



RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. XLV NO. 1

P.O. BOX 3454, TUSTIN, CA 92861-3454

JANUARY 2004

THE PREZ SEZ:

First let me wish everyone a very happy, healthy and Ham Radio filled New Year. So, I know everyone wants to know what kind of President I will make, being the quiet and introverted type. Just what direction would I like to see things go?

I believe our monthly meetings should be fun and deal with our hobby, although I recognize that club business needs to be conducted, and because we are 'people', some of these meetings can become passionate. I will however control them, and expect others to speak up, if I am not doing it.

The club breakfasts seem to be going OK, we sit and talk, and on occasion plan for future activities.

During meetings, I have heard suggestions that we get involved in activities, perhaps building activities, perhaps serious setup/demonstrations of various activities of our hobby. These are terrific ideas, and I personally would consider such meetings a success if we had 2-4 people participating.

One successful activity are Larry's Not-So-DXperditions. It might be something to consider if we set something like this up close by. How about along the shore line in Newport or Huntington Beach? This might allow additional people to attend.

So the bottom line is: I would like to create activities involving ham

radio that club members would attend and enjoy - I am open to all suggestions.

The amount of fun and enjoyment we can have, is totally in our own hands.

73, Steve, KB1GZ



The first issue of 73 Magazine cover. See Page 5 for 73's demise.

Reminder:

It's time to pay your club dues for the 2004 year.

You must pay by March 31st to remain a member in good standing and be included on the private roster. Dues remain at \$20, the same as last year (Bet your cable TV company cant say that!) Please pay Bob, KD6BWH at a meeting or breakfast, or mail your dues to our P.O. Box.

JANUARY PROGRAM:

J-Pole Antennas... Why they are good... How they work...
by Ken Konechy, W6HHC.

Ken will compare the performance of a J-Pole to other antennas, explain how they work, explain why they work so much better than a dipole or 5/8 wavelength antenna. They are really simple to build. Learn how to calculate the dimensions and how to build one yourself if you are so inclined. He will also show you how to build a "super-J-Pole", too.

The next regular meeting will be:

**Friday, Jan 16th 2004
@ 7:00 PM**

We will be meeting in **Room 208** in the **east Red Cross Bldg.**

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**Next Club Breakfast &
Open Board Meeting
February 7th 2004**

**THE ORANGE COUNTY
AMATEUR RADIO CLUB,
INC.**

P.O. Box 3454, Tustin, CA 92781



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Monthly Events:

General Meeting:

Third Friday of the Month
At 7:00PM
American Red Cross
601 N. Golden Circle Dr.
(near Tustin Ave & 4th St)
Santa Ana, CA

Club Breakfast:

First Saturday of the
month at 8:00 AM
CowGirl's Cafe, Too
2601S. Harbor Blvd.
(just south of Warner)
Santa Ana, CA

Club Nets (Listen for W6ZE):

7.115 MHz CW OCNW
Sun - 9:00 AM - 10:00 AM
Rick KF6UEB, Net Cntl.

28.375± MHz SSB
Wed - 7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wed - 8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

VISIT OUR WEB SITE

<http://www.w6ze.org>

for up-to-the-minute club
information, the latest
membership rosters, spec-
ial activities, back issues
of **RF**, links to ham-related
sites, vendors and manu-
facturers, pictures of club
events and much much
more.

Club Dues:

Regular Members \$20
Family Members* \$10
Teenage Members \$10
Club Badge** \$3

Dues run from January thru December
& are prorated for new members.

*Additional members in the family of
a regular member pay the family
rate up to \$30 per family.

**There is a \$1 charge if you'd like to
have your badge mailed to you.

Club Presents Award to: Cowgirls Café Too.



Photo tnx to W6HHC & his PDA camera!

At the January breakfast President Steve Brody, KB1GZ presented to the manager of Cowgirls Café Too in appreciation for their hosting our monthly club breakfast and Board meeting the following framed certificate:

**THE ORANGE COUNTY
AMATEUR RADIO CLUB**
Proudly Presents to:
Cowgirls' Café Too
Our Award of Appreciation
for providing our Club a place to hold its
monthly Breakfast and Board Meetings, and for
their fine service and hearty bill of fare.

Decreated: January 2004

Given Out at the Orange
County Amateur Radio Club

Refill Your Battery? (Micro Fuel Cells)

Wait, aren't you supposed to refill your butane lighter and recharge your handheld battery? Maybe not after a new technology emerges. STMicroelectronics is working on a micro fuel cell battery for handheld cell phones. If successful, it will surely quickly find its way into amateur handheld radios. The new fuel cell batteries will be considerably lighter than current battery technology but not smaller.

Currently, size is the problem. A typical cell phone requires 3.6V at 300 ma. Its battery size is on the order of 12 cubic centimeters in volume. Today's fuel cell structures require 60 square centimeters of surface area to produce this current. The output current is directly related to the surface area. ST's new See Fuel Cell on page 8

Christmas Dinner

For those of us that were sick or committed elsewhere, you missed a pretty good Christmas Party. It was held at Marie Callender's, near HRO, just off of Euclid and the 5 Freeway. The food was pretty good, and the service not bad.

Without hesitation, I can suggest this restaurant for a family meal, I think you will not be disappointed.

We initially had approximately 30 people commit to the dinner, but as several people were sick or were unable to attend in the end, we ended up with fifteen people attending. But since we did commit for about thirty people, they put on additional servers and table space. When the people did not

show, we were initially billed for the missing meals and service costs. We negotiated with them and things worked out pretty well. We ended up with paying about \$70 for the additional servers they hired for the evening and not for the additional fifteen or so meals not purchased, each at \$20.

We did learn a few things. First, their contract was poorly written and certainly didn't describe their requirements, and secondly, perhaps for next year, we might want to consider a prepayment option for dinner. This certainly would help determine the number of people who will be coming.

73, KB1GZ



Outgoing President Lowell, KQ6JD presents editor and webmaster Ken, W6HHC with the Good of the Club Award



Incoming President Steve, KB1GZ accepts gavel from outgoing President Lowell, KQ6JD [Tag! You're IT]

Bob's Tech Talk #25:
by: Bob, AF6C

Coax Cable Measurements

I had hoped a few club members would suggest new topics for the **Tech Talk** column, but (sigh) nary a peep was heard. However, it's still not too late for next month; **your inputs please!**

Hey, I was cleaning up in the garage and found a big hunk of RG-8 (50Ω) coaxial cable. It looked in pretty good shape and had PL-259 connectors on each end. I thought about getting out my tape measure, laying the cable on the sidewalk and measuring how long it was. But, it was supposed to start raining at any moment, and besides I was feeling lazy, so I decided to measure the length another way!

I dragged the roll of coax into the ham shack and connected a half-watt 150Ω carbon resistor across one end of the cable using very short leads. (I measured the resistor so I knew the resistance accurately!) The other end of the cable to be measured was connected to my noise bridge, and the impedance was measured at four frequencies that I picked pretty much at random. I chose: 7, 12, 17 and 22 MHz. – avoiding frequencies that were harmonics of each other.

Table One shows the impedance I measured at each frequency and its normalized value for plotting on a Smith Chart. Normalizing was explained last month, but basically each R and jX value was divided by the nominal impedance of the coax (50Ω) to get the normalized values for plotting. I also normalized the impedance of our 150Ω load in the same table. Now all the hard work was done!

Figure One (on page 6) shows a Smith Chart. The first point plotted on the chart was the 150 + j0Ω load impedance (in red); since it is purely resistive, it lies on the horizontal “axis of reals”. With a compass, a circle of constant SWR (solid

red circle) was then drawn so that it passes through the load impedance point and has its center at the *prime center* of the Smith Chart. This circle represents all the impedances that would be seen along the coax cable due to the 3.0:1 SWR presented by the 150Ω load, assuming there was no loss along the cable. A (red) line was also drawn from the *prime center* through the load impedance point to the outer wavelength scale.

Next, the four measured impedance points were plotted. Notice that they all fall inside the circle. This is due to loss in the coax; if there was no loss, these points would fall on the SWR circle. Finally, lines (blue) were drawn from the *prime center*, through each of the four impedance points and out to the outer wavelength scale.

How does this let you find the length? Look at the red line where it crosses the outer wavelength scale. Note that there are really two scales marked *wavelengths towards load* and *wavelengths towards generator*. Since we're going to start at the load we'll be using the scale marked *wavelengths towards generator*. Notice that the load (red) line crosses the scale at 0.25 wavelengths. Now look at the line passing through the 7 MHz impedance point; it crosses the scale at 0.43 wavelengths. The difference is 0.18 wavelengths. Since a full circle around the smith chart is 0.5 wavelengths, we know the the length of the cable must be 0.18 wavelengths plus an integral number of half wavelengths. In other words the cable is either 0.18, 0.68, 1.18, 1.68... wavelengths

long at 7 MHz. Using the formula for wavelength (feet) vs. frequency (MHz):

$$\lambda_{feet} = \frac{984}{f_{MHz}}$$

we find those cable wavelengths correspond to lengths of 24.8, 95.1, 165.3, 235.6... feet. But wait - that is the electrical length of the coaxial cable. RF moves slower in coax than in free air, so the cable is shorter than those numbers by the velocity factor of the cable, which for standard RG-8 is 0.88. Therefore the length of the cable is either 21'10", 83'8", 145'6" or 207'4". A good guess from looking at the cable is that the cable is 145'6"; but other frequencies can be used for confirmation. Since harmonics give similar results we've avoided them. Lets look at the impedance we see at 17 MHz. The solid blue line passing through the 17 MHz measured impedance reads 0.10 wavelengths on the *wavelengths towards generator* scale. But, watch out; we start at 0.25 wavelengths at the load (red) line and pass the 0.50 wavelength point at the far left of the scale and then continue to the 0.10 wavelength point. Thus the total length is 0.35 wavelengths (0.50 - 0.25 + 0.10 = 0.35). Repeating the procedure above, we see that for 2.85 wavelengths (5 half-wavelengths plus the 0.35 wavelength) we get a length of 165.23 feet electrical, or 145'5" actual length. Table Two shows these results and the results of the other two frequencies.

Notice that the impedance points are inside the SWR circle. Below the Smith Chart are some periph-

Freq. MHz	Measured Impedance	Normalized Impedance
7.00	23.3 - j18.5	0.466 - j0.37
12.00	108.5 - j24.0	2.170 - j0.48
17.00	31.0 + j27.0	0.620 + j0.54
22.00	25.5 - j12.0	0.510 - j0.24
Load Resistor:	150.0 + j0.0	3.00 + j0.00

Table One - Measured and Normalized Values

Length in Feet for WL + N half wavelengths										
	WL	N=0	N=1	N=2	N=3	N=4	N=5	N=6	N=7	N=8
7.0 MHz	0.18	24.77	95.06	165.34	235.63	305.91	376.20	446.48	516.77	587.06
12.0 MHz	0.02	1.45	42.45	83.45	124.45	165.45	206.45	247.45	288.45	329.45
17.0 MHz	0.35	20.52	49.46	78.40	107.34	136.29	165.23	194.17	223.11	252.05
22.0 MHz	0.2	8.83	31.19	53.56	75.92	98.28	120.65	143.01	165.38	187.74

Table 2 - Possible Cable Lengths (electrical) for Measured Cable

eral scales. These can tell you a lot. Set your compass to the radius of the SWR circle and then place the compass point at the center point of the top scale marked "ATTEN dB" and scribe an arc on the scale. Now set your compass to the distance between the *prime center* and the 22 MHz impedance point (marked 25.5-j12.0Ω). Again place the compass point at the center point of the "ATTEN dB" scale and scribe another arc on the scale (these are shown as purple lines in Figure One). The distance between the lines gives the attenuation of this length of coaxial cable at 22 MHz. I read it as 1.6 dB or about 1.1 dB per 100 feet. Is this good for RG-8? Would you buy this cable from me? Use the tables in the ARRL Handbook to see if this is reasonable for RG-8.

To review recent issues of the *Tech Talk* column go to our website at:
<http://www.w6ze.org/>

Past Club Presidents From 1970:

For a list that dates back to 1933, see the January 2002 issue of RF on the W6ZE website.

Year	Call	Name
2004	KB1GZ	Steve Brody
2003	KQ6JD	Lowell Burnett
2002	KE6WIU	Cory Terando
2001	KD6BWH	Bob Buss
2000	K6LDC	Larry Hoffman
1999	WA6VPP	Bud Barkhurst
1998	KD6BWH	Bob Buss
1997	WA6VKZ	Frank Smith
1996	AF6C	Bob Eckweiler
1995	N6XTJ	Jim Roberts
1994	KJ6ZH	Chris Breller
1993	KC6TAM	Jane Breller
1992	WA6VKZ	Frank Smith
1991	W6HHC	Ken Konechy
1990	KJ6ZH	Chris Breller
1989	WA6VKZ	Frank Smith
1988	W6HHC	Ken Konechy
1987	N6JSV	Jim Talcott
1986	WA6VKZ	Frank Smith
1985	AF6C	Bob Eckweiler

1984	KA6IMP	Chris Breller (call now KJ6ZH)
1983	W6IBR	Al Watts
1982	KA6HNY	Robin Hoff
1981	WA6VKZ	Frank Smith
1980	WA6FOW	Ernie Prichard
1979	WB6IHZ	Terry Mathers
1978	WA6LFF	Jim Kingsbury
1977	WA6WZO	Fried Heyn
1976	WB6PEX	Martin Raymond
1975	WA6LHB	Art Sheldon (call now K7ZE)
1974	W6HHC	Ken Konechy
1973	WB6QNU	Bob Eckweiler (call now AF6C)
1972	WA6FIT	Ron Cade (call now W6ZQ)
1971	WB6CQR	Billy Hall (call now N6EDY)
1970	WB6UDC	Jack Hollander (call now N6UC)

A special thanks to Ken, W6HHC and to our Club Historian Bob, WB6IXN for compiling this list.

73 Magazine Closes:

73, *Amateur Radio Today Magazine* ceased publication after the September 2003 issue. The magazine, started in October 1960 by former *CQ Magazine* editor Wayne Green II, W2NSD, ceased publication for economic reasons, Wayne said.

73, which originally sold for 37¢ and later for 73¢ an issue, grew to be a 300 page magazine in its heyday. Always colorful were Wayne's *Never Say Die* editorials. While some readers found them to be "outside the norm" in the later years, Wayne was an accurate visionary on the growth effects of SSB and FM for the ham community in

the 60s & 70s. He was an avid pioneer and supporter of FM repeaters

73's content included frequent good construction articles and interesting stories concerning ham radio. Contest coverage was left to the other magazines. 73 provided a more basic coverage of technical issues and complemented the more technical *Ham Radio Magazine* well. *Ham Radio Magazine* began publication eight years after the start of 73 and ceased publication in 1990.

If you miss reading Wayne Green's editorials, they will still be available on the web at:

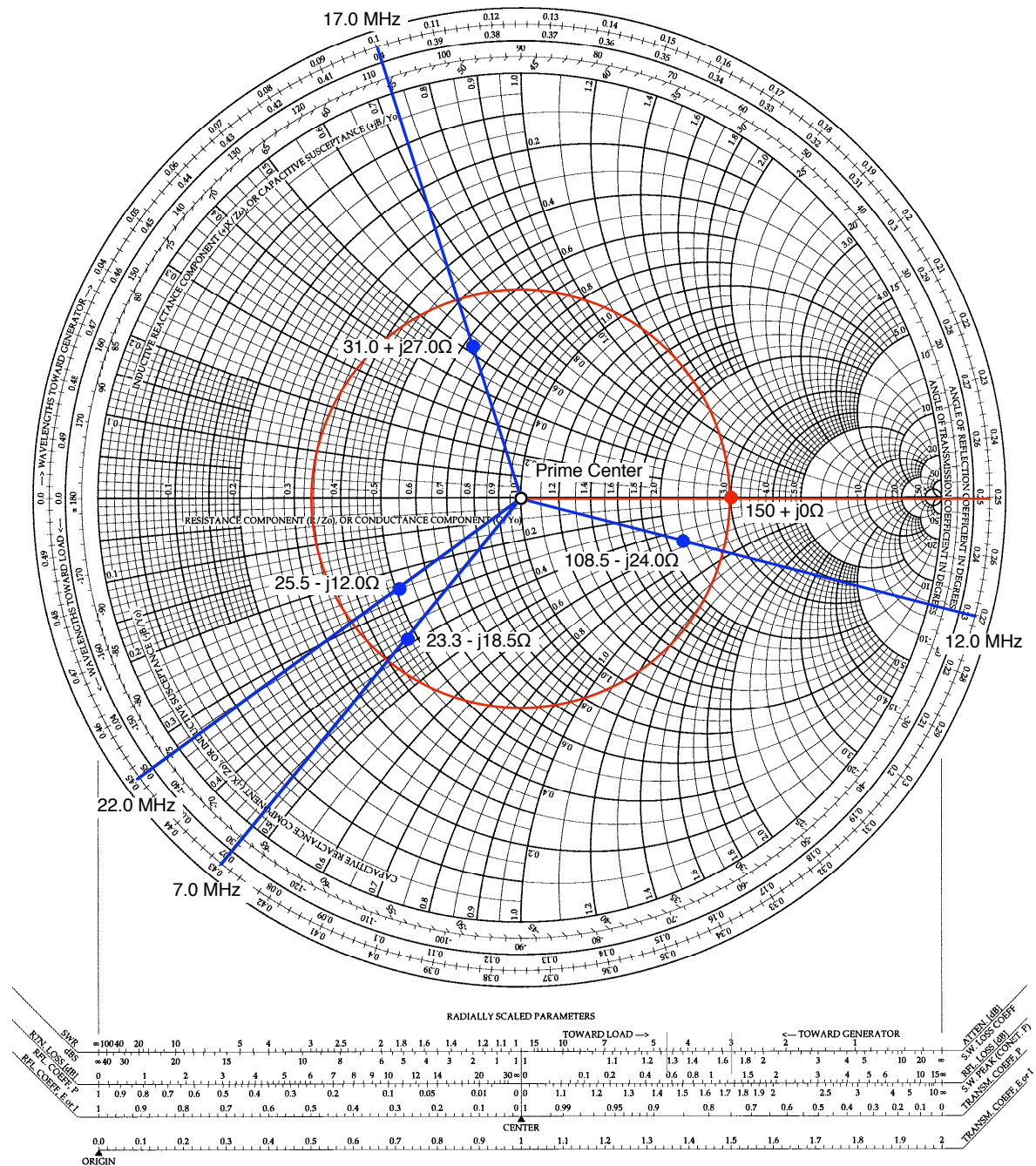
<http://www.waynegrreen.com/>

73 is just one more electronic hobbyist publication to stop in recent years. *Poptronics*, which was a combination of former magazines *Popular Electronics*, *Radio & Electronics* and *Electronics Now* ceased publication rather unexpectedly after the January 2003 issue.

Currently, there are no general electronic hobbyist magazines published in the United States, which presents a sad outlook for the US electronics industry's future. British electronic hobbyist magazines are plentiful on the news stands in Europe according to a ham recently returning from overseas.

73 Magazine, we'll miss you!

Figure 1 - Smith Chart showing plots of 150Ω load resistor at frequencies of 7, 12, 17 & 22 MHz for measuring the length of a roll of coaxial cable



Ham History:

The Old Novice Class:

In the fifties and sixties, before incentive licensing (and more recently no-code licensing), there was an amateur class that almost all radio hams started out in, the Novice Class! This class allowed a new ham to learn the basics of radio communications and develop his code speed by actually getting on

the air. The biggest goal of a Novice Class ham was to upgrade to the General Class License, which then allowed full operating privileges.

The novice license was very restrictive. It was valid for a period of one-year and was NOT renewable. This was because the novice license was designed as a stepping stone towards a higher class license. It gave a newcomer up to one year to

hone is CW operating skills and technical knowledge before taking the General Class exam. If a novice failed to upgrade by the end of the year, he was off-the-air. He could either continue to study and take the Technician or General license test directly, or find a new hobby. After a period of a year or two, a former novice could start "fresh" and take the novice test again, receiving a new call and an-

other year of novice privileges. Later, with incentive licensing, the novice license was extended to two years and then to a renewable five year term. It's now folded into the Technician Plus license.

The novice test could be given by an adult amateur of General Class or above. When a person felt they were ready to take the novice test, they sent to the FCC, who sent back a license form and a sealed envelope containing the Novice written exam. The ham-to-be filled out his part of the form and took it, along with the sealed test questions, to his ham examiner. The examiner first gave the code test, which consisted of twenty-five five letter words (no punctuation or numbers); this took five minutes. If one minute or more of the five minutes of code was copied solidly, the person passed and went on to take the written test. If the code test was failed then the sealed written exam and the form were sent back to the FCC with a note of the failure. The person then had to wait a month before attempting to take the exam again.

The written exam consisted of 20 questions covering basic theory, regulations, and operating practices. No question pool was available to memorize! When the written test was completed, the examiner placed it in another sealed envelope, filled out his portion of the form and sent the package to the FCC. The FCC graded the written exam, and if it was passed, the new novice had a long wait (six to eight weeks) before he received his call and license.

Novice calls were distinctive. Originally, US amateur calls started with a 'W' and then a number that designated the "call area" that the ham resided in. (Yes, if you moved to another call area you had to get a new call.) The number was followed by the letter suffix. Novice calls had an 'N' between the 'W' and the number. When the person got his General class, the 'N' was

dropped. Thus WN6XXX was a novice call and became W6XXX after the General Class was obtained. When all the 'W' calls were taken in a call area 'KN' and 'K' were used instead. When they were used up things got a bit more complex and the 'WV' prefix was used for novices which became 'WA' upon upgrade.



Heathkit Two'er
"Lunchbox"

A novice was allowed to operate CW only on portions of the 80, 40 and 15 meter bands (3.700-3.750 MC, 7.150-7.200 MC and 21.100-21.250 MC). Transmitters used by novices had to be crystal controlled. Most novices owned at most two or three crystals and were "rock-bound" to those frequencies. Most radios of the day didn't have the frequency accuracy nor stability of today's equipment and staying within band using a VFO required skill. Crystals were stable and assured the novice knew is frequency. The novice transmitter was limited to a generous 75 watts of input power. Input power was the total power input to the final transmitter tube exclusive of filament power. Maximum RF power output was on the order of 40 to 60 watts.

A novice could also operate voice in a two - "megacycle" (MC) portion of the 2-meter band. In those days, two-meters was not the popular band it is today. FM repeaters were rare. Most novices that operated two-meters used AM transceivers such as the simple Heathkit "Lunchbox"; wealthier novices might have used a Clegg 22 transceiver or a Gonset III "Gooney Box". Novices tended to stay off two-me-

ters since it detracted from their goal of improving their code to pass the General Class test.



Heathkit DX-20. Many novices started with this 50W CW transmitter. The knob-like cover on the left pulled out to reveal the crystal socket.

Since novices were "rock-bound", stations working each other were rarely on the same frequency. When you answered a CQ you used a crystal as close in frequency as you had and gave a call long enough for the person to tune around the novice band and find you. If you were calling CQ you would tune around the band looking for a reply. This normally worked out just fine. However, certain frequencies were more crowded than others because of the availability of inexpensive war surplus crystals of specific frequencies. Those frequencies were more prone to interference, but custom crystals were expensive, especially for a young novice.

To a recently licensed ham, all this must read like a horror story. Why is it then that many older hams look back on this period as so notable? I do; and I think that hams who missed this phase of their ham career really missed out on a tremendous experience.

Next month I'll relate some of the stories of my novice career and the fun and trials involved. Many ham friendships were made in that year, and even though I've moved across the country many of those friendships remain strong today, almost forty-five years later.

73,
Bob, AF6C

Jan. Board Meeting Minutes

OCARC Board Meeting for:
Jan 3, 2004

Prior to the meeting a plaque was presented to the manager of the *Cowgirls Café Too* in appreciation of their continued service to the Board.

The meeting was called to order by President Steve Brody, KB1GZ at 8:38 AM. A quorum was present.

Bob Eckweiler, AF6C will over see the audit committee, and the audit will be finished by Jan. 16th.

Ken Konechy, W6HHC is interested in having members tell him of programs they would like to have presented.

The By Laws are on the web and at the direction of the President all members who have a responsibility that has a written job description will be given a copy of the By Laws by the Secretary at the next meeting.

The President brought up how he would like to have a "how to component" added to club activities. Discussion was held and it was felt this could be a program at a meeting or a activity on a Saturday. There was discussion of the possibility that smaller groups could work well for this type of activity rather than a large group. The goal is to bring more interest and members to the club.

Elmer Thomas, W6PFA, looking his usual dashing self, related that he will be presenting guidelines for Slow Scan ATV in the *TechTalk* section of the RF in the next few months.

A discussion was held regarding the changing of the location of Field Day activities. There is a concern about noise interference on 40 and 80 meters. Site checks will be made and a report brought back to the Board and the membership.

Meeting adjourned at 9:08 AM.

Submitted by Rich Helmick

...Fuel Cell - cont. from page 2

technology uses a nanoporous silicon layer that has millions of pores and a very large effective surface area for its size, and should be able to meet the size requirement for cell phones. These batteries are still a few years away, even if everything stays on-track.

Instead of recharging your cell phone (or handheld) you will refill it just like refilling a butane lighter. No more multi-hour charging sessions; and no need for a nearby wall outlet or car adapter. However, with today's security in airports you may have to buy a new can of "juice" at your destination, because it may not be allowed on commercial aircraft. Maybe a battery "juice" exchange business at airports will be a franchise business of the future, right next to the terminal McDonalds restaurant!

For more information, go to the STMicroelectronics webpage at:

<http://www.st.com>

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First Class Mail

Time Dated Material. *Please Expedite!!*



Next RF Deadline: FEB 7th