

The

# FLASH



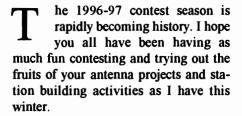
The Official Newsletter of the Mad River Radio Club

February - March 1997

Volume 26 Issue 5

## From the MRRC 'Big Fish'

By Bruce Lallethin, AA8U



Since the introduction of the MRRC Championship Plaque I have been concentrating my modest single operator efforts toward earning some "plaque" points. This has proved to be an awesome task. It seems there is hardly a weekend to rest or attend to other domestic duties between events. Oh well, that domestic stuff will still be there for me after WPX CW and Dayton.

I have no way of knowing for sure, but it seems the level of MRRC participation in the major contests has increased. The "GAVEL quest", our club project this season, and the "MRRC Championship" have both been instrumental in promoting our collective efforts. I trust our efforts will be proudly displayed in the results, eventually. Don't you just hate to wait for the write-ups?



How about activating K8MAD during field day this year? How about establishing a MRRC web page? How about a DXpedition to somwhere warm this coming winter! How about some suggestions? How about some suggestions from our new members? Don't hold back. This is your club and for it to be its best you must participate!

Dayton, our "Mecca", is nearly upon us, especially when you consider the limited number of paychecks between now and then. Fortunately I have developed an excellent relationship with VISA. They just can't wait for me to whip it out at Dayton. Dare I say, they won't be disappointed?

Speaking of Dayton, you must all be aware that the "election" of officers will once again take place, however briefly, on Saturday at Noon, high above the Cushcraft booth in the peanut gallery. For new MRRC members, the Dayton meeting is one of the most important for you to attend. You will likely see more members here than at any other meeting during the year. This one is an event you will not want to miss. Here you will

be able to put some faces with those voices, fists, and reputations.

While precious little real MRRC business gets discussed beyond the annual "MRRC RAILROAD", we do have to establish what goals we will strive for in the next contest season. Your input is needed to help us select our next club The MRRC Championship project. plague winner for the 95-96 contest season will be revealed at Dayton. Beyond this, the meeting is a great place to congregate and swap lies with your fellow club members. It is also a great way to duck out of the blazing sun/pouring rain and give your aching feet a rest. I hope to see you there!

73, de Bruce, AASU

#### MRRC goes to KP4

In what amounts to a true last-minute decision, three MRRC members will be going to Puerto Rico for the 1997 CQ WPX SSB contest. Dave Pruett, K8CC, Bruce Lallethin, AA8U, and Ken Meier, W8MJ have joined the multi-multi team that will activate WP3X the last weekend in March.

The team leader is **Ken Ramirez**, **N4UK** (ex-KP4XS) who is a former resident of Puerto Rico. Ken has established an operating site at the home of his brother on the west end of the island. The QTH is on high ground on a penninsula, with water shots to the north, west, and south, plus no obstructions to the northeast.

The station is located in an apartment built in the basement of the house. There is a shack with three operating (Continued on page 5)

The FLASH is the official newsletter of the Med River Radio Club, and is published six times per year in even-numbered months. Submissions of material for the FLASH are welcome, and may be sent to the editor at the address of the last page.

The Mad River Radio Club is an ARRL-affiliated club of amateur radio contesting enthusiasts. The club area is centered on Findley, OH, and serves the surrounding states. Membership in the MRRC is open to anyone. Dues are \$12 per year, payable to club tressurer KEBOC. Please make checks out to Tim O'Sullivan.

In addition to six in-person meetings per year, MRRC has an informal net every Monday evening at 8:30 PM Eastern time on 3825 KHz ± QRM. Everyone is welcome to check in for the latest club news and information.





am going to ask a question that will likely be highly controversial. I realize that any discussion of tampering with a MRRC tradition is likely to evoke a strong response from the membership. Before you get ready to assault K8CC with a vicious flame-o-gram, stop and take a deep breath and hear what I have to say. The question:

#### Has the Monday Night MRRC Net outlived its usefulness?

When I joined MRRC in 1982, the Monday Night Net was one of the high points of my week. There was almost always ten or more guys on every Monday, and I was surprised to later discover that even more members would just listen incognito. Those were heady days - we'd spend hours discussing C-Line modifications, stacked beams, 40M antennas for SS, and whatever was the hot rumor. There were different big guns then, and many of todays MRRC "big gun" stations were but a dream.

In 1982, the *FLASH* and the Monday Night Net were the only way to keep in touch with club activities short of the telephone., but times have changed. First came packet radio, and although we never have been able to get a reliable direct link between Michigan and Ohio, the PacketCluster systems do a reasonable job of keeping members informed of MRRC activities in their area. Next came the Internet, where reflectors deluge us with more info on contesting than we can digest.

Nowadays, not too many members show up for the Net. Old habits die hard at K8CC, and I feel guilty when I'm not on 3825 at 8:30 on Mondays. A few hardy faithful, lead by our *FISH* still carry on, but have packet and the Internet supplanted the need for the Net? If not, then by all means let's carry on and do what we can to improve participation. Otherwise, I would suggest that we discontinue the net and put the effort and time into some other means of communication like a MRRC page on the WWW.

73, de Dave, K8CC

#### A 40 Meter Vertical Array By Greg Surma, K8GL

Here is a simple antenna system that <u>seems</u> to offer a good solution to a lot of the problems the author has suffered with on 40 meters.

The author was bitten with the DX contest bug back in the early 60's, in the days when the ARRL contest ran two weekends each mode (!), but featured quotas of not being able to work more than 6 stations in each country on each band in the CW portion. A good weekend of operating yielded 260 QSOs. Through the years of operating I've had the good fortune to watch the competitive level grow and grow. The 2 element phased vertical array on 40 that served us well in the 70's is taking a back seat to the stacks of multiple elements that the lucky enjoy. The key is to figure out a compromise between the wallet and the tolerable frustration level!

The situation is this: How do I fit in a competitive 6 band station on a 140' x 140' lot with zoning restrictions? A previous article in *The Flash* outlined my success with a squashed 4-square array on 80 meters; 160 meters has been easy with my "Cage-of-6-Wires" gamma-matched 80' tower with top loading; 20/15/10 have been taken care of quite well with various quad arrays. 40 Meters seems to be the band perennially keeping my effort from going up a notch or two.

The K8GL QTH has seen a variety of 40 meter antennas, all yielding limited success. Multi-element slopers, a 4 square with loaded elements, a 402CD at 80', and other arrays all have proven to be miserable failures when pressed into competition. The weekend is usually spent in the S&P mode, while fortunate stations with the larger arrays pound my score into the ground.

I believe I may have stumbled onto a solution, courtesy of a November 1971 issue of 73 magazine. W4AXE was looking for a way to be LOUD on 75 meters. His eventual solution was to gamma feed his 125' tower and employ a wire reflector and wire director for gain and pattern discrimination. ON4UN and others have refined this approach in various recent articles. K8LX is successfully using such an array with driven/director on 80 meters. I make no claim on originality in the design.

My solution called for one of the 80 meter 4 square elements to be a driven half-wave vertical element on 40. A simple LC network working against 6 random-length radials provided a match. YO provided an optimization scheme for either a broadband or a CW-only 3 element array in the vertical plane. Cut #14 wires were pulled up on a rope sloping from the top of my tower. In theory 17 dB F/B and 6 dB of gain was possible with 20'-spaced reflector-driven-director array.



## **MRRC Scores**

Collected by Jim Stahl, K8MR k8mr@barf80.nshore.org



ARRI	_160M		
квсс	1359 78 32	332,970	Op. W8MJ
AA8U	1156 77 29	269,240	
KU8E	540 71 19	103,680	L/P
AA8R	468 78	76,050	L/P
K8GL	423 67 8	65,475	L/P
K9TM	414 70	60,270	
N8TR	225 65 21	46,182	
K8SIA	344 59 1	41,640	L/P
W8AV	151 59 19	28,470	
M811	250 50	25,000	
VE3ZTH	114 38	8,664	
K8MR	100 41	8,569	
AC8E	74 40	6,520	
KT8X	<b>75 28</b>	4,200	L/P
AA8VN	57 29	3,306	+PKT
K8MK	1296 119	361,000	(+K8LR,WB8YJF,WR8C)
NU8Z	1241 77 25	267,546	(@K8AQM,+AA8HZ)
K4LT	588 72 5	91,938	(+W9VNE)
KG8CW	304 40	24,320	(+AA8E)

NA	QP	CW						
	LW8M			AF8A				
160	132	42	160	0	0			
80	180	42	80	111	34			
40	195	42	40	109	34			
20	121	33	20	83	32			
15	49	16	15	53	19			
10	21	11	10	49	16			
TOT	698	186	TOT	405	135			
1	29,82	8		54,675				
	K8MR			K8GT				
160	45	22	160	0	0			
80	62	22	80	120	34			
40	49	22	40	69	25			
20	49	21	20	60	28			
15	65	21	15	36	16			
10	53	21	10	14	8			
TOT	323	129	TOT	299	111			
	41,66	7		33,18	9			
NU8Z		194-91-17,	654					

#### **ARRL 10M** CW SSB Mix CW SSB Mix AA8U 659 69 181,884 AA8HZ 191 189 43 102,350 46 KG8CW 182 183 33 24 62,586 W8MJ 40 31,200 L/P AA8R 20,640 L/P 240 43 AA8VN 74 20 32 13 9,240 K8GT L/P 48 17

CQ 1	60M CW		
K8CC	1119 56 55	451,215	Op. W8MJ
AA8U	815 56 44	254,600	·
AA8R	380 64	60,224	Low Power
K8MR	272 58	37,352	Low Power
KU8E	175 63	31,122	
K8JM	226 42	21,168	
VE3ZTH	64 26	7,930	+Packet
NU8Z	1055 57 49	371,742	(ƏN8CC,+K8AQM,K8KS, K8AEM,KG8CO,W8MC)

#### **NAQP SSB** W8MJ USAA 160 204 47 160 122 45 80 247 53 80 426 55 40 108 49 57 23 40 20 174 39 20 339 56 15 109 27 15 26 11 10 11 6 10 0 0 TOT 853 221 TOT 970 190 188,513 184,920 W8MJ 794-180-142,920 KG8CW 371-119- 44,149 341-113- 38,533 NU8Z K8MR 195-104- 20,280 AC8E 185- 89- 16,465 N8TR 116-65-7,540 K8RM 102-48-4,896 W8AJ 75-31-2,325

#### K8MR 50 88 27 144 137 27 222 28 14 432 63 20 TOT 316 88 35,816

**VHF SWEEPSTAKES** 

## 1996 Sweepstakes SSB From K7UP

By Mike Bruening, W5FX (ex AA8FE)

Greetings from the desert southwest! My move here to El Paso in June '96 gave me mixed emotions - leaving my home state, many friends and family members on one hand, but moving to a larger market (a plus in the broadcasting business) and the prospect of spending a winter with temperatures in the 50s and 60s. Oh, yes..and the possibility of doing some SS operating from an area of the US that has traditionally provided plenty of top ten scores! Prior to leaving Michigan, a "CQ El Paso" posting on the Internet Contest Reflector was answered by Steve, KN5H who lives near Las Cruces, NM (about forty miles north of El Paso). He invited me to join in with himself and John, K7UP who owns a well-appointed station located in the foothills of the Organ Mountains just east of Las Cruces.

My first exposure to K7UP came in October when we all got together for CQWW SSB just for some fun. There was a decent JA opening Saturday night, which gave me the opportunity to put the NA rate meter above 100+ for a fair period of time. Having passed my "audition", I was invited by K7UP to handle the chores of SS Phone single-op high power (both John and Steve are dedicated CW ops). I jumped at the opportunity to see just how different the propagation was here in the southwest...and maybe a chance at a top-ten score!!

The K7UP station is somewhat modest by "Big Gun" standards. It's not designed for DX contesting (which down here is about as much fun as watching cactus grow!), K7UP is instead set up for taking advantage of the superior conditions that exist for stateside contesting. The rig (just one!) is an ICOM IC-765 drving a Drake L4B amplifier. I had brought along my Heil Pro-Set and trusty MFJ voice keyer (no sound card in the computer). The 386-66 computer had NA9 up and running. The antennas are on two towers, and consist of a 5L 10 at 85', a 4L 15 at 75', a 4L 20 at

65', a KLM 4L 40 at 75', plus a TH6 fixed NE at 40' and an A3 fixed NW at 60'. A 40 dipole and a pair of inverted Vs for 80 round out the setup. Steve handles most of the antenna maintenance chores.

I arrived at K7UP on the Saturday of SS at about 10 AM, having had little opportunity to sit down in the weeks prior and "play around" to see how the bands reacted at different times of day. This would later prove to be a bit of a problem. I hopped on the radio a little after noon to begin getting the feel of things. Which band to start on? 10 was dead (big surprise there, huh?) so the choice came down to 15 or 20. 15 seemed in pretty good shape to the east, with lots of elbow room. Several QSOs before the contest indicated a booming signal to the coast, so 15 it was. It's now 2100Z...off and running!

21Z: 15 meters. 124 Qs, 28 sections. East coast booming in. Pileup technique.

22Z: Still on 15, but rate slows as band folds like a cheap suit. QSY to 20.

Takes some time to find a hole, but rate holds at 100 for hour #2 plus 21 sections.

23Z: 20 meters. 110 Qs, 7 sections. 334 x 56 after three hours. Looking good!

00Z: Rate starts slipping. Snag VY1JA and QSY to 40. 83 Qs, 14 sections.

01Z: 40 meters. 91 Qs, 1 section. 508 x 71 after five hours.

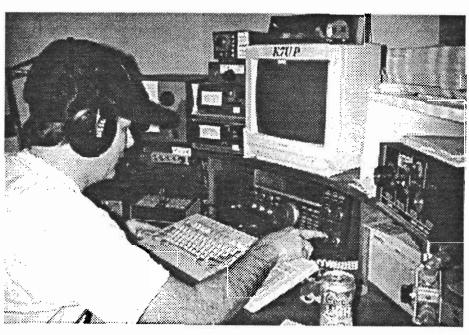
02Z: Hour starts off good until the @#\$%\$ Voice of America decides to sign on right on my frequency. End the hour with 77 Qs and 1 new section.

03Z: A QSY to 80 proves useless. Lose time and rate. Back to 40. 67 Qs.

04Z: 40 meters is the only meters! 94 Qs. 746 x 73 after eight hours. Still feeling good as I work lots of guns with lower QSO totals.

05Z: The 40 monobander goes too long...all I'm hearing is European QRM and CQs on the dipole don't net much. Back to 80. Bad move. 58 QSOs for the hour.

(Continued on page 5)



Mike, W5FX at the controls of K7UP

#### '96 SS SSB at K7UP

(Continued from page 4)

06Z: Back to 40 on the dipole. East coast is difficult to dig out of the noise, but lots of midwest and west coast make up for it. 88 QSOs. That's better.

07Z: 40/80 back and forth. Things are slowing down (including me!), 53 QSOs but at least VE2 calls in for #74.

08Z: Decide to go another hour. Again on 40 and 80. 63 QSOs and VE9ZL for the Maritime mult. Call it quits for the night at 0859Z with 1008 x 75.

Rolled out the sleeping bag and zonked out in two minutes, having set the alarm for 1400Z. A couple of cups of coffee and a pop-tart or two have me ready to get back in it!

15Z: Decide to start on 20. Still needing KL7, KP2 and KP4 for the sweep. Keeping this in mind ends up hurting me big time later in the afternoon. 71 Qs to kick off the day.

16Z: 20 meters. Camp out on a clear frequency and add 109 Qs.

17Z: 20 goes lame late in the hour. Up to 15. 78 Qs.

18Z: 15 meters. Working both east coast and northwest. Band is wonderfully quiet and weak signals are easy to pull out. 94 Qs. 1360 x 75.

19Z: I will look back on this hour as being the one where I probably cost myself a top ten finish as I decide to go multiplier hunting. I move to 20 and find KL7WP for #76 and then Stan, K8MJZ at WP2Z for #77. But is it worth it? Only 36 Qs in the hour.

20Z: Back up to 15 midway thorugh the hour, rate back to 58 Qs...but the trip up to 20 looking for mults cost me dearly. Dumb move!

21Z: 15 and 20 meters. 73 QSOs. 1527 x 77 with five hours to go.

22Z: 20 and 40. 54 Qs.

00Z: 40 working well, but I've STILL got this mind set of finding that PR mult. Trips to 20 looking around slow the rate. End the hour with 62 Os.

01Z: Staying where I should have (on 40) the rate goes back to 72.

02Z: Catching the last few stragglers, end the contest with a 51 QSO hour.

The final tally:

80 93

40 782

20 526

15 438

Total:  $1839 \times 77 = 283,206$ 

A good score...and my all-time best effort, but not what I wanted. Latest posting on the reflectors indicate that the score will most likely end up #12 USA. Another 150 Qs would have put the score over 300K and likely would have resulting in a Top Ten finish.

Some thoughts and self-analysis:

- 1) Forget the mults! From here in the southwest, the only thing you should be doing is RUNNING! There's no one off the back of your beams, and K7UP is loud wherever it is aimed. If the rate falters for a bit, sit it out. As long as the band is open, THE RATE WILL COME BACK!
- 2) Spend more time on 40.
- 3) Don't let anyone run you off a frequency (with the possible exception of the VOA on 40). Use the unique propagation from out here to your advantage and have confidence that no one is louder than you are!
- 4) Spend more time on 40!
- 5) Next year TWO RADIOS! Much of the time I wasted looking around the other bands for mults could have been done while maintaining a run frequency if I had used a second rig for the mult

hunt. Might even have nabbed KP4 for the sweep!

- 6) Spend more time on 40!!
- A more comfortable chair. My padded swivel rocker goes with me next year.

The K7UP station needs some ergonomic upgrades (plus a sound card in the computer) but otherwise is a dream to use. My thanks to John, K7UP for the opportunity to use his fine setup.

#### MRRC goes to KP4

(Continued from page 1)

positions, a bedroom with three beds, and another large room that can accommodate three additional operating positions. Monoband yagis for 20/15/10, plus lowband wires are in storage on site, plus a bunch of coax, one SB220, one desktop computer, cables for a CT network, etc.

The MRRC contingent will be taking two complete stations and manning three bands. Thank goodness Northwest flies non-stop to San Juan from Detroit! K8CC is taking the 20M station, which will be a TS930 and a Alpha 91B. AA8U is taking the 160M/10M station, which will be a FT990 and a Titan amplifier. Dave and Ken will be holding down 20, while Bruce does 160 and 10.

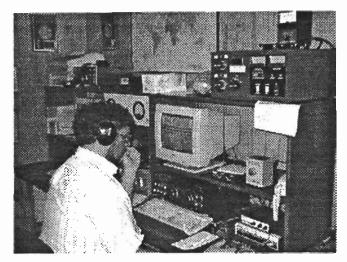
The WP3X team includes three other operators. Tyler, K3MM will be doing 15M with a FT1000MP and SB220, Ron, AA4S will be doing 80M with a IC765 and SB220, while Ken, N4UK will take care of 40M with a IC740 and SB220.

The entire station will be assembled the week before the contest, including antennas. This station has won multimulti the past two years signing KP4XS, so we plan to continue the tradition. We hope everyone in MRRC will get on and give WP3X a QSO on all six bands - we'll be looking for you!

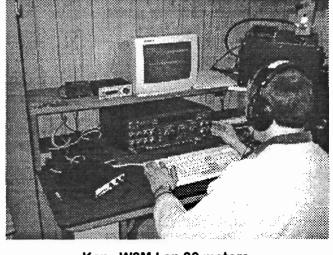
73, de K8CC, AA8U and W8MJ

## 1997 ARRL DX CW at K8CC

Not Shown: Stan- AC8W, Dave-K8CC, Hank-K8DD, Buck-N8CQA, Sinesa-VA3EFM, and Ron- W8RU



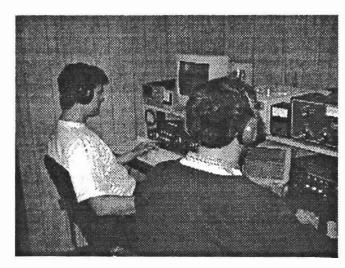
Greg, K8GL on 160 meters



Ken, W8MJ on 80 meters



Dennis, KT8X and Tim, K9TM on 40 meters



Nick, VA3NA and Greg, K8GL on 20 meters



John, K8JM and Jim, K8SIA on 15 meters



Tim, W8JJ on 10 meters

## **NCDXF Beacons**

Reprinted from the Frankford Radio Club Newsletter

The Northern California DX Foundation, in cooperation with the IARU, maintains a series of beacon stations which operate sequentially. The 10 dB power steps are precise and are useful for "S" meter calibration and for judging band conditions. The entire system was designed and built by Foundation volunteers at no cost except for the actual price of hardware components.

This table gives the minute and second within each hour of the start of the first transmission of each of the new five-band beacons on each frequency. Transmissions currently being sent are indicated in bold. Each transmission is repeated every three minutes. A transmission consists of the callsign of the beacon sent at 22 words per minute followed by one-second dashes. The callsign and the first dash are sent at 100 watts. The remaining dashes are sent at 10 watts, 1 watt, and 0.1 watts. The actual starting time of each transmission is approximately 20 milliseconds after the nominal time due to the keying delay of the transmitter. Equipment used at each site includes a Kenwood TS-50S transmitter, a Cushcraft R-5 vertical antenna, a Trimble "Navigation Acutime" GPS receiver, and a controller built by the NCDXF. For more information, contact the Northern California DX Foundation, Post Office Box 2368, Stanford, CA 94309-2368, USA.

Country	Call	14.100	18.110	21.150	24.930	28.200	Operator	Status
United Nations	4U1UN	00:00	00:10	00:20	00:30	00:40	UNRC	On the air
Canada	VE8AT	00:10	00:20	00:30	00:40	00:50	RAC	On the air, temporary site
USA*	W6WX	00:20	00:30	00:40	00:50	01:00	NCDXF	On the air
Hawaii*	KH6WO	00:30	00:40	00:50	01:00	01:10	UHRC	On the air, temporary site
New Zealand	ZL6B	00:40	00:50	01:00	01:10	01:20	NZART	In New Zealand
Australia	VK6RBP	00:50	01:00	01:10	01:20	01:30	WIA	Will ship December 1996
Japan*	<b>JA2IGY</b>	01:00	01:10	01:20	01:30	01:40	JARL	On the air
Russia		01:10	01:20	01:30	01:40	01:50		Planned
China		01:20	01:30	01:40	01:50	02:00	CRSA	Locating site
Sri Lanka	4S7B	01:30	01:40	01:50	02:00	02:10	RSSL	In Sri Lanka
South Africa	ZS6DN	01:40	01:50	02:00	02:10	02:20	ZS6DN	On the air
Kenya	5Z4B	01:50	02:00	02:10	02:20	02:30	RSK	On the air
Israel	4X6TU	02:00	02:10	02:20	02:30	02:40	U Tel Aviv	On the air
Finland	OH2B	02:10	02:20	02:30	02:40	02:50	U Helsinki	On the air
Madiera	CS3B	02:20	02:30	02:40	02:50	00:00	ARRM	On the air
Argentina	LU4AA	02:30	02:40	02:50	00:00	00:10	RCA	On the air
Peru	OA4B	02:40	02:50	00:00	00:10	00:20	RCP	Ready to ship
Venezuela	YV5B	02:50	00:00	00:10	00:20	00:30	RCV	On the air

Notes: The W6WX and KH6WO beacons are not yet licensed for 18.110 and 24.930 MHz operation. The JA2IGY beacon is currently licensed only for 14.100 MHz operation.

#### K8MAD On the Air By Dave Pruett, K8CC

An impromptu MRRC meeting was held on January, 8, 1997 at the QTH of K8CC. The occasion was a visit from Bill Kennamer, K5FUV, DXCC manager at the ARRL who was in town to do presentation of the XZ1A DXpedition at the SE Michigan DX Association. Bill is an active contester, having been one of the driving forces behind N5AU in the eighties, and his visit was seen as an opportunity for Bill to meet MRRC members and the west

side Detroit DXers. A dozen or so people showed up, mostly MRRC members but also a few guests from SEMDXA.

Since this was also the weekend of the NCJ North American QSO Party on CW, we decided to put K8MAD on the air in the multi-2 category. Two FT-1000Ds were available to whoever wanted to operate. After starting an hour late, both rigs were keep humming for most of the afternoon. After most of the folks left, AA8U and K8CC took Bill out for pizza and the usual contester ragchewing. Finally, after

another showing of the Burma slides for the benefit of K8CC, Bill and Dave took one more turn at the radios to catch the last few low band multipliers. The final score for K8MAD looks like this:

> 160 107 36 80 122 42 40 159 44 20 80 25 15 26 15 10 11 505 171 = 86,355

Not a bad score for a somewhat "casual" effort. When will K8MAD ride again? How about Field Day 1997?

## Treasurer's Report By Tim O'Sullivan, KE

By Tim O'Sullivan, KE8OC keloc@eol.com



Not much to report financially this month. Trimming the roster saved money on newsletter printing, and some dues are still trickling in. We're solvent, and things look good for the second half of MRRC year.

Balance reported 12/96	\$407.20
Income	
Dues received	\$70.00
Badge Income	\$30.00
Expenses	
Checking Acct Maintenence	\$ 9.00
Plaques	\$ 50.00
FLASH printing	\$ 79.00
Balance 2/97	\$369.20

Respectfully Submitted, Tim O'Sullivan, KE8OC

### 40M Vertical Array

(Continued from page 2)

The first few nights of operating were encouraging. EA8, 3B8, ZA1, J28, and OH0 were quickly logged first call, all while running 8 watts output! At this level I had Europeans answering my CQ's, which was quite a thrill for someone habitually frustrated by the band. Operation in the CQ WPX SSB Contest was a treat. With the amplifier Europeans were easily worked first call, something never before enjoyed by the author.

Alas, the lawn had to be mowed, and the array was delegated to "winter only" status. Plans for K8GL in '97 include two of these arrays in phase with 100' spacing between them, being opposite ends of the 80 meter 4 square. This would put 6 elements on Europe, a target three-point area previously owned and hoarded by the privileged few.

I was pleasantly encouraged by the results shown by this simple array. Similar systems tailored for different bands, or phone/CW, can easily be fit into most urban areas. The ultimate benefit is from the lack of rotor and lack of investment needed.

I'd appreciate hearing from anyone else trying similar arrays of this sort.



MAD RIVER RADIO CLUB Dave Pruett, K8CC 2727 Harris Road Ypsilanti, MI 48198 USA





Jim Stahl K8MR 30499 Jackson Road Chagrin Falls, OH 44022

#### **MAD RIVER RADIO CLUB OFFICERS**

President: Bruce Lafethin, AA8U 9221 Ford Road Rives Junction, MI, 44691 (517) 589-2763 as8u@voyager.net Treasurer: Tim O'Suillvan, KESOC 39991 Finley Drive Canton, MI 48188 (313) 397-9732 ke8oc@aol.com

Scorekeeper:
Jim Stahl, K&MR
30499 Jackson Road
Chagrin Falle, OH 44022
(216) 831-6954
k&mr@barf80.nahore.org

Editor:
Dave Pruett, KBCC
2727 Harris Road
Ypellanti, MI 48198
(313) 481-0755
k8cc@bcnetcom.com