transformers that were mounted under the chassis on top over unused holes. In the case of the 25B they put in an extra 5-pin socket to fill a left over hole and labeled it auxiliary power.

For 1941 Stancor came up with a new look to their kits. They replaced the 60P 60 watt AM/CW transmitter with the model 69. Coils and crystals could be changed from the front through a drop down door. The model 69 chassis and cabinet were integrated together, and was 1/2 the size of the 60P. World War II intervened before Stancor could complete the change over to the modern look for any other transmitter kits. The new look was picked up again with their first postwar transmitter. The Stancor ST-202A was a modernized version of the 110 watt multiband prewar unit. The 202A utilized the integrated chassis cabinet approach of the model 69 but with an opening top for coil and crystal change. In addition it had a rather stylish looking overhang on the front and a brand new Stancor emblem. While it was updated mechanically, it was still a crystal controlled plug-in coil CW transmitter.

With dealers discounting ST-202As as they were not selling well, Stancor added an AM modulator to pep up sales. Stancor was selling an audio amplifier kit with a pair of 807s in the output, their CH-2133. They released a 45 watt version with a modulation transformer in the output and single mic input to be used with the 202A for AM operation. Apparently it was too late however to compete with units like the Johnson Viking or Hallicrafters HT-19. The last Stancor transmitter kit was the ST-203A, a 25 watt 10 meter mobile transmitter kit with a 2E26 modulated by a pair of 6V6s. It was somewhat an unusual kit for them to sell as it had only two small Stancor transformers in it, an audio interstage transformer and a modulation transformer. The power supply was external and they recommended using a PE-103 surplus dynamotor, so no Stancor power transformers or chokes were required.

Looking at the 14 year run of instructional manuals that accompanied Stancor kits provides insight into the technical progression (or regression?) of amateur kit builders from 1938 to 1952. The 1938 Stancor 100 transmitter instructions had 11 paragraphs describing the three stage RF chassis, including theory and tune up options. It had 8 paragraphs describing the 4 stage audio chassis theory and design criteria. The power supply was described in 3 paragraphs. There were three schematics, with parts lists, a coil winding table, and six photos, the transmitter front and back, the RF chassis top and bottom, the back of the power supply, and the top of the audio chassis. There were only two paragraphs, totaling ten lines, of construction information. A total of 6 pages.

The 1940 model 25B is listed as a beginners simple one-tube CW transmitter. The book is 2 pages, including schematic, parts list, and 2 photos. The circuit is described as a regenerative crystal oscillator, but Stancor suggests that the amateur might change it into other types such as the

continued on page 41

The New Ocean Hopper

by Bob Dennison, W2HBE
82 Virginia Ave
Westmont, NJ 08108

When I was in junior high school, I sent off for the Allied Radio catalog. When it arrived, I sat in the wicker rocking chair on the front porch and carefully studied every page. Then I planned my first order. Since I had only $3, it would have to be done thoughtfully so as to be able to spend exactly $3 including postage and cost of a money order. Let's see—power transformer with 2.5 volt filament winding, 86¢; Type 57 tube, 36¢; two one watt resistors, Continental Carbon, 10¢; one Aerovox .01 mFd condenser (you young fellows call them capacitors), 9¢; a 2.5 mH RFC, 15¢ (couldn't afford a National—they cost twice as much); and so on until I reached $3. Then back to the wicker chair on the porch waiting for the parcel delivery truck. Oh, what joy, unwrapping those goodies! I thought it must be like heaven to visit Allied Radio in person.

One of the items listed in the Allied catalog was the Knight AC-DC Ocean Hopper. This sold for $5.95. Two tubes were extra—$1.67. A set of four plug-in coils cost $1.25 and a couple of coils for the broadcast band was another 65¢. And if you wanted to go all the way, a five-inch PM speaker and output transformer could be had for another $1.78. Let's see—the total came to $11.30. And don't forget postage and money order. Wow! You had to cut a lot of grass or bag groceries at the A&P to earn that kind of money. Even so, I imagine that Allied sold a lot of Ocean Hoppers. If you missed out on that one, here's my design for an up-to-date version of the venerable Ocean Hopper.

The 1941 Allied Radio catalog shows that the Ocean Hopper used a 12SJ7GT detector and a 70L7GT as a combined beam-power output and rectifier. A later version used a 12AT6 detector, a 50C5 output tube and a 35W4 rectifier. These sets used a special line cord that incorporated a third resistance wire to drop the line voltage for the series-connected filaments. These special line cords are very hard to find these days so we will use a transformer.

Both the 70L7 and the 50C5 are beam-power output tubes designed for use in AC-DC sets where the DC plate voltage is about 100 volts. These tubes are designed to draw a fairly heavy plate current (about 40 mA) at the relatively low plate and screen voltages found in these sets. These tubes have very high transconductance—about 7500 micromhos. There is a tube with a 6.3 volt filament that matches the 50C5 in power rating and sensitivity. It is the 6W6. But, be careful! The 50C5 uses 7.5 watts heater power (50V x .15A) and the 6W6 also uses 7.5 watts heater power (6.3 x 1.2A). I felt that I could do better using two small tubes, each taking .15A heater current. This allows me to use a much smaller power transformer. Final choice was to use a 6AQ6 driving a 6AK6. This combination gives high gain, adequate power to drive a small PM speaker and uses minimal heater power.

The schematic is shown in Fig. 1 and the coil data is given in Fig. 2. I wanted the set to tune most of the broadcast band using just one coil so C2 must be a little larger than the 100 or 140 pF capacitor normally used. I used a Hammarlund 200 pF capacitor having 27 plates and removed 2

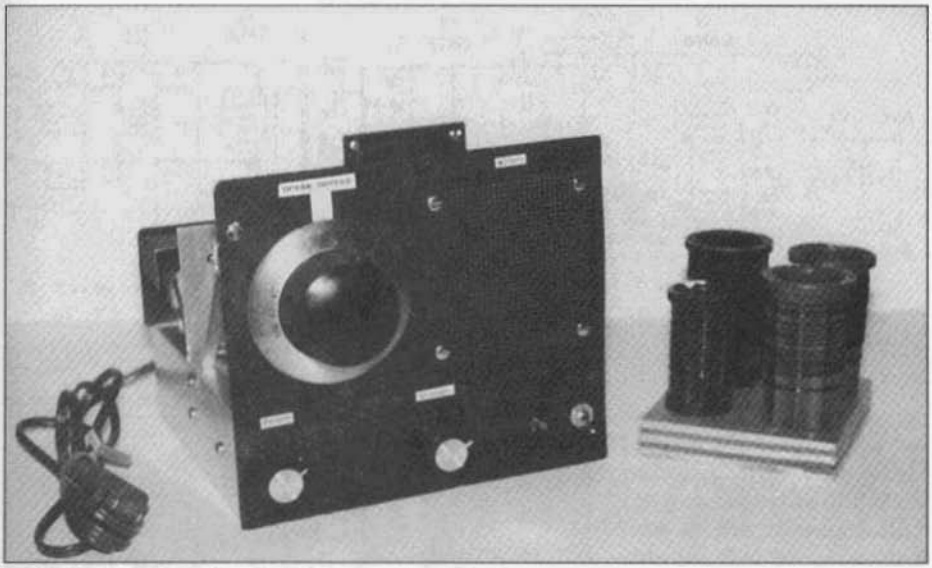

Figure 1. Front view of the "new Ocean Hopper"

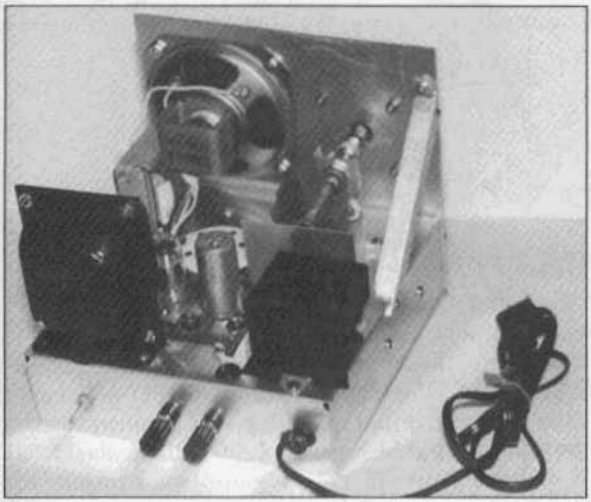

Figure 2. Rear view

rotor and 3 stator plates. The range is then 10-175 pF. The detector input capacitance is 5 pF and various strays including the distributed capacitance of the coil are 3 pF so the net tuning range is 18-183 pF. This capacitance range is sufficient to allow most of the broadcast band to be covered with just one coil.

A 6BH6 tube is used as a detector. It gives high gain while using only .15A filament current. Screen voltage is stabilized by zener diodes Z1 and Z2. I recently discovered that Hammond Mfg. offers a high inductance (150 H) choke at nominal cost so this was used at L3. With so many possible sources of hum and feedback, it was felt desirable to shield L3. I had a defective power transformer from an old Atwater-Kent radio so I used the shell of this transformer to enclose and shield L3. A wave-trap (Lx,Cx) eliminates interference from a nearby BC station. Antenna coupling capacitor, C1, can be adjusted for optimum signal gain and minimum detector overload. The best setting will depend on your antenna and what local BC station is causing interference.

The original Ocean Hooper used a Kurz-Kasch vernier dial with a 9 to 1 ratio. These occasionally turn up at swap meets. The only dial in my junk box was

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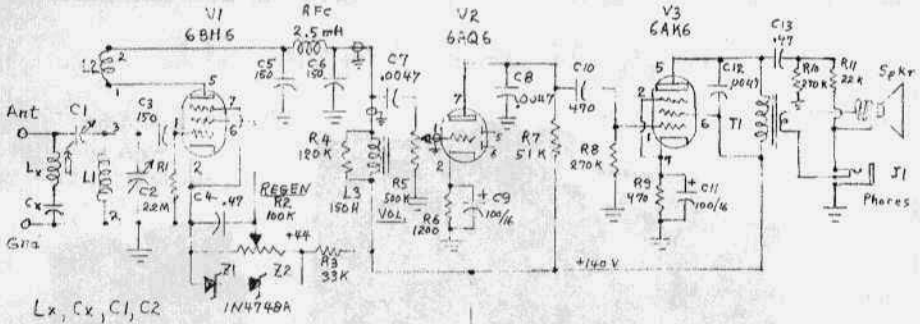


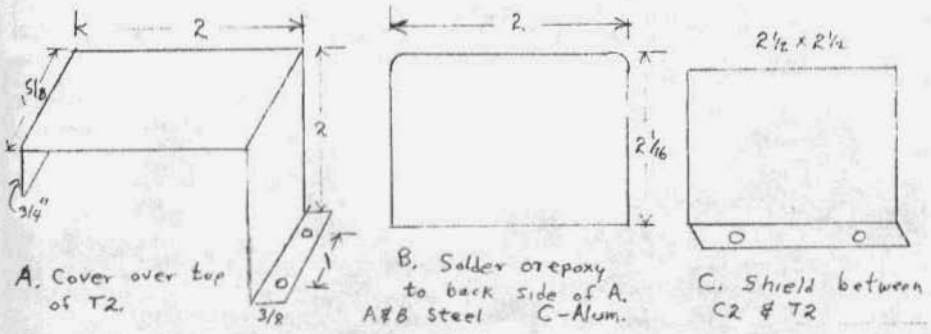
The New Ocean Hopper

Bob Dennison W2HBE

Pins 5 & 6 of V7 — No connection.
Use aluminum angle stock to brace panel
to prevent movement during tuning.
Audio leads shielded with Radio Shack 278-512.
Lx = North Hills 180-J, 500-1000 μH slug-tuned.

COIL	BAND	N1	N2	a	b	Dia.
1 RED	590-1460 kHz	22 turns No. 30 CW	10 turns No. 30 E CW	1.25"	1/8"	1 1/2
2 YEL.	1.8-4.4 MHz	39 turns No. 20 E CW	5 turns No. 26 E CW	1 3/8"	3/16"	1 1/2
3 BLK.	4.3-10.6 MHz	16 turns No. 20 E	3 turns No. 26 E CW	1 1/2"	3/16"	1 1/2
4 WHT.	9.8-24. MHz	7.5 turns No. 20 E	3 turns No. 26 E CW	1.125"	1/8"	1 1/8

a National velvet vernier dial, 3 inches in diameter with a 5:1 ratio. It is mounted on the front panel and connected to the tuning capacitor by means of a small flexible coupling of unknown make but any of the National or Millen couplings will do. The tuning capacitor is supported on a stiff bracket so that its shaft is two inches above the chassis. A short piece of 1/2 inch aluminum angle stock runs from the left side of the chassis to the panel to stiffen it and prevent unwanted movement during tuning.



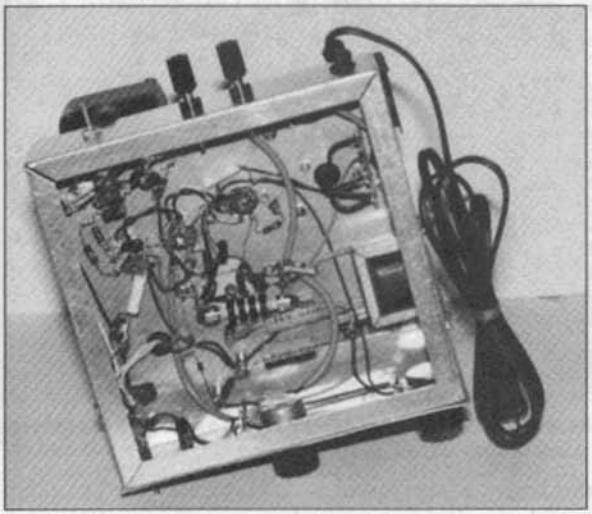


Figure 3. Underchassis view

The 3-1/2 inch PM speaker is one a friend gave me. I used perf board (Radio Shack 276-1394) to cover the 2.75 inch panel opening. This grill was painted flat black. Radio Shack also provided the output transformer Tl. See *Electric Radio* No. 139, Dec. 2000, page 20 for more info on this transformer and how to use it. Filter choke L4 came from a 5 tube AC-DC radio. Almost any small choke having 250-350 ohms resistance will suffice. Most of these chokes have about 5 H inductance.

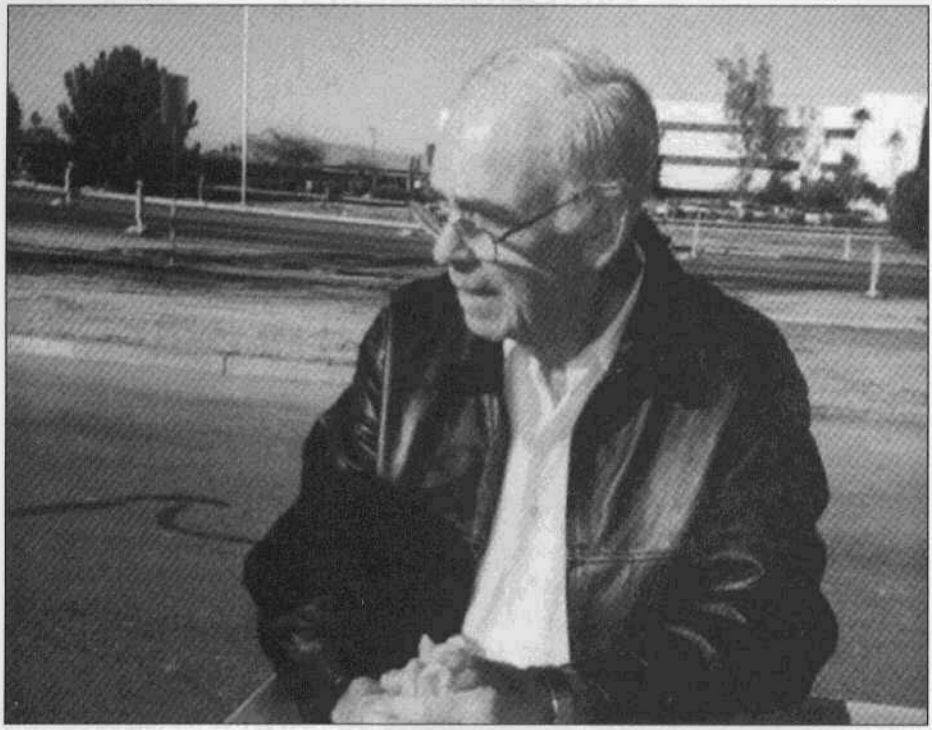
I used a power transformer, T2, that has a Faraday shield between the primary and secondary windings. If your transformer doesn't have this feature and line noises become a problem, try a bypass capacitor (say .01uF) from the hot side of the AC line to the chassis which should then be grounded. When you connect the 125 and 6.3 volt windings in series as shown on the schematic be sure that the polarities are aiding.

When the set was ready for testing, I found that the hum level was too high. I was able to reduce the hum by placing a shield around T2. A few scraps of sheet iron were formed into a shield as shown in Fig.3. While this shield cut the hum level considerably, there was still a noticeable hum. My solution to this was to roll-off the low frequency response of the audio amplifier. The value of C10 was reduced to 470 pF and the value of R8 was cut to 270K. Music and speech sound very natural now that the hum is eliminated.

Conclusion

I hope your Ocean Hooper thrills you with worldwide reception. Even though Allied no longer offers kit radios, you can still enjoy the wonders of exciting shortwave DX-ing with this up-to-date version of the famous Ocean Hopper. ER

Hank Scharfe, W6SKC, Silent Key



This photo of Hank was taken by Lockt Pingree, W1ZD, at the Mesa, Ariz. hamfest last December.

Over the years I had many telephone conversations with Hank and I had met him at hamfests in Arizona and New Mexico but I really didn't get to know that much about him. I think he was a very private person.

The most profound thing that I remember about Hank was his incredible knowledge regarding vintage gear—particularly receivers—and his technical savy. I don't think I've ever met anyone that had such a complete grasp of things electric, electronic or radio oriented.

He designed the noise silencer for the Hammarlund HQ-180. He was living in Mexico City at the time, which he said was the noisiest environment he'd ever experienced. The noise silencer was later manufactured by the Hammarlund Company and today it is a much sought after accessory. He also designed a noise blanker for the KWM-2 that was described in an ER article several years ago.

Another device he designed—and also built and sold— was the Dovetron RTTY Terminal Unit. It was sold to the military all over the world and I understand that in many countries it is still in use. Some of the more knowledgeable RTTY enthusiasts think it was the best TU that was ever built.

Hank contributed much to Amateur radio and I know that all his ham friends are going to miss him. 73 Hank...
N6CSW

VINTAGE NETS

Arizona AM Nets: Sat & Sun, 160M 1885 kHz at sunrise,75M 3855 kHz at 6 AM MST, 40M 7293 kHz 10 AM MST; 6M 50.4 MHz on Sat. at 8 PM MST; 2M 144.45 MHz, on Tue. at 7:30 PM MST.
West Coast AM Net meets Wednesdays 9PM Pacific on or about 3870kc. Net control alternates between John, W6MIT and Ken, K6CJA.
California Early Bird Net: Saturday mornings at 8 AM PST on 3870.
California Vintage SSB Net: Sunday mornings at 8 AM PST on 3860 +/-
Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net controls are Andy, WA4KCY and Sam, KF4TXQ. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.
Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.
Northwest AM Net: AM activity daily 3 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT. The formal AM net and swap session is on 3875, Sundays at 3 PM.
K6HQI Memorial Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 5:00 PM PT, 7 days a week and usually goes for about 2 hours.
Colorado Morning Net: An informal group of AM'ers get together on 3875 Monday, Wednesday Friday, Saturday and Sunday mornings at 7AM MT.
DX-60 Net: This net meets on 3880 at 0800 AM, ET, Sundays. Net control is Jim, N8LUV, with alternates. This net is all about entry-level AM rigs like the Heath DX-60.
Eastcoast Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is Ted, W3PWW. Saturday mornings at 0500 ET on 3885 + or - QRM.
Westcoast Military Radio Collectors Net: Meets Saturday evenings at 2130 (PT) on 3980 + or - QRM. Net control is Dennis, W7QHO.
Gray Hair Net: The oldest (or one of the oldest - 44+ years) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8:00 PM EST & 8:30 EDT. www.hamelectronics.com/ghn
Vintage SSB Net: Net control is Andy, WBØSNF. The Net meets on 14.293 at 1900Z Sunday and is followed by the New Heathkit Net at about 2030Z on the same freq. Net control is Don, WB6LRG.
Collins Collectors Association Nets: Technical and swap session each Sunday, 14.263 MHz, 2000Z, is a long-established net run by call areas. Informal ragchew nets meet on Tues nights on 3805 at 2100 Eastern and on Thur nights on 3875. West Coast 75M net that takes place on 3895 at 2000 Pacific
Collins Collector Association Monthly AM Night: The first Wed. of each month on 3880 kHz starting at 2000 CST (0200 UTC). All AM stations are welcome.
Drake Users Net: This group gets together on 3865 Tuesday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, W8NS; Rob, KE3EE and Huey, KD3UI.
Drake Technical Net: Sunday's on 7238 at 4PM Eastern time hosted by John, KB9AT; Gary, KG4D; Jeff, WA8SAJ and Evan, K8SQG.
Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.
Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net was started in 1978.
K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.
Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.
Southern Calif. Sunday Morning 6 Meter AM Net: 10 AM Sundays on 50.4. NC is Will, AA6DD.
Old Buzzards Net: Meets daily at 10 AM Local time on 3945. This is an informal net in the New England area . Net hosts are George, W1GAC and Paul, W1ECO.
Canadian Boatanchor Net: Meets Saturday afternoons, 3:00 PM EST on 3745.
Midwest Classic Radio Net: Sat. mornings on 3885 at 7:30AM Central time. Only AM checkins allowed. Swap/sale, hamfest info and technical help are frequent topics. NC is Rob, WA9ZTY.
Boatanchors CW Group: 3546.5, 7050, 7147, 10120, 14050. 80 on winter nights, 40 on summer nights, 30 and 20 meters daytime. Nightly "net" usually around 0200-0400 GMT. Listen for stations calling CQ BA, CQ GB.
Wireless Set No. 19 Net: Meets the second Sunday of every month on 7.270 +/- 25 kHz at 1800Z (3760 +/- 25 kHz alternate). Net control is Dave, VA3ORP.
Hallicrafters Collectors Assoc. Net: Sundays, 1730-1845 UTC on 14.293. Net control varies. Midwest net on Sat. on 7280 at 1700 UTC. Net control Jim, WB8DML. Pacific Northwest net on Sundays at 22.00 UTC on 7220. Net control is Dennis, VE7DH
Mighty Multi-Elmac 75 meter AM net: Every Tues eve at 8 PM EST. NCS is Mike, N8ECR
Nets that are underlined are new or have changed times or frequency since the last issue.

The National Company and the Mysterious Hum in Early HROs

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Bill Orr (1975, p. 17) once stated "the HRO is fondly remembered today as an outstanding example of equipment design and a receiver that was the standard of comparison for many DX operators." The HRO, in several iterations, dominated production facilities at the National Company for nearly a half-century; from early 1935 to the late 1970s, when the HRO-500 was perhaps the final item off its assembly line as the company tanked. The preeminence of the HRO, and the vaunted reputation of the National Company, however, were established during a manufacturing period of twelve years, 1935-1947, from the first HRO until the HRO 5TA-1 was superseded by the streamlined HRO-7. The essence of the classic or traditional HRO has been described in numerous publications, including Fisher (1989), Fizette (1983, 1990), Fizette & Wiesner (1983), Millen & Bacon (1935), Musgrove (ER, 1990, #19), Nagle (1986), and Orr (1975).

All of the HRO models during the twelve year time period share in common: (1) a black, crystalline lacquered front panel and steel cabinet, 8-3/4"H x 17-1/4"W x 10"D; (2) a five-inch, circular, micrometer dial; (3) a coil drawer, 2-1/4"H x 10-1/8"W, of four compartments, which is located in the chassis and entered through an opening in the lower-center of the front panel; (4) four sets of coils that cover 1.7 MHz to 30 MHz. Each set is comprised of four coils in separate aluminum cans that are mounted on an aluminum panel, 2-3/8"H x 10-3/8"W, and ganged together to create a plug-in assembly. The panel usually frames two calibration curves, 2-1/4"H x 3-1/4"W each, one for general coverage and one for bandspread.

Figure 1 shows the front panel of an early HRO, model #G-191. A coil assembly is inserted in the drawer. The position of the controls shown in Figure 1 is basically invariant across the years: The S-meter is in the upper left corner. Its on-off switch and a phone jack are directly below it. An audio gain control, automatic volume control (AVC) switch, and a combination beat frequency oscillator (BFO) switch/control follow in order downward. The circular tuning dial is in the center of the panel. On the right side of the receiver, from top to bottom, are controls for crystal selectivity, crystal phasing, and radio-frequency (RF) gain. A B-plus on-off switch is immediately above the RF gain control.

HROs manifested an exasperating problem during their first year of production: the receivers were constructed to interchange complements of either 2.5 volt or 6.3 volt tubes—those using the 6.3 volt complement encountered, as Millen (1939) described it, "a modulation hum ... in the vicinity of 15 mc." The National Company addressed the dilemma both publicly and privately. My intent in this paper, therefore, is three-fold—to consider briefly: (1) how historical developments in the radio manufacturing industry promoted development of the HRO, and inadvertently, the mysterious hum; (2)

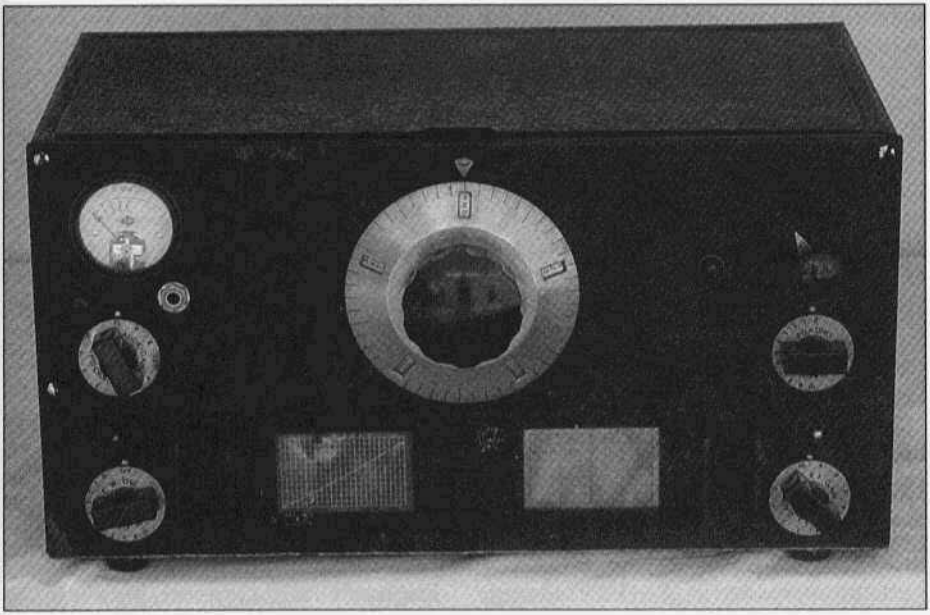

Figure 1. An early HRO, model #G-191

how the National Company dealt publicly with the hum; and (3) how the Company responded privately to it.

Historical antecedents of the HRO

The development of tetrode and pentode tubes in the late 1920s heralded a new epoch in radio manufacturing, and in the 1930s, forecast for the HRO its future as an advanced state-of-the-art receiver. The 222 and the 24-G tetrodes of 1927 and 1929, respectively, eclipsed journeyman triodes. The 36 tetrode, 37 triode, and 38 pentode (6.3 volt, ac/dc filaments) superseded in 1931 the 222 and 24-G. A higher tranconductance series of pentodes, 57, 58, and 2A5 (2.5 volt, AC/DC filaments) appeared in late 1932; then, in 1933-34, the 6C6, 6D6, and 42 series of pentodes (6.3 volt, AC/DC filaments) became available. The 2.5 volt and 6.3 volt pentodes are comparable in transconductance; however, the remote-cutoff 6D6 handles in RF amplifier circuits variations in signal voltage with less distortion than any tube heretofore.

Aspiring radio manufacturers of that era, including the National Company, faced an indomitable barrier configured as the Radio Corporation of America (RCA). Thanks to its parent stockholders, Westinghouse and General Electric, RCA acquired vast financial resources and research facilities, and thereby, control during the 1920s of so many patents that it was strangling the industry. RCA thus earned an unenviable reputation as a "'patent octopus'" while contentiousness arose over its imposition of fees. (MacLaurin, 1949, p.136).

The circuit design of the superheterodyne receiver had long been RCA's most desirable patent. RCA had purchased sole rights to it shortly after Edwin H. Armstrong had developed it in 1920. RCA engineers recognized the superiority of the superheterodyne circuit to other receiver designs and refused steadfastly to allow anyone (except itself) to market superheterodyne receivers for approximately the first ten years of the radio manufacturing industry.

Since RCA refused to license other

continued next page

manufacturers to produce superheterodyne receivers, the only way a radio enthusiast could avoid purchasing the superior receiver from RCA, at a relatively steep price, was to build it. A number of radio parts manufacturers thus generated a lively business producing special transformers and coils for home experimenters. For a time, then, during the 1920s, it was actually possible for an individual to build a better receiver than radio manufacturers other than RCA could market (Grinder, 1995, p. 37).

The opposition to RCA monopolistic policies intensified when manufacturers realized that the maximum capabilities of the new multi-grid tubes could not be utilized if RCA prohibited access to its superheterodyne patents. The intolerable pressure persuaded RCA in 1929 to begin granting licenses to manufacturers-at exorbitant rates-that permitted them to market superheterodyne receivers. Ire continued to churn, however, prompting the Department of Justice in 1930 to allege unlawful restraint of trade and to institute anti-trust action against RCA. After 18 months of negotiations, RCA accepted a consent decree, November 21, 1932, and reduced licensing fees substantially for its superheterodyne circuit, which for the first time, enabled radio manufacturers to compete with RCA. Nearly every radio manufacturing company-Emerson, Philco, Zenith, etc.-rushed superheterodyne receivers into the marketplace, and in the process, competed ruthlessly with one another via cosmetic features and gimmicks for the favor of consumers.

The National Company, Malden, MA, avoided the fray. It had been manufacturing high-quality regenerative receivers for amateurs, and now, given its reputation, it was invited to design a high-performance, commercial shortwave receiver for the Airways Division of the U. S. Department of Commerce. It was to be "a professional receiver in which considerations of price are entirely subordinate to those of performance and reliability" (National Company, 1934, p. 74). The new receiver was designed for "Aircraft Ground Station" use, and accordingly, was designated as the "AGS." Its first version utilizes nine, new-at-the-time tubes (4-36s, 4-37s, and a 38). It tunes from 1.5 MHz to 20 MHz, with three separate plug-in coils (RF amplifier, mixer, and oscillator) for each band. An external power supply and speaker are necessary. The AGS is superbly constructed mechanically, which enhances the accuracy of its calibration and the stability of its alignment.

The National Company employed James Millen in 1927 as its Chief Engineer and General Manager to expand its product line, primarily for radio amateurs. Millen produced for the company a series of regenerative, shortwave receivers before supervising development of the AGS. Earlier, he had achieved distinction as a writer. As a college student, for example, he had written articles for Radio Broadcast, in which he addressed readers' technical problems. Not surprisingly, then, Millen launched in QST, March, 1934, a series of one-page, technical advertisements. Millen used his narrations as a vehicle for describing why and how the National Company produced new components and equipment.

Millen was a visionary, young man of strong convictions; above all, he abhorred any practice that might compromise receiver performance. Consequently, he used his monthly series to defend vigorously his viewpoints. For example, he advocated external over built-in power supplies for four reasons: they save space on an operating table, they can be substituted for batteries easily, they can service more than one receiver, and importantly, they "always" generate

relatively lower noise and hum in receivers. Similarly, Millen deplored band-switching or coil switching in shortwave receivers because, from his "experience" he knew that images, noise, and sensitivity are affected by coil type, size, and shielding, which make optimum proportions difficult to attain; space requirements for several coils are excessive; long leads degrade sensitivity; and idle coils contribute to absorption losses (Millen, 1934c, p. 61).

Millen was happiest when he was free to create a receiver without regard to either design or production costs. His systematic, innovative mind enabled him to compartmentalize cogent visions into precise conceptualizations for an ideal receiver. He was supremely confident that he could create a one-of-its-kind, professional communications receiver embodying advanced technical accomplishments in electronics. Millen was thus delighted when Herbert Hoover, Jr., W6ZH, approached him early in 1934 to propose that he design a second generation AGS. Hoover, then in charge of radio communications for Western Airlines (later to be absorbed by TWA) acted as an informal spokesperson for the airlines (Nagle, 1986).

The AGS provided reliable radio reception and had impressed the aircraft industry. However, several aspects of the AGS needed upgrading: tuning was too touchy, images were too strong, frequencies above 20 MHz were unavailable, and plugging in so many coils at once confused inexperienced operators (Fisher, 1987; Fisher, 1989). Hoover and his colleagues thus insisted, (1) given Millen's absolute dedication to plug-in coils, that they must be ganged together so that those for a particular band are plugged in simultaneously, and (2), given the image problem, that another stage of preselection or RF amplification be added. Millen readily accepted Hoover's propositions, since he had been busy devising a "strictly amateur receiver" with such features as "we believe to be desirable for amateur band operation . . . [1] a two-stage pre-selector, [2] a radically new type SFL gang condenser with precision pre-loaded worm drive tuning, [3] a new dial, [4] a separate built-in vacuum tube voltmeter for direct reading of carrier intensities [S-meter], [5] a Lamb-type Single Signal crystal filter with full front-of-panel control [Lamb, 1932], and [6] calibrated plug-in coils ganged for easy handling." "Obviously," he said, "it has been necessary to design this new receiver without the restrictions as to cost" (Millen, 1934b, p. 69).

The two principals agreed that both the aircraft industry and radio amateurs warranted a professional-grade receiver of unsurpassed quality. According to Orr (1975), Hoover set up a laboratory in his garage in Pasadena, CA, to work, along with a few technicians on circuit requirements, while Millen tackled mechanical details in Malden, MA.

Millen pushed his machinists and electronic technicians into hours of overtime. The laboratory staff chose the letters, HOR, by which to tag their time sheets. HOR stood for "Hell of a Rush." From the perspective of the staff, HOR, as a job description, aptly portrayed the circumstances thrust upon them. The advertising department at National Company, taking a socially conservative stance on the matter, jumbled the three letters, coming up with HRO, to ensure that the letter combination did not represent an offensive phrase.

Millen's effort to establish mechanical parameters for the new receiver required innumerable special machinings, castings, and moldings. Special dies were used for the chassis and welded steel enhanced its mechanical stability. The drawer for the four-gang coil assembly (2-RF, 1-Mixer, 1-Oscillator) was located in the chassis to isolate the coils from tube-generated heat. The metallic lead ends of specially-designed, ceramic resistors were often

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soldered directly to tube sockets, etc. so that their wire leads could be cut off. All components were fixed firmly in place with tie-point strips. Lock washers were used with all screws and nuts.

The National Company manufactured RF transformers, variable capacitors, dials, coils, insulators, etc. Litz wire was used for IF coils, and all of them were wound upon precisely grooved dielectric forms to ensure exact inductances. A small air-capacitor (59 total) was placed across each coil for fine adjustment.

Three aspects of the main tuning system—a four-gang variable capacitor, a precision worm drive, and a five-inch, circular "micrometer" dial constituted the premier mechanical features of the HRO. The worm drive is housed in a heavy-duty gear reduction box; it provides a 20-1 tuning ratio and it is loaded with springs to take up backlash. The capacitor sections for the RF amplifiers, mixer, and oscillator, are mounted directly on the gear housing and never touch the receiver chassis, which means that distortion in the chassis cannot affect the capacitor adjustment and calibration. Rotor plate shapes are straight-line frequency. The micrometer dial also mounts directly on a support projecting from the gear housing, and does not touch the receiver panel either, and thus, it is also protected from misalignment and panel warping. The dial has fifty divisions and makes ten revolutions in covering the tuning range. The dial provides five windows for a logging scale—numbered every ten divisions. The numbers rotate with the divisions, and are changed epicyclically with every revolution of the outer dial by a mechanism within the dial. The epicyclic dial arrangement, coupled with the 20-1 ratio in the gear box, provides a scale length of 12 feet for the tuning capacitor.

The circuit design of the HRO is "classic in its simplicity" (Orr, 1975, p. 20), and it appears that Hoover actually had very little input into either its development or its final adjustments and alignments. Millen had to have most of the circuit details worked out before coils and components could be manufactured. Hoover tinkered at the outset with problems associated with AVC and 2nd detector circuits, but the bugs were eventually worked out in Malden.

Early advertisements state that the HRO was available to buyers in either a "2 volt or 6 volt AC model." Millen had chosen the newest pentode tube complements for the receiver. The tubes had been released as he was beginning to design the HRO and before he had opportunity to examine them experimentally. Nonetheless, Millen gambled that his choice of the very latest tubes available would strengthen his guarantee that the HRO would attain state-of-the-art status. Nine tubes were required for the HRO: 58 or 6D6 (1st RF), 58 or 6D6 (2nd RF), 57 or 6C6 (1st detector), 57 or 6C6 (oscillator), 58 or 6D6 (1st IF, 58 or 6D6 (2nd IF), 2B7 or 6B7 (2nd detector/AVC/1st audio), 57 or 6C6 (CW oscillator), 2A5 or 42 (audio output). Tubes were not included in the purchase price.

Purchasers of HROs were also expected to provide their own power supplies. The first advertisement stated "The HRO has been designed to employ an external power supply, as many amateurs already possess suitable power supplies." (National Company, 1934, p. 72). A four-wire, five-foot cable was connected internally to a HRO at one end, and at the other end, to a four-prong plug for connection to a power supply. Millen was troubled, however, by the prospect of buyers building their own power supplies, especially for the 2.5 volt model. A power supply would have to deliver 2.5 volts at 9 amperes (one ampere for each tube), and he argued that it would have to supply 2.8 volts under load to compensate for a .3 volt drop in the con-

necting cable (Fizette, 1983; Millen, 1934a, p. 63; Millen & Bacon, 1936, p. 3). The National Company prepared for the problem, for in 1933, it began manufacturing a power supply, #5897, expressly for users of the HRO with 2.5 volt tubes. The filament current draw of the 6.3 volt HRO was only 2.7 amperes (.3 amperes per tube), and nothing on the horizon suggested that a cantankerous problem was brewing. The National Company thus manufactured another new power supply, #5886, and recommended it to purchasers of HROs who preferred 6.3 volt tubes.

The National Company deals publicly with the modulation hum dilemma

The first advertisement for the HRO in October 1934 indicates that the National Company believed that the 2.5 volt and 6.3 volt models were interchangeable in every way (National Company, 1934, p. 72). Millen & Bacon (1935) appear to make the same assumption in their discussion of the design of the HRO. The opening paragraph of the first edition of the Instruction Manual (Millen & Bacon, 1936, p. 4), however, sets forth a restriction. It reports that they are identical "as far as alignment and performance are concerned" but battery power only is appropriate when 6.3 volt tubes are used. Further, "this recommendation was based largely upon the difficulty experienced with modulation hum encountered in the vicinity of 15 mc when AC was used on the 6.3 volt heaters" Fizette, 1983; Millen, 1939, p. 71). Millen blamed the problem on the new 6C6 and 6D6 pentodes. He said, too, that he preferred tubes of 2.5 volt heaters to those of 6.3 volts because they "are definitely less noisy" in high gain receivers, and "the HRO is very definitely a high gain job" (Millen, 1937).

The National Company generally ignored its public repudiation of AC operation for HROs with 6.3 volt tubes. For example, the Company Bulletin #240 (National Company, 1934, p. 73) highlights via bullets "outstanding features" of the HRO. One of them states: "2-1/2 volt AC and 6 volt AC or Battery models." Further, the Radio's Master Encyclopedia for 1936 ("Advertisement," 1936), following a practice common in early HRO advertising, promoted a HRO-2 and a HRO-6; it listed unconditionally the AC #5897 power pact as an accessory for the former, and the AC #5886 for the latter. Since HRO advertising often neglected the hum dilemma, purchasers whose preference was for 6.3 volt tubes were likely to learn of it only while perusing the Instruction Manual—after they had selected a tube complement and equipped the receiver. Fisher (1989) estimates that a press run of 6,500 copies of the first HRO Manual were published and that they were distributed to 1,000 or more purchasers. Very likely, then, a great many amateurs who chose 6.3 volt tubes for their early HROs had to live stoically with the annoying hum.

Millen announced in 1939, five years after recommending battery operation for HROs employing 6.3 volt tubes, that tube manufacturers [namely RCA and Sylvania] were making 6C6 and 6D6 pentodes that were "free of this former trouble." He said, furthermore, "that we are now able to offer a 6.3 volt tube HRO for AC operation that in every way equals the 2.5 volt tube model." He pointed out, too, that National Company was now offering a new 6.3 volt power unit, #697, for the 6.3 volt version of the HRO. Surprisingly, and somewhat disingenuously, he added that "this new power unit should not be used with the 6.3 volt HRO's heretofore supplied for battery operation, as the plate voltage will be too high." Millen seems to imply that prior 6.3 volt models had been altered for battery operation; however, no mention of such a modification was ever mentioned in the National Company literature. Indeed, the mantra of the Company had been that complements of 2.5 volt and 6.3

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volt tubes could be used interchangeably in any given HRO, hum notwithstanding. Moreover, a comparison of the schematics and parts lists for the early HROs and the HRO-M, the first of the newly recommended 6.3 volt models, indicates that they are identical in every essential respect (National Company, 1936; Rider, 1948)

The National Company deals privately with the modulation hum dilemma

Perhaps the National Company obfuscated its commentary regarding the hum issue because Millen and his engineers questioned the premise that 6C6 and 6D6 pentodes were the problem. Maybe they wondered whether their #5886 power supply was instead at fault? The discussion below shows that they may have explored this possibility thoroughly.

I acquired an abiding interest in HROs when opportunity arose in the spring of 1990 to describe Hank Brown's, W6DJX, noteworthy collection of HROs (Grinder, 1990). Hank, who is the well-known founder of the Military Radio Collector's Group (MRCG), acquired several years ago a passion for HROs, and he has slowly built up a sizeable inventory of them. The HRO which he treasures most, model #E-169, is one of Millen's first production units. It is distinguished particularly by a pearl-faced pushbutton for switching the S-meter in and out of the circuit. The pushbutton was featured only on the first few hundred HROs manufactured. Consequently Hank's #E-169 is today a highly prized collector's item.

I learned subsequently from Fisher's (1989) survey of HRO attributes that approximately 25 production runs occurred between 1935 and 1947. Alphabetical letters were used to denote production runs; Arabic numbers following the letters were used to designate the serial order of a HRO in the run. The data are usually stamped into the HRO chassis near the antenna binding post. Fisher (1989) estimates that the National Company produced on average about 250 sets per run, and sometimes, receivers at the end of one run were identical to those at the outset of the next. For example, a short D run preceded that of Hank's #E-169 HRO: the letter "E" indicates the second run. The two runs occurred simultaneously between January and March 1935, and the HROs from them are virtually identical. The next two runs, F and G, were produced between April and July 1935. A red pilot-light was added during the F run, and during the G run, a push-pull brass switch replaced the pearl pushbutton (see Figure 1). The silver, nickel-plated finish on the micrometer dial shown in Figure 1 was changed to a black enamel finish for models subsequent to the G run. Millen maintained that the change was made because the nickel-plated version did not stand up (Millen, 1938), but Fisher (1989) suggests cost-reduction may have been the reason.

I coveted Hank's #E-169 HRO, with its pearl pushbutton and silver, nickel-plated dial, but knowing its rarity, I despaired ever attaining one like it. However, I was on the East Coast, October 1990, and the occasion provided opportunity for me to attend the fabulous, semiannual Hosstraders' tail-gate swapfest, held back then on the fairgrounds at Deerfield, New Hampshire (Barry, ER #14, 1990). Thousands of buyers and sellers swarmed over 35 acres dotted with clusters of pine trees amidst abundant meadowland. While I wandered about, I turned onto a grassy knoll where two men and their wives were selling items from the estate of an amateur, who, I learned shortly, had lived in Malden, MA, the home of the National Company.

The origin of the estate items seemed immaterial to me at the moment, for my attention had centered on a dusty HRO with a nickel-plated micrometer dial. Pluses included a coil assembly in the

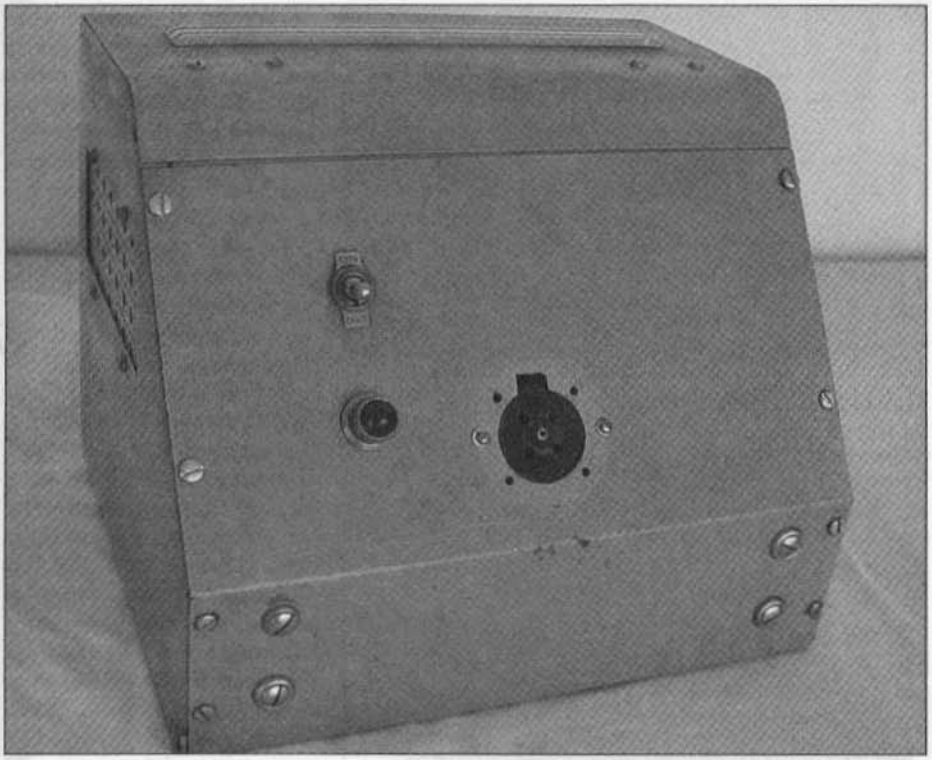

Figure 2. A special laboratory power supply built at National Company expressly for a HRO using 6.3 volt tubes

receiver drawer and five others in a dusty oak box along side the receiver. Negatives were more abundant: the receiver power cable had been cut off and its bottom plate was missing, there was no speaker, and the accompanying power-supply was housed in a Bud, hand-painted, grey cabinet, 8"H x 10"W x 7-1/2"D. The power supply appeared to have been home-built and it was quite unappealing cosmetically (see Figure 2). Prospective buyers nearby seemed puzzled by the silver dial, repulsed by the cut cable, and dismissive of the strange power-supply. They shied away, but thanks to my familiarity with Hank's #E-169, I recognized the receiver as a very early HRO, and I hesitated hardly a moment in purchasing it.

When I returned home with the receiver, I discovered that I had purchased a #G-191 HRO model, equipped not with 2.5 but with 6.3 volt tubes. After lifting the Bud cabinet away from the power supply, I found that I possessed a special laboratory power supply built at National Company expressly for a HRO using 6.3 volt tubes (see Figures 3 and 4.). "F 4" is stamped on one side of the black chassis in red paint (Figure 3)-the same red paint that had been used in stamping numbers on the coil assemblies in order to identify them as integral components of the #G-191. "HRO No. 25" is stamped in red paint on the back of the chassis (Figure 4). The data shown in Figures 3 and 4 suggest perhaps that this power supply represents a design that was built initially for the fourth receiver in the F production run, and may have been number 25 in its own production run.

Engineers and technicians at National

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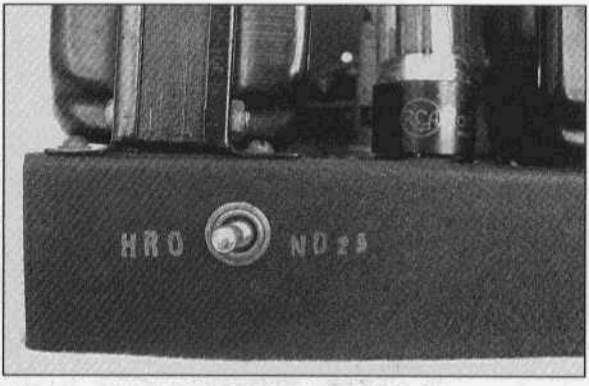

Figure 3. Sideview of chassis showing F4 in red paint.

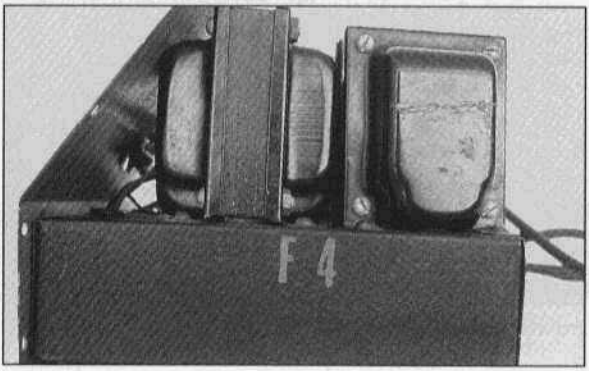

Figure 4. Back of chassis with HRO no. 25 in red paint.

Company appear to have created the special laboratory power supply, hoping to solve the modulation hum mystery. It incorporates a choke input filter system, which utilizes three Thordarson transformers. Further, whereas the #5886 power supply lacks a bleeder resistor, the laboratory supply uses a tapped bleeder resistor and extra filtering. Was the project successful? I decided recently to run a quasi-scientific, aural experiment with the #5886, the laboratory supply, and the #G-191 to assess whether, on the one hand, the #5886 produced the hum at 15 MHz, and, on the other hand, whether the special laboratory supply diminished it below aural threshold. First, I obtained from Dave Lowenstein, N7AF, an avid collector of vintage receivers, an early Instruction Manual and an original HRO cable. I had already a #5886. I assembled the cable to the #G-191 and replaced most of the capacitors in the receiver. Second, I replaced the electrolytics in the two power supplies. Third, I aligned the two RF and two IF stages in the #G-191.

I conducted the aural experiment as follows: First, I coupled inductively a Hewlett-Packard 608E, VHF signal generator to the antenna circuit of the #G-191, and I listened on a SONY 2010 to be certain that its signal was free of hum distortion. Second, I connected the #G-191 to the #5886 power supply. Third, after warming up the equipment, I injected a 15 MHz, unmodulated carrier into the #G-191. I listened expectantly for a hum-modulated signal. I found it not only to be strong, but discernible for about three MHz above and below the injected signal. Fourth, I powered the #G-191 with the lab supply, and again, I injected a 15 MHz carrier. I discovered that the carrier was modulated just as had been with the #5886 supply; the hum was also distributed plus or minus about three MHz.

My belief is that the technicians at the factory of the National Company were unsuccessful at conquering the hum-modulation via the special power supply. Of course, it is possible but not probable that they built the power supply for an entirely different purpose and never intended to attack the hum problem. At least, Millen was never compelled to retract his attribution of blame for it to early production runs of

6C6 and 6D6 tubes. Even if the technicians had succeeded, chances are nothing would have been said, since the laboratory supply, relative to the #5886, would have been prohibitively expensive to manufacturer.

Aspects of the scenario, nonetheless, are fairly clear. The data printed on the sides of the laboratory power supply provide evidence that it had been constructed in the National Company factory for first-year models of HROs with 6.3 volt tubes. An engineer or technician probably brought it home to power the 6.3 volt #G-191. Eventually the HRO and its unusual power supply were set aside, perhaps in an attic for a half-century, and finally, I obtained the two items at Deerfield as remnants of the employee's estate. The #G-191 and its power supply surely will provide many more years of listening pleasure; further, the commentary herein will provide hopefully closure on another anecdote in the history of amateur radio. ER

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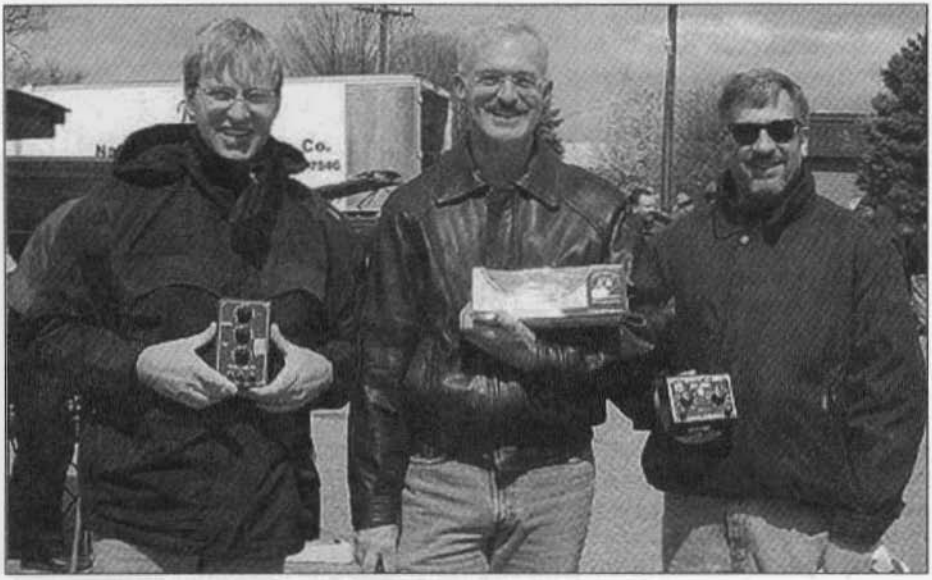

At the Trimonium, MD, hamfest three AM'ers pose proudly with their acquisitions. Left to right: Steve Ickes, WB3HUZ; Paul Courson, WA3VJB and Jay Greenberg, N3WWL.

Well-wishers on 75 meters in April helped give Steve, WB3HUZ (left) an on-the-air sendoff as he prepared to move to a new home in Virginia. The farewell party was at the home of Paul Courson, WA3VJB, accompanied by friends Tim West, N3DRB (center) and Frank Esposito, KB3AHE (right).

Colorado 3875 gang. Front row, left to right: Orlin Jenkins "OJ", KØOJ; George Shute W4BDG; Arnie Burnham, KTØO; Horst Geipel, WAØNUH. Back row, left to right: Steve Stuntz, NØBF; Willis Whatley, WA5VRL; Don Ermest. WØDON; Gene Worth,WØAGU

Longtime and well-known AM'er Don Chester, K4KYV, at his AM operating position. His station is noted for its outstanding audio and always loud signal. *Photo by Tim West, N3DRB.*

Radio Service in the Golden Age
1930's through the 50's

by Bruce Vaughan, NR5Q
504 Maple Drive
Springdale, AR 72764
NR5Q@aol.com

Episode 13

The Art of Selling Television

Salesmanship is necessary to survive in any competitive market. Substantial sales however, can often be attributed to nothing but dumb luck. I have always had my share of both—dumbness and luck.

Perhaps before I continue I should explain something of the demography of our area as it existed in the immediate post war era. Springdale is one of several small towns clustered closely together in the northwest corner of our state. Springdale in the late 40's had a population of about 3K, Fayetteville, 8 miles south was a little larger due to the University of Arkansas enrollment. At least another dozen small towns and villages surrounded our city—none of which were large enough to attract wholesale electronic distributors. Radio and appliance distributors for Arkansas were concentrated in Ft. Smith, and Little Rock.

"Some day all this will be one large town," my Dad used to say, waving his arm in a broad arc as we drove along the lightly traveled blacktop roads connecting each small town to the next. It was our family custom to take a Sunday drive in the 37 Dodge sedan—often stopping at a roadside cafe for lunch. One restaurant, near Anderson Missouri, was located in a hillside cave. A spring-fed stream ran through the dining room. Trout swimming gracefully in the cold, crystal clear water were blissfully unaware of their impending fate, and could not have escaped even if they wanted to do so. A heavy screen on the downstream side kept the trout in the restaurant or upstream. Even without air conditioning, the temperature in the cave was such that a light jacket was needed even on hot summer days.

Dad's prediction came true—though not in his lifetime. We now speak of the metro area when talking about NW Arkansas. Our population is nearing the 400K point, and some city limits do join each other. Most old timers liked it better as it was years ago.

Most business firms in Springdale preferred doing business in Fort Smith because of travel time. Little Rock was a 200-mile drive over a mountainous, crooked, two-lane blacktop road. Both cities required travel across the Boston Mountains—noted for ice in the winter, slow moving tourist traffic in the summer, and year 'round ground fog, especially in the early morning hours.

When television first appeared on the scene if buyers had understood the financial risk they were taking when buying a TV receiver it is doubtful if it would ever have gotten off the ground.

The usual scenario went something like this. A radio serviceman or hobbyist such as myself would invest his hard-earned money in a TV and tinker with it until he received some sort of a snowy picture. If he was among the more prosperous businessmen of the community he might buy a sweep generator and a 'scope—neither of which he knew how to use. I might add that very few radio servicemen were listed among the town's prosperous businessmen.

Television manufacturers, like those in most other new technologies, were a lot more interested in selling their product than in the customer's welfare. Get the set out of the factory and into the customer's home. When the new TV 'broke down' as it was sure to do, or when it failed to operate from day one, or when it caught on fire—a not uncommon experience—the new TV owner turned to the seller for help. Many times this was little more than an exercise in frustration.

When I first began selling television, one of my competitors was a grocery store. It was a common sight to see the crew from the grocery store trying to install an antenna while still wearing their blood stained butchers aprons. Such TV merchants had little choice when a customer called in with an inoperative TV. Call a local service shop to do the repairs as needed, or give the customer a new television set. Either choice was a poor one. Giving a customer a new set every time they needed service would lead to bankruptcy in a hurry, calling a service man every time the customer complained would only prolong the bankruptcy. The only practical course of action for television dealers was to add a TV service department and do their own service. One thing was wrong with this—where do you find a good serviceman?

Discount retailers such as Wal-Mart, K-Mart, and Sears soon corrected this deplorable situation when they started selling TV's at discount prices. Customers were offered a choice—buy an extended warranty or seek service on your own.

I had a service shop for over 25 years, and at one time had six repairmen on the payroll, with three trucks on the road. In all that time I had ONE good serviceman; the rest were average at best. Yet, my repairmen were among the best in the area.

It was a hectic time. Everyone was learning. To the credit of state distributors, they did have one to three day service schools throughout the year, but TV was changing rapidly and by the time you learned something, your knowledge was obsolete.

So how did we early retailers deal with this impossible situation? The best answer I can give is that we kept sets working any way we could, repairing what we could, seeking help from the distributor when our technical problems exceeded our knowledge and experience. Often, servicemen called each other on the phone and discussed their repair problems. During this period there was enough business to go around. Most radio repairmen in our area were well acquainted and often good friends. They helped each other stay in business by sharing knowledge, experience, and inventory.

When one of the manufacturers, Admiral I believe, introduced a three-way combination featuring a radio, record player, and TV with a giant 14-inch screen, I placed my order for one immediately. The largest screen I had on my floor at the time was a 12-inch GE. This was the age before mass merchandising; dealers and distributors considered 6 TV's a large order.

I remember the day the big three-way combination was delivered. I could not wait to open up the box and see the latest television model. It was a beauty all right, with its pull out record player drawer, tilt-out radio panel, and big 14-inch screen television hiding behind a door.

You can imagine my disappointment when I first powered the unit up and was greeted by the sight of gray smoke curling up from the back of the fine mahogany veneer cabinet. I quickly unplugged the set and the smoke dissipated—however, the smell of a hot transformer lingered in the shop for some time.

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I was really upset. This was one of several brand new sets that had arrived with major problems within the past few weeks. Here I had spent almost $350.00, and all I had was an inoperative unit that was going to take time and money to repair. Oh, but were not all TV's guaranteed by the manufacturer, you might ask. Let me explain... television sets, like other electronics, did come with a warranty. What was the manufacturers warranty worth to the average TV dealer? Absolutely nothing. Let's look at a typical example. A TV arrives from the state distributor and upon unpacking, or after the set is sold, requires service within the 90-day warranty period. The dealer bears all the labor costs, all service call expenses. The manufacturer will replace a 20-cent capacitor, a 15-cent carbon resistor, or even an $8.00 transformer—after the dealer fills out numerous forms, packs the part, and pre-pays it to the distributor. If I had all the money, parts value included, that I received from manufacturers for warranty work during my 30 years in business, I would not have enough to take my wife out to McDonalds for a hamburger and a shake.

What was a TV guarantee worth to the customer? That all depended upon the retail dealer. Most dealers did honor the company warranty—even though it cost them dearly to do so. Some companies, Philco for example, would replace defective parts, but I know of no dealer who ever received a penny for doing the service under warranty. On the other hand, getting a penny from GE was like getting blood from a turnip.

I made a decision that I was not getting the shaft on this set—I would box this lemon up, load it in my truck, and take it back to the distributor tomorrow morning. I intended to come home with a new, working TV, or with a credit memo for the full purchase price.

At the time I was driving a 1938 Chevrolet pickup truck that had been modified for heavy-duty work during the war. Several things on the truck needed replacing—including tires, the gasoline level indicator, and the speedometer. After all $350.00 did not buy much of a pickup, even in those days.

I neglected to fill up my tank before starting the trip. Half way up the Boston Mountain I felt the truck start missing. The ageing Chevy coughed and wheezed a bit, then died of fuel starvation.

Fortunately, our world back then was far less complex than it is today. The area was so sparsely populated that I knew who owned almost every business along the Boston Mountain road. I realized that I was less than three miles from the peak. On the very top of the mountain there was a cluster of businesses. The Burns family owned the east side and operated an excellent restaurant known as 'Burn's Gables.' During the twenties and thirties there was also a 'Tourist Court'— six or seven small one-room cottages that rented for $1.50 per night.

The Bellis family had long owned the west side of the road. Mr. and Mrs. Bellis ran a gift shop and restaurant. Eddie Bellis, a son, ran a garage, service station, a kiddy railway that circled a two-acre man made lake, and a 100-foot high observation tower. By paying a dime you could climb what seemed to be unending flights of stairs until you reached a small platform at the top from which you could see exactly what you could see from the ground—only from a little higher vantage point.

I did not stand by the roadside but a few minutes before a car stopped and the driver offered help. I asked him to stop at Eddie's Garage and asked him to bring me two gallons of gas so that I could make it up to his station for a fill-up. Some 15 minutes later Eddie came down the hill in his wrecker. After the

usual greetings and small talk, he reached in the cab of his truck and took out a gasoline can. Before leaving, he had me start the truck. When he was convinced that all was well, he left for his station with me trailing along behind.

Please bear in mind that I had never personally met Eddie Bellis before this morning. Such friendly greetings and small talk between total strangers before transacting any business was part of the Ozark culture. Younger people today do not understand it—and it is a habit older Arkansans never forget. You will also notice that no money changed hands until I pulled into his station and filled up my truck. The charge for my roadside service was zero. It was a simple courtesy that Mr. Bellis extended to me in return for my purchase of ten gallons or so of 28-cent gasoline.

After filling up my truck, we sat down on a bench in front of his station and traded a few stories. During the conversation he turned to me and said, "I'm curious, what are you hauling in that big box in back of your truck?"

Today such a question would be unthinkable. Back then, only someone carrying stolen or illegal merchandise would have been offended by such a question. Why would he not be curious?

"That's a brand new television set. It has a giant 14-inch screen, a record player, and a radio that gets the new FM radio broadcasts," I answered.

"By golly, that must be something," said the young man. "I've been reading about television in Popular Mechanics and Popular Science magazines. They say there is a station in Tulsa now. You know I've never seen a television set. Could you let me take a look at it?"

"Sure, I'd be glad to show it to you. Just let me take off the furniture pad; then if you'll help me we'll lift the box straight up off the set."

When the set was uncovered, Eddie was really enthused. "If you have time I'd like to go upstairs, and have the wife and kids come down and see their first television set."

"No problem", I said, "This one has a little bug in it and I'm taking it down to Fort Smith to exchange it for another one just like it. I have all day."

Eddie climbed the outside stairs up to his living quarters over the garage. Soon he and his wife, followed by two little girls came back down.

The entire family had a lot of questions about television. I tried to answer them as though I had all the answers. In reality, I was nothing but a novice stumbling around in a darkened room full of new technology.

I have seen few before or since more intrigued with a piece of electronic gear. Eddie explained that he subscribed to a lot of magazines, and that he and his wife had been reading about TV for years. They thought how wonderful it would be to have one in their home, as they were 30 miles away from the nearest movie theatre. For those who ran a business on top of the Boston Mountains, once the tourist season ended winter months were long and dreary.

I glanced at my wristwatch—I had killed almost an hour visiting with Eddie. I had to get on my way—it was another 35 miles to Fort Smith. If I hurried I could still get there before the lunch hour.

Suddenly I realized I might make a sale here. "Eddie, I've got an idea," I said. "If they have another set like this in the warehouse in Fort Smith, I could unpack it there, check it out, and drop it off here at your house by about 3:30. You already have one of the best antenna towers in the state. How far is it from your garage to the base of the tower?"

"Well, let's see," mused Eddie. "My garage is about 45 feet from the gift shop. The tower sits halfway between my garage and the gift store."

"OK, if we mount the antenna on the northwest corner of the tower, run the lead in down that leg, we would have less

continued on page 42

John Mohn, W5MEU, Silent Key

Voice Of Tamale Town Laid To Rest

by David Olsen, W6PSS
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Ramona, CA 92065
w6pss@aol.com

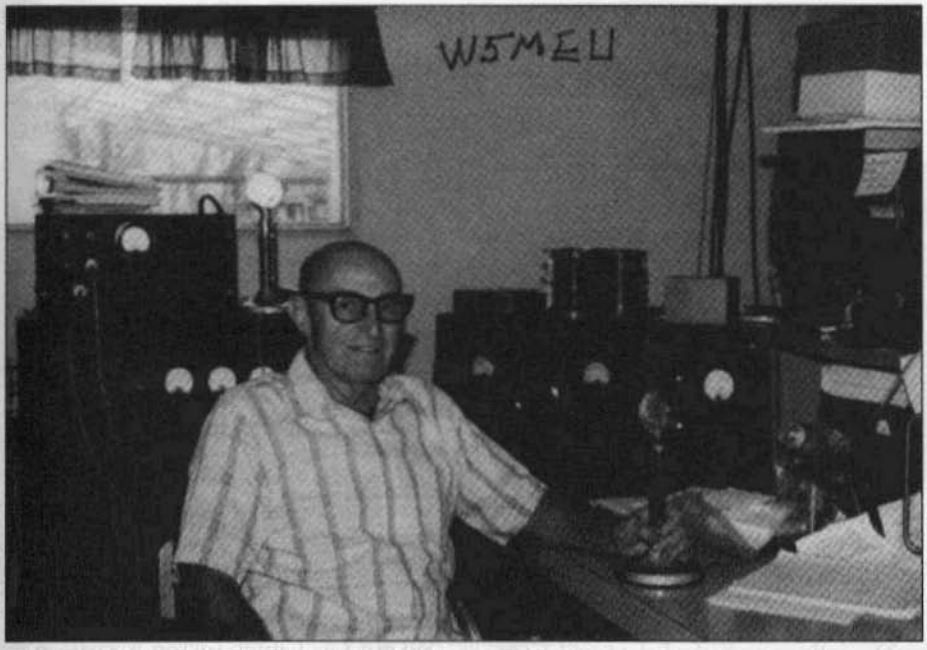
"I hate to be the one who has to telling you this Dave, but John L. Mohn, W5MEU, became a silent key this past December—around the 18th". Jeff, W5OMR reported the sad news when queried about the prolific "Voice Of Tamale Town" noting that both he and his dad had known John for many years.

"He was one of the finest persons I have had the pleasure of knowing" wrote Paul, W9IEY. "I looked forward to those Saturday evenings on 7160 when we could get together and solve the Worlds problems. I learned a lot and it was amateur radio as has never been equalled. My log shows our first QSO was on 10/21/79 on 7.166 at 0419 GMT. This initiated weekly schedules that lasted for over a decade. Noteworthy was John's participation in the national AM network that soon followed our QSO on the same frequency. It usually evolved into a round table consisting of Ken, W5FLV; Alton, W5FAP; Bill, K1KV; Rick, K8MLV/Ø; Hoisy, W4CJL; Ozona Bob, W5PYT; Doug, VE4BX; David, W6PSS; Pete, W1VZR; Luke, W5LUT; Ashtabula Bill, W8VYZ; Tim, WA1HLR; Don, K4KYV and later Barry, N6CSW and others. Quite a group!" This was to become 'The Saturday Night Bash' christened by Rick, K8MLV. But alas, the net was to succumb to foreign BC QRM. In addition to the above, John also kept the rotation straight on the Saturday morning 40M SPAM Group.

During the 5 years that Floyd Dunlap was President of SPAM (Society For The Promotion of Amplitude Modulation), John gave financial support to the organization. Hearing of Floyd's untimely death in 1988, John traveled to Floyd's QTH in Houston to get his SPAM records. And he provided flowers on behalf of SPAM to Floyd's parents. According to Norm, WB6TRQ, John made a very generous contribution to help restart SPAM. In 1989 John formed and chaired a committee that set up a SPAM booth at the ARRL Convention in Dallas, TX. A book could be written about this man overshadowing these few humble words of tribute.

John was born September 26, 1917. His grandpappy, Ingraham, was a famous preacher who had a Texas town named after him. Young John was fond of and drove stock cars. He joined up with the US Army Signal Corps in WW II and continued on in the US Air Force rising to the rank of Chief Warrant Officer. He married beautiful "Bobbie" and their union produced two children —first Vivian and two years later John Brian "Tiger". I had the pleasure of meeting the whole family in the mid-80s and was introduced to Bobbie's delicious homegrown okra.

While in the military, John acquired an insatiable passion for the BC-610 transmitter that would remain with him the rest of his life. John freely shared his knowledge of taming the "Bear Cat" beast in correspondence and on air. Many have utilized and will remember his cure for BC-610 modulation "talk-back." Johns generosity didn't stop there. Paul, W9IEY recalls that John's 1959 Chevy pickup came in handy when



W5MEU in his hamshack with his beloved BC-610s.

he purchased 2000 pounds of surplus on a $15 bid on 5/8/80. A Jamesway type metal building was soon erected to facilitate the necessary warehousing. This became a repository that benefited hams all over the country. Countless hams reported receiving John's "Care Packages" including Paul and this operator. Some years later John presented Paul with a BC-610 asking that he make delivery arrangements. Paul's work precluded arrangements at the time and John sold the transmitter after a long wait. John sent a letter of apology to Paul with proceeds of the 610 sale. Paul sent back a personal check that John refused to cash!

John's sense of humor was second to none. On one occasion, I was the recipient of two care packages. Upon opening the first containing a BC-191 transmitter, an old bottle of Mexican tequila was discovered gingerly packed into the space reserved for the tuning unit. Thirteen years later, upon removing the top homemade dust cover from the tuning unit that had occupied the second care package, the following inscription appeared on its reverse side: "Hi Dave; Whatcha lookin' in here for?? J.L.M. W5MEU 1 Sept 1989 GOTCHA!!" When identifying his QTH, John would boyishly say "Tamale Town" in lieu of San Antonio. John also indulged in creating phonetics for you to adopt, e.g., "Chula Vista's Powerful Super Station." And, when it was your turn to transmit he would preface challenging you to "Say a few thousand words." John could put a smile on your face.

During the above visit, John's home workshop had become a BC-610 rework depot. Having just completed several units, John acknowledged the need to slow down—he was then in his late 60s. Then he pointed to a home library of well selected books that he hoped to devote more time to. John was self educated and possessed an in-depth knowledge of earth science and philosophy. It was good to tune in on John.

Paul, W9IEY, reports their last QSO

continued on page 42

Military Radio Nets at Dayton

by Jim Karlow, KA8TUR
4907 Oakwood Ct.
Milford, MI 48382

This year at Dayton Hamvention 2002, on Saturday May 18th, two historical radio nets were run. These were the WW II Radio net featuring HF radios from World War II through the early 1960's running the AM mode on 3885 kHz at 12:00 noon and the Korean War VHF Radio net running vintage VHF equipment on 51.0 MHz at 1:30 PM. Both nets were local, with participants operating from the area of the Dayton Hamvention. We converged later for eyeball QSO's and pictures.

The following is the log of each of the nets, including the check-ins and the equipment used:

The 3885 kHz AM Net:
Jim, KA8TUR, NCS, using a BC-1306 with whip antenna powered by a DY-88 dynamotor supplied by KB3CI.

N3TPM, Craig, using a BC-611
K9WT, John, using a Navy DAV-2 with whip antenna and original T-45 lip microphone
KQ6XA, Bonnie, using a modern VX1200 Manpack radio
WA4VAG, Joe, with his GRC-9 powered by a GN-58 Handcrank Generator cranked by Eric, KD4PCH
WB4LZQ, Kim, with a BC-611
WD8AXA, Chuck with a BC-611D with D cell and 11-9 volt battery pack
KD4PCH, Ed with a BC-611
KM6AB, Mike, with a modern Harris PRC-138
KB9BVO, Vic, with his BC-611 F
K4CHE, Breck, with his BC-611 (Breck also had a nice looking PRC-64 in a VietNam Special Forces Display)
WD9GHK, Bruce, with his BC-611
K9IKZ, Ron, with his French BC-611
WD8MGO, Fred, with a Navy MAB Transceiver packed with 9 volt batteries and a D cell, owned by Joe, WA4VAG
WØZKN, with a BC-611
KP9PZC, Paul, with his BC-611 F
N9LWN with his BC-611

The 51.0 MHz Cold War Net:
KA8TUR, Jim, NCS using a AN/PRC-70 with original battery and whip antenna.

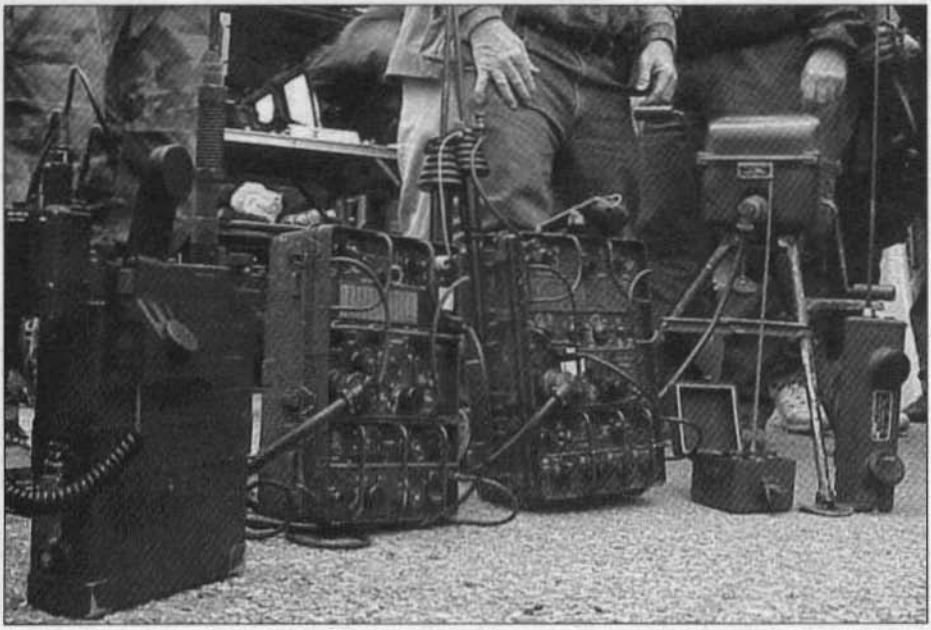
N3TPM, Craig using an AN/PRC-28
WA4VAG, Joe, using an AN/PRC-10 with whip antenna
KM6AB, Mike, using an AN/PRC-138
KIØPF, Mark, using an AN/PRC-88 (PRT-4/PRR-9)
WF2U, Meir, using a PRC-25
KI6QK, Fred, using an RF-5800V
WD8AXA, Chuck, using a Russion R-105
KB9VRV, Jim, using a Racal PRM-4090M
K9WT, John, using a PRC-10 with battteries
KB9NNL, Debbie, using an AN/PRC-6
KB9BVO, Vic, using an AN/PRC-88 (PRT-4/PRR-9)
KB9PZC, Paul, using an AN/PRC-6
KC8JZO, John, using a PRC-1088
WD8MGO, Fred, using an AN/PRC-68A
N9KZC, Tom, using an AN/PRC-126
N9KZI, Bill, using an AN/PRC-88 (PRT-4/PRR-9 XE2)
WA4VAG, Joe, using his second station, a PRC-6
WD9GHK, Bruce
WB4LZQ, Kim, using a CPRC-26
VA3ZA, Bill, with a Yaesu VX5R
NM4A, Bill
KY4JD, John, with an ICOM T81A
KD4PCH, Eric, with a PRC-6
WD8IGL, Gabe, with a PRC-126
KC8KBK, Scott, with his backpack mounted PRC-25N3DM, Dale with his Cherokee AH-56

51 mHz net photo, some of the checkins for the Cold War Net. *Photo by Mark Francis, KIØPF.*

Some of the 3885 checkins. *Photo by Mark Francis,KIØPF.*

more photos next page

Breck Smith, K4CHE with his BC-611 and the PRC-64.



Military equipment, from the left: Harris PRC-138, a modern current radio, 2 -90 mHz, all mode; the BC-1306; the GRC-9, and a BC 611. *Photo by Mark Francis, KIØPF.*

Stancor Kits from page 13
tri-tet. They provide 2 options in the output tank, link coupling, or pi section so the operator may experiment with different antenna coupling. The final statement in the book says "the 25-B will give the new licensee a compact experimental transmitter at minimum cost while affording a maximum of operating enjoyment". Compare those instructions given the new 1940 ham with those of the Ameco AC-1 one tube CW transmitter instructions for the 1956 novice licensee, "do not deviate from the step by step procedure as damage to components and improper operation may be the result".

The last Stancor kit, the 1948 ST-203A 25-watt transmitter has thirteen paragraphs describing the 2 stage RF circuit and 2 stage audio. That is preceded by 4 pages of specifications, and general information about the transmitter. There are 7 paragraphs of introductory information about the assembly of the transmitter, followed by 94 construction steps, each very explicit as to hardware to be used, component, size, color, and length of wire to be used, and if it was soldered or not. There are numerous references to 7 different close up photos, each with labeled parts. There is a large two page fold out schematic in the book plus a separate one for the work bench. There are 3 pages of control functions, check out, and tuning procedures, and 2 pages of parts identifications and descriptions. There is a fold out diagram of a typical mobile installation, and a similar one for fixed use. The book has 3-1/2 pages of mobile installation instructions and recommendations. There are 3 references to ARRL and *QST* information as well as a listing of the FCC address, FCC rules and a specific warning about them. Lastly there is an invitation for comments from builders and users of Stancor equipment. I think the book would do even Heathkit proud. I wonder if there were any Stancor ST-203A kit manuals at Heathkit for reference and guidance.

Stancor must have felt that by 1952 the ham fraternity needed complete step by step procedures to complete a transmitter. The kit builder of the thirties and forties was buying the kit to save time and money, but knew enough about the transmitter he was building to do it with out any help from Stancor. By the early fifties the kit builder appeared to be entirely dependent upon the kit supplier for all guidance. He was obviously interested only in an end product that could save him money compared to a factory built unit. If this was Stancor thinking, it is easy to see why they ended the kit line. They were in the kit business to sell transformers and this new kit builder was not a home brewer, modifier, or experimenter, and would not be the type to buy components, especially transformers. They turned their attention to kit builders like Ameco, Arkay, Central Electronics, EICO, and Heathkit to sell Stancor transformers. **ER**

WC3K Silent Key from page 3
the shack. Well the -610 stood for months while Bill insisted on making more magic by screen modulating the SB-401. Finally under the "social pressures of the 40 meter AMers" (Bill's exact words) he got it on the air the first of May. That was truly another proud day for Bill.

So 73 to you Whiskey Charlie Three Kilo, thanks for checking into the round table. Your presence, humor, and quick wit will never be forgotten. As you often said "good on ya mate" and we say back thanks for all you gave of yourself to Amateur Radio...
73 from Your Radio Friends **ER**

Radio Service from page 35
than 20 feet of lead in between the tower and your house. It would take quite an ice storm to load the lead-in to the breaking point. Even if it does, you would have no problem doing the splicing yourself. I could leave you fifty feet or so of lead in to use in case it broke."

I can buy a joint of pipe and some clamps to fasten it to the corner of the platform on top of the tower. Then I can climb down the corner of the tower putting standoff insulators about every six to eight feet. You would only need a 10 foot joint of 1.25 tubing, about 100 feet of lead-in, a five element yagi antenna, a dozen standoffs, and a few cheap pieces of hardware, and you'd be in business. Let me figure the total cost for you."

"Here is my proposition Eddie," I said. "I'll install the antenna, with your help we'll carry the set up to your living room, and have you a picture tonight. You pay me nothing. I'll come back in a week and pick up a check for $600.00, or pickup the antenna and TV set. If you decide not to buy, we shake hands and quit the best of friends. No hard feelings either way."

"By gosh, you got yourself a deal," replied Eddie.

"Hold on a minute, Eddie, there are a couple of things you should know before you say yes" I said. "TV is a new technology. New stations are going to be coming on the air, and new improvements are sure to come in both antennas and TV sets. This is not the last TV or antenna you will buy. You should consider the investment in both antenna and TV as a cost for entertainment only—no way is it going to last forever. Within five years you will see much better television sets and antennas coming on the market, and if I know you, you will want the latest and the best."

"Heck, Bruce, I know that," replied Eddie. "TV is no different than the automobile. The first ones were a pain, but they were also a lot of fun. If I was the kind that waited until new ideas were perfected I'd still be reading my Popular Mechanics by a kerosene lamp and taking my wife and kids to church in a buggy."

TV came to the Boston Mountains that evening. I heard the Bellis household was a beehive of activity. The 100-foot tower on top of the highest mountain in Northwest Arkansas provided the Bellis household with one of the best pictures in our trade area. ER

W5MEU, Silent Key from page 37
was on 3/3/96 following John's recent bout with pneumonia. "It was evident that John's health was falling. Near the end, John would amble into the shack with help of daughter Vivian to listen to the bands only to disclose that he hadn't the strength to talk." John was 84.

John was preceded in death by Bobbie and is survived by Vivian and John Brian who is distinguishing himself with our Special Forces in Afghanistan. The memory of John Mohn, "The Voice of Tamale Town" will long be remembered. How fortunate we are to have such great forbearers and a magazine to honor them. Thank you Electric Radio. ER

P.S.

Thanks Jeff, W5OMR ex KA5THB who's now the proud owner of a W5MEU BC-610. Jeff, we'll all be expecting you to say a few thousand words! Thanks too to Paul, W9IEY, and XYL Terry. She provided the W5MEU photo. Paul's astute diary-like list of specific times and dates on John is available at w6pss@aol.com.

AM Press Exchange archives the source of John's SPAM financial support.

A complete index of the entire 13+ years of ER is available for viewing or downloading at the following website: http://www.qsl.net/n9oo

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FOR SALE: Radio books, magazines, catalogs, manuals (copies), radios, hifi, parts. Send 2 stamp LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857. ka1edp@juno.com

FOR SALE: New Ranger 1, Valiant 1, & Navigator plastic dials, freq numbers in green, with all the holes just like orig. - $17.50 ppd. Bruce Kryder, W9LWW, 336 Sliders Knob Ave., Franklin, TN 37067

FOR SALE: Military Radio manuals, origs & reprints. List for address label & $1. For specific requests, feel free to write or (best) email. Robert Downs, 2027 Mapleton Dr., Houston, TX 77043, rwdowns_wa5cab@compuserve.com

FS/TRADE: EFJ/Ranger/PTT - $350; Millen/90881 amp - $300; BC-342 - $250; BC-348 - $150. E-list.Sam Timberlake, KF4TXQ, POB 161, Dadeville, AL 36853. (256)825-7305, stimber@lakemartin.net

FOR SALE: Yaesu FRG-7 with orig manual-$200. Very nice condx with fine tuning control. Carter, (434) 979-7383

FOR SALE: 160' guyed radio tower, 36" on center, on ground - $800 or BO. Bob, K8MGC, OH, (330) 829-5250 or bobjudy@sssnet.com

FOR SALE: Hallicrafters, RME, Gonset, others. Also some military, test equipment,VHF/RF amps, more. LASE, Don Jeffrey, POB 1164, Monrovia, CA 91017.

FOR SALE: New Collins winged lapel pin, still have meatball version, either type - $5.95 + 75¢ s/h. W6ZZ, 1362 Via Rancho Prky, Escondido, CA 92029. (760) 747-8710

FOR SALE: Send SASE for large list of excess parts, publications, ham & test gear. K4AFW, 104 Glenwood Dr., Williamsburg, VA 23185

FOR SALE: Mohawk/Apache drum dial reproductions. email for details. Ron, AB5WG, ab5wg@mylinuxisp.com; (281) 491-7823

FOR SALE: Vintage Radio Service. We repair radios, record changers, radios home, auto, tube & transistors. 1930-1980. Ken Hubbard, KA9WRN, POB 792, Beloit, WI 53512. (608) 362-1896

FOR SALE: CE 100V - $400 shpd. Jim, OK, (918) 747-3136, kd5gho@swbell.net

FOR SALE: Hallicrafters SX-100, as is, needs one knob and electrical check - $100. Mike Grimes, K5MLG, 3805 Appomattox Cir., Plano, TX 75023. (972) 867-6373, grimesm@flash.net

FOR SALE: Vibroplex bug w/case, papers, exc - $327; S-20R - $200; SX-43 - $185. Ron, MI, (517) 374-1107.

WANTED: Any info relating to ASB-8 Airborn Radar set. Pete Deierlein, KD2LN, 6257 Perryville Rd., Chittenango, NY 13037. (315) 687-5456, p.deierlein@worldnet.att.net

WANTED: National NTE CW xmtr in working condx. I love National. Sylvia Thompson, 33 Lawton Foster Rd., Hopkinton, RI 02833. (401) 377-4912. n1vj@arrl.net

WANTED: National Co. emblems, escutcheons, logos from equipment, also National AN/WRR2 in working order. Don Barsema, 1458 Byron SE, Grand Rapids, MI 46606. (616) 451-9874. dbarsema@prodigy.net

WANTED: B&W type JEL coils; McElroy Bug; Heath SB series parts source. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123. (724) 758-2688 k9vky@arrl.net

WANTED: Wkg xtal controlled CB radio mobile or base, cannot contain ICs or tubes. Rex Badger, KB9JAU, POB 4518, Jeffersonville, IN 47131. (812) 282-4824

WANTED: Looking for a Knight T-150A that I modified in the '60s. I added a one-tube reactance modulator behind the VFO. It was enclosed in PC board material which was soldered together. Does anyone have this T-150A? Ed Santavicca, AA8TV, OH, (216) 521-6093. aa8tv@aol.com

WANTED: Galaxy (Hygain) RF-550-A wattmeter; Elmac AS-1 mobile spkr; military LS-2 spkr; any Harvey-Wells spkrs, VFOs, aircraft units, TBS-50-B. All answered. Kelley, W8GFG, 9010 Marquette, St. John, IN 46373. (219) 365-4730

WANTED: Dynamotors from WW II & Korean War, looking for real small sizes, clean & unused. Bob Ryan,1000 S. Gilbert St., Apt. 132, Hemet, CA 92543.

WANTED: Marantz's first pwr amplifier, working or not. Charles Graham, 4 Fieldwood Dr., Bedford Hills, NY 10507. (914) 666-4523

WANTED: ARRL CallBook, this year's or last year's or year before. How much? Bob Ryan, 1000 S. Gilbert St. Apt 132, Hemet, CA 92543.

WANTED: Hallicrafters 5-T w/boy, collector quality; OTBs 1-4, 2-1, 3-2, 5-2, 6-2. Bill, W9WR, 300 Oxford Rd., Kenilworth, IL 60043. william.ross@attbi.com

WANTED: Schematic or IB for Heath scope model 10-18. Bob, W2HBE, 82 Virginia Ave., Westmont, NJ 01808. (856) 854-3301

WANTED: Control box for AR-22 rotor (4 wire); I also have 1" rotor inductors w/counter, anything to trade? N1APC, jrwatterson@snet.net

WANTED: Lafayette HE-73 preselector/converter. Spencer Cromwell, K6VRS, 4415 NW 131st St., Vancouver, WA 98685. (360) 258-1734, K6VRS@Hotmail.com

WANTED: Radios Master catalogs, pre vol #12th ed, all before 1947. R.V. Matson, W1CSO, POB 956, Lake Panasoffkee, FL 33538. (352) 568-1629

WANTED: Coils above 10M for Natl 1-10 rcvr or specs to duplicate. Robert Johnson, W5KTN, 7230 Lehigh, Dallas, TX 75214

WANTED: Knight Star Roamer; Hammerlund HQ-100A; Elmac AF-67; Viking I-II; Valiant; Ranger. George Elliott, #AP-5528, 10745 RT 18, Albion, PA 16475.

WANTED: Manual & schematic for Kenwood QR-666 SW rcvr; HP 427A meter; Heath IG-18 pwr sply; Heath IM-16 meter; Tek466 scope; Luxman L-430 int amp. Dave Thomas, 11496 CR 45, Findlay, OH 45840. (419) 423-9178

WANTED: SCR-522, other WWII radio for flying aircraft restorations. NIB or exc condx. Ian Abbott, KC6UPT, (209) 747-3639, ian@wildblueaviation.com

WANTED: Globe Chief 90, DX40 or similar. Pse state price and cdx. Carl, KN6AL. 3290 6th Ave. 1E, San Diego, CA 92103. (619) 997-6146 kn6al@earthlink.net

WANTED: TBX radio and/or accessories required by military radio collector. Ray, VK2ILV, ROBINSON@SHLRC.MQ.EDU.AU

FOR SALE: OEM Heath belts - $2.50 each shpd; or 10+ for $2 each shpd. Send check or money order. Roberta Hummel, 202 Midvale Dr., Marshall, WI 53559

FOR SALE: Manuals for old ham gear of the '30s to the '70s. Check WEB Catalog www.hi-manuals.com

FOR SALE/TRADE: Misc. parts, tubes, for tube gear. Sandy Blaize W5TVW, 40460 Edgar Traylor Rd., Hammond, LA 70403. ebjr@i-55.com

FOR SALE: Vintage equipment at the K8CX Ham Gallery Classified Ads section. Visit the largest Antique QSL Card Gallery http://hamgallery.com

NOTICE: T-368 Registry. For info w2zr@aol.com. Subscribe to the T-368 & BC-610 reflector at: http://groups.yahoo.com/group/T-368_BC-610

FOR SALE: Lots of old radio & related books. Eugene Rippen, WB6SZS, www.muchstuff.com

FOR SALE: Strong steatite antenna insulators. Lengths from two to fifteen inches. SASE for list. John Etter, W2ER, 16 Fairline Dr., East Quogue, NY 11942. (516) 653-5350

FOR SALE: Please visit www.radioworld-online.com. We have ham gear, tubes, parts and so much more!. Carl A. Blomstran, POB 890473, Houston, Tx 77289

FOR SALE: Aluminum knob inlays, Collins, Drake, National, Hallicrafters, Heath; Collins Dial Drum Overlays. Charlie Talbott, 13192 Pinnacle Ln, Leesburg, VA 20176. (540) 822-5643, k3ich@arrl.net

FOR SALE: CRV 46151 aircraft rcvr 191 to 9050 kc parts only; navy made by RCA - $25. D&L Specialties, WØBEI, 214 Third St SW Box 462, Faribault, MN 55021. (507) 332-8055

FOR SALE: Older type electronic parts & hardware; free vintage flyer. Mail order since 1954. Bigelow Electronics, POB 125, Bluffton, OH 45817

FOR SALE: VM parts, new boxed electron tubes, new Heathkit parts, new panel meters. Norm, 1440 Milton St., Benton Harbor, MI 49022

FOR SALE: Build your own "Midget" bug replication by KØYQX, ca 1918, featured by K4TWJ in CQ Magazine, May, '98. 10 detailed blueprints. FAX (507) 345-8626 or e-mail<bugs@mnic.net>

FOR SALE: Parts, tubes, books, ect. Send two stamp SASE or email for list. Wayne LeTourneau, POB 62, Wanraska, MN 56761. wb0cte@arrl.net

FOR SALE: Tubes. We specialize in early receiving & collector tubes & tube related books. Send for free catalog or see www. fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281. (480) 968-7686, tubes@qwest.net

FOR SALE: Collins restoration. Everything inside & out to make it as Art Collins built it. 50 yrs experience. W90JI / N4PZ, IL, (815) 734-4255 or N4PZ@aol.com

FOR SALE: Collins S-line and A-line repair. FCC licensed, many years of experience. lal@metrocast.net, (207) 457-9257

FOR SALE: Galena xtal radios in hardwood case, polished, lacquered, copper panel & cover liner, advanced circuit, homemade - $50 ea. L. Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150. radiolen@aol.com

FOR SALE: 12 (1931) QSTs, (4) handbooks (old), (4) code keys, MFJ keyer, etc - $300. Tom Waters, 2918 Kings Ridge Rd., Baltimore, MD 21234. (410) 488-5356

FOR SALE: 51J-4 filter replacements, direct plugin—6.0 kc Collins mech. filter, 3.3 xtal lattice, 2.3 kc xtal latice ,500 cycle xtal latice - $215 each; R-390A 16 kHz flat phase filter, for Hi-Fi AM - $245. Chuck Felton, KDØZS, WY, (307) 322-5858, feltoned@coffey.com, www.feltondesign.com

FOR SALE: Military and commercial communications items: http://www.maxpages.com/murphyjunk. Murphy's Surplus, 401 N. Johnson Ave., El Cajon, CA 92020. (619) 444-7717

FOR SALE: Tube list, new & used, wide variety audio, ham. Recently expanded. SASE 52¢. Bill McCombs, WBØWNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212

FOR SALE: Panel refinishing: Johnson Ranger sets - $250; Valiant sets - $300; Johnson 500 sets - $300; Collins R390(A), front side - $125, both sides - $225; Hammarlund HQ-180 series panel & bezel - $200, cab add $100. http://w4pnt.8k.com. Dee Almquist, 534 W. Main St., Waynesboro, VA 22980. (540) 249-3161 Cell: (540)480-7179

FOR SALE: 1951 Meissner Deluxe Signal Shifter, looks like new condx, 23 coil sets, most in sealed military pkg's - $175 or Trade. Allan Lurie, W9KCB, 605 E. Armstrong, Peoria, IL 61603. (309) 682-1674

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB - $19.99 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston, MI 48348. (248) 391-6660, hires@rust.net

FOR SALE: Complete hardware set to connect Collins PM2 to KWM2 - $19.95 ppd. Warren Hall, KØZQD, POB 282, Ash Grove, MO 65604.

FOR SALE: Repair, upgrade, performance modification of tube communications & test equip. Accepting most military, all Collins & Drake designs, & the better efforts from others. Laboratory performance documentation on request. Work guaranteed. Chuck Felton, KDØZS, Felton Electronic Design, Box 187, Wheatland, WY 82201. (307) 322-5858, feltoned@coffey.com, www.feltondesign.com

FOR SALE: Ur old QSL card? Search by call free, buy find at $3.50 ppd. Chuck, NZ5M, CRBCS1@prodigy.net

FOR SALE: New Release. For details send 2-stamp LSASE to: Olde Tyme Radio Co, 2445 Lyttonsville Rd. Ste 317, Silver Spring, MD 20910

FOR SALE: WACO-5NWX telephone filters. Just plug in. 1/$13.95, 2/$25, 3/$34. Money back. Cecil Palmer, 4500 Timbercrest Ln., Waco, TX 76705. (254) 799-5931, w5nwx@hotmail.com

WANTED: ARC-5 rcvrs, racks, dynamotors. Jim Hebert, 1572 Newman Ave., Lakewood, OH 44107.

WANTED: Antique tubes. Paying $40 ea for good used type 201 tubes (not A). Buy list & new 2000-2001 catalog of collecter tubes available. See www.fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281. (480) 968-7686, tubes@qwest.net

WANTED: Old military radar displays, scopes, antennae, receivers, manuals, etc. Even half ton items! William Donzelli, 15 MacArthur Dr., Carmel, NY 10512. (847)225-2547, aw288@osfn.org

WANTED: Bendix radio rcvr RA-1B; Belguim set RST-101. George Rancourt, K1ANX, MA, (413) 527-4304 or k1anx@mindspring.com

WANTED: Collins 70K-2 PTOs working or not; IN82A diodes; Bretting 14/14AX manual. Clark, WØBT, KS, (785) 286-2132

WANTED: Seeking unbuilt Heathkits, Knightkits. Gene Peroni, POB 7164, St. Davids, PA 19087. (610) 293-2421

WANTED: Electric Radio, Antique Radio Classifieds; Old Timers Bulletin. Alan Mark, POB 372, Pembroke, MA 02359

FOR SALE: Vacuum tubes NOS, used, some xmtg, SASE for list. E.F. Hayes, WØJFN, 3109 N. Douglas Ave., Loveland, CO 80538

FOR SALE: Viking II, 122 VFO, manuals, good condx, working, estate of KB4YST, pick up - $275. Roger Lowary, W9BZ, 465 Lacy Dr., Greenwood, IN46142. (317) 881-7466, LR-JL@ juno.com

FOR SALE: Johnson Screws (tie-bolts): Valiant set of 4 - $15.50; Ranger set of 3 - $13.50. Other parts: 3PDT 110VDC relay - $7; 9-pin plug - $8. All ppd CONUS! **WANTED:** Backlit S-Meter from any of the following National receivers: NC-125, HRO Senior, NC-200 or any other back lit National radio S-meter for an upcoming project. Let me know what you have and thanks. Cal Eustaquio, N6KYR, 1964 11th St., Los Osos, CA 93402. catman351@digitalputty.com

FOR SALE: Hammarlund S-100 spkr - $75; Heath IT-17 tube tester - $50; HW-101 xcvr w/AC - $175. Richard Prester, 131 Ridge Rd., West Milford, NJ 07480. (973) 728-2454, rprester@warwick.net

FOR SALE: Heath SB300 - $175; SB400 - $175; HW101 w/ HP23 - $250; Drake TR4C - $350; TR3 - $175. Ken Sands, K8TFD, (734) 453-7658, ken.sands@juno.com

FOR SALE: (2) used United Electronics tubes, type V-70-D, good condx, untested but reasonable sure OK - $49.95 +$5.50 shpg. James Schliestett, W4IMQ, 420 Lakeview Dr., Cedartown, GA 30125. (770) 748-5968, imq@bellsouth.net

FOR SALE: Yaesu FT-101E, good condx - $225. Bob Braza, W1RMB, MA, (508) 222-5553.

FOR SALE: R-390A Amelco, real nice, IERC shields, orig meters, engraved panel, new PTO, aligned - $650; TS-530S - $350; ARC-5 xmtr's; large RCA mod xfmr type 901760-501, 5500 ohms; Collins 500 cy plug-in 455 kc filter - $275. **WANTED:** Hickok CA-4, CA-5 & SA-4 tube tester adapters. Dale, K5AJZ, OK, (918) 596-7778, lestourgeon@earthlink.net

SELL/TRADE: TV2/U,A/U,B/U military tube tester w/manual, exc operating condx. John Snow, 1910 Remington Ct., Andover, KS 67002. (316) 733-1856

FREE: 8-tube Gonset 10-15-20M converter, 115 VAC, no cabinet - $85/H. Robert Wheaton, W5XW, 16015 White Fawn, San Antonio, TX 78255. (210) 695-8430

FOR SALE: Drake DC-3 mobile pwr sply (untested) visually good w/schematic - $40 + shpg. John, W2PRR, jandjm130@juno.com

FOR SALE: Precision E400 sweep signal generator w/manual - $35. Robert Martin, 111 Bancroft, Rochester, NY 14616. (716) 663-4182

FOR SALE: Hallicrafters S-38-E, looks & works like new - $75 + shpg. Ken, TX, (254) 772-7307

FOR SALE/TRADE: Transmitting/rcv'g tubes, new & used - 55¢; LSASE for list. I collect old & unique tubes of any type. **WANTED:** Taylor & Heintz-Kaufman types & lge tubes from the old Eimac line; 152T thru 2000T for display. John H. Walker Jr., 13406 W. 128th Terr., Overland Park, KS 66213 (913) 782-6455, jhwalker@prodigy.net

FOR TRADE: Two good RCA 833A's for one Taylor 833A; also looking for Taylor 204A, 813, 866B. John H. Walker Jr., 13406 W. 128th Terr., Overland Park, KS 66213. (913) 782-6455, jhwalker@prodigy.net

FOR SALE: Navy control box, CANG 23487, two sides have four channel switch, volume, phone & test jacks, 5"x6"x8", NOS - $22. Allan Lurie, W9KCB, 605 E. Armstrong Ave., Peoria, IL 61603. (309) 682-1674

FOR SALE: These Collins parts only for 32V1 or 32V3, some are same as 32V3: front panel exc w/ class bright dial lettering - $90; cabinet exc 32V1 or 32V2 - $90; set of meters for 32Vs same as 32V3 - $100; 455-J-60 6 kHz filter for 75A4 - $260; 455-J-08 800 Hz filter - $190. Bill Smitherman, KD4AF, 9401 Hwy 67, E Bend, NC 27018. (336) 699-8699

FOR SALE: Hallicrafters SX-42 w/matching spkr - $220; Hammarlund HQ-160 - $250. Both nice & orig. Art Hogrefe, N3FEB, ahogrefe@statecollege.com

FOR SALE: ARRL Handbooks 1990 prices, LSASE for list. Selling out. John Snow, W9MHS, 1910 Remington Ct., Andover, KS 67002. (316) 733-1856

FOR SALE/TRADE: Manuals: S53A; DX100; 75A4; DX40; 75A1; Ranger; TR5; 30L1; HA350; NC183D. A.J. Bernard, POB 690098, Orlando, FL 32869. (407) 351-5536

FOR SALE: National HRO-500 - $900; 2 ea Eimac 4CX-1000-A, like new, tested - $250 ea; Drake High Patch, 584-A - $30; Telex C-1320 headset - $30; 304-TL socket - $25; Simpson 215 VOM - $25; Hallicrafters S38B - $65; Thordarson choke T-19C43 12HY, 300 MA - $30; Peerless Univ. modulation xfrm, M-328-A, 40 watts - $50; Heathkit HDP-242 dynamic cardioid desk mic - $30; Millen dual xmtg cond. 04100, center dr, 6000V 100mmf per section, new - $70; ARC-5, 274-N equip; old rare radio books; military equip & TM's; lots of parts & tubes. E mail or call your needs. Jerry Fuller, W6JRY, CA, (530) 343-1131, jefuller@juno.com

FOR SALE: Sony 2010 rcvr, manuals, orig boxes, etc, absolutely mint - $250; Drake R4B rcvr, manual - $275. Plus shpg. S. Mount, W2AO, NY, (845) 691-7957, jensdad@webtv.net

FOR SALE: Military whip antennas, Heath Vector scope - $25. Bruce Beckerey, 5472 Timber Way Dr, Presque Isle, MI 49777. (989) 595-6483

FOR SALE: NC-100A rcvr or trade for Heath SA-2040A ant tuner. Don, AZ, (602) 953-0279

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RCA Radiotron Handbook, 4th Edition - $ 62
Radio Boys on CD-ROM - $ 39.
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970-564-9185, er@frontier.net

FOR SALE: RIT for KWM-2 and S-Line. No modifications for KWM-2. $59.95 tested/42.95 for kit. SASE for details and order info. John Webb, W1ETC, Box 747, Amherst, NH 03031

FOR SALE: Aluminum heat dissipating plate and grid connectors for all 3, 4 and T series Eimac tubes, including 3-500Z, 4-1000, 304T's and 100T's, etc. Alan Price, fixr75266@cs.com

WANTED: Old Callbooks, especially those covering the years before 1930. Alan, W3BV, PA. (215) 795-0943 or W3BV@arrl.net

WANTED: National HRO black wrinkle spkrs, oak coil boxes, coils; Western Electric horns, spkrs, amps, mics. Barry Nadel, POB 29303, San Francisco, CA 94129. bnadel@ccnet.com

WANTED: New or used unmodified BC459A, BC696, T18/ARC/5, T19/ARC/5, CBY52232. Louis Lytch, K2DET, 117-33 230th St., Cambria Heights, Jamaica, NY 11411-1806. (718) 528-5065

WANTED: Manuals, manuals, manuals for radio-related equipment to buy or swap. Catalog available. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (732) 238-8964

WANTED: Collecting military electronics including radio, radar, RDF and test, manuals & literature. William Van Lennep, POB 211, Pepperell, MA 01463. (978) 433-6031

WANTED: Postcards of old wireless stations; QSL cards showing pre-WWII ham shacks/equip. George, W2KRM, NY, (631) 360-9011, w2krm@optonline.net

WANTED: Stancor/Chicago PCC200, PCO/PS0150, RC8150; Triad A-9-J, A-10-J, A-11-J, A-12-J. **FOR SALE:** Books, send SASE. Richard Robinson, POB 1425, Wallingford, CT 06492. (203) 949-0871, richmix@erols.com

WANTED: R-390A rcvrs, parts rigs or restorable, will restore yours at reasonable prices. Walter Wilson, KK4DF, (706) 733-8323, wewilson@knology.net, www.knology.net/~wewilson

WANTED: Info on xmtrs made by Clough-Brengle Co. Used by the CCC, in the mid to late 30's. Any help would be greatly appreciated. Ron Lawrence, KC4YOY, POB 3015, Matthews, NC 28106. (704) 289-1166 hm, kc4yoy@trellis.net

WANTED: QSL cards from old/pre WW II Ham DX countries; old regen kits. Hajime Suzuki, Nishikuniyoshi 1644-24, Ichihara-Shi, Chiba-Ken, 290-0231 Japan

WANTED: WW II Japanese xmtrs & rcvrs (parts, plug-in coils) for restoration & ER articles. Ken Lakin, KD6B, 63140 Britta St., Ste. C106, Bend, OR 97701. (541) 923-1013. klakin@aol.com

WANTED: Collins 310B3, basket case OK - welcomed; & Chicago 500W CMS-2, high-level modulation xfmr; Taylor T21. Jerry, W8EGD, CO, (303) 979-2323

WANTED: Complete manual for Heath EK-2 BC/SW rcvr; components from Heath GD-57 R/C system. Louis D'Antuono, WA2CBZ, 8802 Ridge Blvd., Brooklyn, NY 11209. (718) 748-9612

WANTED: Kleinschmidt teleprinter models: 311, 321, (AN/FGC-40, AN/GGC-16, AN/UGC-39...) Tom Kleinschmidt, 506 N. Maple St., Prospect Hts., IL 60070-1321. (847) 255-8128

WANTED: Visitors and tubes by museum. Old and odd amateur or commercial tubes, foreign and domestic purchased, traded or donations welcome. All correspondence answered. K6DIA, Ye Olde Transmitting Tube Museum, POB 97, Crescent City, CA 95531. (707) 464-6470

WANTED: WWII BC-610-E series or earlier xmtr; BC-739 interphone control box. BC-652 rcvr. Steve Finelli, N3NNG, 37 Stonecroft Dr., Easton, PA 18045. (610) 252-8211, navrad@enter.net

WANTED: 1950's Popular Electronics; 1961-65 Heathkit catalogs & Radio-TV Experimenter. John Curtis, WØCAR, 3146 S. Franklin St., Englewood, CO 80110. (303) 781-8027, wøcar@arrl.net

WANTED: Searching for RME CT-100 or 3R9 xmtrs and info about them. David Edsall, W1TDD, 156 Sunset Ave., Amherst, MA 01002. (413) 549-0349, dedsall@crocker.com

WANTED: RBB/RBC rcvrs, pwr splys, cables & RAK/RAL equip. Andy Miller, KD6TKX, CA, (831) 484-2389, amillertkx@aol.com

WANTED: Orig Heath manuals for ham & test equip. Please state condx & price. Warren, K1BOX, NC, (828) 688-1922, k1box@arrl.net

WANTED: RCA 140, 141, AVR5A. GE K80, K80X, K85. Any condx. James Treherne, 11909 Chapel Rd., Clifton, VA 20124. treherne@erols.com

WANTED: Service manuals, originals, copies for copy of HP 3330B, HP 3582A, HP 11710A. Will pay ALL exp. and more! Reinhard Wieschhoff, 7 rue du Debuche, F-78120 Rambouil.Let, France. Tel/Fax: 0033 1 304 111 02

WANTED: Scott Special Communications rcvr. EA4JL, please call, Kurt Keller, CT, (203) 431-9740, k2112@earthlink.net

WANTED: Russian 1.5-8 MHz military transceiver, type P(R)-131. Will pay well for a good one. Leroy Sparks, W6SYC, 924 W. Mc Fadden Ave., Santa Ana, CA 92707. (714) 540-8123, leroysparks@earthlink.net

WANTED: SW3 #33A and #35 coils. I will trade my extra coils SW3 coils. Hank Bredehorst, 2440 Adrian St., Newbury Park, CA 91320. (805) 498-8907

WANTED: Long wire ants AT101, AT102, GRC-9; DY88/105; PP327GRC9; counterpoise CP12 & 13 GRC9; BC348 pwr conn PLQ102/103. KA1ZQR, 348 N. Main St., Stonington, CT 06378.

WANTED: Globe King 500 B/C; Viking Valiant I/II; Viking 500; Heathkit Mohawk. Frank, (916) 635-4994, frankdellechaie@sprintmail.com

WANTED: National SW-3 model1, version 3. Uses 32-32 30 tubes. Dean Showalter, W5PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: Collins 32V & Collins 75A series; Globe Scout; National SW54. KBØW, CA, (916) 635-4994, frankdellechaie@sprintmail.com

WANTED: Hallicrafters SX88 or SX115. Larry Redmond, 413 Bedfort Dr., Duluth, GA 30096. (770) 495-7196

WANTED: Clean fully functional w/manuals Swans FC76, PS1 and WM2000A . Contact C6ANI @ c6anirumcay@hotmail.com

WANTED: WW II German, Japanese, Italian, French equipment, tubes, manuals and parts. Bob Graham, 2105 NW 30th, Oklahoma City, OK 73112. (405) 525-3376, bglcc@aol.com

WANTED: HeathGear, unassembled kits, catalogs and manuals. Bill Robbins, 5339 Chickadee Dr., Kalamazoo, MI 49009. (616) 375-7978, billrobb@net-link.net

WANTED: I wish to correspond with owners of National FB7/FBXA/AGS coil sets. Jim, KE4DSP, 108 Bayfield Dr., Brandon, FL 33511. j.c.clifford@juno.com

WANTED: Parts for a TMC GPT-750 xmtr. I need the AM modulator deck and other parts to restore this unit. John, KF2JQ (716) 873-0524 jpruso@acsu.buffalo.edu

WANTED: Collins 30K1 xmtr; also need orig manuals & literature for 75A1, 32V1, 30K1. Paul Kluwe, W8ZO, POB 84, Manchester, MI 48158. (734) 428-2000

WANTED: Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 820, Hot Springs, AR 71902. (501) 318-1844, Fx 623-8783, james.true@ibm.net

WANTED: Collins promotional literature, catalogs and manuals for the period 1933-1993. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. (661) 259-2011. FAX (661) 259-3830

WANTED: Information/service manual for ITT PLESSEY IMR 5000 marine radio co. limited. Similar to Plessey PR155. Al Royce, KE6CPS, CA (310) 812-0188, alan.royce@trw.com

FOR SALE: R648/ARR-41 Mil version of Collins orig mfg, no mods, like new w/manual - $500; Icom IC 730 warc bands, solidstate, 100 watts, small size w/manual & mic - $395; Yaesu FT102 warc bands, 150 watts, (3) ea 6146 finals, manual & mic fet front end, exc condx - $395; Natl NC121 rcvr ham & best bands, good for beginner & serious SWL, AC self contained & spkr - $125; Atlas 215X w/AC console assy, spkr, mic, 100 watts all solid state, exc condx - $250; Sigma test set VHF w/built in Deviation meter w/manual, new - $200; SASE for list of more items. All + shpg, pkg n/c, UPS 90201. Harry, W6ATC, CA, (310) 276-5934, w6atc@aol.com

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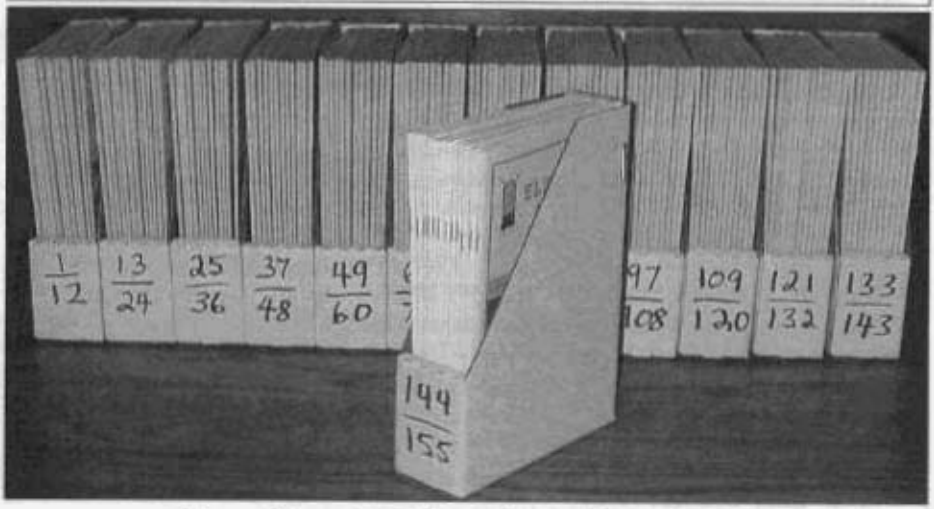

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