

# SCOPE

A newsletter by and for the  
Palomar Amateur Radio Club  
of San Diego, California.



**Who was the featured listing on QRZ on 21 January 2012? Why, Preston, W6ASP of course!**

Call: N6KI  
Operator(s): N6KI  
Station: W6HCD

Class: Single Op LP  
QTH: CA  
Operating Time (hrs): 10

Summary:  
Band QSOs Mults

160:	56	13
80:	64	20
40:	138	44
20:	158	45
15:	184	46
10:	168	28

Total: 768 196 Total Score = 150,528

Club: Southern California Contest Club

Team: SCCC #2

Disappointing condx overall. never got anything going on 10 and 20. 80 mtrs was a real struggle but 160 surprised me as I could actually get few small runs going. 15 and 40 yielded most Mults per QSOs

Still working on noise issues at this hilltop site and hope to relocate noise sense antennas closer to the source of a neighbors noisy DLP TV nearest one set of antennas.

K3, 3 El SteppIR @ 40 ft - 2 El Shorty 40 @ 46 ft, 80 and 160 inv V dipoles at 70 ft

N6KI

## Save the Date

Club Meeting

**1 February 2012**

APRS by Paul KB5MU

Board Meeting

**8 February 2012**

Palomar Amateur Radio Club board meeting at 7:30pm at K2RP QTH.

Social Event

**Food Massacre!**

It's a tradition. Talk to Dennis N6KI.

## Club Membership for February Edition

New Members Joining PARC: WA6GHW and KC9IYR.  
Several members reinstated their membership, which had lapsed. Thanks to all.

A number of members have elected to receive the SCOPE on the WEB. This saves the club the cost of printing and mailing, which is good. The 'not so good' is that they do not get the monthly reminder that their membership is up for renewal - which is printed on the mailing label for those that receive the SCOPE by mail.

Now club membership is listed on the web site, along with the renewal date. If your call is not listed, maybe you have upgraded and have a new call, or maybe I made a mistake along the line, or is it possible that you have forgotten to renew?

AI  
W6GNI

The ARRL San Diego Section now has a Section Emergency Coordinator.

Bruce Krypton, KG6IYN, has agreed to fill the position. I am confident that Bruce will do an outstanding job.

Steve Early, AD6VI

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January Issue Fold & Staple Crew  
We had the whole crew, new and old!!  
W6GNI AI & Kathy KB6NMK Jo & N6UZH Terri  
WA6ACE Sonny & W5EPM Roni  
KB6YHZ Art & KI6LKP Dave  
Tyler Brewer & Matthew Brewer &  
Micak Brewer

The last Fold & Staple for 2011!

Do you have a mobile installation? Do you want to have a mobile installation, and need some motivation?

We're looking for a few good mobile installations - whether they're completed, on the drawing board, or half-way done and tripping you and your passengers every time you get in and out of the vehicle - to be featured in the Scope. We'd love to show your installation.

Tips, narratives, explanations, techniques, problems encountered and solved (or encountered and evaded) are what we're looking for. Send them in!  
[scope@palomararc.org](mailto:scope@palomararc.org)



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# Advertisements are free for members

Have items that need to find a new home? Advertise here! Send your ads to [scope@palomararc.org](mailto:scope@palomararc.org)

## For Sale

AMERITRON ALS-600 SOLID STATE NO TUNE FET AMPLIFIER WITH AMERITRON 50 VOLT SWITCHING POWER SUPPLY. NEW, NEVER BEEN OUT OF THE BOX \$900.00 FIRM.

ED GENEST  
w6abe@arrl.net

## For Sale

Hammarlund HQ 129X receiver (vintage 1946) in great working condition (New Filter Caps) and above average appearance. \$150. K2RP@ARRL.NET or 760-436 -8109

## For Sale

Hello:

My 93 year old neighbor (Richard Krist) has requested my assistance with re-listing his radio gear (as he is going deaf). The last free ad I was able to find was from your April issue. I have relisted the items (minus the ones he sold) for you to place back into your scope newsletter for the next few months as he desires to sell his stuff. Here is what is left:

### For Sale (BEST OFFER)

Cushcraft Ringo Ranger, Model ARX1, Vertical 2M	\$30.00
YAESU FT-1000 Transceiver	\$2,000.00
Kenwood TS-950 S, 10-160 M Transceiver	\$2,000.00
Simpson Analog Multimeter, Model 260	\$60.00
Heathkit Phone Patch, Model HD 15	\$30.00
Remote Motor driven, 6 Pos Coax SW with Control Box	\$100.00
YAESU FT 2500 M, with Astro PS 12 A	\$300.00
Kenwood TR-7330 2 M, with Astro PS7A	\$150.00
Ten-Tec Centurion amp 1kw with spare 3-500 tubes	\$1,500.00
Ten-Tec Titan amp 1kw, 10 to 160 M	\$2,500.00
6 Tubes EIMAC 3-500	\$100.00 ea.

Contact: R. F. Krist, W6KTE, (760) 724-2786

Buyers are welcome to contact me with their offers via email or on my cell phone so that I can present them to Richard. I can send photos if that will help. Thanks for your assistance in this matter.

Regards, A good neighbor

Dennis Firenze  
760-536-3372  
760-224-0849 (cell)  
fired@att.net

# What Has Changed on the W6WNG Repeaters?

By Bernie, N6FN

In mid-January, Art, KC6UQH and Bernie, N6FN, took a trip to the repeater site to install a re-worked 447.000 repeater, which Art had modified to operate using low-side injection (rather than high-side injection) with the objective of preventing image interference caused by another repeater service on Palomar Mountain. This had been a serious problem for over a year and was measurably improved mid last year after Art improved received signal filtering by installing an additional cavity duplexer. But under certain conditions, interference could still occasionally be heard on the squelch tail. Art's low-side injection modification should completely eliminate the interference.

PL is now required on 146.730: On the same trip the firmware controlling the 146.730 repeater was replaced with modified code so that it now defaults to PL on. For the last year or so, it had been the club's practice to enable PL on the 146.730, just like all of our other repeaters. But the way the 146.730 controller firmware was written, it defaulted to PL off. Consequently it had to be re-enabled "by hand" every time the power failed or the controller was reset. Now it operates just like all of our other repeaters, defaulting to PL on whenever power is reapplied. If you are having trouble accessing the repeater, make sure your radio has 107.2 CTCSS tone encode enabled.

At the same time the firmware for all of the other repeaters was also changed. Most of the modifications will be transparent to repeater users, as they primarily affect how the repeaters are remotely controlled via a separate control link frequency.

**What has changed contest:** One of the firmware changes made to the repeaters should be noticeable to observant users. What this change is will be announced in next month's SCOPE. In the meantime, we are having a contest, awarding a \$40 Gift Certificate via a drawing that can be entered by those that figure out what changed. The \$40 Gift Certificate is good for any of the amateur radio guides and books available from the Nifty Ham Accessories web page: [www.niftyaccessories.com](http://www.niftyaccessories.com).

Hints:

1. The change can be noticed by monitoring conversations on any of the W6WNG repeaters.
2. What was changed had previously been

in effect since 1993, when the currently used repeater controllers were originally installed.

How to enter the contest: If you have figured out what has changed, send an email to

[berniel@niftyaccessories.com](mailto:berniel@niftyaccessories.com)

stating what you think it is. Please place "What has Changed" in the subject line of the email so that I can pick out your email from all the others I receive. All correct entries will be placed in a drawing, from which one will be drawn at the next meeting to receive the \$40 Gift Certificate.

## Minutes

Palomar Amateur Radio Club  
Board of Directors Meeting  
December 14, 2011

The meeting was called to order by President Dennis Baca KD6TUJ at 7:09pm at the home of Ron Pollack K2RP. In attendance were:

President	Dennis Baca KD6TUJ
Vice President	Ron Pollack K2RP
Secretary	Paul Williamson, KB5MU
Treasurer	Dave Ochs KI6LKP
Director #2	Eric Hutchins K7ELH
Membership Chairman	Al Donlevy W6GNI
Repeater Technical Chairman	Conrad Lara, KG6JEI
ex-Treasurer	Georgia Smith KI6LAV

### Approval of Committee Chairs

KD6TUJ re-appointed Al Donlevy W6GNI as Membership Chairman, and W6GNI agreed to serve. KD6TUJ re-appointed Michelle Thompson W5NYV as Editor of the newsletter, and KB5MU relayed W5NYV's agreement to serve. KD6TUJ re-appointed KE6JEI as Repeater Technical Chairman, and KE6JEI agreed to serve. KD6TUJ stated that the position of Repeater Site Chairman remains open. Motion by K2RP that the newly elected members of the Board approve these appointments. Seconded by KB5MU. Motion passed unanimously.

KD6TUJ designated committee chairmen W6GNI, W5NYV, and KE6JEI to serve as directors. Motion by KB5MU that the newly elected members of the Board approve these designations. Seconded by K2RP. Motion passed unanimously.

## **Treasurer's Report**

Treasurer KI6LKP distributed copies of the Treasurer's Report. Motion by KB5MU to approve the Treasurer's Report as published. Seconded by K2RP. Motion passed unanimously.

KI6LKP stated that he'd find it convenient to have an ATM card to facilitate making deposits. KI6LAV stated that the type of account we have does not allow ATM cards.

KB5MU asked if we can move our account away from Bank of America "because they are evil." KI6LKP agreed to investigate options.

KI6LKP stated that there are two big boxes of Treasurer's records and asked if they could be stored at the TOWizard storage site. KD6TUJ agreed.

KI6LKP asked about the purpose of the self-insurance account. It was explained that the club set aside money against the need to replace equipment in preference to paying for equipment insurance. K2RP stated that the ARRL equipment insurance deal was much improved since the club opted out of it.

## **Secretary's Report**

KB5MU distributed copies of the minutes of the October and November Board meetings, previously sent by email. Motion by KG6JEI to approve the October minutes as published. Seconded by K7ELH. Motion passed unanimously with KI6LKP abstaining. Motion by W6GNI to approve the November minutes as published. Seconded by K7ELH. Motion passed unanimously with KI6LKP abstaining.

## **Upcoming General Meeting**

K2RP reported that the January meeting is scheduled to be presented by W5NYV on Lithium Ion Batteries: How they work, why they fail. The February meeting is scheduled to be presented by KB5MU on some aspects of APRS. March will mark the club's 75th anniversary of affiliation with ARRL, but by general agreement that will not be the main focus of the meeting.

## **Membership**

W6GNI reported that the membership is 260, and that the online membership query and join or renew facilities are working well.

## **Repeater Technical Report**

KG6JEI reported that the work party trip on Sunday was quite chilly. DC-DC power converters were installed on the metro net and 145.05 MHz packet nodes. The packet repeater is still off the hill for repair. The county (or someone) has done

a lot of brush clearing on the slope below the repeater site. The tower was examined to find a mounting site for the PTZ camera, and John Kuivinen WB6IQS was consulted by phone and will fabricate mounting brackets.

KG6JEI asked about placing a second lock box at the site to hold a full set of keys to the buildings not unlocked by the key in the existing lock box. The consensus was that this would be a good idea.

The new 6m antenna built by KD6TUJ was installed, but slightly bent, and showing a 1.3:1 VSWR on the tower. An antenna analyzer shows at least a 2:1 VSWR on the cavities, which still need to be tuned.

Sensitivity complaints about the 145.05 MHz packet node were investigated but not confirmed. The squelch on that receiver was adjusted. There may be a lingering squelch issue on the 147.13 MHz repeater. Otherwise the repeaters seem to working well.

The repeater site is in good shape and ready for the winter. No scheduled work parties are scheduled until spring.

The generator stored at the site is not able to run the battery chargers, because they require 240VAC and a very stable frequency. The plan calls for both the generator and the battery chargers to be replaced.

KD6TUJ stated that his cost to construct the 6m antenna was \$83. Motion by K2RP to reimburse KD6TUJ \$83. Seconded by KB5MU. Motion passed unanimously.

## **Meeting Room Availability**

KD6TUJ reported that we have reserved a meeting room at the Carlsbad Safety Center for all club meetings in 2012, including the auction meeting in October. We also reserved a meeting room for VE testing for all dates in 2012 but one. That exam date will just be canceled.

## **Operating Day**

KD6TUJ reported that the Operating Day scheduled for November 20 was canceled due to unpleasant weather. It will be rescheduled for the spring. It was suggested that the parking lot at Fry's Electronics might be good, perhaps on March 18. KD6TUJ agreed to ask Fry's about it.

## **SANDARC Bylaws Amendment**

KD6TUJ reported that he had received no responses to his email asking other clubs about

*continued on page 6*

*continued from page 5*

the San Diego Amateur Radio Council (SANDARC) bylaws amendment.

### **Next Board Meeting Location**

It was agreed that the next Board meeting would be held at the home of K2RP at 7:30pm on January 11, 2012.

Adjournment

The meeting was adjourned at 8:22 pm.

Respectfully submitted,  
Paul Williamson KB5MU  
Secretary

## **Minutes**

Palomar Amateur Radio Club  
Board of Directors Meeting  
January 11, 2012

The meeting was called to order by President Dennis Baca KD6TUJ at 7:32pm at the home of Ron Pollack K2RP. In attendance were:

President Dennis Baca KD6TUJ  
Vice President Ron Pollack K2RP  
Secretary Paul Williamson, KB5MU  
Director #1 Don Johnson, WD6FWE  
Director #2 Eric Hutchins K7ELH  
Membership Chairman Al Donlevy W6GNI  
Repeater Technical Chairman Conrad Lara, KG6JEI

### **Treasurer's Report**

KD6TUJ distributed copies of the Treasurer's Report. The \$587.28 expense listed under Repeater Equipment is a reimbursement to KG6JEI for DC-DC power supplies and DC cutoff relays. Motion by KB5MU to approve the Treasurer's Report as published. Seconded by K2RP. Motion passed unanimously.

### **Secretary's Report**

KB5MU distributed copies of the minutes of the December general membership meeting and the December board meeting, previously sent by email. Motion by W6GNI to approve the general membership meeting minutes as published. Seconded by WD6FWE. Motion passed unanimously. Motion by KG6JEI to approve the board meeting minutes as published. Seconded by WD6FWE. Motion passed unanimously.

### **Upcoming General Meetings**

K2RP reported that the February meeting is scheduled to be presented by KB5MU on APRS. K2RP asked WD6FWE to do a presentation on 6m

for March. Joe Coronas N6SZO has volunteered to present on hidden transmitter hunting for April.

### **Membership**

W6GNI reported that the membership is 277.

### **Repeater Technical Report**

KG6JEI reported on an unscheduled trip to the repeater site to investigate problems with the 147.130 MHz repeater. It appears the power supply is in overcurrent shutdown. It was replaced with a spare supply, but the repeater failed again while the work party was driving home.

The 147.175 MHz repeater is still having squelch problems, but they don't interfere with normal use of the repeater.

The 6m cavities were removed from the hill. They are in surprisingly good condition inside. Some teflon insulators might be fabricated to mount the tuning rods more securely, reducing the need for periodic percussive maintenance.

Would it be a good idea to ask for permission to link our 6m repeater to the N6LXX linked system? Perhaps this can be discussed after the repeater is working again.

### **Field Day**

Field Day is coming. We don't have a chairman or a site yet.

### **Next Board Meeting Location**

It was agreed that the next Board meeting would be held at the home of K2RP at 7:30pm on February 8, 2012.

### **Adjournment**

The meeting was adjourned at 8:23 pm.

Respectfully submitted,  
Paul Williamson KB5MU  
Secretary

# A Home Brew Story

by Ron K2RP

January QST's theme was "Do it Yourself," and highlights construction projects, including an article on building a 1950s style Novice CW transmitter.

This article inspired me to share the story of a home brew transmitter of this variety that I own, even though I did not myself build it from scratch. First, let me share the story of how it came into my possession. A few weeks ago I attended a swap meet in Carlsbad sponsored by an antique radio association which emphasizes broadcast receivers and home entertainment. Although my interest lies in short wave equipment, I had heard that such equipment, as well as parts and tubes, show up frequently at these meets.

On the tailgate of a truck at the very first spot was a homebrew project with a chassis on which several tubes and coils were mounted. Closer examination revealed that it was a 75 watt transmitter, built from plans in the 1962 ARRL Handbook, with a copy of the construction article included. It appeared to have been built almost exactly as the article suggested. A conversation with the owner revealed that the coils included were for the 40 meter band, and that he had tested the unit, and while there was some output, there were some issues. As was common at that time, the design was for separate plug in coils for each band-no bandswitch. Thinking of the upcoming "Straight Key Night," a deal was quickly struck, at a very reasonable price.

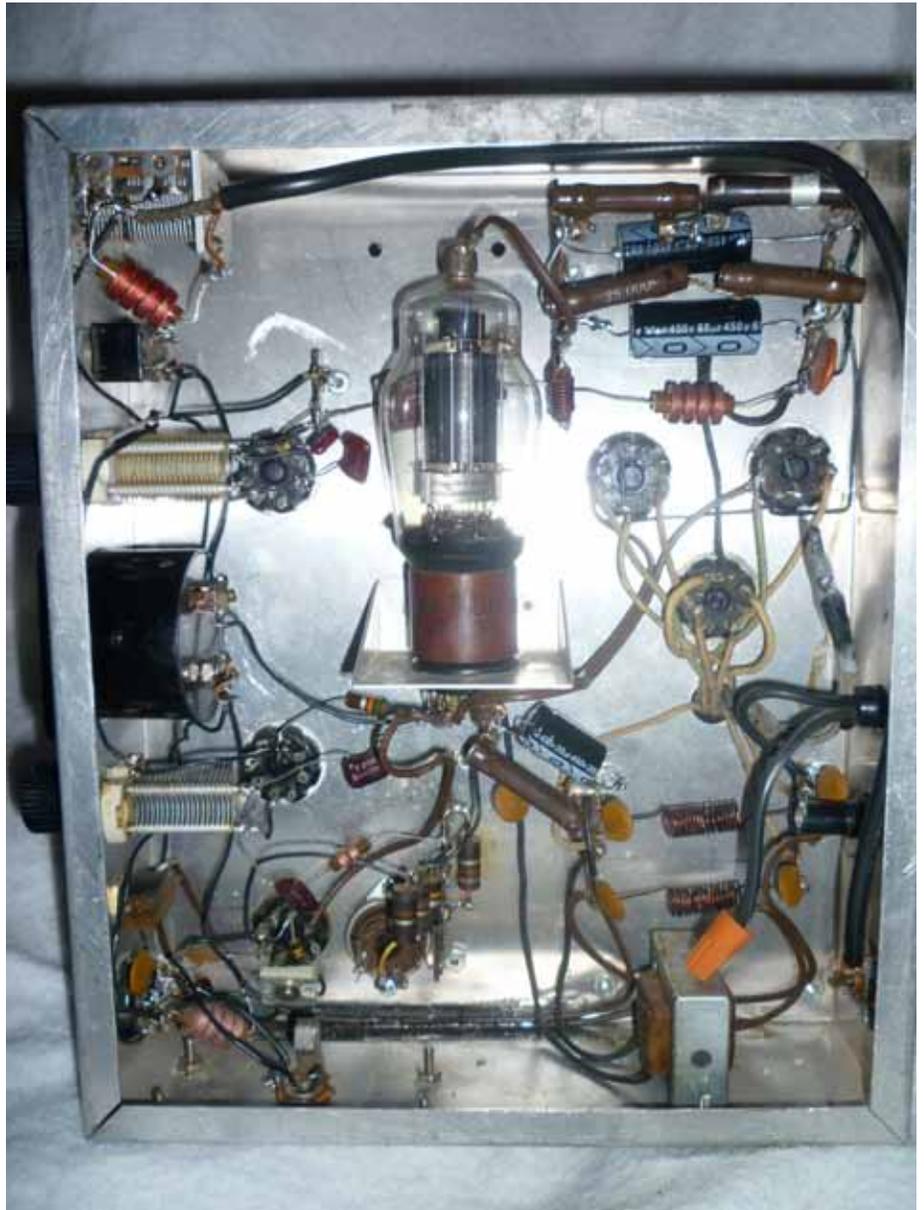
A word here about the seller: It turns out that he is a ham. Bill, KC9IYR, has recently moved to our area from Wisconsin, and lives only a few blocks from me. Immediately, he was invited to PARC's December social meeting, where he met many of our members, and joined on the spot! Welcome, Bill!

The circuit is very similar to many Novice units of the era. The heart of the transmitter is a 6AG7 oscillator driving a 1625 amplifier. Old timers will remember the 1625 tube as the 12 volt filament version of the popular 807, often used as an AF or

*continued on page 12*

RF amplifier handling about 75 watts input (as power was measured at that time). The 1625s were used as final amplifiers in the ARC5 Command sets that were popular after World War II for conversion to amateur use. The tubes were available at that time for 25 to 50 cents each, brand new surplus! This transmitter design, unlike many others, included separate rectifiers, (6DE4s) for the low voltage requirements, as well as a string of NE2 neon bulbs as voltage regulators. The original builder substituted an 0C3 regulator tube for the NE2 bulbs. This attention to the B+ system no doubt accounts for the fact that there is no chirp distinguishable on the output, unlike most similar home brew, and many commercial, low power simple transmitters.

When I examined my acquisition, I found a few deficiencies that needed to be corrected before plugging it in and testing it. The electrolytic filter capacitors were suspect, so they were replaced.



Hi Michelle,

Here are the pdfs about that article that was found that made it into a 1940s QST, for PARC's archives.

Two of the pdfs are of the actual newspaper clipping; one is a bit clearer which is a copy of the actual article without the date. The other is from the newspaper which was sent to me by a friend who found it while researching other items. Having this date allowed me to actually dig thru the old magazines my dad had saved, finding the actual article which I then scanned.

Regards,

Roni Elsberry  
W6EPM



## Building and Tuning a Three-Element Beam

Complete Details on a Practical Home-Made Rotary

BY HAROLD ULMER, W6EPM

About a year ago I decided to put up a Q-fod antenna and later convert it into a "Q beam." Looking over the good places to hang the antenna, I noticed a light pole with only a street lighting circuit attached to it. This seemed like just the support for a real antenna that any little gust of wind would not take down, and soon the "Q" was doing its stuff.

No more thought was given to the antenna until my neighbor across the street, a trouble shooter for the local power company, knocked on the door and said he had orders to cut down the antenna and let it fall in the yard. I immediately went scotching around and got in touch with a friend in the company who said that some poles were for sale which were of no value for line work but were considered good "fire wood." The enormous price was three cents per foot!

This was almost too good to be true, but my friend promised to pick out a good one and have it available in about two weeks. I borrowed some digging tools and had the hole ready the very next day and that afternoon, while I was at work, my friend phoned and said the pole was lying in the yard. That was really more than had been expected, but I bought a gallon of creosote on the way home and painted the base of the 40-foot pole.

That evening I went to see a close friend who happens to be a blacksmith. We looked at every picture of every rotary beam antenna in all the magazines and handbooks until we found one using a Model T Ford rear end and decided on that. Because we are right on the coast, we decided the greased bearings were just what we wanted, and that very evening we scouted around until we found what we wanted.

We first operated on the rear end by cutting off one axle at the edge of the differential casting. This end of the casting was covered with a plate to keep the grease in the housing, and then the sawed-off axle was jammed by welding two of the small differential gears together so that the untouched axle would move freely and with no differential effect. A nut put in the gears will also jam them satisfactorily, but welding can be relied upon not to jump out of place as a nut might do.

Next, a piece of 7½-inch water pipe was purchased from the city water company. The rear end was the right size that would set in the pipe nicely and a disc, with a hole large enough to take the sawed-off end of the differential, was made

and welded about 6 inches from the end of the piece of pipe. The differential was then welded in eight places—four around the end of the pipe and four around the internal disc. With this welding, any four places can break and the antenna will not come down. The pipe was slipped over the end of the pole and fastened by eight 3-inch lag screws.

When the rear end was in place, some of the fellows "who raise poles for a living" were kind enough to come by and see that the pole was put up properly.

The cross beam for the elements was the next thing for consideration. First it was necessary to decide on a good method of getting to the ends of the cross beam for adjustments. Thanks to W9HLE,<sup>1</sup> it was decided to make a strong cross beam and pivot it on two bolts in the ends of a turn table mounted where the car wheel used to go. The cross beam was made of two 18-foot lengths of 2 by 4, separated by six short lengths of 2 by 4, making the boom 4 inches high, 6 inches wide and 18 feet long. The turn table was made by first tearing apart the old wheel until only the hub remained. Then a piece of ¾-inch sheet iron 8½ inches by 14 inches was bolted and welded (safety first!) to this hub. Two pieces of 1 inch by 2 inch channel iron 3 feet long were welded to the plate and half-inch holes were drilled in the ends. The pieces must be at least half the thickness of the boom longer than the plate, to make it possible to tip the boom. Small blocks of ¾-inch iron 2 by 5 inches were welded at the ends of the channel iron to furnish additional side support to the boom. It is a very simple matter to remove either bolt and, by using hooks (five-foot pieces of thin-wall iron conduit with a hook at one end and a loop at the other) with ropes tied on the ends, it is possible to pivot the boom on the remaining bolt. The tipping is

<sup>1</sup>Moore, "Supporting the Rotary Beam," *Radio*, March, 1939.

If you have gazed long and longingly at the rotary-beam ads but your purse didn't agree with your desires, you might be interested in some of the ideas in this story. You may not be quite as fortunate in your choice of friends as is W6EPM, but that shouldn't hold you back too much.

# LOCAL AMATEUR HAS ARTICLE IN RADIO MAGAZINE

Harold Ulmer, local postoffice employe and an amateur radio fan, shows his versatility this month by having an article published in QST, official organ of the Amateur Radio operators.

Ulmer, who operates amateur radio station W6EPM from his home at 302 North Clementine, has recently built and tuned a three-element beam, which is the latest development of the amateur operators.

In the article, which carries his by-line he tells how this was done, and of the pleasure he got from building as well as operating the beam.

In a letter to the Blade-Tribune from John Huntoon, of the American Radio League, he has this to say:

"Experimental work done by Ulmer and reported by him in his article has to do with the construction and installation of a short-wave directive antenna system. Interest among amateur radio operators in directive antenna systems, particularly those with variable directivity controlled by a motor-driven rotary, has been quite high in recent years; amateurs, of course, engage only in two-way communication and are therefore interested in transmitting a maximum signal in one direction only, rather than a broadcast in all directions. Such a policy, in addition to giving the receiving operator a stronger signal to work with, is a great help in eliminating interference in the crowded amateur bands. An additional feature of Ulmer's article is that complete details are given on the tuning and adjustment of the system."

# Website Update

on Wed, Jan 4, 2012 at 11:55 AM, Joseph wrote:

was thinking it might be nice to have the scheduled weekly NETs on the published calendar, I have that subscribed in my Google Calendar and on my iPad, it would give me a nice one spot to see when everything is happening.

Thanks!

OK, I've set up a Google calendar with the regularly scheduled nets on it, and put links to subscribe on the main page (below the regular calendar) and on the Nets page. Let me know if that seems to work for you.

3 -Paul KB5MU

done by one person on the ground pulling on the rope on the side of the turn table from which the pivot bolt has not been removed.

My good neighbor insisted that he help me when it came to climbing the pole, since he was experienced at that work. That sounded fine, so his offer was put to good use. The way the parts were arranged it was possible for just the two of us to put the cross beam up.

The turn table was made secure at the top of the pole in the same manner as if it were the wheel which belonged there, and we were then ready for the cross beam. We fastened a small block and tackle to the top of the pole, and while I did the hoisting my good neighbor guided the cross beam in to its resting place and put the bolt through the two channel irons and beam. We were then ready to put on the cross arms and elements.

The cross arms used were of 2 by 4 pine 8 feet long and were fastened to the cross beam by 3-inch lengths of 3-inch angle iron  $\frac{1}{2}$ -inch thick. The elements were mounted through the holes in some type P18 insulators. In case this is an unfamiliar type to some of you, the type P18 is the kind used to tie the service lines on at the edge of houses near the meter box. They can be secured at most electrical supply houses and are very good for supporting beam elements because of their strength and the fact that they have a



The boom is raised by block and tackle after the cradle is in place on top of the pole. In this view, the boom is on the way up and a rope is being tied to the boom so that it can be pulled into place over the cradle.

single screw mounting. There is a single hole through the insulator which will take either  $\frac{1}{2}$ - or  $\frac{3}{4}$ -inch pipe, depending on the size insulators purchased.

The elements in this antenna were made of the new thin-wall hard-drawn copper water pipe and, using the "streamline" fittings, a neat layout is possible. We used a section of  $\frac{1}{2}$ -inch pipe, then a piece of  $\frac{3}{8}$ -inch pipe, and the last 6 feet of each half section was some  $\frac{1}{2}$ -inch dural pipe which happened to be on hand. This type of element has some sag but is fine electrically, and the cost was only about \$9.00 for the six sections. Iron conduit was considered at first because of its rigidity, but it was impossible to get it plated at a poor man's price. To put it up without plating was simply out of the question, after our experience with iron for shielding in a transmitter. Iron proved to be a very poor conductor of r.f., as indicated by different r.f. potentials all over the shielding which was supposed to be at ground potential. That may be a word of warning to anyone thinking of using iron pipe for r.f. purposes.

Now that the antenna was all up, we couldn't wait to give it a check — even before the rotating gear was finished. The first step was to take the old Q-fed flat-top and put it in a vacant lot about 130 feet away and about 6 feet in the air. A thermogalvanometer was borrowed and put in the center of this antenna and, with the rig on low power, we checked the meter while rotating the antenna. We were very disappointed — the first

reading was 10 on the front side and 8 on the back. This showed us, of course, that the tables used for element calculation could not always be depended upon, and it also indicated that any of the already-cut-and-pretuned commercial beams cannot always be "on the nose." Again my good neighbor volunteered to go up the pole and adjust the element lengths. The first step was to lengthen the reflector  $1\frac{1}{2}$  inches — the meter went to 20, showing that we were going in the right direction. After about two hours of adjusting, we found the reflector approximately 15 inches longer ( $7\frac{1}{2}$  inches each side of center), the antenna okay, and the length of the director not to be very critical at all, so it was decided that the formulas were okay on the antenna and director. The antenna was tuned for 14,300 kc.; the director length is 32 feet, the antenna length is 33 feet 5 inches, and the reflector length is 35 feet 8 inches.

The feed line is brought down to the end of a 42-inch bracket mounted half-way down the pole. The bracket is pivoted on a 9-inch iron angle which allows the bracket to swing around the pole for about 300° rotation, effectively preventing the feeders from tangling at any time during the rotation of the antenna system.

## Results

The final results were very pleasing. With the transmitter at about 800 watts input the meter went off scale with a bang — probably about 150, if the meter had read that far — on the front side but on the back side, with a full kilowatt, the meter read less than  $\frac{1}{2}$  of one division, showing a ratio of at least 300 to 1.

The next step was to get the standing waves off the feeder. The conventional Y-matched impedance formula should be approximately correct or a good place to start at least. Most articles say to use a neon lamp to check the voltages along the feed line, but this is a little difficult with enameled wire, so a wavemeter type indicator was used, using the conventional coil, condenser and lamp in series. This type is the best, because it is cheapest, and if you drop it you don't

lose much. This part is important, because it is generally necessary to fasten a 10- or 15-foot stick to it in order to follow the feeders. If the point on the Y where the feeders connect can be reached, it is simple to tell which way to move the tap on points of the Y to the antenna. If the indicator lamp gets dimmer as you move down the feed line from the junction, the tap-on points on the antenna should be nearer the center. If the lamp gets brighter as you move away from the junc-

Two views of the steel cradle used to support the boom. As can be seen in the view at the right (the cradle is upside-down), only two bolts are used to hold the boom to the cradle. This allows the boom to be pivoted down parallel to the pole, so that adjustments can be made on the elements.

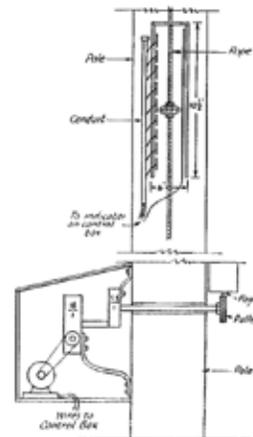


Fig. 2 — Two views of the pole, showing the direction indicator (above) and the rotating mechanism (below). The direction indicator uses a sliding contact fastened directly to the control rope. The contacts, in turn, are wired to the 16 dial lamps shown in Fig. 3.

The rotating mechanism, mounted on the side of the pole, uses an old washing-machine motor and reduction gears.

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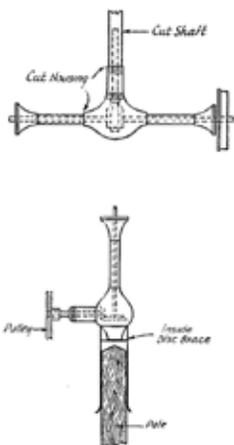


Fig. 3 — The rotary mount for the antenna cradle is made by cutting an old Model T Ford rear end as shown in the top drawing and welding it in a section of pipe as shown in the lower drawing. The pipe is then fitted over the pole and fastened with lag screws.



The Radio Amateur's Journal

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#14 NORTH AMERICA #7 UNITED STATES OPS: N6KI WQ6X N6CY AF6WF K6KAL KD6HYN

*Robert Johnson* K5ZD

CQ WPX Contest Director

*D.S. Wood* W2VU

Editor, CQ

We Done GOOD !!!

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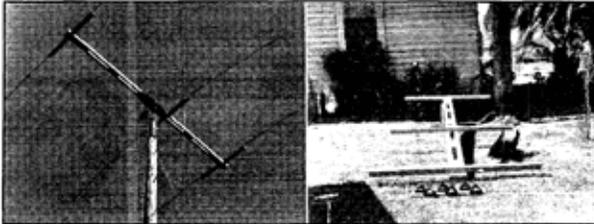
Thanks to all Ops for your efforts!

See Above Award

73, Dennis N6KI



Not to be outdone by Dennis, I had to share my 1st place finish in WPX as well. -Michelle



The 3-element beam is mounted on a turntable made from an old automobile rear-end and is rotated by a motor fastened near the base of the pole. Delta match is used between the radiator and, by supporting the feeders away from the pole by a bracket (not shown), it is possible to rotate the beam through 360° without tangleing the feeders. Two ropes, broken up by egg insulators, support the feed line at the bottom of the delta section. The steel cradle used to support the boom and the brackets that hold the cross-arms to the boom are shown in the picture at the right.

tion, the taps on the antenna should be moved out farther from the center of the antenna. Our final adjustment was 53½ inches each side of the center. Incidentally, this feeder adjustment should be the very last adjustment because every other change will affect the distance between taps on the antenna. This type of feeder was selected because of the low resistance of the antenna on a three-element beam. When a center matching arrangement is used, it is necessary either to use two Q sections or slip rings and a J section. Slip rings were considered undesirable because if even one ohm resistance is introduced by the connection, approximately ¼ of the power is wasted in a 7-ohm antenna. The current at this point is of the order of 10 amps with 1 kilowatt input, so the connections have to be good or else avoided.

**Rotating the Beam**

The antenna was far from finished though, because we wanted it to be completely controlled from the operating position in the shack. We first mounted a 12-inch pulley on the drive shaft of the rear end and put a ¼-inch rope over the pulley.



Fig. 3 — A sketch of the control box.

It would turn and stop nicely from the ground, so we next bored a hole directly through the pole large enough to take a piece of ¼-inch water pipe. This was for the bearing of a ¾-inch shaft on which a 3-inch pulley was mounted to turn the rope belt. A 12-inch piece of heavy coil spring was tied in the rope to take care of the expansion and shrinkage due to the moisture the rope absorbs at night, and the rope given two wraps on the small pulley to prevent slipping. This gave a ratio of 4:1 through the two pulleys, and with 3¼-to-1 in the rear end, we had a total ratio of 15:1. We next looked up the local washing machine repair man, and for \$3.00 we obtained two wringer gear boxes and gears with as high a ratio as possible.

One turned out to be an 18-to-1 gear out of an old Maytag machine, and the other was 5¼-to-1 out of an unknown machine. This now made our ratio 1485-to-1, which is not bad for \$3.00, plus a dollar to the local machine shop to connect the two gears together and to use a 1-to-1 pulley and drive the gears with a ¼ h.p. washing machine motor. We ran in 4 wires from the motor to make it reversible — it is only necessary to reverse the starting winding leads to the power leads and any induction motor becomes a reversible motor.

We could now drive the antenna in either direction but didn't know where it was pointed. A lot of book research was conducted but none of the ideas suggested seemed to suit our needs, so it was necessary to look at the situation from a different angle. We found out that the rope moved about 10¼ feet for a complete revolution of the antenna. That meant that if we had indicators or contacts on the rope, we could have an indicator on the operating table. We made a trough out of wood 6 inches wide, 3 inches deep and 10¼ feet long, and then measured the exact travel of the rope and cut 16 pieces of brass lineoleum binder

exactly 1/16 of the distance of travel. These 16 pieces were all mounted on one of the 3-inch sides of the box and connected to wires run to the operating table. The other side of the box had a single strip for the full length. This trough-like box was mounted on the side of the pole where the rope could run through the trough between the 16 pieces and the full length strip. A clamp was made to fasten to the rope and two spring brushes were mounted to make contact between the single strip and any one of the 16 contact strips. We now made a box and mounted our reversing switch, a push button to run the motor and 16 dial lamps in an equally divided circle about 4 inches in diameter. The 17 wires from the contact box were connected to the 16 dial lamps and a small transformer to light them and it was now possible to tell the position of the antenna in relation to the 16 points of the compass indicated by the dial lamps. It can be seen that there are 32 possible indications by the 16 lamps because two lamps will light at once when the brush is in the position where it passes from one contact to the next. This gives an accuracy of direction of one-half of 1¼° or 5¼° plus or minus. This is sufficient accuracy because the beam seems to be about 30° broad. This was determined during the adjusting procedure, because we found that if the beam were 15° off, the meter reading in the center of the receiving antenna dropped to half. Two extra contacts were considered to be used as safety lamps to indicate red when the antenna should be stopped to keep the feeders from wrapping around the pole. These were not used, however, and the two U-shaped stops were put on the pole for the rope to run through and a clamp put on the rope. The stops were set so that the travel between them is exactly enough to rotate the antenna 30°. It is then of course impossible to twist the feeders around the pole because the drive pulley slips when the stop is reached.

After the antenna was all tuned and could be turned at the operating table we didn't know where we wanted to point it, so we set out to make a simple direction finder. A 5-inch globe mounted on a long bolt through the center looked like a good possibility. This was disassembled and remounted so the bolt went through our city instead of the North Pole as is customary. On a piece of drawing paper, a 1¼-inch circle was drawn and divided into 16 parts, each marked by its appropriate compass position — N, NNE, NE, ENE, etc. — and then pasted into position on the globe over our city. When the north-south axis lines up with the north and south poles, the rest of the points will be in their proper position. A stiff wire was soldered from the top to the bottom of the mounting bolt and made it possible to swing the globe so that any city in the world can be placed on the wire. Where the wire crosses the drawing paper marker, the direction of the desired city can be judged accurately to 2° or 3°.

In conclusion, it might be stated that whatever urge it takes to get started building a three-element beam, it certainly is worth-while. Thanks to my good friend, Alex Babics, who tuned the antenna and did all the dimming, and another good friend, Miles Ross, who took the pictures and helped in the meter reading, I was perhaps a little more fortunate than some might be in getting the work done. Needless to say the antenna will really put out a signal and everyone who hears it gives us flattering reports, but to get the results, be sure and adjust the elements to the proper lengths and don't take someone's word that they are just right, or the results will never be as good as can be obtained.

**Strays**

And as further evidence of something or other, we find this in the April, 1914, issue: "The Secretary of Commerce recently approved a penalty of \$25 to be collected from an amateur wireless operator in San Francisco, for a violation of the 15th regulation of the wireless act of August 13, 1912, in that the wavelength emitted by his wireless station exceeded by 370 meters the limit fixed by law for his class of station." We're luckier nowadays — they don't assess the 25 buck!

In an issue of *Modern Electric* for one of the following years—1908, 1909, or 1910—I had an article published on the construction of a keying relay. I wonder if any of the old timers may have this magazine.

—Howard R. Darling, W1FZ1

**Silent Keys**

It is with deep regret that we record the passing of these amateurs:  
 Joe Barrett, W5BOG, Sulphur Springs, Texas.  
 A. R. Cook, W7GCN, East Missoula, Montana.  
 Homer M. Cooper, W8OIG, Woodfield, Ohio.  
 Sam W. Harry, W5ECJ, Dallas, Texas.  
 Herman L. Hepp, W8UAE, Columbus, Ohio.  
 John D. Lawson, VE4GD, Winnipeg, Man.  
 L. A. Paulsen, W9MPT, Glenview, Illinois.  
 Warren R. Rudd, W9QGX, Sidney, Nebraska.  
 Herman A. Schmidt, W2AEN, New York.  
 Arthur H. Winson, W9TOW, Ft. Collins, Colorado.

**HAM RADIO**

Jose XE2SJB  
 Jerry N5MCJ  
 Joe N6SIX

H  
 R  
 O

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*continued from page 7*

and replaced. The meter, which was switched to read either plate or grid current was intermittent, and was replaced with a 200 ma meter I had on hand, and rewired to read only plate current. I modified the crystal oscillator to make it possible to use a VFO as well as crystal control, and the meter switch was rewired to offer VFO or crystal control. In addition, the voltage regulator tube was "dangling" by wires soldered to the tube, with no socket! I punched a hole in the chassis to accept a socket, and rewired it properly. A standard ¼ inch socket was installed for the key, replacing a cumbersome arrangement in the original design. A few dubious connections were cleaned up, and it was time to give it a try. (I hasten to point out that Bill was not the builder of this transmitter, so any construction defects were not his doing!) After attaching the output of the transmitter to a dummy load/wattmeter, I plugged in a 40 meter crystal and a key, and turned it on. Immediately, it tuned properly with about 70 watts input, and about 40 watts out, which is typical for this kind of unit.

Now for the real test: How will it work on the air? I called my friend Dick, K6BZZ, in Arizona and asked him to listen for me. He immediately gave me a good report, with good tone and keying characteristics. He even held the phone to his speaker so I could hear it for myself.

The article gave the coil specifications for other bands, and my junk box yielded a piece of coil stock suitable for 80 meters. That was mounted on an octal plug, and in short order, I was on 80 as well.

January 1 of each year ARRL holds "straight key night," a 24 hour operating activity using straight keys. This nostalgic event usually brings out a great deal of vintage equipment, and this year was no exception. I used this transmitter to make several contacts on both bands with good reports and no problems.

I started 2012 by joining the "1950s 4H Club:" I used Heathkit, Hallicrafters, Hammarlund, and Homebrew equipment to kick off the year!

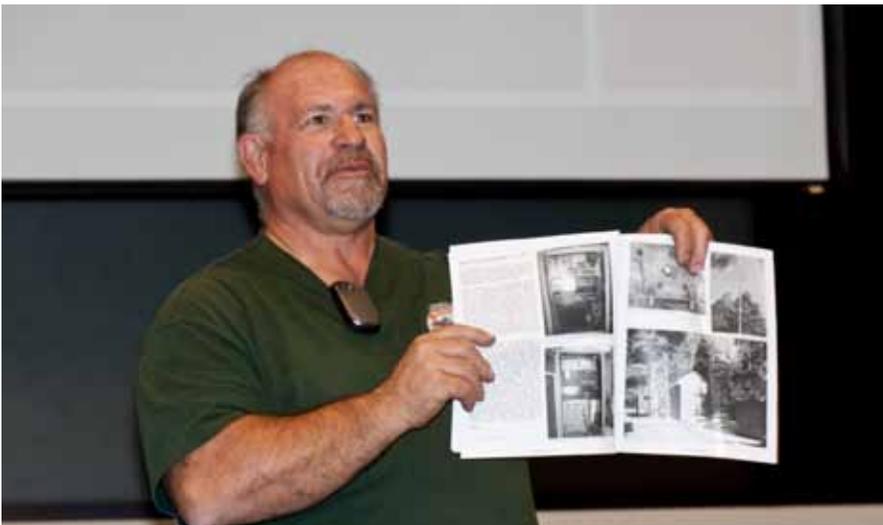




Hey! That's me! Thank you to everyone at the January membership meeting for making the Lithium Ion Battery presentation so fun to do. Only one person fell asleep! Photo by Paul KB5MU.



Dennis KD6TUJ carries the flag before the pledge of allegiance at the January membership meeting. Photo by Paul KB5MU.



Dennis KD6TUJ shows off the Scope at the January membership meeting. Photo by Paul KB5MU.



It might be winter, but Field Day is on our mind. Here's a shot from 2010. We need a Field Day Chair and a site. Can you help? Photo by Nash W6HCD.

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by AI W6GNI



Our car - Antenna shown - No holes drilled, full clearance in garage.



There it is! (Connected to the six car speakers for surround sound)



Not obvious when going grocery shopping.



Where did it go? Works with the lid closed, with only the microphone wire and microphone showing!

## Balun Note from Dennis N6KI

Next time you order a balun and want to make sure you don't have to climb that 40 or 140 foot tower again anytime soon after a repair or replacement Caveat Emptor on Balun quality / construction

<http://www.balundesigns.com/servlet/the-template/Test/Page>

I have no pecuniary interest in this matter!  
73, Dennis N6KI

80/160 mtr RX Loop needs to be mounted and  
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Editor: Michelle Thompson W5NYV

Submissions: [scope@palomararc.org](mailto:scope@palomararc.org)

Questions? Ideas? Comments? [W6NWG@amsat.org](mailto:W6NWG@amsat.org)

### Featured Program:

At 7:30pm on the 1st of February 2012, Paul KB5MU will talk about Automatic Packet Reporting System (APRS).

Arrive at 7:00pm to socialize. We look forward to seeing you at the Carlsbad Safety Center, 2560 Orion Way, Carlsbad, CA.