

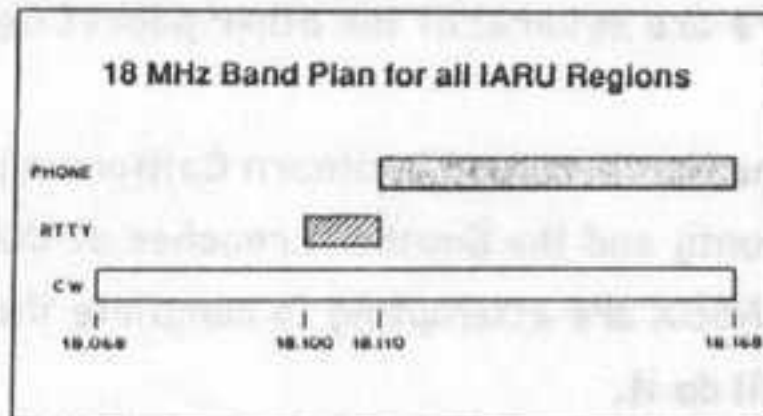
# SCCCORE SOUTHERN CALIFORNIA CONTEST CLUB OPERATIONS, RESULTS, ENLIGHTENMENTS.

MAR/APR 89

## 17 METER BAND OPENS

At 0001Z on January 31 the 17 meter band was officially opened to amateur use. The 17-meter band is one of three new HF bands allocated to the amateur service by the 1979 WARC. The other two bands, 30 meters (10.1-10.150) and 12 meters (24.890-24.990) have already been allocated to the service.

The band is open to all General, Advanced and Extra class licensees with a maximum output power of 1500 watts. CW is permitted over the entire band, with RTTY/packet recommended from 18.100-18.110. The SSB/analog subband is from 18.110-18.168. \* See below:



## HAM RANKS ON THE INCREASE

For the first time in history the ham ranks have exceeded 440,000 according to FCC figures. This information is good for contest planning purposes.

NOVICE	80,168
TECHNICIAN	101,495
GENERAL	113,082
ADVANCED	98,681
EXTRA	46,885
<b>TOTAL</b>	<b>440,311</b>

## SCCC SOUTH COUNTIES GAIN ANOTHER OP

Dennis, NE6I, has just relocated from the Lancaster area to the San Diego area. We're sure that Dennis will be joining some of the San Diego SCCC groups for some serious contesting. Dennis is a past President of the SCCC and one of the SCCC Mexico contest pioneers. NE6I address will be published in the next issue of SCCCORE.

## NEXT MEETING OF THE SCCC

The next meeting of the SCCC will be held in conjunction with the DX convention at Visalia, California on Saturday April 22nd at 3pm. There will also be some contest rooms at the convention offering tall tales and tall ales.... Look for further details on the SCCC meeting at the convention. They will be posted on the announcement board in the hotel lobby..

The convention promises to be the best with a cocktail party Friday evening; presentations and sessions all day Saturday; cocktail party Saturday afternoon; banquet and guest speakers Saturday nite; and breakfast and speakers Sunday morning. The convention ends at noon on Sunday. CU there!

SCCC OFFICERS: PRESIDENT, RAY, N6VR; V.P., KEVIN, NC6U; SEC/TREAS., SKI, N6AD1; SGT. ARMS, JIM, N6TJ; BOARD MEMBERS: WA6OTU, MARK; N6ZZ, PHIL; NE6I, DENNIS; NI6W, KURT.

DUES ARE \$4.00 PER YEAR TO M. BROZOWSKY

PO BOX 62, OAK VIEW, CALIF. 93022.....



From the Prez:

Welcome to April, where does the time go? Sent off for some of that Antenna Wax that was advertised in April QST. Says it will lower my SWL if I give my 80m vertical a good rub down with it. Boy, I'm glad, I've always had a high SWL with that antenna.

Think we have all enjoyed this years contest season with the generally great conditions. A new contest coming up on April 9 is the USA-USSR Goodwill Contest. US and USSR work each other only! Its for 24 hours (0000 - 2359) but select only your best 5 hours for your score. Almost could treat this one like a Sprint if you didn't have the full 24 hours to operate. (I'd suggest about 6-7 PM to 11 PM midnight and/or Sunday early morning 6 to 8AM). Exchange for the US is report, QSO number and State, phone and/or CW and only on 10, 15 and 20m. I'm not certain of the exchange, CQ says a report is needed, QST and NCJ say no. If the bands are in good shape, the West Coast could do well. For other contest info see the Contest Calendar within the bulletin.

Next meeting of the SCCC will be on April 22 at the Visalia DX Convention, probable about 3 PM near the indoor swimming pool. We'll pass the word around on Friday and Saturday if there are any changes. At the last SCCC meeting at Luigi's the club agreed to help the NCCC with some beer for the Saturday night bash. So we'll be passing the hat around for a collection. Thanks....

Talking about meetings, I'd like to ask if anyone would like to volunteer their QTH for a SCCC meeting during the summer? Only requirement is that you have a BBQ, charcoal and plenty of ice. Last summer we met at the QTH's of K6GXO and K6JYO. These gatherings bring some variety to the club meetings and gives us all a chance to see some of the other guys stations.

If you are not yet on 2M packet radio you ought to consider it or at least see it in operation. I'm on myself somewhat, its fun (to see if you can list a rarer one than the last guy) and also makes you feel good by helping the newer, less experienced guys find good DX to chase. It really works too. I've found some good DX and band opening by packet, and also when I've announced something rare, within seconds there are several of the other packet users in there calling. The trick is to work them first then announce....

The packet managers are in the process of attempting to connect the Northern and Southern California packet groups. The problem is that there is a large gap between Northern L.A. county and the Southern reaches of the W6OAT packet group in the bay area. Bill, WA6IET near Santa Maria and Darrell, N6DX are attempting to complete the link. If these stations can connect, or possibly if N6DX can reach Fresno, that will do it.

Darrell, N6DX would like it to be known that his station can be used for any official SCCC functions or activities. The station is slowly progressing in becoming a very competitive station. Separate towers and stacks for 10,15 and 20M are at different points of completion. The really big antennas for 80 and 160M will take a little longer. Contact N6DX, N6IC or N6VR for more information.

Finally, please note the SCCC CW Sprint results further in the bulletin. Its quite interesting to see all the results in one place. The most noticeable scores, of course, are those of N6TR and K6NA. Dave, K6LL has always done well, but not always for the SCCC. The other noticeable thing is that out of almost 100 members, only 54 have ever entered the CW Sprint, and of those who have, hardly a dozen are consistent entries. But you say, what about the phone Sprint? Its even worse. We seldom have a full team for phone, and of those who enter, only 3 or 4 are consistent. For a contest club, we could sure do a lot better. I remember back when Jim, N6TJ challenged the NCCC. That was a good sprint, we had nearly 30 entries. With the combined entries of the SCCC and the NCCC for that contest, the W6's accounted for 50 percent of the total Sprint entries. But really, as a club member, think about the Sprint and enter the next one in September. You can be sure you'll hear more from me about it!. 73's and DX, c u at Visalia.

RAY, N6VR  
President, SCCC



OPERATOR	AVERAGE	CLAIMED	STATION	SEPT 88	STATION	FEB 88	STATION	SEPT 87	STATION	FEB 87	STATION	SEPT 86	STATION	FEB 86	STATION
N6TR/7	12202			13728		12978		13120		12714		9088		11583	
K6LL/7	12030	13020												11040	
K6NA	11856	12159		13254		12520		11760		12012		9372			
K6STI	11580	11808	N6ND	11352	K6JYD										
WA6DTU	10658		W6AQ	12232	W6AQ	12306	W6AQ	11080	W6AQ		W6AQ	8820	W6AQ	8854	W6AQ
N6AA	10555			10569	N6AA/7	11726		11840		10520		9758		8917	
N6ZZ	10343	11567		12558		11316		9694		10412	N6VI	8840		8015	N6VI
N7BG	10218									10218					
N6TJ	10149			10680	W7EJ	12390		10608		8640	W6MKB	9828	W6MKB	8750	
NE6I	10014			11094		11398		9472		9576				8532	
AA6RX	9910					11560	W6UE			10260	W6UE	9768	W6UE	8050	W6UE
W6YA	9586	11625		10406				11193		5120					
N6CW	9376			11340						7412					
NI6W	9163	10600		10922	N6ND	9361	W6KUT	9126	W6KUT	8568	W6KUT	7656	W6KUT	7910	W6KUT
N6VR	9061	11475		10062		7585		10707		8424		7788		7385	
K5MM/7	8892													8892	
W6SX	8444							9462		7425					
KZ6E	8034					8510						7557			
K9VV	7677	7805	XE1FUX/2			9120		6107	XE1FUX/2						
AC6T	7589			7800				7378							
NC6U	7483			7236		8288		8584		5824					
W7CB/6	7459			7480		7527		8600		5888				7878	
N6ND	7255							7676		7560				6528	
W6UQF	7224	9006		9675		2072		7910		7455					
N7CW/6	7210									7210					
W6NV	6615							6615							
N6AW	6293													6293	
KD7EY	5880			5670	WA6WZO	6090									
K6VNX	5874					6688		5810		5976		5022			
N8BJQ/6	5742													5742	
N6MM	5495					5495									
WE7G	5402			5402											
KV0I	5187	6600		4900				4060							
WK6V	5146							5146							
W6DUL	5093					4551		5635							
N6VI	5070							5070							
N6NI	5022							5022							
N6CQ/3	4892	8229		7942		1078		5474		5611		3510		2400	
N6MA	4630					620		8640							
W6EE	4026							4026							
KB6RFX	3978			3978											
N6IC	3388										3388				
W6XD	2745									2730		2760			
W6HAL	2435					2970		2200						2136	
K5KT/6	2388					2300				2475					
W2KVA/6	1844							1587				2100			
W6TMD	1656									1656					
K6GXO	1449													1449	
K7NHV	896					896									
W6GC	672													672	
AA6CR	286							286							



**W**hen it comes to their antennas, contesters tend to fall into one of three categories. Some hams are compelled to put up tall towers with all the elements they will hold, while others are content to attack the fray with whatever they happen to have. This month's column is directed to those with physical limitations of their real estate, but who are willing to put forth the effort to optimize what they are able to put up. These stations are usually limited to a single tower—the question is how to get the most out of it.

For the contester, balanced performance is important—emphasizing one band while shortchanging the others is usually counter-productive. For example, a very large 15-meter beam is not a good idea if it limits you to small beams on 20 and 10 meters and no beam on 40 meters. The difference between a large beam and a small beam is minor, while the difference between having a beam or not is a big deal.

W9XT's Contest Tips, Tricks and Techniques column in the July/August 1988 *NCJ* asked the question "What would be the optimum antenna complement for contesting using one tower, maximum of 120' high?" The respondents were in surprisingly unanimous agreement: a 90-100' tower with a tribander and a shortened 40-m beam. This type of station offers balanced performance, a good signal and is well within the reach of most contesters.

Let's assume you are going to put up a single tower, between 50' and 100' high. (The reasoning behind these heights will be explained later). We will also assume that you will have a mast extending out of this tower approximately 10 feet. This distance is probably the minimum required to ensure minimal interactions between adjacent beams, particularly between 15 m and 40 m. We will assume that the antenna complement will be a tribander and a shortened 40-m beam. As an alternative, a "Christmas Tree" of monobanders is not out of the question, given the height constraints which we will discuss. With balanced performance in mind, we will see that the choice of tower height and antenna placement are inter-related between the various ham bands.

## 10 Meters

Ten meters offers the shortest wavelengths of the HF ham bands, which means that changes in tower height have the greatest impact. This band is also rarely affected by D-layer absorption, which attenuates low-angle waves before they even reach the reflecting layers of the ionosphere.

A 100-foot-high 10-m beam is a low angle radiator, while a 50-foot-high 10-m beam is a moderate angle radiator. The higher antenna will be better any time the MUF (Maximum Usable Frequency) on the path is at, or just above 28 MHz. As the MUF exceeds 28 MHz, the optimum angle of

radiation increases, and lower antennas come into their own. These criteria can be applied to a path of any length—just remember that angle of radiation is related to that which exists on the path at that moment.

Experience has shown that a 100-foot-high 10-m antenna is not too high for the majority of operating. When the sunspots increase and conditions get good, you may get beaten by stations with lower antennas. For those conditions, you might want to consider adding an alternate antenna, or a second tribander for use in a stack (which we will discuss in a moment). Overall, it is better to be too high on 10 m, rather than too low.

## 15 Meters

Fifteen meters is a chameleon band. With low sunspots, it acts like 10 meters, but with high sunspots it can (and often does) act like 20 meters: It can be affected by D-layer absorption. When the MUF is at 21 MHz, very high antennas can produce impressive results, but these same very high antennas get killed at moderate wave angles. These considerations argue for moderate tower heights—fortunate, given our mechanical constraints.

A 50-foot-high antenna on 15 m is slightly over a wavelength high, while a 100-foot-high antenna is about 2.1 wavelengths above ground. The higher antenna will be better opening and closing the band, while the low antenna may be better at the peak of the opening. However, another consideration is that during the peak of an opening (which would correspond to the maximum MUF on that path) a single-op all-bander would be wise to QSY up to 28 MHz; that high-angle capability might not be important. Overall, we would conclude that we would like the 15-m beam to be at the high end of our available heights, rather than the low end.

## 20 Meters

Here is where our requirements begin to change. Twenty meters is a band which is dependent on the sunspots to drive the MUF about 14 MHz for it to work, but which can also be limited by the LUF (Lowest Usable Frequency), controlled primarily by D-layer absorption.

The D layer is the bottom-most layer of the ionosphere. Its characteristics are dependent on illumination from the sun, which causes its absorption to increase with the amount of daylight present on the path in question. This same solar illumination is what causes the path MUF to increase, so you can see that as the MUF rises, we are trapped between a rising LUF and the upper end of the 20-meter band.

Twenty meters also responds to geomagnetic disturbances differently than either 15 or 10 meters. A disturbance can often shut these bands down entirely, but 20 can remain open with weak signals.

Those signals that do arrive come at a relatively high angle.

Experience has shown that a 100' tower height works very well on 20 meters under most conditions. Disturbances can dictate the need for a lower antenna—but hopefully, these conditions are rare. An antenna at 100' is not too high to get killed by normal D-layer absorption—again, the ardent single-op will have QSYed to 21 or 28 MHz long before that becomes a problem. We can conclude that we would prefer our 20-meter antenna to be at the high end of our available tower height.

## 40 Meters

Given our limitations of height, on 40 meters the higher the better. Antennas for this band are the low in terms of wavelength, but as it turns out this is not too much of a disadvantage. Radiation angles on this band are moderate because D-layer absorption limits daytime DX. As night falls and the D-layer dissipates, DX is possible.

Changes in height from 50' to 100' can make a very big difference on 7 MHz. A 50-foot-high antenna is only 3/8 wavelength up. At that height, the major lobe is around 40 degrees and there is appreciable radiation at higher angles which is only slightly suppressed by the H-plane pattern of the beam. What all that technical jargon means is that although a 50-foot-high 40-m beam will radiate, it will not show much directivity or DX-pileup punch.

The situation gets better as we go higher. At one wavelength (70'), the main lobe is at 30 degrees. More importantly, though, there is a natural null at high angles which can reduce close-in QRM. N4KG argues for 5/8 wavelength (80') as the optimum height for a 40-m antenna. Tom's reasoning is that minimum self-impedance of the elements occurs at this height, which leads to maximum element currents, and therefore gain. At 3/4 wavelength (100'), the high angle lobe is back, but the main lobe is down to 20 degrees—a good spot for 40-m DX.

We can conclude that higher is better for 40 m. This can drive us to choose higher towers, but also can influence our stacking decisions—that is, which antenna to put on top.

## 80 Meters

This can be a most difficult band on a city lot. If the tower is your only antenna support, it will be very difficult to construct an above-average antenna for 80 m.

Probably the best 80-m antenna for the single tower station (and one which the CTT&T respondents also agreed upon) is the sloper. Accurate measurements of these antennas show them to have unity gain (that is, none over a dipole) but often with some observable directivity. They are mechanically more convenient than either a dipole or inverted-V in that only one high support is required.

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However, a full-size half-wave sloper reasonably requires a tower at the upper end of our criteria (96' for a 45 degree slope). Half-wave slopers hung from lower supports start to resemble droopy dipoles, with equivalent performance.

For lower tower heights the quarter-wave sloper (also known as the half-sloper—confusing, huh?) could be a viable choice. Even a 50' tower provides a 45 degree slope angle, and experience has shown that slopers hung from towers in the 50'-70' range are often easier to match and tune than those hung from higher towers.

When it comes to 80 m on a city lot, nothing is gonna beat the guy across town with the 80-m beam. Take heart though: As the sunspots go up, so does the 80-m radiation angle and the simple antennas (like slopers) don't do so bad.

#### 160 Meters

The recommendation for this band is simple—shunt feed the tower. It will probably radiate better than any wire you can put up, and it won't interfere with your best shot on 80 m (remember, balanced performance).

A shunt-fed tower has a higher self-impedance than your typical wire vertical, so it is not quite so dependent on you copper-plating the back yard. However, a good ground helps—drive in as many ground rods as you can stand, then lay out as many radials as you can find wire for. They don't have to be resonant; any wire on the ground helps.

With a kilowatt amplifier, a reasonable shunt-fed tower will get you through most of the pileups on 160 m.

#### Conclusions

From this discussion, we can conclude:

1. Our tower should be as high as we can make it. We don't want the 20-m antenna to be above 100', which means that the tower should be in the range of 90' to 100', depending on how we stack the beams.

2. The 40-m beam wants to be up high, another argument for the taller tower. It also wants to be on top of the stack—that is, at the top of the mast extending out of the tower. This makes the 40-m beam (which is usually the least mechanically reliable) hard to get to for repair.

3. If you are severely restricted on tower height, try to put up at least a 50 footer. If the 40-m beam is installed on top of the mast, it will be around 60' above ground, where it has a chance to develop some reasonable directivity.

4. The taller towers will make our life less miserable on 80 m, using a sloping dipole appropriate for the size tower we erect.

5. Shunt-feed the tower for 160 m

#### Tips for Success

- My recommendation is to buy a tri-band, rather than trying to interface mono-banders. But buy a good tri-band—in this context, generally bigger is better. The most popular tri-banders are the KLM KT34XA and the Hy-Gain TH6DXX/TH7DXX. The KLM probably has better gain, but the reported pattern on 15 m leaves something to be desired. The TH6/TH7 are in wide use, and

very reliable. Also, the Mosley Classic 36 and its successors are worthy of consideration.

- Take every precaution to make your 40-m beam reliable *before* you put it up, particularly if it will be above the tribander at the top of the mast. There is probably nothing to be done to a Mosley S402, but a Hy-Gain 402BA needs to have something done to its driven element insulators unless you're only going to run an SB-200 or treat it with kid gloves. With the Cushcraft 40-2CD, you need to pin the boom sections with through bolts (don't trust the hose clamps), and also stuff a piece of aluminum tubing or pipe in the ends of the boom. This will allow you to really torque down the element mount U-bolts, to prevent the elements from rotating on the boom (a common occurrence with these beams).

- Not really an antenna recommendation, but a big help when running from a small station (or any station, really) is to acquire an amplifier capable of running the legal limit under contest duty cycles. There really is a big difference between 1500 W output and the 700-1000 W output produced by amplifiers designed before the new FCC power regs.

- If you want to be on the leading edge of contest antenna technology, try stacking two tribanders. A second tribander, mounted one third to one half way up the tower will provide the same advantages as when stacking monobanders. The trick is figuring out a way to feed the array, maintaining impedances while providing the two-way power split. I know of very few people who have successfully stacked tribanders. Maybe if we all get together, K7RI will tell us how he did it!

#### Comments

At this point, you may be telling yourself that even with the right choices, a single-tower station cannot compete with the big guns. To a certain extent, this is true, but you might be surprised how many "big-guns" are running these types of stations. As a prime example, is our very own NCJ editor K5ZD/3 in suburban Pittsburgh, Pennsylvania. Randy has a 100' Rohn 45G tower carrying a TH7DXX at 100' and a Cushcraft 40-2CD at 110', a quarter sloper for 160 m and an inverted-V for 80m. Very similar to the description of our "engineered" station, huh? It works well enough (4th place on the claimed score list for 1988 CQWW SSB) to have his W8 neighbors muttering to themselves...some W3s too.

#### Coming Attractions

Next issue, we will look at the K8CC Five-Element Beam. My goal was to design a good beam for use at the K8CC contest station, using computer modeling techniques. The resulting design and the methods which led to it were presented at the 1988 Dayton Antenna Forum. After two seasons of use, the design seems to work well, and hopefully others will find it of use.

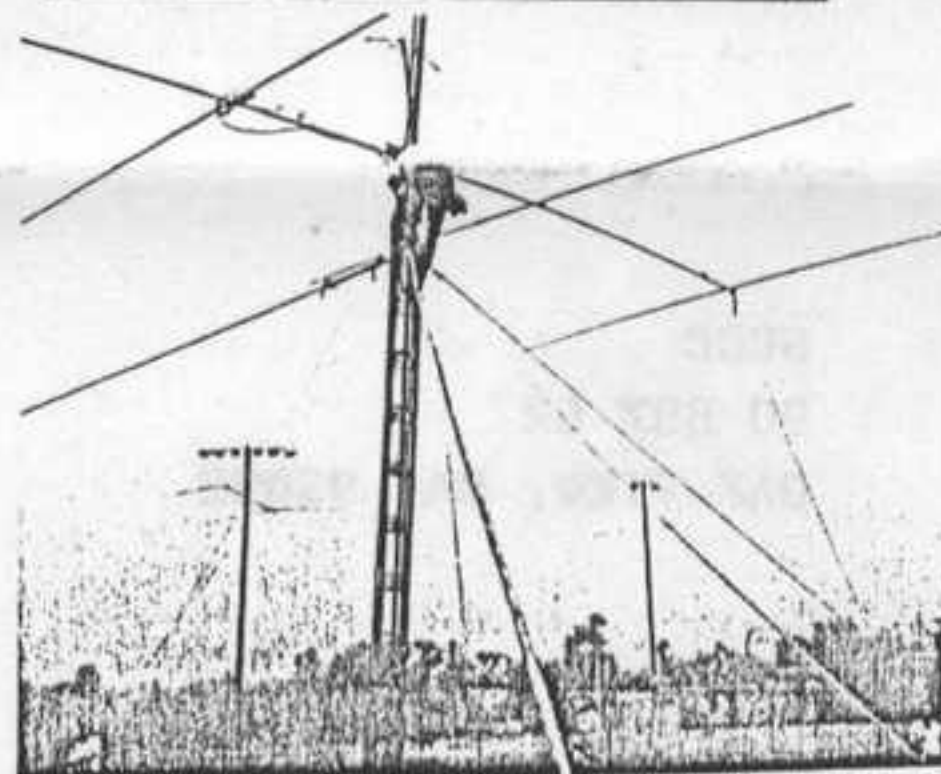
The following issue, I hope to do a column on computer antenna modeling, discussing software and techniques to analyze antennas

without actually having to build them. We hope to review most of the major antenna modeling software packages available to the general ham community. Authors, if you have something which you think should be reviewed, let me know about it.

There has not been much mail received here concerning topics for this column. This month was an attempt to get away from the pie-in-the-sky stuff, and get down to where the "middle-gun" could benefit. Your comments are still solicited for what you would like to see in the upcoming columns—even the announced subjects are not sacred and good subjects/questions are always welcome.

#### Coming Events

Mar 25—CQ WPX Phone Contest  
Apr 1—Massachusetts QSO Party  
Apr 8—NA QSO Party CW Contest  
Apr 15—NA QSO Party Phone Contest  
May 10—WPX Phone Log Deadline  
May 20—Midnight Special  
May 27—CQ WPX CW Contest  
July 10—WPX CW Log Deadline  
Sep 10—NA Sprint CW Contest  
Sep 17—NA Sprint Phone Contest



FIELD DAY ? ANYONE ?

#### ADS AND ANNOUNCEMENTS

FOR SALE: 402 BA (40 METER 2-ELEMENT YAGI \$100.; TH3MK3- 90X COMPLETE \$50. OR TRADE ? CONTACT : RAY, N6VR AT (805)-649-9696...

ANNOUNCEMENT: RAINBOW RIDGE WORK PARTY ON APRIL 15TH. MONITORING DX REPEATER OR CONTACT RAY, N6VR...

YOUR ADS OR ANNOUNCEMENTS COULD BE USED HERE... SEND THEM IN...

WHAT ABOUT FIELD DAY 1989 ? ARE WE GOING TO DO SOMETHING OR JOIN THE HUGHES CREW AGAIN ?



