The Hamilton Amateur

The Hamilton Amateur Radio Club Newsletter — 76 Years of Amateur Radio 1932-2008

The Hamilton Amateur Radio Club
PO Box 91215, Effort Square PO
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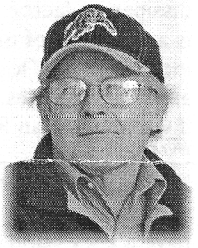
Est. 1932 Inc. 1956
http://www.hamiltonarc.ca/

In This Issue

March Meeting

by President David Bruton, VE3DWJ



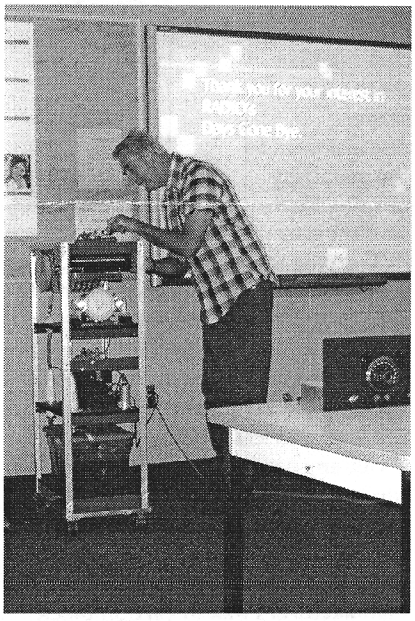
On Wednesday March 18th the speaker will be David Wilson, VE3BBN, from the Niagara Penninsula Amateur Radio Club, who will be presenting the topic "Reflections".

This topic has to do with Walter Maxwell's work on transmission lines and impedance matching. Maxwell's ideas refute some of the old concepts hams learned along the way that are just wrong. Hi

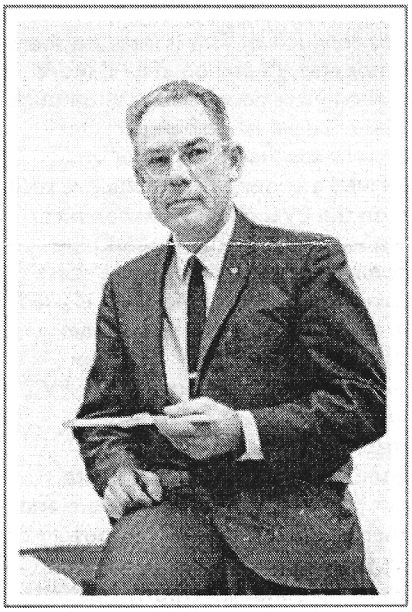
Waler Maxwell was an engineer working on deep space communications and consequently was well versed in the matching of transmitters to loads. This presentation looks at the many misunderstanding of how power travels down the transmission line and what the actual losses are and what causes them.

Our presenter, David Wilson is no stranger to the Club. You may recall an earlier visit in September 2006 when David demonstrated his home brewed spark gap transmitter. We are pleased to be welcoming David once again. As you know we have ample space in the cafeteria of the Christian High School where we meet, so please encourage visitors and bring a friend. I am looking forward to seeing you all at the March meeting.

Presenter, David Wilson, VE3BBN



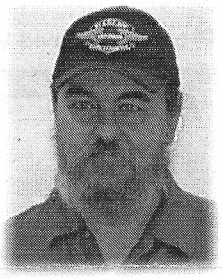
Walter Maxwell



Club meetings – 3rd Wednesday each month – 7:30 pm (except July and August) at Hamilton District Christian High School, 92 Glancaster Road, Ancaster, L9G 3K9, corner of Rymal Road (Hwy. #53) and Glancaster Road. Parking on location. Complimentary refreshments.

To Use Or Not To Use Black PVC, That Is The Question

by John Hudak
VE3CXB



At the January club meeting there was some discussion as to the suitability of using black, or dark grey PVC piping for certain ham radio purposes. This got me to thinking, as such things are of interest to me, so I decided to read up on the topic in an attempt to get to the core of the issue. The PVC pipe in question is the kind that can be bought at just about any hardware or DIY store, (do-it-yourself). The area of concern was whether black PVC is conductive or not. Raw PVC (polyvinyl chloride) is a white, brittle plastic. Manufacturers mix in carbon black (basically soot) to alter it's properties. The black PVC you buy is not conductive. This is because there is not enough carbon in it. If more carbon were added such that enough of the individual carbon particles actually touched each other and formed a continuous conductive path then the PVC pipe would conduct, but as this is not the type of pipe commonly available to us we don't have to worry about it. PVC is used in many electrical and electronic devices (insulation on wires for example). Don't confuse black PVC with carbon fiber composite material. Carbon composite is conductive because the graphite cloth used is a continuous piece and therefore there is a continuous conductive path. Also available is black ABS, another type of plastic which also contains carbon but is not conductive.

The question becomes how suitable is black PVC for use in RF fields? If we use the PVC pipe in a typical situation such as a weatherproof housing for a balun, or a boom for a lightweight yagi antenna, then it shouldn't be a problem. Where using PVC might become a problem is when we use it directly as a component of an RF element - a coil form in a transmitter, a trap in a yagi or vertical antenna, or as the dielectric material in a sleeve capacitor. This is because we have to take into consideration it's RF dissipation factor. Dissipation factor is a property of materials that indicates how "lossy" the material is at RF frequencies. What this means is if we impress an RF field within the PVC material, some of the energy will be absorbed by the plastic and turned into heat. Raw PVC does not have a very good dissipation factor compared to other plastics. For example, it is 10 to 30 times worse than High Density Polyethylene (the white plastic that kitchen cutting boards are made from), and 60 times worse than Teflon. In fact the dissipation factor of PVC is inferior to most other plastics. These figures are for raw PVC. If we now introduce a material like carbon into the mix this should make the PVC even more lossy.

What does this all mean? Well, maybe very little depending on your usage, or it may be a deal breaker. If you use it for a coil form it could lower the Q of the coil. This is why air core coils are preferable in RF circuits, especially at higher powers. If you build an antenna with traps that use black PVC tubing as coil forms they could heat up if you run high power through them. Given the poor dissipation factor of PVC, the trap could be lossy. At best this would lower the Q of your trap making your antenna less efficient. Not only would you waste RF energy it could cause the coil form to melt and deform, or even burn if the RF power is high enough. Has this ever happened? Yes, there have been reports of hams who have used PVC coil forms finding their traps melted. Is it a sure thing that it will happen to you? That would be difficult to predict. If it were me and I were building a trap for an antenna I'd just as soon use some other lower loss material if possible. On the other hand, if you are going to use the black PVC as a weatherproof container for a ferrite balun then it probably won't make much difference as most of the RF field will be contained within the ferrite core of the balun. In fact the carbon that is mixed into the PVC helps to make it more resistant to ultraviolet light which makes PVC a good choice for a housing used out of doors.

Yes, there are better plastics than black PVC to use in an RF environment, but can find you them in the form and the sizes that you need and at a price you are willing to pay? Have you checked the price of Teflon lately? It's pretty shocking.

HARC 2008-2009 Executive

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We do have a couple of plastics suppliers in the Hamilton area where you can buy various types of plastics in small quantities. In fact you can buy white or off-white PVC tubing (that contains little or no carbon) at your local DIY store, so given a choice I'd go for that over the black PVC.

Another down side to PVC is it's dielectric strength. This is it's ability to withstand high voltages before it breaks down. PVC is not quite as good as some other plastics. Once again a lot depends on how high a voltage you are likely to encounter, how clean the surface of the PVC dielectric is, if there is any moisture present, etc., so your mileage may vary. Cleanliness of RF insulator surfaces is a factor with any type of material. The combination of poor dissipation factor and low dielectric strength is why folks who work with high voltages tend to stay away from PVC for such things as coil forms or insulators. I don't think it would be wise to use it in a linear amplifier.

One other matter that came up for discussion was the testing of plastics for RF absorption (dissipation factor) by putting them in a microwave oven to see if they warm up or even melt. The whole basis of operation of a microwave oven is that our food has a high dissipation factor (our food is very lossy at RF frequencies!) This causes the food to absorb microwave energy from the oven and thus heat up. Since microwave ovens operate at a frequency around 2.45 GHz. one might think that this isn't a fair comparison for our plastics which will be used in the HF or maybe VHF range. At first glance this would appear to be a reasonable assumption. A given plastic material shouldn't have the same absorption characteristics at 1 GHz. as it does at 10 MHz. In actual fact this assumption is incorrect. If you check the dissipation factors of plastics you will find that they really don't vary that much from the low frequency range up to the microwave frequencies. For example the dissipation factor of High Density Polyethylene (HDPE) stays pretty constant from 1 kHz. up to 1 GHz. Teflon (PTFE) also shows no change from 1 kHz. to 1 GHz. Even raw PVC changes only by a factor of 2 over the same range. So I would say that putting your plastic coil form in your microwave oven is a valid and useful test.

There are some properties that do change with frequency. The dielectric constant for some plastics does vary as you go up in frequency, but not as much as you'd think. In fact for polyethylene, polypropylene and teflon it doesn't change much at all. Still if I were going to make a sleeve type capacitor for a gamma match section, for example, I would be inclined to use polyethylene or teflon tubing for the capacitor's dielectric as opposed to PVC tubing. Or go the traditional route and use a piece of RG-8 coax cable (which has a polyethylene dielectric) as the capacitor.

If you find some ham radio device that uses PVC I would venture a guess that it's probably because it does not negatively effect the operation of the item. In the end you will have to decide if using black PVC will be detrimental to your purpose. Many hams out there use it with good results. I suspect that there is such a variation in the manufactured quality of PVC piping that it may be hard to determine the good from the bad. If you have a critical situation where the characteristics of the PVC may have a negative effect then test it out first. Better to be safe than sorry and risk a bad outcome by assuming it was OK to use PVC instead of a more appropriate plastic dielectric material.

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Nuts and Bolts of Ham Radio: some thoughts about antennas.

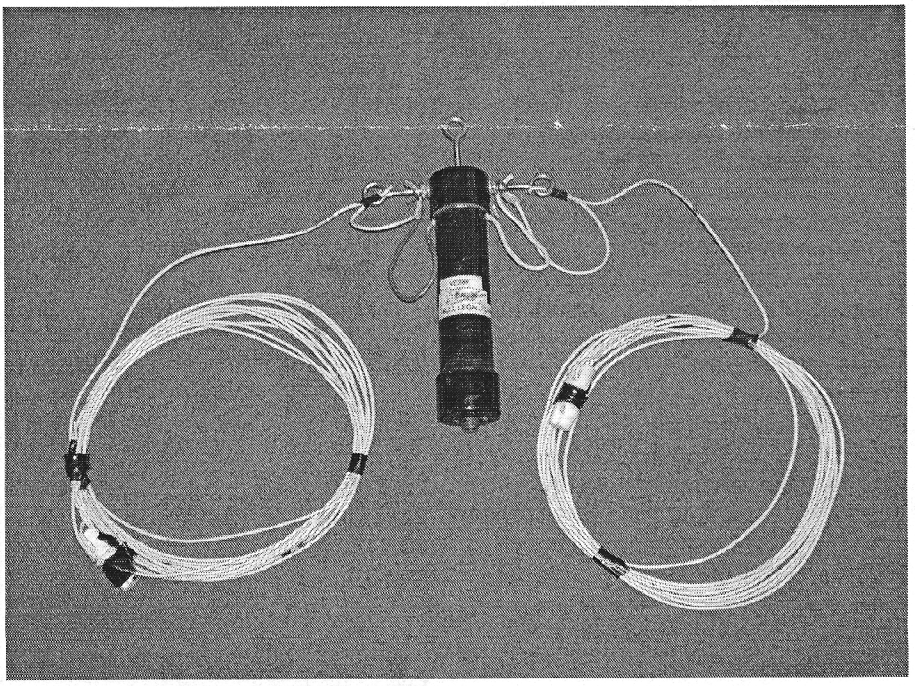
by Rick Danby, VE3BK

The best bang for the buck is a simple dipole that you can make yourself. Basically the dipole is a ½ wave antenna fed in the centre. The feedpoint is around 75 ohms, so makes it perfect to be fed directly with 50 or 75 ohm coax.

We are going to keep this all simple as I believe in the "K.I.S.S." rule (keep it simple Simon) for most things, antennas included. At the contest site we have tried many different antennas, but find the simple dipole is still the easiest, simplest and most economical to get on the air, especially if you make it yourself.

Now for the technical stuff: The formula for a dipole is 468 divided by the frequency in Megaherz. This formula yields the total length of the dipole in feet. Of course, the length of each equal arm of the center fed dipole would be half that total length. An example of this would be: say you wanted to make a dipole for the centre of the band for the ONTARS Net on 75 meters because you mostly did phone on 75 meters and checked into ONTARS every day. That would be 468 divided by 3.755 = 124.63382 feet, divided by 2 to get the length of each arm. Each arm, which is ¼ wavelength, = 62.31691 feet. (To calculate the number of inches consider just the decimal part .31691 and multiply it by 12 inches to get 3.8 inches or 3 3/4 inches as a fraction. Enough of the math stuff.

Feeding this dipole can be done in different ways. You can use 300 ohm TV type twinlead (balanced feedline) and use a tuner to make this antenna work on 75 meters and up. This method would allow the dipole to be used as a multiband antenna. You could feed this antenna directly with coax. Employing the direct method you cut the coax to a ¼ wavelength multiple. Here goes the math again, as you need to take the velocity factor of the coax into account. To figure that out: 984 divided by the frequency in Megaherz times the velocity factor of the coax used to give you a full wave length at that frequency. You can divide by 4 to get ¼ wave length or by 2 to get a ½ wave length. The velocity factor of



Important Points

Executive Meetings
HARC Executive committee meets each month, except July and August. Members are invited to attend and participate. The meetings are on the Tuesday following the club General Meeting each month. Ask an executive member for the location.

VE3NCF 146.760 - & 444.075 +
HARC operates VE3NCF repeater, located atop the Niagara Escarpment. It's open for use by all Amateurs. Special features are a privilege of membership.

Nets
HARC "check-in net" is held every Tuesday evening at 7:30 p.m. HARC "swap net" follows at 8 p.m. All contacts are welcome.

Examinations
Amateur radio license examinations are conducted the second Wednesday of each month, except July and August. Contact the voluntary examiners to make an appointment. There will be a fee for each examination.

Membership Information
Club membership, including all privileges, is $25 per person, per year, Sept 1 to Aug 31. Additional membership, for immediate family living in the same home, is $1 per person. One newsletter sent to each address.

The Hamilton Amateur
The Hamilton Amateur is published ten times each year (not in July or August). Deadline for article submission is the last Saturday of the month for the next month's issue. Preferred format is .txt file. Articles will be checked for spelling and grammar, but the author is responsible for factual content. E-mail submissions to Editor, John Hudak VE3CXB, <hudakjm@mcmaster.ca>

RG8 or RG213 is .66 so that means: 984 divided by 3.755 = 262.0506 x . 66 = 172.9534 for a full wave length so divided by 4 = 43.238349 for a quarter wave or 86.476698 or 86' 5 ¾" for a halfwave, which might be a reasonable length for most shacks.

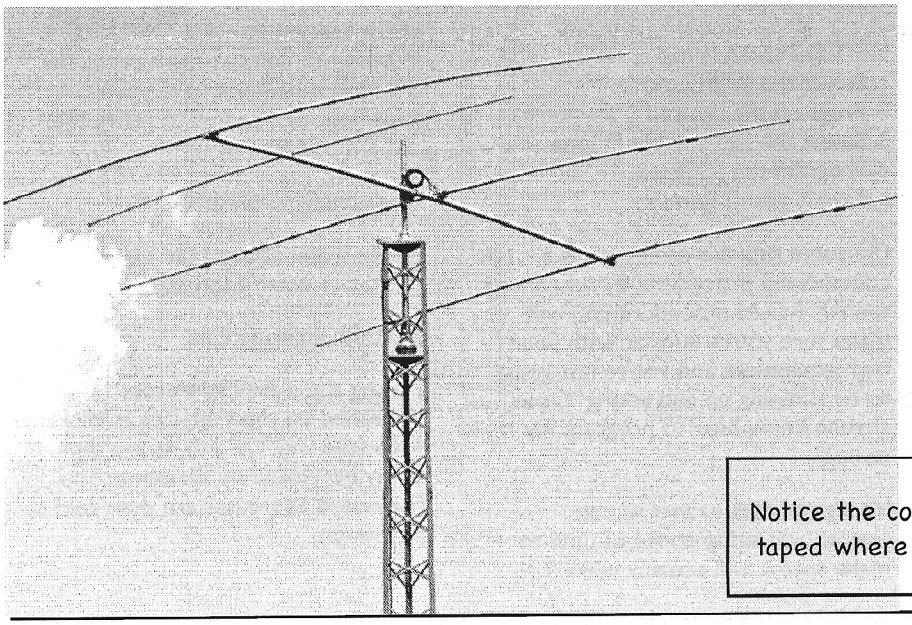
Another way to feed a dipole is with a choke or what they call a coaxial Balun. A choke is made by coiling coax several times and taping the coil together. Chokes are often seen on the feed lines of multi-band yagis right up where the feed line joins the antenna. The coaxial balun or choke, stops RF from traveling on the outside of the unbalanced coax. Usually 9 turns are recommended in a 6" circle. With this method, you can feed the antenna with any length of coax.

The last method involves using a one-to-one balun, (a balanced to unbalanced transformer). The balun will stop any RF down the coax, just like the choke. In my experience, baluns work well, but are only good for the frequency the dipole is cut for, or any harmonic frequencies. This means that a 40 meter dipole would be good on 15 meters, and an 80 meter dipole cut for the lower or CW portion of the band would be good on 40 and 20 meters. You should be able to use the WARC bands too, with this configuration, probably with a tuner, but 15m would likely give you real problems tuning because of the high Q. Below is a picture of one of my dipoles that I have used at our Contest Site. This one has my homemade balun and is cut for 40 meters. I will probably be covering baluns at a later date.

One other thing I should mention is the height and orientation of the dipole. Generally dipoles radiate off the sides in a figure "8" pattern (check your Amateur Handbook) and they say "the higher the better", but this is not always the case. If you want to talk fairly close, you need a skyburner or low antenna, which will work like an omni directional. Some hams will recommend elevating the dipole ½ wave off the ground or a 6th wave off the ground for better directionality. I find that elevating the dipole ¼ wave above the ground works great for our contesting.

You can experiment with any heights you can get, depending on your situation. That is usually the determining factor for most people. We can't all put up that super tower and antenna. Slopers are another idea (check your antenna book or handbook) but again, something we can cover later.

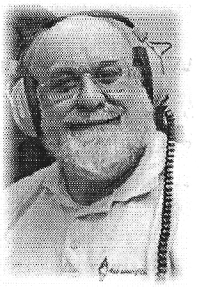
Have fun making that dipole and experimenting. That is the name of the game. What works great on your property, may not work so well on someone else's property, depending on surroundings like telephone wires, houses too close, a lack of support for the dipole, etc.



Notice the coaxial balun (or choke) coiled up and taped where the feed line ends at the antenna.

Contest Corner

by Rick Danby VE3BK



This contest (at the end of February) went very well. It was a 48 hour contest, starting at 5pm on Friday Feb. 27 and running mostly night time till 5pm on Sunday Mar. 1, 2009. Dan VA3DJ and myself (Rick VE3BK) went out early on Friday and setup the radio and computer. We were all set up by about 4pm so Dan went off to buy some pizza. I had ate supper and was on the air by 5pm.

The band was very busy and hard to find a spot to call CQ, but we did and the points started to rack up. I think this is one of the busiest contests that we have worked as it was almost impossible to find a spot to call CQ without someone coming in right beside you doing the same thing. Dan came back and we took turns operating. Sherry VE3DCU came walking in the door with some stuff for our Contest Group operating stations and we had a short visit with us as she had some family things to do. Thanks for your generosity Sherry. Next Mark VE3RYI came in and we were taking turns operating again. Calling CQ we worked VP2E Anquilla. Working search and pounce we worked HI3TEJ Dominica Republic, KV4FZ Virgin Islands, CM6RCR Cuba. Back to calling CQ we worked ZF2AM Caymen Island, C6ANM Bahamas, XE2TZP and XE2TH in Mexico. I think that Dan, Mark and myself did a great job in the first part of the contest. Some of this could probably be put down to not working everyone yet, but anyway, Dan and Mark, you guys did an excellent job. By 6am in the morning, I finished off with 403 contacts before I went to bed. Dan and Mark had gone home before that, Mark

staying till 5 am. By the time Dan came back, I had about 20 more contacts (not bad for daytime operating). Our delta loop and Windom for 160m, worked very well for us.

Saturday, the other operators started coming in. Dan and Mark were both back. Fred VE3GCP showed up and went right to town. He did more than the usual 1 hour stint with a real good qso count. Jim VE3EEZ and Joe VE3OCD were there too, and we had a visit from Tom VA3TVW, who ended up not staying to operate. Joe took a turn and then Fred took another turn before he went home. Fred even worked KP4KE Puerto Rico for us. Thanks Fred, you did very well with the QSO count. Fred's remark after his second long stint at the radio:" no wonder I am tired, it's after 2 am." Joe and Jim took turns after that I think as I went to catch 40 winks (I was very tired by this time) and the next thing I knew, Jim was waking me up as he went home at 6 am. The QSO count was at 740 by this time.

It was slow going early on Sunday morning. I worked Jerry VE3ACA (who we had worked earlier so his QSO didn't count towards our score) and John VE3EJ (a neighbour of Dan's with a big antenna farm), Steve VE3OZO (one of the Contest Club members who does CW for us usually), and John VE3CXB (also a Contest Club member). The QSO count was 771 by this time, not bad for only 26 hours and 4 minutes of total operating time. Dan showed up and tried calling CQ for some more contacts, but everyone still on the 160 band had either been worked already or the band was just dying now that daytime had arrived.

I would like to thank all that operated, helped out or worked us. It was another successful contest where we had fun working so many people.

73 es gud DX Rick VE3BK

Can You V-F-T-O-M?

adapted from an article by Wayne Barringer, KB6UJW that was posted on the PEEL ARC website.

The topic of radio operator proficiency frequently surfaces when hams get together to work as a group. In our club, the Paris to Ancaster Bike Race would be a good example. Some of these public service opportunities occur annually leaving lots of time in between to let our skills get rusty and to forget how equipment works. Hams should not assume we have an adequate level of operator proficiency but rather, work to assure it.

For example, take passing messages between radio operators during a scheduled exercise. Someone may have to be reminded (usually on the air during the drill) to "slow down" when speaking. Remember, we speak much faster than we can write and the net control may be recording information we give. Also, the quality of our voice may deteriorate as a result of transmission. Slowing down helps both problems. Work on the habit now.

On the topic of being able to program your own radio please don't wait until the day of exercise to test your skill level. You can prevent both frustration and embarrassment by reviewing V-F-T-O-M procedures ahead of time.

V-F-T-O-M stands for:
1. Select the [V]FO mode
2. Program the desired [F]requency
3. Select the sub-audible [T]one
4. Program the [O]ffset, "+" or "-"
5. Save it into [M]emory

On some rigs this can be quite a complicated procedure. By rehearsing the V-F-T-O-M procedure you will make sure you're familiar with your own equipment and you're not going to be showing up and asking "Does anyone know how to program my radio?"

It's a good idea to test out an operational setup ahead of time to make sure it will actually work. For example, if you will be net control at a new event, set up the control station a couple weeks ahead of time and have an associate test out the radio coverage to make sure it will work on the day of the event. Testing ahead of time will allow you to make changes if you need to, and will improve your chance being successful on the day of the event.

Although amateur radio is a hobby we should not take a casual attitude toward being proficient. In this hobby we function as a group. We count on one another to have equipment that will work and skills that allow us to communicate effectively. Think of it as a responsibility to be proficient. Our level of satisfaction and the impression we create in the minds of the public depend on how proficient we are.

Changes To E-mail Addresses On The HARC Web Site

Here is a message from our web designer, Anita, VA3ANI. This message failed to get in last month's THA. Apologies to Anita for the delay.

Hello everyone:
In order to combat spam problems the club executives have been experiencing, I've had to retire the old e-mail address:

executive@hamiltonarc.ca.

Please make note of the new executive email address:

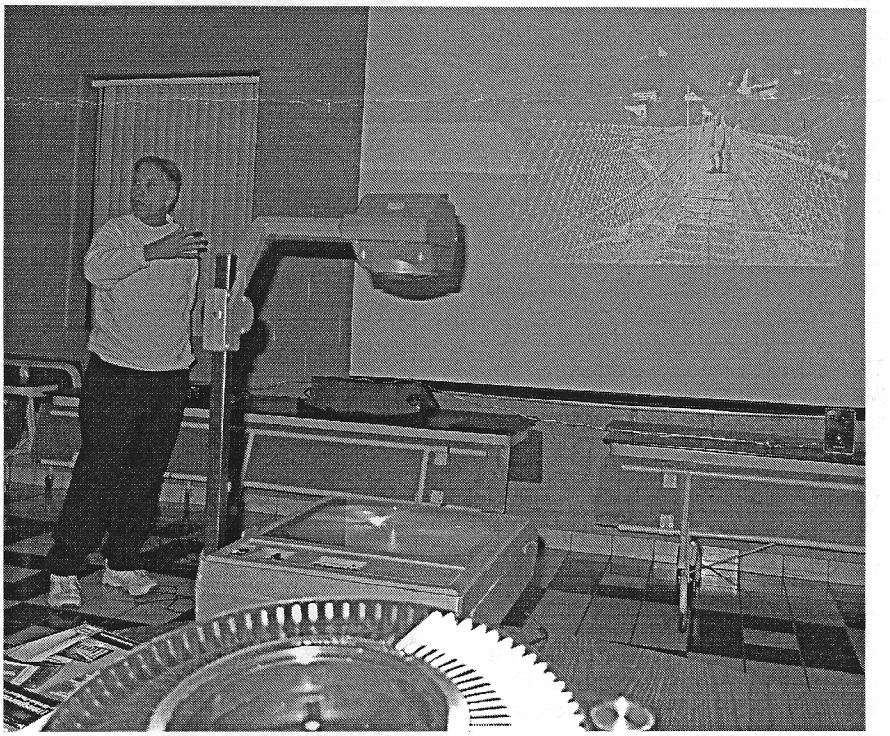
exec@hamiltonarc.ca

Having the e-mail addresses published on the Web site as clickable links (the way we did) makes them easily harvested by spambots. The harvested addresses are then sold to spammers.

Now we are publishing e-mail addresses on the web as images (pictures) of e-mail addresses. This new method prevents the spambots from doing their dastardly deeds.

Anyone wishing to send an email to one of these new addresses will have to manually type the address into their email client the first time, however, most email clients will "remember" it for the next time you need to send a note to one of those email addresses.

Thank you for your understanding.



Minutes Of February 18th , 2009

By secretary Ron Ouwehand VE3OUW.

Guest Speaker

David Bruton introduced our guest speaker Bob Zimmerman VE3RKZ.

Bob is one of our own club members and honored us by giving us a presentation on his career working in Puerto Rico at the Arecibo Radio Radar Telescope. For those of you that were not there you missed a very interesting night. Bob is an engineer who worked at the site, an installation using radar to look into deep space. This started in the sixties and still continues today. Bob gave detailed pictures and explanations on how the radar can see things in deep space that regular telescopes cannot see. Things such as craters on Mars that they can look into and through the gasses on Saturn that block the view for regular telescopes. This installation features the most powerful transmitter on earth with terawatts of effective radiated power. We were treated to a visual tour of the huge radio telescope and an interesting account of the work needed to maintain the facility. The presentation was followed with a queston and answer period. Thank you Bob for a great night.

Business Meeting

Announcements

Jerry Osborn, VE3JSO, mentioned that Industry Canada now has a manual out on ARES training. He is prepared to give a course if there is interest in taking the ARES training. For more information contact Jerry at ve3jso@rac.ca

Lorraine, VA3NZ, mentioned that there would be no emergency preparedness day for the City of Hamilton this year due to budget constraints. Canwarn training will be held again on April 18 at the Nash auditorium. The Erland Lee Museum will be having it's annual open house on March 28. Lorraine would like to set up a station and any volunteers are asked to contact her at va3nz@rac.ca

David Bruton asked for a motion to accept the minutes of the last general

meeting. Casey made the motion and Rick seconded it. Motion carried.

Fred VE3GCP, mentioned that John Vandenberg VE3DVV, has the new repeater controller and will be installing the phone patch module into it. It was supposed to come complete but we now have the unit and it will be installed on site when John has time. Fred also gave the treasurers report. All is well with our finances and our next biggest expense will be field day. Mardy, VE3QEE, moved the treasurers report be accepted as presented and Mike Krebs seconded it. Motion carried.

Rick Danby mentioned the ARRL International DX contest on March 7 & 8.

Correction to last month's membership counts, 62 full members and 9 family members.

David Bruton made a motion to adjourn at 9:15 seconded by Mike Krebs. Carried.

Guides On The Air

submitted by Tracy Van Wort

On Sunday February 22, 2009 Tom Van Wort (VA3TVW) hosted the 1st Grimsby Pathfinders for Guides On The Air at the Van Wort residence in Hamilton. Tom had special help from Jeff (VE3NVY). They explained a little about amateur radio and some of the uses for it. The girls got a chance to listen to a gentleman talking in the United Kingdom to a bunch of guides in Mississauga thru the I.R.L.P. The girls also talked to some of the local hams via VE3TVI which is one of the local repeaters. They also got some information on the different antennas and how they work. Then the girls got to talk to K9ILG in Minneapolis thru the I.R.L.P. All the girls were amazed at what can be done through the radio and enjoyed themselves. Tom and Jeff were pleased to have such a large and interested group of Pathfinders activate a station for this year's annual Guides On The Air event.