Newscaster

The Official Publication of the
Winnipeg Amateur Radio Club
Winnipeg Senior Citizens Radio Club

January 2000

QRP

What does it mean ? & What can you do to help?

Date: ***January 10th, 1999***
Time: 7:30 p.m.
Place: Sturgeon Creek Regional Secondary School

Other Important Dates:

Articles: Feb 2nd. - Article Deadline February Newscaster

WARC: Feb 14th - Valentine's Meeting - Bring the (X)YL
Mar 13 - Monthly Meeting
Apr 10th - Home Brew Night

WSC:

ARES: Jan 18th, Meeting - SAR Manitoba
Feb 12-13, Public Service Event- Sled Dog Races

Other:

WARC: Executive for 2000

Past President	Norm Coull	VE4EH	885-1692
President	Darcy Wilson	VE4DDW	783-0421
Vice-Pres./ PR			
Treasurer	Sue Collings	VE4SYM	694-1525
Secretary	Ruth Mills	VE4XYL	837-6915
Goodwill	Vern Dutton	VE4VQ	256-5346
Membership	Mariska Maguire	VE4MMG	256-3143
Program	Tom Mills	VE4SE	837-6915
Director@Large	Susan Keller	VE4SUE	888-9011

RADIOGRAM FROM THE PRESIDENT:
by Darcy, VE4DDW

I hope everyone had a great holiday season! Wasn't the weather just perfect for Christmas? What a wonderful winter so far! I'm writing this just as Christmas has passed and the temperature is over +2 already!

With the past Merry Season we had the annual WARC Christmas party. I think this year's party was better than any in my recent memory. We had a wonderful turn out and all that were there had a fantastic time. If you missed out on the meeting I'll just have to give you an idea of what you missed out on. The night started with a very tasty spread of sandwiches and treats put together by Ruth. During this feast everyone was pleasantly surprised by a "special" performance of the very talented "Intermods". This combination of voices was able to put a smile on everybody's face. It really was a treat to have a special concert like that for this time of year. (Maybe they should cut a record?)

After being stuffed, we started with the annual "mug" competition, which brought out some fierce competition, but the real glory was given to the winner of our NEW "Best hat contest". There was plenty of thought and creativity put into the creation AND judging of the competition! Thank you to all that took part!

The December meeting is of special importance for another reason. The Past Presidents have the privilege of deciding the winner of the "Oscar Award" This year another very deserving amateur was chosen. Congratulations to Jeff, VE4MBQ, on being selected for this fitting award.

Just a reminder that the Annual Home Brew night will be held in April, 2000. So start planning your project now. You only have 3 months to plan, build and test and finally show us what you did.

Lastly, if you are reading this, we all survived Y2K HOPE YOU HAD FUN!!!!!

NEWS from the Winnipeg Seniors' Radio Club

by Gil Frederick, VE4AG

We're starting off the New Year 2000 with guest editors for this column: George Gillespie, VE4GNG, and Albert Weakley, VE4APA, who publish the 'Blips 'n' Blurbs' newsletter for VE4WSC.

From our outgoing President, Bob Hall, VE4RJH, we have this final President's Message: "December seemed so far away at the beginning of my term of office; lots of time to accomplish all my goals. Time marches on, and before I realized it, the plan changed to, "so much to do and so little time to do it." My only disappointment is that I did not have time to do more.

I had a very enjoyable and pleasant time as President and thank everyone for their help and cooperation. I considered it a privilege and an honour to serve as our Club President and work with so many kind people. Without your support I could not have done my job.

I had nothing but cooperation during the past year. When we required volunteers to help with many community events we hosted during the year, and our own functions, all I had to do was make a few phone calls. Before I could fully explain the event the answer was, "I'll be there." What a feeling!

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Voice 1-888-780-3333 (toll-free)
Fax: 1-613-991-5575
Email: spectrum.amateur@ic.gc.ca
Web: http://strategis.ic.gc.ca/spectrum

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Comments or if you just want to reach us :

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A special thanks to the Board of Directors for their help and understanding.

The time has come for me to move on to my next assignment and make room for someone with new fresh ideas.

Have a Merry Christmas and a joyful and prosperous New Year.

W.S.C.R.C. Christmas Dinner & Party ..... There were 96 tickets sold and 90 people attended. By all accounts it was a success - good food and lots of it - great company - great raffle and door prizes - congratulations to all the winners, and a great big thanks to all who were there, and a gracious thank you to all the members and their wives who helped out in all ways.

Entertainment was provided by the "INTERMODS" who are as follows: VE4SN, VE4OPC, VE4ALF, VE4GE, VE4YU, VE4XYL, VE4GNG, and the XYLs of the following - VE4RJH and VE4SN. Special thanks to VE4SN, Adam, as the MAESTRO and to VE4YU, Ed, for putting together a first-class show. And who could not appreciate the stellar MASTER OF CEREMONIES by VE4RJH, Bob, who does everything well.

"Dollf the Clown" (a.k.a. VE4DAR) performed his act admirably, and it was certainly enjoyed by all. First class job, Dollf. And a SURPRISE SPECIAL GUEST, VE4XQ, Cal Shermerhorn, and his magical playing on his BANJO. Thanks Cal.

Congratulations to the recent students of the Basic Radio Course - no callsigns have been assigned to them as yet, but listen for them and make them feel welcome ... They are: Margaret Sheridan ....Trevor Dandy.... Richard Small.... Tom Martyn. Congrats to VE4RCJ, Bob, on his upgrade to Advance and also for his 12 wpm c.w. endorsement. Also congrats to VE4DAR, David, on his 12 wpm c.w. endorsement.

During the Christmas Party, two members were presented with Certificates for entry into the HONOR ROLL.

They are: VE4YU, Ed, and VE4SZ, Sandy. Both well deserved, and hearty congratulations on being added to this distinguished list.

VE4GE, Gladys Haldane-Wilsone, was also acknowledged by our President VE4RJH for her outstanding contribution and dedication to our Club... well done Gladys!

The following is a notation from George, VE4GNG: As a new member of the Board of Directors in 1999, I would like to take this opportunity to thank all members of the Executive and the Board of Directors for their help, and guidance in

this past year. It has been hectic at times, what with the monthly breakfast meetings, the annual picnic, the in-house Bingo event, and the annual Christmas dinner and party. Also as the "Star Reporter" for the Blips 'n' Blurbs, along with the kind cooperation of VE4APA, Albert, the Editor and Publisher. Once again, thank you all and my best wishes to everyone in the future.

My synopsis of the Social Activities .... Monthly breakfasts at the Garden City Inn, Norlander Inn, Windsor Park Inn and Days Inn ...average attendance, 23; Annual Picnic - St. Vital Park...attendance, 81; in-house Bingo, attendance, 16; Annual Christmas Dinner ....attendance, 90 (96 paid).

Note: Perhaps besides these events, others could be planned to include a CHILI COOKING CONTEST, and a Cribbage Tournament, along with a return of VE4YU's nostalgic movie-time. What say you (any suggestions deeply appreciated).

For your enjoyment (submitted by "Dofft") ,,,,,, Sometimes I wonder ...how the word 'CEMENT', the glue in the mix of aggregate and water, came to replace the product 'concrete'..... and Where's the 'DUMMY' when I hear LIDS tune on the air. when that's what a call sign is for.

The Annual General Meeting was held in the clubrooms on Wed., December 15, 1999. The results of the election to the Executive and Board of Directors is as follows:

President - VE4YU, Ed Henderson; Vice-President - VE4GOM, George Moodie; Treasurer - VE4GE, Gladys Haldane-Wilsone; Secretary - VE4GNG, George Gillespie; Past President - VE4RJH, Bob Hall.

Members of the Board .... VE4AND, Bert Andrews; VE4AX, Albert Diamond; VE4AG, Gil Frederick; VE4LIL, Lila Forrester; VE4EH, Norm Coull; VE4WF, Joe Konkin; VE4JCM. Colin McBeath; VE4WCM, Bill McMenemy; VE4MKM, Keith McKone; VE4SN, Adam Romanchuk; VE4ZI, Abe Schumann; VE4ALN, Alan Haldane-Wilsone; VE4WJE, William Elliott; VE4BYL, Bill Shipley; VE4ROY, Roy Coldwell. Congratulations to all, and we are sure you will do a first class job in your new responsibilities.

Thought for the Day and Every Day .... Most people would find greater happiness and satisfaction if they remember and practice the following... always put principles before personalities.

And finally, for your reading pleasure, the following submitted by VE4PEG, Tom.

OLD AND NEW FRIENDS
Make new friends, but keep the old;
Those are silver, these are gold.

New-made friendships, like new wine,
Age will mellow and refine.

Friendships that have stood the test ...
Time and change ...are surely best;
Brows may wrinkle, hair grow gray;
Friendship never knows decay.

For "mid-old friends", tried and true,
Once more we our youth renew.
But old friends, alas! may die;
New friends must their place supply.

Cherish friendships in your breast ...
New is good, but old is best ...
Make new friends, but keep the old;
Those are silver, these are gold.

MINUTES for W.A.R.C. December 13th, 1999
Submitted by Ruth, VE4XYL

The last WARC general meeting and Christmas party of this millennium was held December 13th, 1999 commencing at 19:30hrs. A warm welcome from the President was followed by introductions of the 79 in attendance.

CORRECTION

Our November minutes in the newscaster should have read "seconded by John VE4JNF".

MOTION.

Moved by Rolf VE4VZ and seconded by Dick VE4HK that the minutes be accepted as amended. Carried. Business arising from the minutes, none.

TREASURERS REPORT

Sue VE4SYM reported that the bank balance as of Nov. 30,1999 is $5267.23

MEMBERSHIP

Reported by Mariska VE4MMG as of Dec. 13th 1999 we have 214 members.

RAC

Along with the regular RAC report Rick VE4OV brought Christmas greetings and best wishes for the New Year 2000 from all the various RAC representatives and promised us that Adam VE4SN's name will appear in the next issue of the TCA magazine.

WARES

Jeff VE4MBQ said that at least 3 operators are needed for the WFD and VHF operators are required for standby. All WARES and Y2K volunteers are encouraged to attend the WARES general meeting on Tuesday Dec. 21/99 at which time Jeff will give a final Y2K briefing. Don VE4DJM reported on the great reports received from the RCMP and sincerely thanked all volunteers who have gone North to install antennas. Wayne VE4WR also expressed a big thank you to all the volunteers and for their outstanding co-operation. There are still volunteers needed for the rural areas.

QUESTION

Michael VE4MJM questioned as to the Vice President vacancy in WARC. The executive explained that they were waiting to hear from an elected member whether they still wanted to remain on the executive. It took many tries and phone calls to finally get an answer from this

person that they were not interested anymore. The executive will deal with this matter in the New Year.

OSCAR AWARD

Presented by Norm VE4EH. Sincere congratulations from all of us to a very deserving recipient of this award, Jeff Dovyak VE4MBQ.

A moment of silence was held in memory of all the now silent keys who passed on during 1999.

The meeting adjourned at 20:00hrs.

CHRISTMAS PARTY

There were treats for the members and guests followed by excellent prizes that were organized by Sue VE4SYM and Mariska VE4MMG. Best decorated mug , 1st prize went to Dale VE4DAW, 2nd prize to Phil Kor VE4KOR. Best decorated hat, 1st prize went to Ed VE4EIH, 2nd prize went to Ruthie VE4CRS. Other membership draw winners were, Sue VE4SYM, Derek VE4HAY, Glen VE4GWN, Mariska VE4MMG, Ken VE4AFL, Phil VE4KOR, Don VE4DJM, Paul VE4OPC, Ted VE4VID, Vern VE4VQ, Tom VE4YG, Denis VE4UK.

The members of WARC wish to express a sincere thank you to Mike VE4TCH of Comteleco Electronics for his continued support and the many donations of prizes he has always given to our every event.

Contest Calendar

January

01	0000-2400	CW ARRL Straight Key Night
01	0800-1100	RTTY SARTG New Year Contest
01	0900-1200	CW AGCW Happy New Year Cnst
01	1600-2200	CW/SSB HangOver Hustle
08-09	1500-1500	CW AGCW-DL QRP Winter Contest
08-09	1800-2400	Digital ARRL RTTY Roundup
08	1800-2400	SSB Kid's Day Operating Event
07-09	2200-2200	CW Japan Int'l DX Cnst, Low Bands
08	0500-1000	CW/SSB Old New Year Contest
08-09	1800-0600	CW North American QSO Party
15-16	0000-2400	CW YL-ISSB QSO Party
15-16	0700-2359	CW Michigan QRP Club CW Contest
15-16	0900-2100	SSB/CW Hunting Lions on the Air
15	1200-2000	CW LZ Open Contest
15-16	1800-0600	SSB North American QSO Party
16	0000-2400	CW HA DX Contest
28-30	2200-1600	CW CQ W W 160m Contest
29-30	0600-1800	CW REF
29-30	1300-1300	SSB UBA

February

06-07	0000-2400	SSB/CW Vermont QSO Party
06-07	0000-2400	SSB/CW New Hampshire QSO Party
06-07	0000-2400	SSB/CW Maine QSO Party
06-07	2 periods	SSB/CW Delaware QSO Party
06-07	1800-0600	SSB/CW/RTTY Minn QSO Party
06-07	1800-2400	RTTY Mexican RTTY Contest
06	1600-1900	CW AGCW Straight Key
06-07	1700-0500	Digital NW QRP Club Digital Cnst
06-07	1600-0400	CW/SSB FYBO QRP Field Day
07	0000-0359	SSB North America 'Sprint'
07-08	0000-0400	SSB/CW Classic Radio Exchange
08-13	13-01	CW/SSB School Club Roundup
13-14	0000-2400	RTTY W-Wide RTTY WPX Contest
13	0100-0700	CW/SSB Utah 160Meter Challenge
13-14	1200-1200	CW/SSB PACC
13-14	1200-1200	CW/SSB Carnaval of Loulé Contest
13	1100-1300	CW Asia-Pacific Sprint
13-15	1400-0200	SSB YLRL YL-OM Contest
13-15	1400-0600	CW QCWA QSO Party
13-14	2100-0100	CW RSGB 1.8MHz Contest
14	0000-0359	CW North American 'Sprint'
20-21	0000-2400	CW ARRL DX Contest
20-21	0000-2400	SSB YL-ISSB QSO Party
26-28	2200-1600	SSB CQ W W 160 Meter Contest
27-28	2 periods	SSB/CW North Carolina QSO Party
27-28	0600-1800	SSB REF
27-28	1300-1300	CW UBA
27-28	1400-0200	CW YLRL YL-OM Contest
27-28	1500-0900	CW RSGB 7MHz Contest
27-28	2200-0400	CW/SSB Co. QRP Winter QSO Party
28	2 periods	CW HSC Contest

Winnipeg ARES Report

by Jeff, VE4MBQ - Winnipeg EC

Our 21DEC meeting was very well attended, by members AND Y2K volunteers. We watched a CAA Winter Driving Video, reviewed Emergency Call-Out Procedures, and had a final Y2K briefing.

Winnipeg ARES welcomes Edward Horton VE4EIH to the membership. Our Emergency Plan will be updated in the New Year - any members with suggestions should get them in writing to MBQ by 18JAN00.

We have been asked once again to provide volunteer amateur communications for Festival du Voyager Sled Dog Races 12, 13 FEB00 at The Forks. Anyone interested in volunteering should notify MBQ ASAP.

Our next monthly meeting is TUE 18JAN00 1900h at Sir Wm Stephenson Library 765 Keewatin St. Shauna Eggertson from SAR Manitoba will be giving us a presentation on Cold Weather Preparedness.

The deadline for the January Newscaster was quite early so you will have to wait until the February issue to find out what happened with Y2K Operations.

Digi-Phone
By KE6RMP

We invite you to try our new digi-voice communications - Operators needed

I created a web page with the assistance of KB9PZA that allows people to talk around the world. My web page is strictly for amateur radio use only so it is not on any search engines and I do not say the address over the radio or to general public and jammers etc. I used packet to get the word out and so far Europe and Australia have been using it a lot, unfortunately when I am sleeping hi hi... I would like to invite you to try our web page communications. It requires that you have a PC "Personal Computer, non-mac" with a sound card, speakers and a mic. plugged in. I use headphones with a mic. boom from Radio Shack. The software to communicate is ready for download on the web page. This is the new mode for ham radio and it is fun but we need more operators to join us.

If you like this new mode please pass the word on for use by word of mouth.

Web page address:

http://members.aol.com.cqdxnet

Note:

It may take a while of waiting for someone else to log on but it is great when it happens.

(editors note: Also check out the following site, which I detailed in a prior newsletter and demo'ed at the Spring Ham fest. To use Rptrlink, you must be a valid Amateur and be registered. Your callsign will be verified to your name etc.

http://www.mebcs.com/rptrlink/

requires the Iphone be installed first and then rptrlink does the rest.)

RAC Bulletins
http://www.rac.ca/~racnews/othernotices/racbullemail.htm

99-114E

VE5EB new RAC Assistant Midwest Director

RAC is pleased to announce the addition of James Bendle, VE5EB as RAC's newest Assistant Midwest Director. Jim was first licensed in 1963, and has been actively involved with ARES as an Assistant Emergency Coordinator and EC for the Province of Saskatchewan. Jim has been a Net Controller and an "Elmer" and Instructor to Amateur Radio Newcomers.

Like many of us, Jim came up through the ranks, starting with a Crystal Set and progressing through "Home-Brewing" his all-tube Mobile. Following a Degree in Welfare, Jim spent many years helping people. He moved to assume positions with Parks Canada, and latterly with Health Canada.

Jim is the third Assistant Director in the Midwest Region of Manitoba and Saskatchewan. He joins Bob Shehyn, VE5FY of Moose Jaw, SK and Adam Romanchuk, VE4SN of Winnipeg, MB. Jim, from Young, SK., (near Saskatoon) can be reached at <jbendle@sk.sympatico.ca>.

RAC Bulletin 99-116E

Email callsign alias

This bulletin is a reminder of the advantages of a call sign alias address. Any licensed Canadian amateur radio operator can have an e-mail address of the form callsign@rac.ca. This means that you do not have to advise all your contacts of your new e-mail address if you change your internet service provider. The e- mail service is provided for the members by Radio Amateurs of Canada. You need not be a member to register, but we hope that this is another reason to support your national amateur radio membership association.

If you wish to obtain a callsign e-mail address, simply send a message to (alias@rac.ca) with (callsign=realaddress)

in the body of the message. If you have access to the world wide web, you can find detailed instructions at http://www.rac.ca/alias.htm

RAC Bulletin 99-121E

National Y2K prefixes

Industry Canada informs Canadian Radio Amateurs that the following National Special Event prefixes are authorized for the Y2K. The valid period is from December 20, 1999 to February 16, 2000.

VE1 => CG1
VA1 => CF1
VE2 => CG2
VA2 => CF2
VE3 => CG3
VA3 => CF3
VE4 => CG4
VA4 => CF4
VE5 => CG5
VA5 => CF5
VE6 => CG6
VA6 => CF6
VE7 => CG7
VA7 => CF7
VE8 => CG8
VE9 => CG9
VO1 => CH1
VO2 => CH2
VY0 => CI0
VY1 => CI1
VY2 => CI2

Hints & Kinks
de Ralph, VE4RY

When setting up a multiband HF antenna system, the situation sometimes arises where the SWR is very good on all bands except 15 meters. This band is not related even-harmonically to the other bands and seems to be the one that usually gives us trouble.

But, there is hope! I can't think a time when it wasn't possible to "fool" the system by adding a few feet of coax to the feedline. About 6 feet will usually do the trick, having no effect on the other bands, but magically dropping the SWR to 1:1 on 15 meters.

Purists may argue that tuning the coax feedline is not really fixing the problem, but the transceiver won't have any "argument" with this technique, and it sure can save a lot of time.

Selecting a Multi-Band Vertical

part 2

Verticals With Traps

Most hams prefer to work multiple bands. When antenna possibilities are limited, this indicates a multi-band antenna. Unfortunately for the user, the most common design approach for multi-band antennas is to use traps. A trap is a combination of a coil and a capacitor. The combination is designed to prevent RF above the trap frequency from passing through the circuit, while RF below the frequency can move through.

This sounds great, but unfortunately traps force serious compromises. For one thing, ALL traps are lossy. The ARRL Handbook states that traps attenuate RF between .5 and 1.5 db for every trap RF passes through. Consider for a moment a 40 - 10 meter trapped vertical, with traps for 10, 12, 15, 17 and 20 meters. The antenna should work well on 10 meters - on that band it is full size and there are no traps. But on say 20 meters, the RF has had to pass through the 10, 12, 15 and 17 meter traps. If the traps are "efficient" and only attenuate .5 db each, then your signal has lost 2 db - almost half your power! But if the traps are inefficient, you can lose as much as 6db - 75% of your signal! Wasted. And in a vertical, this loss is before we even get to grounding problems! Always remember, especially when reading expensive four color advertisements, that the term "High Performance Trap" is a classic oxymoron, like "Jumbo Shrimp".

Worse, that is not the entire problem with traps. Since each trap includes a coil, the antenna is physically shortened for the lower frequency bands. A full sized quarter wave vertical for 40 meters is about 33 feet high. But a trapped multiband vertical such as described above is typically somewhere between 15 and 18 feet high. While being physically more compact can be an advantage in some cases, it also inevitably means that the antenna is significantly less efficient, even ignoring trap losses. Further, all else being equal, the bandwidth is considerably narrower. And, being shorter, the antenna does not stick up as far, which means in turn your transmitted RF is more likely to get squirted into the trees, the power lines, the neighbor's VCR etc., and not over the horizon into the DX station's log.

Another significant disadvantage of a trapped antenna is that the radiating part of the antenna is always at the bottom. The RF travels up the antenna from the coax feed point until it reaches the trap appropriate for that band, and stops there. So on 10 meters, the bottom of the antenna up to the first trap is hot, the rest cold, RF wise. On 15 meters, the RF passes through the 10 meter and 12 meter traps and travels up to the 15 meter trap and stops there. All the length of the antenna above that point is wasted for that band. But it would be better if the antenna could radiate at

the top - clearer of trees, houses, TV feeds etc. But trapped antennas simply can not give you that option.

Taken in sum, traps are a poor way to design a multiband antenna. Traps are lossy, narrow the bandwidth, and on most bands do not fully utilize the full physical length of the antenna. There are other issues, such as impedance matching, that come in to play as well with trapped verticals, however we suggest you modestly avert your eyes, shudder, and move on.

But for the designer of trapped multiband verticals, all is not lost. Remember from above, research has demonstrated that having a significant ground system under a shortened antenna is a waste anyhow. A rather reliable rule of thumb is that the radials need be no longer than the vertical is high. Since the ground makes the image the vertical requires, the antenna only needs and can only use an image as good as the vertical radiator. A short, lossy antenna needs only a small and lossy ground - it simply can't do much better with more.

Clever marketing departments immediately jumped on this - "Since we have an inherently lossy antenna that won't work any better with a decent ground, we can offer it as a `No Radial' antenna! And without a decent ground, we can get better bandwidth too!" And so they did. (A good ground actually narrows the bandwidth, because the efficiency is higher. For a complete technical explanation of this and some other points briefly touched on here, see our Tech Notes entitled "Dirty Little Secrets" for a more exhaustive explanation.)

The Low Bands

For most hams, working bands like 80 and 160 meters is going to require something of a compromise in antenna size. But if shorter antennas were all that great, as some manufacturers would have you believe, the big guns on 80 and 160 would be using an eight foot whip with a big coil attached. Trust us on this - they don't.

Still, selection of a multiband vertical antenna based on the physical length of the antenna can be a major mistake. One commercial antenna for example is 45 feet tall. But that antenna has a feed point well above the base, so that the portion below the feed point is actually a part of the ground system, and the actual length of the radiating upper portion is significantly less. Also, that antenna brags about having "no radials", but states that a counterpoise of three wires of 57 feet each is required. But even though the wires are called a counterpoise instead of a radial system, they still are a radial system. And a pretty poor one at that. So, even though the antenna is taller, which is good, the efficiency is poor, which is bad. Adding more radials would seemingly make it work better, but the manufacturer tells you that more radials, sorry - counterpoise wires - in fact hurt the antenna. Which in reality confirms its very poor efficiency. But at least that antenna has a well deserved reputation of being "quiet." And that's why.

Another well known brand of vertical, featuring "high-efficiency" traps, offers an 80 meter add-on to the top, bringing it to over 34 feet tall. This antenna configuration too requires several counterpoise wires. So, not only does it suffer from a poor ground, but 80 meter rf must pass through SIX traps. These traps are an rf killer, "high efficiency" or no. But here again, an antenna of poor efficiency coupled with a poor ground gives a good match for good SWR, good bandwidth - and lousy performance.

(Next month the final part.)

Early Radio Astronomy: The Ham Radio Connection Extracted from

Dave Finley, N1IRZ
National Radio Astronomy Observatory, Socorro, New Mexico

"Reprinted with permission from Ham Radio Online magazine, available for free on the Internet at http://www.hamradio-online.com

Radio Astronomy is a direct descendant of Amateur ("ham") radio.

Following Guglielmo Marconi's (photo below) successful transatlantic communications in 1901, commercial use of radio mushroomed. Ships were equipped with radio, huge commercial stations were set up to handle intercontinental messages after the fashion of the telegraph companies, and many other uses were found for the new technology.

In those days, it was thought that the only really useful frequencies for long-range communication were the very low frequencies, or the very long wavelengths. Thus, when the first government regulations were imposed on radio in 1912,

Gugliemo Marconi in 1896

the amateur operators ("hams"), whose interest in radio was personal and experimental, rather than commercial, got the short end of the stick. They were given the use of wavelengths of 200 meters and shorter -- roughly the frequencies above the current AM broadcast band. These were generally thought useless for long-range communication.

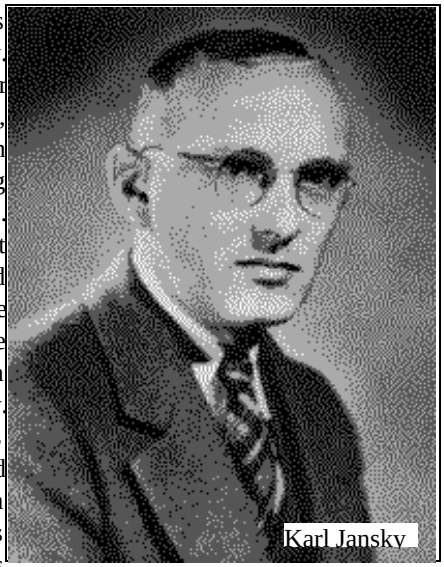
The wavelength restrictions were rather loosely enforced prior to U.S. entry into World War I in 1917, when all amateur and other non-government use of radio was shut down. When amateur operations resumed in 1919, it was much more imperative to abide by the rules, so the hams had to find out just what they could do with the short waves.

Starting in 1921, amateurs made concerted, organized efforts to communicate across the Atlantic with short waves. In December of 1921, an amateur station in Connecticut was heard by an American amateur sent to Scotland with state-of-the-art receiving equipment. On November 27, 1923, amateurs in the U.S. and France made the first transatlantic two-way contacts on shortwave frequencies. In the following two months 13 European and 17 American amateur stations had made two-way transatlantic shortwave contacts. Within a year, amateurs had communicated between North and South America, South America and New Zealand, North America and New Zealand, and London and New Zealand.

These accomplishments proved beyond a doubt that ionospheric refraction could enable world-wide communication by shortwave radio. Further amateur experiments showed that, by using a variety of frequencies in the shortwave region (3-30 MHz), long-range communication could be maintained both day and night. In addition, the shortwave communications were accomplished with transmitters of only modest power, unlike the giant, many-kilowatt transmitters needed for long-range communication at the lower frequencies.

Naturally, once the hams showed the value of shortwave radio, many commercial firms became interested. One of these commercial interests was the telephone company, which thought that shortwave links might be used to carry intercontinental telephone calls, saving the expense of laying cable on the ocean floor. However, as any ham or shortwave listener today knows, shortwave communication is subject to much noise and static. The telephone company sought to identify and find ways to mitigate this noise.

At AT&T Bell Labs in New Jersey, a young radio engineer named Karl Jansky (top right) was given the task of identifying the sources of shortwave noise. He built a highly directional antenna to work at about 22 MHz, and began to make systematic observations. Most of the noise he found was due to thunderstorms and other terrestrial causes. However, he found one source of static that seemed to appear four minutes earlier every day. As most amateur astronomers know, that is a telltale sign of something beyond the Earth. Indeed, what Jansky had found was radio noise emitted from the center of our own Milky Way Galaxy. He discovered this in 1932 and announced it in 1933. His announcement was reported on the front page of the New York Times on May 5, 1933.


Karl Jansky

To most professional astronomers, Jansky's discovery was a mere curiosity, and they did not follow up on it. In Wheaton, Illinois, the news eventually reached Grote Reber, (right) another radio engineer who was an avid ham operator. Reber had spent much time making long-distance contacts on the amateur shortwave bands. He had "worked" all continents and 60 foreign countries. In those days, that was quite an achievement, and it left Reber thinking, as he later wrote, "that there were no more worlds to conquer." When he read of Jansky's discovery, he found some more worlds.


Grote Reber

In 1937, Reber built his own 32-foot-diameter parabolic dish antenna in his backyard, to seek cosmic radio emissions. In an era when artificial satellites were only a dream and television had not yet emerged from the laboratory, this antenna drew amazed remarks from his neighbors.

An avid VHF/UHF experimenter, Reber worked with equipment that then was pushing the envelope of high-frequency performance. In the spring of 1939, he was able to detect cosmic radio emissions with his equipment. In 1941, he made his first survey of the sky at radio wavelengths. Reber's radio astronomy work continued for a number of years, and his results were published in the Proceedings of the Institute of Radio Engineers, the Astrophysical Journal, Nature, and the Journal of Geophysical research.

As the world's second radio astronomer, Grote Reber laid the groundwork for the achievements that would follow. After World War II, the great advances in microwave technology that had produced radar became available to astronomers, who began to seriously pursue radio observations.

Today, Reber lives in Tasmania, still experimenting with radio astronomy. His original parabolic dish antenna now resides on the grounds of the National Radio Astronomy Observatory at Green Bank, West Virginia, alongside a full-scale replica of Jansky's antenna.

Thus, the accidental discovery of cosmic radio emissions was a direct result of radio amateurs' success in developing shortwave communications. Then, for several years after this original discovery, the only person following up with systematic and well-designed radio astronomy observations was a radio amateur.

Today, the connection between radio astronomy and amateur radio remains strong. Many prominent radio astronomers first became interested in science through involvement with amateur radio as youngsters. These include the winner of the 1993 Nobel Prize in Physics, Dr. Joseph Taylor of Princeton University. Nearly 10 percent of the employees of the National Radio Astronomy Observatory are licensed amateurs.

In 1997, the National Radio Astronomy Observatory Amateur Radio Club obtained a license from the Federal Communications Commission for an amateur radio station with the callsign W9GFZ, Grote Reber's callsign in the 1930s. No longer active as a ham, Reber still expressed pleasure that his old callsign would be preserved by NRAO's hams. The NRAO club plans to use the callsign W9GFZ on the air for special events connected with radio astronomy.

Grote Reber poses with his original dish antenna at the National Radio Astronomy Observatory in Green Bank, West Virginia.

Nucleon Spin
Vern Dutton, VE4VQ

A little learning is a dangerous thing;
Drink deep, or taste the Pierian spring:
There shallow draughts intoxicate the brain,
And drinking largely sobers us again.

Do you suppose that Alexander Pope wrote these lines especially for struggling Hams like Dutton? Perhaps you would like to join me for a draught at the Pierian spring of quantum mechanics.

Last July's issue of Scientific American carries an article entitled The Mystery of Nucleon Spin by Rith and Schäfer, so all I am trying to do here is summarize what these gentlemen have told me.

Early in this century, the first subatomic particles - protons, neutrons, and electrons - were discovered. Because the proton and the neutron are confined to the nucleus of the atom, they are called nucleons.

In 1900, the great German physicist, Max Planck, was studying the energy distribution of a black body. Since his observations did not agree with the predictions based on the classical laws of physics, he introduced the concept of a quantum of energy. As Sears (1) has said in his textbook, "Planck's postulate, which marked the beginning of the development of modern quantum theory, was one of the boldest and most imaginative steps ever taken in the history of physics."

The results of Planck's postulate was that we now know that, on an atomic scale, the energy of a system "can have only some one of a discrete set of values ..... The energy can be increased or decreased, but only in stepwise fashion and not continuously." (1)

Over some eight decades, the scientists developed what came to be known as the quark model to explain what was going on in the nucleons. In this model, there were three types of quark called up, down, and strange. While this model was doing a pretty fair job of explaining things, many

scientists considered it to be a little more than a book-keeping system.

As quantum theory developed, it was found that the "fundamental" particles had spin. As the authors phrase it, "A property of tremendous importance is spin, a form of innate angular momentum. All the particles that make up a nucleon have spin, and somehow the spins of all these whirling dervishes must add up to the observed total spin of a nucleon." As Rith and Schäfer state, "The spin of a fundamental particle corresponds to intrinsic angular momentum but has special quantum properties. Quantum mechanics requires spin to come only in multiples of a tiny fundamental quantity called Planck's quantum of action ..."

Then, toward the end of the 1960s. increasingly powerful Accelerators (such as the Stanford Linear Accelerator Center) showed that quarks really do exist.

The latest research equipment - the electron-proton collider caller HERA - is located as the German Electron Synchrotron in Hamburg. In the U.S., further studies will begin this year (2000) at the Relativistic Heavy Ion Collider at the Brookhaven National Laboratory.

I hope this "shallow draught" has not intoxicated you. The article has much more, including a couple of graphs and, of course, illustrations for which this magazine is noted. Why not visit the Public Library in your community and try "drinking largely" for yourself?

(1) Sears, F.W., Mechanics, Wave Motion, and Heat. Addison-Wesley, 1958.

Editor Ramblings
By Derek, VE4HAY

Nothing to say and no room to say it. Are the lights on? 73