SKYHOOK

A bimonthly newsletter published by the Skywide Amateur Radio Club
Located in the Etobicoke area of Toronto, Ontario

March - April 2002

AUTOBIOGRAPHY OF 'UNCLE' RAY HUNTER VE3UR

By Ray Hunter VE3UR,
The 1st of 2 installments - 2nd installment will be in the May - June 2002 Skyhook

My name is Murray Eugene Hunter. I was born April 6, 1909 in Toronto, Ontario. When I was two, my family moved to Galt (now Cambridge), Ontario. My father purchased a garage, a taxi service and a sporting goods store.

When I was 5 and my brother Ernie was 4, we caught diphtheria. I recovered, but Ernie didn't. At age 7 I developed an ailment in my left leg. The doctor put a cast on it, but the next day it had swollen out of the ends of the cast. The doctor wanted to remove the leg. My dad said no, that we had an appointment at the Sick Children's Hospital in two days; the doctor said the boy may not be alive in two days. Upon arrival at the hospital, and after examination by the doctors, an injection was made into my left arm. The doctors had diagnosed a blood infection. After being in the hospital for four months, I became an out-patient. Luckily for me, both sets of grandparents lived in Toronto, where I stayed with them alternately. My grandmother Hunter was an expert checker player so we played as often as possible. My grandfather Buckner took me to the barber shop and we played checkers in the back room. I played from 10 a.m. to 5 p.m. and never lost a game. Needless to say, I was never invited back. When I finally returned to Gait, I was in a metal brace from the hip down to 2" below my foot. My right shoe had to be built up 2" to compensate. I wore this for about six months.

My father's garage had a good machine shop with a lathe, a drill press, plus tools, including micrometers. I enjoyed standing on a box and working the lathe. The years passed, then I received my mechanics license. In 1928 when the Model A Ford's came out, I purchased three wrecked ones. After starting to take them apart, I contracted scarlet fever and jaundice, and was quarantined in the top front bedroom of our house. My mother put a cot-ton sheet sprayed with lysol over the door. Nothing was to come out of the room while the quarantine was in effect. Feeling better after a couple of weeks, I lowered a rope from the top front veranda outside my room, and one of my four remaining brothers would attach a door or fender from one of the cars, and I would haul it up and work on it. When the quarantine was over, I had a corner full of auto parts I had worked on, a corner full of paper I had stripped from the walls and ceil-ing, and I had sanded the floor. I ended up with one coach that I sold, and one roadster for myself, and one engine.

When I was 21, I told my father that I was going to quit the job I was in and get a good job over in Guelph. The company there had just bought four new International trucks and four Chevrolet coaches for the salesmen. They also had two walk-in freezers to service. I met two chaps who were building a Pietenpole aeroplane, which has a 30-foot wingspan, two cockpits, and had a Ford Model T engine. I joined the group, and I offered my Ford Model A engine. We worked on it all winter, then it was ready for a test flight. We were using a Henderson motorcycle magneto. The insulation on the mag was poor and kept breaking down and we could only get about three-fourths of the RPM required. We were all taking flight lessons, and Hew it all summer at about 1,000 feet. The magneto finally became useless, so we tied the plane down outside. We did not have any grommets, and the hot sun made little cracks on the plane's wing surface. Then we had a lot of rain and the wing took in a lot of water. We finally found a German Bosch magneto, but it was set up for the wrong rotation. We had to order the small parts for the opposite rotation from Detroit, which took about two months. Finally we got the parts and installed them and the magneto ran beautifully. The en-

gine ran about 300 RPM more than was required. Ray Reid had already made a solo flight, so he was picked to make the first real flight. It was a beautiful take-off, and at about 2.000 feet, he made a left bank turn. The water in the wing came down to the tip of the left wing and he fought it all the way down in a large spiral and hit the ground, and smashed the plane up. When we got to the plane, he had gone through the first cockpit and was laying on the engine. We took him to the doctor, about a mile down the road, as we thought he was dead, but he just had the wind knocked out of him. The doctor gave him a good examination and told him to take a couple of days off work. We took the engine and the metal parts off the plane and dug a big hole, burnt the plane, and covered it up. The Globe and Mail had a column called "News and Nonsense". They drew a sketch of a boy in a soapbox with a helmet on and the helmet straps flying, with a little bird flying beside. The caption read, "Guelph home-made plane can do everything that a bird can do, except lay an egg and fly." This brought an aeronautical inspector from Toronto who quizzed us for three days. We said we didn't know anything about an aeroplane crash. He got the three of us together and readout the riot act. He could not find any evidence, so he got back into his plane and flew back to Toronto. With no plane left, we started building model aeroplanes. I was designing them and making model engines. I had about twenty engines of all different sizes. We did a lot of model aeroplane flying and model boat floating. I got into building transmitters and receivers using peanut tubes. One boat I took to Belle Isle, and entered it into the radio control class. My boat had portional rudder control along with speed control; the other boats had neither, and I won the course.

The war broke out, and I got a job at A.V. Roe, at Malton, Ontario. My job at A.V. Roe was as an inspector. I started off with small parts, and worked my way up to inspecting completed components. I was sent to Fort William (now Thunder Bay) and my job was to learn all about the completed Hurricane Wing. The rest of the group sent to the fort were not told of their responsibilities for when they returned. It was one big party. Being newly married, I did not participate in the revelries. I took notes of everything I could and returned with three notebooks filled. After the three months were up, we all returned to Malton. Things were quite a mess, most parts that were to be inspected had to be rejected. Finally the chief inspector and I were called to the boardroom. When we entered, we could see the leadmen around the board table. It seemed that they wanted Hunter off the job. The general manager finally said, "Gentlemen, it appears that Hunter is the only one who knows how the job should be done." He also advised the men to get back to their stations, and anything they wanted to know, Hunter would tell them. The job went along pretty good after that. A rig was made for drilling holes in the main spar to carry the auxiliary tanks. It was put up for inspection. The first thing that I did was was ask for the jig that drilled the holes. There was no inspection stamp by the toolmakers on the jig. I asked the leadman why there was no inspection stamp on the jig. He had said that if Hunter passed it, he would put the stamp on the jig, was his reply. Once again, the general manager was called, and asked me why I did not inspect it. Finally I agreed to inspect the drilling without the stamp on the jig. I spent three days putting the wing up in flight position, and using a 'slipstick' for calculation. As there were no hand calculators in those days, I found that the rear hole had been drilled about 1/4 inch out of position. It was a very serious matter - we had to get permission from the English Ministry of Aeronautics. Fort William also had the same condition on the ten pairs of wings that were on the high seas on their way to England. They also had to make application to the English Ministry of Aeronautics for acceptance of these wings the way they were. I had two friends who wanted to go into the production of small parts. I loaned them my quick change lathe along with a fair amount of money. Their business grew very fast. Finally they wanted me to join them, which I did, upon them putting one of my engines into production. We already had the certificate to buy material, if available, under educational purposes. The first thing we did was to buy a bank and ground, and then we built an extension to our shop.

We had approximately 65 toolmakers working for us. At that time I was designing tools for our engines. We had pressure casting make the main casting mold. It was water-cooled and it took two men to Lift it. It took us about a year to get things into production. It was a high-class engine; we used meonite #6 for it's perocity, for both the piston and the sleeve. The tungsten for the ignition points was very hard to secure. I had a handful of tungsten discs to be welded on to the spring and screw. They put all 2,000 discs on the spring, and left none for the screw. We had to find a substitute for the screw. We tried gold and silver, which did not work very well. We then tried platinum, which worked real well. but was very expensive. The United States was our biggest customer as they were not allowed to make model engines. We would export the engines to Buffalo,

and we would go and clear them through customs. We then sent them from our Buffalo office to our distributors. We estimated that we sold over 2(X),000 engines to the States. We also were exporting them to several other countries, in particular, New Zealand. Finally, the war was over, and it took the Americans about a year to tool-up for engines. This had a big influence on our sales. We finally sold the engine business.

(Continued in next issue of Skyhook)...

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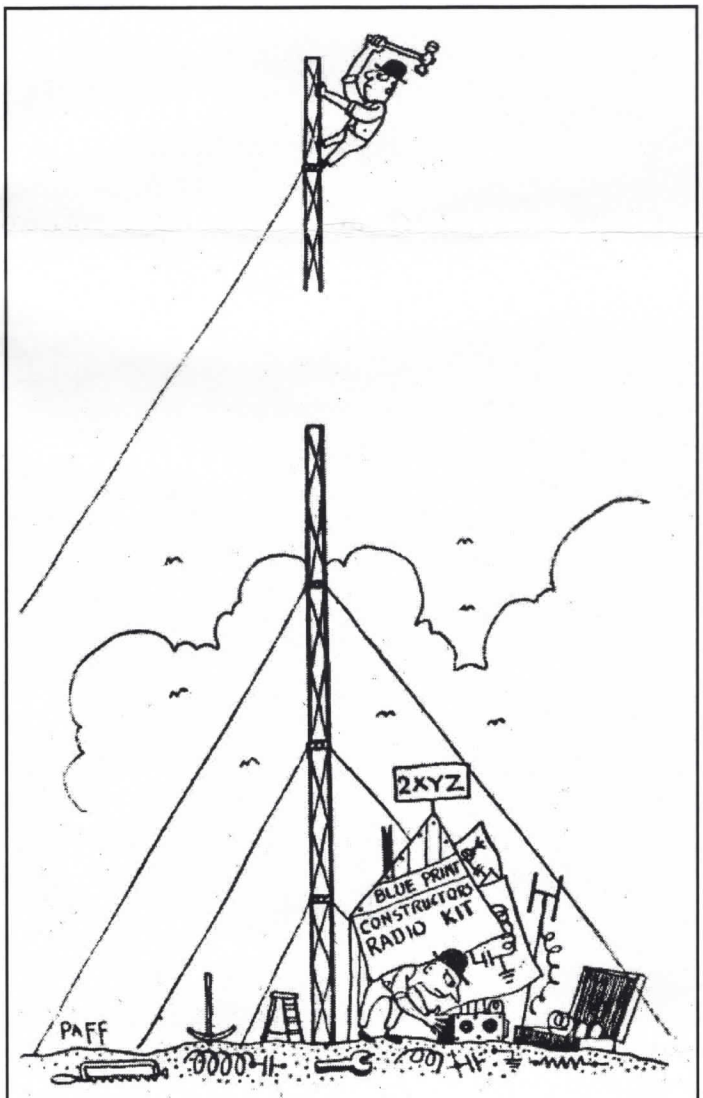
The cartoon below has been contributed by Jack Kinch VE3AMV. It is from the January 1953 issue of *'The Radio Constructor'* Magazine, a British magazine no longer in existence.



" Ease up, Charlie—There's a bit missing from the kit!"

PREDICTIONS THAT MISSED THE MARK

Submitted by Peter Flanagan VE3AYF

Scientific American has been in the practice of publishing extracts from their issues 50, 100 and 150 years ago. The January 2002 issue contained a letter written by Lee deForest, to the Editor, in January 1952, objecting to an article published in the August 1951 issue. They also provided the author with an opportunity to reply. I thought these two items would be of particular interest to Skywide members and they are reproduced below;

"Sirs, the article in August 1951, by Louis N. Ridenour, properly entitled `A Revolution in Electronics,' is most interesting. The article, however, conveys an entirely erroneous impression: that the three-electrode tube amplifier has virtually come to the end of its career. Dr. Ridenour neglected to mention the frequency limitations of the transistor. Under such limitations, it cannot begin to compete with the three-electrode tube, or audion, as I first styled it. The general application of the transistor in radio and television receivers is far in the future. -Lee deForest"

Ridenour replies - *"Sirs, I am very pleased to have the comments of the man who made possible the present age of electronics, even though I must take mild issue with some of them. The time at which consumer radio and television equipment can use transistors may indeed be some years off, as Mr. deForest says. However, this delay is likely to be due to the inability of rising transistor production to keep up with vast and growing military demands. The principal limitations of complex electronic apparatus are traceable to the fundamental shortcomings of the vacuum tube, which nearly half a century of development has alleviated, but not cured. -Louis N. Ridenour"*

I relish this anecdote as much as the prediction made by one of the Wright brothers to newpaper reporters that, ... *"Someday aeroplanes will hurtle through space at 100 miles per hour."* The reporters all laughed because they knew that nothing could go 100 miles per hour!

MUSEUM WEB SITE

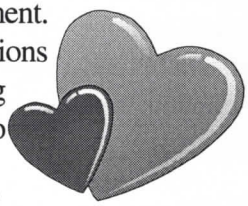
By Jerry Proc VE3FAB

This just has to be the biggest cache of collectibles that I have seen outside a museum. The collector is focused on Technical Materials Corp (TMC) equipment.

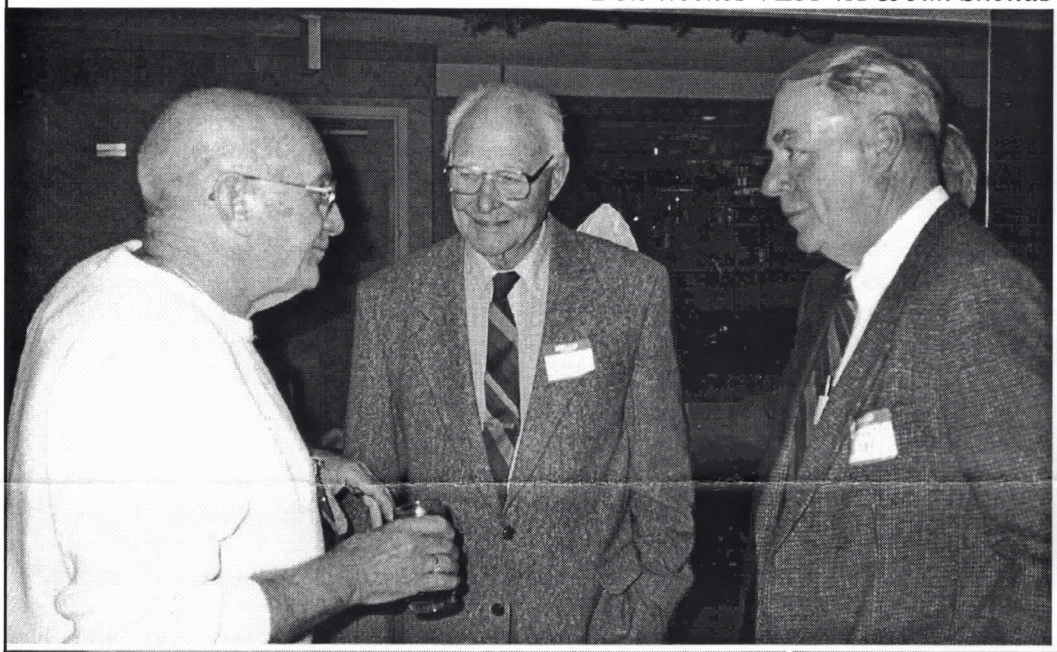
http://www.geocities.com/radiotmc/bobscollection.html

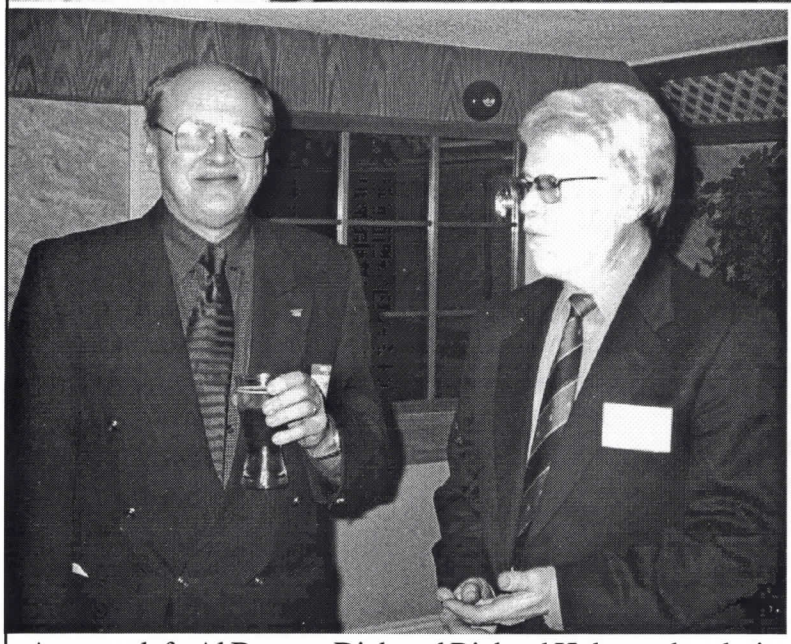
THE SKYWIDE VALENTINES BANQUET

The Banquet Committee says thanks to the sixty who came to a fine dinner at the CANADIANA Banquet Room. They told us the Food and the Service was Top Notch and the room was nicely set up, which made for a memorable evening with friends. The Reg Martin Trophy, for The Most Outstanding Member During The Past Year, was presented to Peter VE3AYF, for his excellent work in the production of SKYHOOK and the Database development. Jack VE3AMV, and Murray VA3KTL were awarded Certificates - Jack for the Technical contributions to SKYHOOK and his outstanding Humour, and Murray was recognized for his work in revitalizing our Hamfest or Fleamarket over the past couple of years. We would like to thank everyone who contributed to the success of this event.



Don Weekes VE3PVA & Jim Sheilds VE3HCS.





At upper left, Al Bonner, Dick and Richard Hobson chat during cocktail hour. At upper right, Kaye Shields who did such a fine job on the decorations and centre peices waits waits for dinner. At lower left, Jerry Proc and Julian Baranowsky chat over drinks. At lower right Godfrey and Ruth Wood fill out the questionaire after dinner. Woody said grace before dinner.

At upper left we have Jack and May Leggett. At upper right Vern and Irene Philips. At centre left is Dori Proc with Bernard and Maggie Dodd. Beside them on the right are Anne Weekes and Grace Kinley. At lower left are Len and Olive TenEycke. At lower right are Joe Mursec and his wife.

TRENDS & DEVELOPMENTS IN AUDIO FILTERS

By Peter Flanagan VE3AYF

In the past when an Amateur wanted to improve his receiver selectivity he would, not uncommonly, built an outboard audio filter. In the old days this device was invariably a passive filter comprised of a variety of capacitors and inductors. A popular component for these filters was the 88 mh toroidal coil which was once readily available. These coils are no longer available.

The passive devices were replaced by the active audio filter that had at its heart an Operational Amplifier combined with some resistors and capacitors to replaced the inductor/capacitor networks of the past. These provided better filtering, better control over the filter parameters and could provide some gain.

The secret to making Active Audio filters practical was the development of Operational Amplifiers on an integrated circuit. Operational Amplifiers could be fabricated from discrete components but required that the components be carefully matched which was impractical in a commercial environment and for most hams. The integrated circuit solved this problem in an inexpensive way.

The important properties of the Operational Amplifier which makes it so useful in a wide range of communications applications are, a very high input impedance, a low output impedance, high gain and linearity over a wide range of frequencies. In filter design high gain is not important since best results are obtained with a gain of unity or at least no more than 4 times.

With the emergence of personal computers, the "wireless network" and cellphone industry a new emphasis was placed on the development of small, cheap and effective filters on one chip that could be mass-produced.

One of the impediments to manufacturing an active audio filter on a chip is the difficulty of fabricating resistors in an integrated circuit. Consistency in resistor manufacturing is also a problem when high precision is required; resistors will vary from batch to batch.

Manufacturers began to explore alternatives. The first development was the MOSFET-C filter, introduced in 1985, where the required resistance was simulated by transistors, thus making it easy to manufacture. Most of the properties of the original filter prototype are retained; the time and frequency response remain the same. However, nonlinearity is introduced by the transistors, as well as the maximum peak swing was limited by the tuning voltage. The next development was the OTA-C Filters (Operational Transconductance Amplifier) where the operational amplifier operates in open loop fashion.

The latest development is the Switched Capacitior filter which operates on the principle of transferring analog signal samples (represented as charges on capacitors) from one storage element to another. The resistors required for establishing the filter frequency are synthesised with a couple of transistor switches and a capacitor. This allows the cut off frequency to be determined by an oscillator, which can be controlled precisely in a linear fashion.

These filters are being packaged on individual integrated circuits at reasonable prices and apparently are capable of superior performance to traditional active audio filters. They can be configured as low pass, band pass or band rejection filters.

The last couple of issues of the ARRL Handbook have Switched Capacitor Filters as projects with printed circuit boards available. These are affordable and relatively easy to construct. Those interested in experimenting might want to investigate further.

I could not conclude any discussion on audio filters without mentioning the ultimate filter which is Digital Signal Processing (DSP) whose performance transcends all previous performance standards. It involves mathematical processing by either specialised DSP chips or computers and is really a software implementation of filtering. However, that is a very large subject that cannot be dealt with here. It is the capabilities of DSP that allows a dozen PSK31 signals to co-exist without interference in a transceivers SSB passband or the 16 tones of MFSK16 to be confined to a 400 Hz passband.

Clearly, there are still many frontiers of communications technology where hams can experiment and make a contribution. The author would be interested in talking to anyone wishing to become involved in a construction project or just tinkering with some of the newer audio filters.

FREQUENCY USAGE IN AVIATION

By Robert Eleazer and Breck Smith
Edited by Jerry Proc VE3FAB

In the 1930's, the primary aircraft navigation system in the U.S. was the A-N Range or "Adcock" range, which used low frequency transmitters in the 200-400 KHz range to enable "precision" approaches to airports under instrument conditions. All the pilot had to do was discern whether the signal being received was an "A" (dot dash) or an "N" (dash dot). If you were precisely between the two stations, both signals combined to produce a continuous tone and that meant the aircraft was "on the beam" and the pilot could follow the published track on the chart.

Virtually everyone who flew needed to use the A-N ranges, and many aircraft without electrical systems carried battery powered receivers for the the L.F. band. Since everyone who had any type of a radio always had a set that could tune 200-400 KHz, the frequency of 278 KHz was adapted for use by tower control. Heath even produced a little low frequency receiver around 1940 for that purpose which sold for $39.50. It had both a VFO for 200-400 KHz and a fixed frequency for 278 KHz.

Aircraft, whether Piper Cubs or B-17's, received the tower's instructions on 278 KHz, but did not broadcast on that frequency. It was "one way" only - tower to aircraft. In order to talk with the tower, two transmitting frequencies were used; 3105 KHz for daytime and 6210 KHz for nighttime . Many aircraft were only equipped with LF receivers and acknowledged the instructions on 278 KHz by wagging the ailerons back and forth if on the ground or pitching the nose up and down if in the air. (For pilots who could not afford radios, there was a simple system of light signals flashed from the tower.)

Presumably, the higher frequency for night operations was intended to prevent night skip from causing everyone in the country from having to hear everyone else when the ionospheric E-layer extended communications range after dark. Note that the night frequency was a harmonic of the day one. The final frequency used by control towers and Flight Service Stations in the early 1960's was 3023.5 KHz.

When WWII broke out, most aircraft worldwide used the 190-550, 3-6, and 6-9.1 MHz frequency ranges. Since no one wanted to compete with powerful short wave broadcast stations, this limited the available frequencies which could be used. One consequence of this was that German and British fighter pilots on occasion would be able to talk to one another during their combats. This sounds like pure Hollywood, but it did happen, if by chance.

And even more bizarrely, German bombers and fighters could not talk to one another. This was a factor in the Luftwaffe defeat in the Battle of Britain. If the fighters and bombers failed to rendezvous properly, it would prove disastrous. Of course, in Europe, the RAF use of the 100-155 MHz band forced the United States Army Air Force (USAAF) to move to those frequencies, at least for fighters. Aside from the need to be compatible with RAF fighter control, early in the war the British used the "Pipsqueak" IFF system, in which a timer in the set transmitted for 14 seconds of every minute on a specific VHF channel, enabling the ground radar controllers to sort out hostile and friendly formations on their scopes. The USAAF had a different, and more sophisticated system that used the BC-645, a far more sophisticated 420 MHz IFF set that used mechanical encoding. Adjustable cams which were part of a dynamotor armature, determined the code to be sent. The RAF refused to change their system, and as consequence, brand new BC-645's became a common surplus item for the next 30 years or so.

HF and LF communications for air traffic control continued after the war, right through the 40's into the 50's and even early 60's. The VHF Omni Range VOR steadily replaced the A-N range, although there was still one in operation in a remote area of Wyoming or Montana right up to the mid-70's . The A-N range was replaced in the 200-400 KHz band with Non Directional Beacons (NDB), intended for use with aircraft Automatic Direction Finders (ADF's) and in some cases, weather forecasts. Despite the wide use of VOR, and now Global Positioning System (GPS), the NDB system is still in use. Today, aircraft use AM in the VHF band (108 to 135 MHz) to communicate with control towers and HF SSB (3-18 MHz) for transocean voice operations.

Skywide Amateur Radio Club 50 Years

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SKYHOOK

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CLUB MEETINGS

2nd & 4th Mondays of each month at 7:30 p.m.
Fairfield Seniors Centre 80
Lothian Avenue, Etobicoke, Ontario
Free parking. Guests and Visitors welcome.

Meeting Schedule

January 14, 2002	January 28, 2002
February 11, 2002	February 25, 2002
March 11, 2002	March 25, 2002
April 8, 2002	April 22, 2002
May 13, 2002	May 27, 2002
June 10, 2002	

CHANGED YOUR ADDRESS, TELEPHONE NUMBER OR EMAIL? If so, please advise Murray Smith, VA3KTL, so the records can be updated.

CLUB NETS

3.733 MHz	Monday/Wednesday/Friday		9:30 a.m.
	Sunday		10:00 a.m.
7.080 MHz	*Alternate Morning Frequency*		
3.710 MHz+/-	CW Net	Thursdays	10:00 p.m.
146.985 MHz	VE3SKY	ARES net on Non-Meeting Mondays	7:30 p.m.
443.100 MHz	VE3SKI	Thurs. Club Net	7:30 p.m.
146.985 MHz	VE3SKY	Thurs Chat Net	10:00 p.m.

Senior's Coffee Club Tuesday 9:00 a.m.
At McDonald's, 2116 Kipling Ave., North of Rexdale Blvd.

COMING EVENTS

March 16, 2002 – Basic Amateur Radio Qualifications Crash Course
Sponsored by Peel ARC.
Location: St. John House, Rutherford Rd., Brampton..
Time: 9:00 am to 5:00 p.m.
Cost: Peel ARC Members $20; Non-Members $45

March 23, 2002 – Hamex 2002
Sponsored by Peel & Missisauga ARC.
Location: Brampton Fall Fairgrounds.
Talkin: VE3PRC 146.880 (-) & VE3MIS 145.430
Time: Vendors 7:00 am; Public 9:00 am to 1:00 p.m.
Admission: $6.00

April 27, 2002 – Durham Region Amateur Radio Hamfest
Sponsored by North Shore & South Pickering ARCs.
Location: Iroquois Park Recreation Centre, Whitby.
Talkin: VE3SPA 147.375 (+)
Time: Vendors 7:00 am; Public 9:00 am.
Admission: $6.00

May 11, 2002 – Annual Spring Hamfest & Fleamarket.
Sponsored by Skywide ARC.
Location: Westway United Church, 8 Templar Drive, Etobicoke.
Talkin: VE3SKY 146.985 (-)
Time: Vendors 8:00 am; Public 9:00 am to 11:30 AM.
Admission: $5.00

June 8, 2002 – Central Ontario 28th Annual Radio Hamfest.
Sponsored by Guelph and Kitchener-Waterloo ARCs.
Location: Fergus & District Community Centre.
Talkin: VE3ZMG 145.210 (-) *and 146.520 simplex*
Time: Vendors 6:00 am; Public 8:00 am .
Admission: $5.00