OTTAWA AMATEUR RADIO CLUB

GROUNDWAVE

March 1999

Check out our Web Page: www.oarc.net

The OARC welcomes the West Carleton Amateur Radio Club

Check out their website: http://www.wcarc.on.ca
Details on page 5

In this Issue ...

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OARC Inc. Memberships

•**Individual Membership** is available for $20.00
•**Family Membership** is available for $25.00
•**New Hams** just licensed may qualify for free membership, contact the membership Chair.
•**Junior Memberships** - To encourage young people to join the club and to participate in amateur radio, the club is opening a junior class of membership. Dues will be at 50% discount but the junior member must pick up his/her copy of the Groundwave (preferably at the meeting).

Club Information

The Ottawa Amateur Radio Club, Inc. (OARC). Is an association of Radio Amateurs devoted to the promotion of interest in Amateur Radio communications in the National Capital Area; and to the advancement and achievement of club members.

Regular Meetings of the OARC Inc., are held on the first Wednesday of each month (except July and August) in the Keefer Room (2nd floor of the Old Teacher's College) of the Regional Municipality of Ottawa Carleton Head Quarters complex on Lisgar Street. Meetings commence at approximately 19:30 hours. Further details about each meeting is elsewhere in this publication.

Executive Meetings of the OARC. Inc., are normally held on the second Wednesday of each month at 19:30 hours. Contact the President to confirm the date, time and place of the next meeting.

Packet Radio Meetings will be held at 19:30 hours on the last Thursday of every second month beginning in September, at the Algonquin College - Lees Campus. This is an OARC Inc. Technical meeting open to all who have an interest in packet radio.

NET's of Interest

The Capital City FM Net meets every Monday at 20:00 hours on the club repeater VE2CRA to pass traffic and to make announcements of interest to amateurs in the National Capital Region.

The SWAP Net is a service provided and conducted by Dan Reardon, VE3GUU. This feature appears on the Capital City FM Net. To list items and make inquiries, call Dan Reardon at 836-2633, Fax: 836-5635.

The POT-HOLE NET is a SSB/HF net sponsored by the Ottawa Valley Mobile Radio Club and is conducted every Sunday at 10:00 hours on 3.760 Mhz. All amateurs are welcome to check in. The SWAP Net is a regular feature of this net.

The POT-LID CW NET is an informal slow-speed CW net sponsored and conducted by Ed Morgan, VE3GX, and meets every Sunday, except during July and August, at 11:00 hours on 3.620 Mhz, to promote interest in CW and CW procedures.

The QCWA Chapter 70 NET every Thursday evening at 2000 hrs local time. Repeater VE3TEL is used, courtesy of the Pioneer Amateur Radio Club. The frequency is 147.03 out, 146.43 Mhz in. The callsign used is VE3QCW. Visiting Hams are invited to check into this Net. You do not have to be a QCWA member to check into this Net.

Club Repeaters

Voice	(VHF)	146.94/146.34	100 Hz output tone
	(UHF)	443.300/448.300	
Packet		147.07(sx) For QSO and Packet BBS.	
Packet 56 kbps		220.55/433.55	
East of Ottawa		145.69(sx)	
Ottawa Centre		145.07(sx)	
Hull		145.05(sx)	
West of Ottawa		145.03(sx)	
South of Ottawa		144.91(sx)	
Nepean		145.59(sx)	
West Carleton		144.97(sx)	

For further information, please contact the Repeater Chair.

February Meeting Minutes

Minutes of the OARC General Meeting - February 3,1999

The meeting was called to order by the President, Ed (VA3MPY), at 7:35 p.m.

We were fortunate to have three guests this evening, Marcel (VA3MG), Terry (VE3KLT) and Cameron (VA3CAM). Welcome gentlemen and we hope to see you again.

In the highly anticipated "Haves and Wants" section of this evening, we were told that Brian (VE3ZRK), as he is apt to do lately, brought assorted catalogues for members enjoyment. In the wants section, Al (VE3ZTU) is looking for a 6 metre transceiver. If you have one, please give Al a shout. Also, Roger (VE3BZR) asked if anyone had experience with the Kachina HF rig. Clare (VE3NPC) suggested that he contact George (VE3BNO).

Rick (VE3IHI) announced that there were two unfilled spots on the Ski Marathon team, though Harrie (VE3HYS) had some people in mind so it was not an issue. Rick expressed his thanks to the Pioneers for their assistance and courtesies in assisting with the Marathon. Rick also mentioned that both Harrie and Liz (VA3ELB) - our Treasurer, have been sick lately. (Sorry to hear that guys, get well soon, eh.)

Continuing on a sad note, Ed mentioned that Mailes Dier (VE3MD) was also ill and was convalescing in Cornwall with regular visits to Ottawa. (Get well Mailes, we need you on the Ottawa radio amateur scene!)

Brian also announced that Bob Lawson (VA3YLR) was recently in the hospital. (Hey Bob, hope you are feeling better!)

Rick mentioned that we will not be in the Kieffer Room until April as it is being occupied until then by Municipal Board hearings.

Turning to the main event of the evening, Ed introduced two students from Algonquin College - Martyna Marjanska and Liz DeCairos. These two very articulate and capable young women explained the concept and the work that their team had put in developing the TxTrak, radio direction finding software. Members found their story of how they experimented with various approaches extremely interesting. All had a great chuckle as the ladies demonstrated their system, zeroing in on Ed's illegal transmissions and leading eventually to his arrest and incarceration behind bars. (Ah, justice.)

Mike (VE3KOY) won the evenings' 50/50 draw.

Reminding members of the Ski Marathon, Ed adjourned the meeting at 8:50 with free cookies for all present.

CSM Thanks

Harry (VE3HYS),

I wanted to commend you and your team for once again providing professional quality communications support for the CSM weekend. There was additional strain placed on the communications system this year by the fact some of our cell phones didn't work (and in any event often they don't work at all in that area).

The discipline required for effective communications on a net as complex as the CSM is not easy to achieve, particularly when it is a once a year thing, but that discipline shone through last weekend.

Thank you on behalf of all CSM participants, skiers and volunteers alike.

Sincerely,

John Ross, President
Canadian Ski Marathon

Radio Amateurs of Canada

All News below is received from Radio Amateurs of Canada (RAC) bulletin service. Readers may subscribe to this service, visit the RAC website at www.rac.ca for more information. Guy Charron VA3FZA Bulletin Editor. Email: va3fza@rac.ca Packet: va3fza@ve3kyt

Date: February 16, 1999
Subject: Two New RAC Contest Managers

RAC President Pat Doherty has appointed two new HF Contest Managers.

Gord Kosmenko VE6SV will manage the Canada Day Contest and Dave Shipman

VE7CQD the Winter Contest. The appointments reflect the growing popularity with both RAC contests necessitating the change from a sole HF Manager. Both Gord and Dave will report to RAC's Contest Chairman, Tim Ellam VE6SH, who is also RAC's appointee to the ARRL Contest /advisory Committee. Gord, Dave and Tim will review the format of both contests in order to keep them current and consider the introduction of new categories, as well as electronic log submissions.

1998 Canada Day Contest Results Delayed

With the retirement of former HF Contest Manager Dave Goodwin VE2ZP, the 1998 Canada Day contest lacked a manager. RAC Contest Chairman Tim Ellam VE6SH took on the task of preparing the results, but due to both professional and RAC commitments he was unable to commence this task until late in 1998 with the hope the results would be released prior to the end of the year.

Unfortuantly VE6SH suffered an catastrophic computer failure in January with a corresponding loss of the many logs which had been cross-checked and entered. Tim hastens to add that hard copies of all the submitted logs are safe and he is busy re entering all contest logs with the plan to post the results on the RAC website as soon as possible and in the May/June issue of TCA.

Date: February 18th, 1999
Subject: INDUSTRY CANADA TO VERIFY AMATEUR RADIO DATA BASE INFORMATION

Industry Canada utilizes multiple databases to manage the authorization of amateur radio operators. As a result, there currently is no automated method for matching the qualifications of an amateur operator with a specific callsign assignment. Part of the enhancement work being done by RAC in the ongoing maintenance of the official Amateur Call Sign Data Base on the Internet, consists of electronically merging the records from the Industry Canada data bases to obtain as great a match as possible between call signs and certificate qualifications. RAC has completed their work on this task. However, due to variations in the initial entry of names of Amateurs in the current data bases, approximately 29% of the records remain unmatched.

In order to complete this matching process and ensure that the data base will accurately reflect Amateur qualifications, Industry Canada will soon be requesting information from Amateurs. This will be done as a mail out to these Amateurs whose records could not be electronically matched. Industry Canada will be requesting the confirmation of vital information, such as date of birth and telephone number. In respect of individuals' privacy, it is important to point out that this type of personal information is strictly for facilitating the matching process. It will be treated as confidential and will not be made available when the new data base is released on the Internet.

When completed this new information will be made available to Amateurs via the RAC Internet Call Sign Data Base web page. The availability of a public data base for Amateurs that accurately reflects callsign and certificate qualification information is of significant value to the amateur radio community. Therefore Industry Canada and RAC ask those Amateurs who receive a letter to respond quickly and positively to this request for matching information in order to facilitate the process.

Date: February 19, 1999
Subject: RAC establishes new Microwave Bandplanning Committee

President Pat Doherty has approved a new Microwave Bandplanning Committee to advise on revisions and improvements to RAC bandplans covering the spectrum from 2300 MHz to 250 GHz. The committee will also advise on possible new bands above 250 GHz.

The existing VHF/UHF Spectrum management committee has been primarily concerned with 2 metre and 70 cm band usage, and will continue to deal with issues in the bands from 50 to 1200 MHz.

With the intense crowding of the spectrum from 2 to 10 GHz, and the rapid expansion of commercial and government use from 10 to 70 GHz, amateurs are being asked to share our bands with other users. Our best defense in such cases is to be able to demonstrate how our bands are currently used, and which of our uses need the most protection from interference.

At WRC 2000, the ITU will consider proposals to move and possibly share our bands between 75 and 250 GHz to satisfy the needs of satellite remote sensing, and radio

RAC Bulletins cont.

astronomy users. In order to be sure that such moves will cause the least harm to Amateur Radio, again we need good band planning, and a good understanding of technology and propagation in those frequency bands.

RAC is extremely fortunate to have the advice and assistance of well qualified amateurs with experience in the microwave range.

The new advisory committee will be chaired by Darrell Ward VE1ALQ of Grand Bay NB, ve1alq@fundy.net

On his committee, Darrell will have the following representatives from across

Canada.

John Currie VE1ZJ Sydney NS.
Clare Fowler VE3NPC Ottawa, ON
Dana Shtun VE3DSS, Toronto, ON
Barry Malowanchuk VE4MA , Winnipeg, MB
Grant Furnald VE6TA , Airdrie AB
Lionel Edwards VE7BQH, North Vancouver BC

If you wish to have an input to the planning process, please get in touch with the committee member nearest to you.

The committee will report through Vice President International Affairs, Ken Pulfer VE3PU

Local News

Local Emergency Measures Radio Group (EMRG) affiliates with RAC ARES

It is official. As of 1999 February 1 Peter Gamble, VE3BQP, is the ARES Emergency Coordinator for Ottawa-Carleton.

As well, a basic Memorandum of Understanding (MOU) with the local Red Cross is complete and was signed by Peter, VE3BQP at the last EMRG meeting

CANWARN training available this spring

George W. Sansom VE3GWS, ve3gws@perth.igs.net announces that a date has been set for the Eastern Ontario CANWARN training. Sunday, March 21, 1999, 0900-1300 hrs in Smith's Falls. The exact location still has to be firmed up, but it will probably be the theatre at the Rideau Regional Hospital. George will notify registrants when that is confirmed.

The Environment Canada instructor, Randy Mawson, will be training in Peterborough on Saturday, March 20 and will come over here to give us the Sunday session. He has to drive back to London on Sunday afternoon so the course is starting as early as possible, bearing in mind that a lot of our attendees have a 2-hour drive to get to Smith's Falls.

This session is open to ALL Amateurs. A $5.00 fee will be collected at the door to help defray any costs. The remainder will be placed in a separate account and will be used for CANWARN related projects.

If you plan to attend, please notify George via e-mail prior to March 13, 1999. Talk-in will be on repeater VE3KJG, 146.640 Mhz. This is your chance to get this excellent training and associated materials. Many amateurs have been waiting a long time for this so let's have a good turnout!

OARC welcomes WCARC

The Ottawa Amateur Radio Club welcomes the West Carleton Amateur Radio Club as an affiliated club. This agreement will provide Groundwaves to WCARC members. The additional production and mailing costs will be paid by the WCARC.

The OARC offered affiliated club status to the WCARC in hopes that it would strengthen the bond that now exists between the clubs.

The WCARC discussed the proposal at a regular meeting and through e-mail. They wholeheartedly accepted the offer.

Representatives of both clubs feel the sharing of information and increased awareness of local projects and happenings will benefit all involved.

Look forward to regular news from the WCARC in the Groundwave!

It is that time again - CPC Club Breakfast

March 06, 1999, 0900 hrs at Gerry's Family Restaurant. 2679 Bank Street South, Gloucester

Hoping to see you all there .... Please reply via e-mail or CPC Net.

Guy Ladouceur, VE3WGL gal@igs.net

HamFests and Flea Markets

Niagara Peninsula ARC Fleamarket
Saturday, February 6, 1999
St. Catharines, ON
CAW Hall, 124 Bunting Rd., St. Catharines
9:00 a.m.-1:00 p.m. Set-up at 7 a.m.
Tables $20
147.240(+)
Information/table reservations:
Joe, VE3NDX, 905-937-6208, ve3vm@rac.ca
NPARC
P.O. Box 20036
Grantham Postal Outlet
St. Catharines, ON L2M 7W7
http://members.tripod.com/~VE3VM/

Burlington Amateur Radio Club Spring Fleamarket
Saturday, February 27, 1999 - 09:00 - 14:00
Burlington, ON
Canadian Legion, Legion Rd., Burlington, ON
(off Queen at Brant)
For more info:
Burlington ARC
P.O. Box 85037
Burlington, ON L7R 4K3
ve3iuo@rac.ca
http://bigwave.ca/~ve3coj/barc

HAMEX '99
Peel Amateur Radio Club
Saturday, March 27, 1999 - 09:00
Brampton, ON
Brampton Fall Fairgrounds
Heart Lake Rd. and Old Church Rd.
(19 km north of 401 on 410)
Admission: $5. ($10/family of 2 adults, 2 children under 12). Tables $25. All tables will be pre-sold (none available at door). No tailgaters.
VE3PRC 146.880(-), 443.550(+)
Basic, Advanced and CW examiners will be on-site
Test bench for used gear.
Jack Summers, va3jak@rac.ca 905-458-0002
George Van Ryssen, va3gvr@rac.ca
George Duffield, ve3wkj@rac.ca
info@peelarc.org
http://www.peelarc.org/

Club Radio Amateur Laval Laurentides (CRALL)
7th annual hamfest
Saturday, March 27, 1999
Sainte-Thérèse, QC
In 1997 it was held at:
Polyvalente Sainte-Thérèse, 401 Boul. du Domaine,
Sainte-Thérèse, QC.
VE2REL 147.315(+)
For more info:
Jean-Paul, VE2LHR 450-625-8656
hamfest99@hotmail.com

From out of the past, continued from page 9

(100 Watts) I was able to work stations in the U.S. and Canada as well as Japan and Fiji.

What's next?

I believe that there is much more to be learned about spiral coils and their RF characteristics and I hope that my work with the coils has proved to be thought-provoking. If only a few of you have been inspired to further experiment with the concept, writing this article will have been worthwhile.

Oh, I almost forgot! You might be wondering what became of the 40-meter antenna which precipitated all of the experiments with the spiral coils. Well, the antenna is still patiently waiting for me, but these spiral coils have proved to be such a fascinating distraction that I must further explore some or all of the possibilities I have suggested before I can get back to modifying it.

I would like to acknowledge the help and encouragement of the following radio amateurs: My late father-in-law Fritz, W8TS, George, K6SG, Jay, W6GO, Peter, W6QEU, Derek, K7FF and my wife Carolyn, K8TFR.

From out of the past — antennas with a new twist

By Bill Petlowany, K6NO Courtesy Worldradio (first appeared March, 1998)

12-foot-long 40M dipole on mailbox.

If you have any interest in antennas at all, fasten your seat belts and hang on to your hats, because what you are about to read here is going to blow you away. Conventional wisdom concerning antenna matching and resonating is about to be shattered and the principles revealed here might just be the start of a new chapter in the field of antenna design.

The heavy 40-meter gift

The path leading to my discovery started with the four-element 40-meter antenna given to me by K6SG in 1995 after it had been damaged in a severe storm. I loaded the pieces into the back of my Chevy pickup, drove two houses down our street and, with George's help, unloaded them onto some saw-horses in my side yard.

During the next few months I'd occasionally go out and look at the hugepile of aluminum and wonder if my Rohn 25 tower would tolerate theadditional weight of such an antenna if I were somehow able to put it together again. I think I realized subconsciously that adding that much more weight to my tower was not a good idea.

On one such occasion, as I looked at the linear loading on one of the elements, I was struck by the complexity of it all and how much weight was added to the antenna as a result. I clearly remember thinking at that moment, "There must be a better way to do this." It wasn't until several weeks later, however, that I was able to work on the problem of simplifying the antenna.

Experiments with 2M antennas

At that time I borrowed an MFJ-259 SWR analyzer from K6SG and started to build some test antennas on 2 Meters. I fashioned the antennas from eight-gauge aluminum wire and proceeded to test the methods most commonly used to resonate them when they were too short to be self-resonant.

I experimented with inductors placed at various places along the elements, end-loading capacitors, wires hanging from the ends of the elements, folded-back elements and, yes, linear loading too, but I didn't feel that I had made any progress toward "a better way to do this." In frustration, I returned the SWR analyzer to K6SG.

After a few weeks of not giving the idea much more thought, I borrowed George's analyzer again because I had the uneasy feeling that I had missed something in my earlier experiments. As I reviewed the results of the various things that I had tried, I noted that hanging wires from the ends of the elements had proved to be not only simple, but effective as well.

In an attempt to make the hanging wires more compact I wound them into coils and re-attached them to the ends of the elements. The coils of wire then had little effect on the

Next Meeting

The next meeting will be held March 3rd at 19:30 at the RMOC headquarters - 111 Lisgar St. in the Billings room. Remember, we may be bumped from the Keefer room, so don't stumble into the wrong meeting!

From out of the past, continued

resonant frequency of the short antenna. In theory, it would take infinitely large inductances placed at the ends of the short dipole elements to tune the antenna to resonance, so the results were not at all surprising.

Resurrected from the junk-box

At this point in my experimenting I thought about my late father-in-law, W8TS. He was into Amateur Radio before 1920 — so early, in fact, that he didn't need a license to operate. I recalled that in the past he had built antenna tuners using some very unusual coils.

Like many other Hams, I never throw anything away, so I still had one of his home-made coils in my junk box. I had looked at the coil many times and had no real use for it, but for sentimental reasons I just couldn't throw the coil away. I decided to try winding coils similar to his by using the lengths of the hanging wires.

I wound the coils in a spiral fashion by starting a turn with a very small diameter and winding each successive turn with a slightly larger diameter until the wire lengths were used up. The completed coils then had a pancake shape with all of the turns in the same plane.

I did not expect these coils to react any differently than the previous ones. Much to my surprise, when I attached them to the ends of the short dipole the resonant frequency was lowered somewhat, although not nearly as much as the hanging wires themselves.

The Petlowany Principle

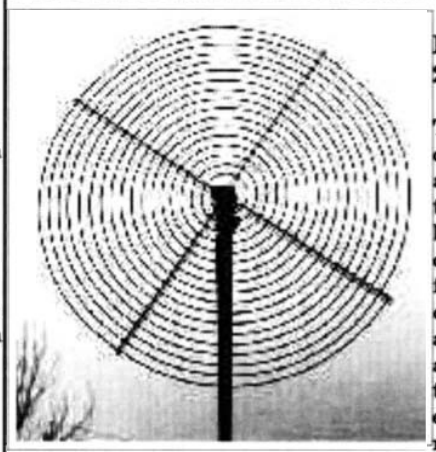
The unexpected results of this test prompted me to many more experiments with spiral-wound coils and caused me to formulate what I like to call (due tomy overly-modest nature, no doubt) "The Petlowany Principle."

It states that "if a length of wire is wound into a spiral-shaped coil and excited by a radio frequency current connected to the innermost portion of the coil, it will then, and only then, exhibit RF characteristics that closely approximate those of a resonant linear wire of the same length."

The shortest self-resonant linear length of wire is not the half-wave dipole as one might mistakenly assume, but instead, a wire one quarter of a wavelength long. Vertical antennas of that length are commonly used by many amateurs. I used wires 1/4 wavelength long in each of the spiral coils that I tested in an effort to keep the size and weight of the coils to a minimum. However, spiral coils wound with wires with resonant lengths greater than 1/4 wave-length also exhibit RF characteristics similar to the linear lengths used.

To further test the spiral coils, I built a full size half-wave dipole and also a 1/4 wave dipole for 2 Meters. I tuned the short antenna to resonance on 2 Meters with two spiral coils. Each coil was made from a length of wire about 1/4 wavelength long. They were then connected to each end of the short dipole. I trimmed off equal lengths of wire from both coils to tune the short antenna to the same frequency as the half-wave dipole.

On-the-air tests on 2 Meters with KI6O indicated that the transmitted signal strengths of the short dipole were equal to or better than the full half-wave antenna. Because the "on-the-air" tests were crude at best, I don't make the claim that the short antenna had any gain, but in any case, it was no worse than the full-size antenna.



Close-up of one spiral tuning coil for 12-foot 40 Meter dipole

Moving on to 20 & 40M

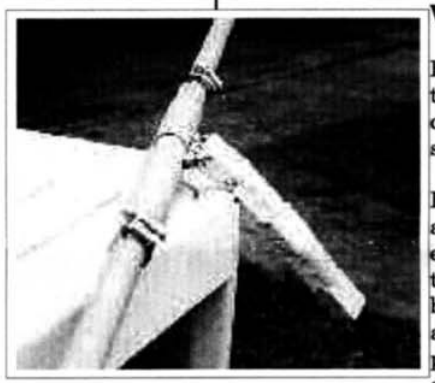
To test the spiral coils on an antenna for use in the HF Ham bands, I then constructed a full-size 20-meter dipole from aluminum tubing and by adjusting the lengths of the elements resonated it to 14 MHz. I then took two lengths of wire, each slightly longer than 1/4 wavelength on 40 Meters, wound them into spiral coils and attached them to the ends of the antenna.

By trimming off equal lengths of wire from the outside turns of each coil I was able to resonate the antenna to 7040 kHz. Amazingly, the antenna was also still tuned to the 20-meter band, although the resonant frequency was lowered somewhat by the capacitive end loading that resulted from attaching the coils. As amazing as the resonating capabilities of spiral coils appeared to be, I found its matching abilities even more remarkable. When the 20-meter dipole was tuned to 14 MHz, it presented a fairly good match to the 50-ohm line feeding it. The SWR was somewhat greater than 1 to 1. On 40 Meters, however, the match was much better than on 20 Meters and was about 1 to 1.

The 1/4 wavelength 40-meter dipole antenna would normally have a radiation resistance of about 14 Ohms. The radiation resistance of the short 40-meter dipole was increased to 50 Ohms by the use of the spiral coils and resulted in a much better match to the 50-ohm

transmission line. The RF current on the antenna "sees the spiral coils" as simply more linear wire and the additional radiation resistance presented by that wire contributes to the overall radiation resistance of the system.

In the process of checking the SWR on 7040 kHz, I had reduced my power output to about 10 Watts so as not to cause any unnecessary interference. When I sent my call to identify, a station in southern California called and we had a short QSO. He surprised me by giving me a 569 signal report. At the height of the antenna (about 30 feet), the power level, and the time of day (mid-afternoon), I was not expecting to be heard at all. Apparently, in spite of its unconventional method of tuning, the short 40-meter dipole could also radiate quite well.



Feedpoint current balun

The bandwidth of the 40-meter antenna over a 2-to-1 SWR range was about 80 kHz. The coils were wound with bare aluminum wire that measured .061 inches in diameter and were built with a spacing between turns of about one wire diameter. Subsequent tests with other wire diameters and spacings indicate that the bandwidth can be improved significantly by using larger wire diameters and greater spacing between turns. It is also important to wind the coils with the diameter for the innermost starting turn to be as small as possible if the maximum bandwidth is to be realized.

Testing out the coils

I have not made any tests to measure the improvement in efficiency to be gained by using the spiral coils, but since they are not connected in series with the high current portions of the antenna, their use can help to reduce the losses normally associated with matching networks, loading coils and linear loading schemes.

During my testing of the spiral coils, I found that their resonant frequency was little affected by the length of the linear portion of the short dipole. The antenna length can literally be from inches long to just short of full half-wave resonant size with only small adjustments to the wire lengths in the coils necessary to achieve resonance. I also found that the radiation resistance was always very nearly 50 Ohms, regardless of the length of the linear portion of the antenna.

I have given much thought to the spiral coils and their behavior in an attempt to better understand how they function. I have concluded that, due to the unique physical and electrical characteristics of the coils, they act as low impedance series-resonant circuits connected to the ends of the antenna. The linear portions of the dipole are simply extensions of the transmission line which is delivering current to the coils. Due to the low impedance nature of the coils the linear portions of the antenna are carrying large RF currents. If the linear portions are long enough in terms of the wavelength of the applied RF current, an appreciable amount of radiation takes place resulting in an efficient antenna.

What does it mean?

How can the amateur take advantage of the spiral coils with their unique characteristics to improve his antenna systems?

He will now be able to resonate a short antenna using an inductor placed at the ends of the elements which, according to conventional wisdom, would not have been possible with anything other than an infinitely large inductor. It is now possible to build very short resonant antennas using coils that do not introduce major losses and that are not impossible to build.

Short dipoles or short monopoles resonated in this way are resonant at two frequencies. One frequency is essentially that of the linear portion of the radiator, the other is that set by the end resonating coils. Multiband antennas are possible by using multiple coils to resonate the short linear portion of the antenna at the desired frequencies provided that sufficient spacing between coils is allowed to prevent detuning of the individual coils. The desired frequencies need not be harmonically related.

Broadbanding of an antenna for a particular frequency range is possible by the use of multiple coils that are all tuned within the desired range of frequencies. Again, to prevent detuning, adequate spacing between coils must be provided. The driven element of a parasitic array can be resonated and matched to the transmission line simply by the use of such coils. In fact, the parasitic elements of such an array can also be tuned as directors and reflectors in this manner.

Short vertical antennas (such as a short tower one might wish to use as a radiator on 160 Meters) can be resonated to the desired frequency simply by adding the appropriate spiral coil consisting of a wire length of approximately 1/4 wave attached to the uppermost portion of the tower or its mast. Doing so will increase the radiation resistance at the base of the tower resulting in improved efficiency.

How well does it work?

I have included photographs of a 12-foot-long 40-meter dipole built with spiral coils for use in my upstairs hamshack. The height above ground of the antenna was approximately 12 feet and, using only exciter level power

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