Newsletter

September 2008

Kingston Amateur News

Kingston Amateur Radio Club 2008 Executive

President: Les, VE3KFS

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Vice-Pres: Robert, VE3RPF

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Treasurer: Bill, VA3OL

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Secretary: Chip, VA3KGB

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Past-Pres: Tom, VE3UDO

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2008 Committee Chairs

Two Meter Net Manager:

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Newsletter Editor: Joan Clarke

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Repeater Committee:

VE3KFS, Les Lindstrom

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VA3GST, John Snasdell-Taylor

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VA3KGB, Chip Chapman

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VE3JCQ, John Wood

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VE3MNE, Don Gilroy

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P.O. Box 1402 Kingston Ontario K7L 5C6

http://www.ve3kbr.com

VE3KAR

VE3KBR

VE3UEL

VE3KER

146.94(-) MHz

The 2nd Repeater is now Operational

147.090(+) MHz

NOTE FROM THE PRESIDENT

Just back from Alert and the 50th Anniversary activities. I was part of a team of four amateurs who put "VE8RCS" back on the air. Full details of this activity can be found at http://users.xplornet.com/~scrouse/ve8rcs.html

Congrats to all club members who were able to work VE8RCS/VY0. It was a pretty tough go but persistence pays off - some times.

I was in Alert when I heard of DUG's passing. We shared many great times doing flea markets in his garage as well as sorting out software issues. He will be missed greatly.

Chip has been doing his magic with the web site. The new overlay files should prove very useful for all who use UI-View and XASTIR. Give them a try.

I will make the Oct meeting (barring unforseen circumstances). Thanks Rob for looking after the Sep meeting.

Another ham course is in the works (probably starting March) – Please get the word out so that all who have expressed an interest can pass their names to me.

Don't forget the next club meeting on Wednesday, October 1st, 2008
7: 00 p.m.
at Smitty's

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From the Editor:

Here we go again with another season. I hope to receive loads of articles to really be able to give you interesting newsletter for you to read.. If you find something of interest, please send it to me.

WEEKLY NETS:

KARC conducts a **2m** weekly net on **VE3KBR - 146.940 (-)** each **Tuesday evening at 7:30 P.M.**

All are welcome to check-in.

SCHEDULE OF NET CONTROLS

October	November	December	January:
7 - VE3KC	4 - VE3NFU	2 - VE3CAK	6 - VE3NFU
14 - VE3CAK	11 - VE3VJF	9 - VE3MUD	13 - VE3VJF
21 - VE3MUD	18 - VE3CLQ	16 - VE3JPW	20 - VE3KC
28 - VE3JPW	25 - VE3KC	23 - VE3CLQ	27 - VE3CAK

If there are any conflicts in the schedule please contact Bill at ve3clq@rac.ca and we'll juggle a few things.

The net script has been posted on the Website

We are looking for two more net controllers……any volunteers?

Thanks… **Bill, VE3CLQ.**

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FRONTENAC ARES conducts a weekly net on 3.755 MHz each Tuesday evening at 8:30 P.M.
All are welcome to check-in.

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Every SATURDAY: BREAKFAST at SMITTY'S. Starts at 8:00 a.m. but come early, chat and mingle.

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The THIRD MONDAY of every month at 7:00 p.m.

is the ARES REGULAR MONTHLY MEETING

at the Woodbine Firehall, second floor.

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KARC Web page designed and maintained by: VA3KGB, Chip
http://www.ve3kbr.com/

Publication Schedule of the KARC Newsletter will be October30, 2008

OF INTEREST

There is a new NET which started Sunday, January 27, 2008.

Every Sunday. Freq: 7.198 MHz. Time: 23:00 UTC.

Also see , http://www.hamwave.com/cgi-bin/index.cgi

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A new sound from Picton: 146.730 TJU Repeater

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Another ham course is in the works (probably starting March) – Please get the word out so that all who have expressed an interest can pass their names along to Les, VE3KFS.

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The club wishes to extend its sympathy to Marilyn and 'Chip' Chapman on the death of Marilyn's mother on September 24, 2008. You are in our thoughts and prayers.

(For your reading.....the following two articles.....Thanks to VE3CLQ)

By: F. Gordon Hubbell - N1OU

To paraphrase a great old saying invented by cautious aviators: "There are old hams and there are bold hams, but there are no old, bold hams."

I'm really pleased to see all the new hams coming into the hobby and I'm also pleased to see good articles in *QST, CQ,* and here on eHam to help them get started in our great hobby and service! It is a good time to be an Elmer. There's so much you can do in Amateur Radio that nobody should ever be bored with it. However, when learning something new, there's nothing quite like listening to experience. That's what Elmers are for. So, this article is primarily for the "newbies" but it also takes a bit of a new angle on some of our constant perils than can be appreciated by veterans, too.

Ham Radio is not a dangerous hobby by a long shot, and I doubt if any ham ever came to the hobby just seeking thrills from risking his or her neck! But, there are some things that need constant attention in order to keep all one's digits intact and the old ticker ticking away. Here, with a different slant on the labels, are some cautions that are universal to being a ham.

First, Mother Nature Doesn't Know You're A Good Guy . . . and bolts of electricity from the sky occur at random, striking antennas as well as trees, poles, buildings, and the occasional pro golfer (just ask Lee Trevino).

There's an old adage that says, "If you're spending $100 on your station, spend $99 on the antenna and $1 on the radio". It's all about getting the most "bang" for your buck. There should be a sub-adage, though, that says, "and spend a good chunk of your $99 on lightning protection in case you get a bang you don't want.

There are lots of good articles on this site and in the ham magazine archives on lightning preparations, so read up before you put up. Basically, the best protection comes down to really adequate grounding, isolation, static protection and disconnection. Even though my station is well grounded and I have taken good precautions, I always disconnect my antennas at the shack end before storms or if I think there's a better than average chance of lightning. I also disconnect them if I'm going to be away so that if a storm comes up I won't have to sit and stew about what might be happening back at my shack. Word of warning, though: A direct strike can course through even the best protection and come in on your feedline. Make sure to have a neighbor or relative check on things if there's been a "big one" in the neighborhood and you're out of town or otherwise occupied.

Second, Gravity Never Takes A Day Off . . . and anything that is up in the air will be relentlessly attempting to come back down. The allies of gravity are wind, water, ice, and time.

While you are allocating that critical ninety-nine bucks, put some of it into the best hardware you can buy, reading and obeying the manuals of tower, mast/pole, and antenna manufacturers. Often, wire and aluminum in the air fall harmlessly, but the goal is to prevent downfalls of airborne equipment just in case there's something valuable (like your new pickup or worse, your head, underneath!).

Some good rules to follow (in addition to the requirements of manufacturers) are:

1. Anchor deeply and solidly - nothing in the air should move much unless it is connected to a rotator.
2. Unless you are absolutely certain you're within an engineer's specifications for "free standing" guy it!
3. Don't put up cheap stuff - scrimping on some components is great fun and part of the challenge of the hobby, but up in the air isn't the place to do it.
4. If you're going "up" always use safety gear and don't go it alone - have a spotter on the ground (wearing a hard hat if he's going to be underneath you).
5. If you've got "anything at all" in the air, check on it frequently. Look for bad things like rust, tilts, sags, leans, bends, breaks or bits and pieces that gravity already snagged and that have come to rest on your roof or on the lawn.
6. Even if you're just "pushing up a vertical" or "slinging a dipole" it's still a good idea to have somebody watching - see the next section!

Third, The Power Company Can Make "Lightning" For You . . . fortunately, its pretty easy to see this potential peril - keep your eyes open!

Some hams will be lucky enough to have both underground power and no CC&R's (read that "antenna restrictions") and will be pretty safe from both. However, the sad news is that there's still plenty of good old AC power coming in overhead for most of us. This means that anything going "up" has the potential to touch it. And, if it does, you'll learn the real meaning of "potential" as voltage translates into amps and watts via your mishandled mast, antenna or wire. If you're lucky you'll get sparks and maybe burns. If you're unlucky you'll be on the next list of silent keys (deceased hams). Always assume you'll be unlucky.

Before you attempt anything that will move metal into the air, take a really good look around the whole area. Never, never count on a "near miss" to work out in your favor - "close" can get you zapped! (See K5END's excellent article "Deadly Misunderstandings About Power Lines") Bite the bullet and pay an electrician or the power company to make a temporary line move for you, or relocate your "raising" if you can.

A final word: When stringing cable or line in the attic, though walls, or under the house, watch out for AC lines, too. Even though it's likely to be "only" 120-240 volts with a circuit breaker or fuse on it, it can still mess up your day.

Fourth, When You're On The Air, You Can Make Lightning, Too . . . This will be of the RF variety (radio frequency) and it has the power to do harm as well as good.

If you're newly licensed, there were questions on your exam about radio frequency energy and its effects at various power levels, frequencies, and distances. Take this stuff seriously, even if all you're going to do is hook your little HT or portable to a higher gain antenna. RF energy can burn, maim and even kill if the situation is right.

Lower power levels at most of the frequencies we hams use are generally safe, but it pays to check your situation. Any time you're stepping up power or antenna gain, re-calculate your radiation! Never point a "live" directional antenna directly at anyone, even at low power. Treat connected antennas like loaded guns - they are going to fire "energy".

Even if you've done your homework and your power and frequency and distance are safe for everyone around, there's some other stuff to be aware of:

1. The ends of a dipole or inverted-vee antenna are sometimes near ground level where they can be accidentally touched by people in the area or come in contact with combustible materials. When transmitting, balanced antenna ends (and sometimes other places on the antenna) can be very high voltage points.

2. Antenna feeds (like the line running to your ground-mounted vertical or to your remote antenna tuner) can connect with an open, unprotected clip or to devices that could be accidentally touched by people in the area.
3. Protect low-lying RF connections of all sorts with some sort of cover or at least a warning. If kids play in your yard, don't make connections their curious little fingers can get into.

Fifth, Ohm's Law Is Still Valid (V=IR for the more advanced reader) . . . a "potential" (voltage) will make current flow through *YOU* when the situation permits (you can suddenly be a conductor, and I don't mean the kind that used to work on trains).

Back in the "boat anchor" days (tube-type radios) all of us hams had a really healthy respect for the transformers, rectifier circuits, B+ lines, and everything else "under the hood" of our gear. As a technician for Uncle Sam and, later, Motorola, I learned to work on these circuits with one hand (watches and rings removed) while the other was tucked behind my back. I always tried to know what was "hot" and treated everything as "hot" until proven it wasn't.

More modern equipment, particularly transceivers and receivers made in the last couple of decades, is usually lower-voltage and relatively safer than older gear. However, that doesn't mean it can't "bite". Even a so-called 12-volt (usually 13.8 or so in reality) "low voltage" hook-up can pack a lot of power if there's delivery capability (high current) involved.

I think it is still a great idea to work on electrical circuits and connections without watches and rings! Yes, if your wedding band spans a couple of lines on a 12 volt printed circuit board it is likely you won't feel anything and may not even see the sparks. However, if there's more current carrying ability (like across the output terminals of a power supply) or if you're working on AC (house current) input circuits (higher potential), that same ring can wind up "welded" to something while your finger is in it! It won't feel good, and your ability to get away from the pain may be limited.

Sixth, Newton's Laws Of Motion Haven't Been Repealed, Either (for every action, there is an equal and opposite reaction, yada, yada, yada and et cetera) . . . which means, when mobile, you and your radio stuff need to be strapped in. Fast stops, or worse getting hit by another vehicle can dislodge "missiles" of many types.

I'm no physicist, but if I were I'm sure I could grab my slide rule (oops . . . I mean my pocket calculator) and inform you how much an unattached, five-pound radio will hurt you when it has been doing seventy on the freeway and suddenly, you are in its way and are no longer doing seventy but it is. Ouch!

Think about the stuff outside your car, too. Magnet-mount antennas are great, but if the antennas are big and heavy, the magnets need to be big and heavy, too. Mount antennas and brackets solidly, on the theory that they will detach themselves, ultimately, if you don't show them who is boss.

Funny story related to this one: I once knew a ham, years ago, who managed to get a 160 meter station into his Volkswagen bus. The huge antenna and loading coil, mounted on a big spring on the roof, would "oscillate" whenever he stopped. If he stopped suddenly, the weight of this thing would really rock the boat (causing the VW to look like it was doing the hula) and his "whip" antenna did exactly as its name implied! Luckily, it never hit anyone.

Wrapping It Up . . . all good advice comes to an end.

Are there other perils and dangers? You bet! These are just the ones I thought about for this article. So, keep your thinking cap on whenever lightning, power lines, RF energy, gravity, momentum or voltage potentials are involved.

I don't want to discourage anyone from tinkering with their equipment, raising a skyhook, or enjoying the warm thrills of those great old boat anchors! Rather, I just want all my fellow hams, and especially the new ones, to play it cautious and be there to carve the next Thanksgiving turkey.

It is easy to enjoy being a ham, safely -- even when you're working with some of the things I've mentioned that are, let's face it, the higher risk activities in our hobby.

There's another old adage that goes, "God looks out for drunks and idiots" and from personal observation I think it is sometimes true. However, don't count on it. Make your own luck!

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Thoughts on the “50-Ohm” Direct-Fed Dipole

By WV4R

As I look back on my personal history of antennas from 1959 to today, I recall my first dipole epiphany.

I knew, from an old copy of the ARRL handbook, a factoid of dipoles being 75-ohms at the feed point when properly tuned & tweaked for the desired operating frequency. But who wants to buy 75-ohm coax when all the modern radios are designed for 50-ohm impedance? Not everyone has a built-in tuner, eh?

For many years I marveled at some of my lucky dipole erections without a clue as to how they worked so well. When pulled up straight and tight, I could never get the SWR better than about 1:2 with 50-ohm coax feed. Every once in a while I would see from my trusty ole SWR meter almost 1:1 with direct 50-ohm coax feed. I would simply chalk it up to location and the lucky length of random coax.

Then, in the 1970’s I came upon a wondrous factoid in an old ARRL Handbook. There it was in a graphic depiction… ALL the correct coax lengths for feed lines for all the H.F. bands for mono-band and multi-band installs! Improvements were immediately realized, especially when operating multiple bands with only one dipole due to location restrictions. Don’t bother trying to find this graph in new publications because they deleted it sometime after 1977. Of course IF you have a random length of coax, then you really do need something to ‘choke’ off the reflected power (SWR) you most probably will have on your coax. Of course you could get lucky because random length might just be the correct length for your install, eh?

I found I could further improve dipole performance with either a simple 19-foot coil of coax at the feed point for 160m. Thank you Collins Radio Company for the tip I found in your antenna designs showing the R.F. choke balun for 160-10m antennas. Please note the higher the resonant frequency the smaller the minimum coax choke windings required. For example, on 20m only 8-turns in a 5-inch coil is more than adequate according the Force-12 antenna manuals and personal discussions with Tom, President of Force-12.

A further improvement in this simple R.F. Coaxial Choke is to wind it around a large coffee can or PVC pipe. After years of just making a simple rope-like coils held together with plastic tape, I discovered it is considerably more efficient to make the coils parallel to each other. Pay attention that your coil diameter is sized according to manufacturer specifications on how tight a coil you can make in their coax without affecting impedance and/or migration of the dielectric. Note: do not use 'foam' dielectric because over time impedance will change as the center migrates toward the shield. Hard dielectric rules in making a choke balun.

All chokes are made from RG/8 coax .405Dia. stuff. All windings must be beside each other BUT !!! Never over lapping each other for mono band antenna's ,8 Mhz 22 feet made from 8 turns on 8 1/2 inch diameter

7,2 Mhz 22 feet made from 10 turns on a 7 inch diameter
14 Mhz 10 feet made from 4 turns on a 7 1/2 inch diameter
21 Mhz 7 feet made from 7 turns on a 3 inch diameter
28 Mhz 6 feet made from 6 turns on a 3 inch diameter

For multiband use antenna's

80 to 10 meter's 10 feet made from 7 turns on 4 1/2 inch diameter
80 to 30 meters 18 feet made from 10 turns on 6 inch diameter
40 to 10 meters 12 feet made from 8 turns on 5 inch diameter
20 to 10 meters 8 feet made from 6 turns on a 4 inch diameter
Did I mention I steal knowledge and expertise from anywhere I can find it?

Further multiple band improvement is gained by constructing the "FAN DIPOLE" which is simply cutting multiple dipoles for each desired band & connecting them together at the feed point, fanning them apart, a.k.a. the 'fan'. There are two schools of thought on constructing this fan dipole. One thought is to erect them all parallel to each other (longest one on top to support the rest) & separated an inch or more depending on the design of the wire used (twin lead, multi-conductor, plain wire, etc.). One cheap and good separator is lengths of small diameter PVC pipe drilled for the wire to pass through and cable-tied to prevent slippage. Oh, you are the classic cheap ham… well TV twin- lead will make Two-band operations. A real good thing to remember is to cut each dipole for the LOWEST operating frequency. Better to be a foot too long than an inch too short, eh? Next best thing to remember is to prune and tweak your dipoles starting from the longest one to the shortest one… checking All bands each time you prune any band because there is a 'coupling factor' alive and well in this multi/fan design that must not be ignored.

Also you can build or buy a 1:1 balun using ferrite doughnuts around coax with connectors on both ends or the fancy ones using Teflon wire wrapped around a super ferrite doughnut for a no-fuss no-muss install. So, somewhere between a couple bucks and a couple hundred bucks you can have yourself an R.F. choke balun.

I thank NT5W for the birthday present of a Mighty Fine Junk (MFJ) Antenna Analyzer which helped me SEE how the critical "INSIDE ANGLE" of the dipole allows the determined dipole builder to Direct-Match a 75-ohm dipole to 50-ohm coax. After many hands-on experiments I found the ballpark solution to be about a "150-degree" inside angle. To put it another way… a classic "DROOPY DIPOLE" as I have heard it called & how I describe my dipoles to this day.

Think of it as an inverted V with each leg drooping down 15-degrees thus making the magic 30-degree inside angle droop. I found the advantage of the droopy dipole over the classic 90-degree inside angle inverted V to be the resonance and the maximum power point to be fairly the same with the droopy dipole over the classic inverted "V" and hands-on proof that you can match a 75-ohm classic dipole to 50-ohm. Oh yes, inverted "V" dipoles are more omni-directional… just my personal observations.

Oh yes… if you desire to maximize your signal to a given point, the dipole appears to work best when erected at least ½ wavelength above the true reflected ground, or as I call it, the wet water table, at your location. In other words, if you were to dig a hole in the ground under the feed point of your dipole, the point where you start getting a wet shovel is the true reflective ground. To put it another way, if your mast/tower is 35-feet above ground and your wet ground is 7-foot below the ground, your total height is the magical minimum height for 5/8 wavelength on 20m… plus or minus your "Kentucky Windage". Now if you are suspicious of the "magical 42-feet" minimum height, please read the books of the late/great William Orr-W6OR and experience your own epiphany.

There does not appear to be any improvement above 1-wavelength, however, I have heard a number of stations describing their dipole install as high as 2 wavelengths… and… on 75m that is quite a marvel of commitment to the ham radio hobby, eh?

Benefits of proper height are concentrating your entire signal to a 45-degree takeoff angle with real nulls of the ends of up to 3-4 "S-units". Concentrating all your signal at this 45- degree takeoff is just like the classic maximum trajectory of a cannon ball (45-degrees) which will give you the best reports according to the real propagation skip on your frequency at the time. However, like a cannon ball, or a heavy round stone thrown into a pond at 45 degrees there is one plunk. If you want DX you got to get a flat stone and throw it at the flattest takeoff angle to get the "skip" and the DX… thus the proof of the odd-multiple wavelengths above ground to achieve flatter takeoff angles and thus greater DX skip with your dipole.

So, IF you want some real DX to spice up your life, you can increase your height above your true reflective ground to a minimum 5/8 wavelength and/or higher odd multiples to give you minor lobe/lobes with a lower takeoff angle and some advantage for DX.
I know some skeptics are wondering HOW I discovered this factoid. The key word here is "empirical testing/hands-on installs". I like 17m for my testing for a number of reasons. It is a narrow band so antennae can be constructed in many restricted locations and be broadly resonant across the whole band with No tuner. The magical height more easily achieved in restricted zoning situations. A rotatable dipole install is possible readily showing those hams living in Missouri, the "Show Me" state, the fantastic nulls. Let's face it, for many non-technical amateur radio operators/short wave listeners, about the only thing you can tune/tweak nowadays is your antennae, eh?

Recently, I constructed a homebrew 17-meter dipole made out of aluminum tubing scraps from many wounded beams. I used my trusty ole Craftsman pop-riveter to provide the third best way of securing the telescopic elements. I then mounted this dipole on my 42- foot tower, fed it with 50-ohm coax a simple R.F. coax choke balun wound from the same continuous piece of random coax and rotated it. Voila… Empirical Evidence!

Kingston Amateur Radio Club, Inc

Treasurer's Report for Sept. 17, 2008

	This Month (Sept)	Year to date	
Membership	100.00	720.00	
50/50 Draws	8.50	81.26	
Donations (from Tailgate)	0	601.50	
Net Income from Breakfast	0	130.00	
TOTAL	108.50	1532.76	
Expenses			
Repeater upgrade	0	100.00	
RAC insurance	0	150.00	
Queens Balloon	0	215.00	
Post Box Rental `	0	127.05	
Newsletter expenses	0	44.66	Website Cost
0	106.25		
Donation to Communications Museum	0	200.00	
TOTAL EXPENSES	0	924.96	
NET INCOME (LOSS)	**108.50**	**607.80**	
Change in Cash Position Sept. 08			
Opening Balance in Chequing a/c	5136.96		
Opening Petty Cash	23.51	5160.47	
Ending Balance Chequing a/c Sept. 17/08	5136.96		
Ending Petty Cash	132.01	5268.96	
Net Difference in 'cash' account balance		**108.50**	

Bill, VA3OL
Treasurer Kingston Amateur Radio Club

AGENDA

KINGSTON AMATEUR RADIO CLUB, INC

October 1st, 2008

At Smitty's Restaurant, back room

7:00 p.m.

1. **Introduction of members**
2. **Additions and/or deletions**
3. **Minutes of Monthly Meeting Errors/Omissions**
4. **Treasurer's Report**
5. **OLD BUSINESS**
6. **50/50 Draw**
7. **NEW BUSINESS**
8. **Reports:**
    a) RAC
    b) Net Manager - VE3KFS
    c) KARC Newsletter
    d) Web page - VA3KGB
    e) Any other reports
9. **Presentation: (If one has been arranged)**
10. **Adjournment**

MINUTES OF THE MEETING OF THE KINGSTON AMATEUR RADIO CLUB INC

HELD ON

Wednesday, 3 Sept 2008

At SMITTY'S RESTAURANT,
PRINCESS STREET, KINGSTON, ONTARIO

1. Meeting was called to order at 7 pm by the the Vice-President, Rob, VE3RPF

2. The meeting acknowledged the passing of Silent Keys Royce Graham, VE3HVB, and Doug Neil, VE3DUG, with a minute of silence.

3. Introduction of members and guests.

4. Minutes of the Last Meeting: It was motioned by Chip, VA3KGB, and seconded by Doug, VE3FFR, that the minutes of the 4 June 2008 meeting be adopted as read. The minutes from the May 2008 meeting were still not available. Motion carried.

5. Treasurer's Report: Bill reported on income/expenses over the summer. It was motioned by Bill, VA3OL and seconded by George, VE3SIQ, that the Treasurer's report be adopted as presented by Bill, VA3Ol. Motion carried.

6. OLD BUSINESS:

a) Field Day: 28/29 June 2008. Was held out at Don, VE3MNE's cottage at Hay Bay operating the full time.

b) The Sky's the Limit Festival: 5 July 2008. Held at Memorial Centre grounds. Manned by Doug VE3FFR, Christine and Rob VE3RPF, Chip VA3KGB, Drew VE3UIN and Hal VE3???.

c) Ham Course: Exams were written and five new Amateurs in the area..

d) Fox Hunt/Picnic: Tabled until next meeting. OPI Les, VE3KFS not present.

7. VE3RCS/VY0: Being reactivated 20 Aug to 10 Sept 14.165 SSB to celebrate anniversary of CFS Alert. Les, VE3KFS, and Bob, VE3GLO, are participating. Link to website off Club page.

12. NEW BUSINESS: NIL

13. 50-50 Draw: Doug, VE3FFR, won $8.50.

14. REPORTS:

a) RAC - Nil Report.

b) REPEATERS: 09 Repeater in Clarington Station does not have tones installed. Kingston repeaters will be used for the Ottawa - Kingston Bicycle Rally, 2200 riders are registered.

c) NET MANAGER: 13 checkins, had a good inversion. last net ran for 45 mins. Require more trivia.

d) NEWSLETTER: Send articles etc directly to Joan. **Also update your email for front page of Newsletter!!!!**

e) WEB PAGE: Send articles and info to Chip, VA3KGB.

15. NEXT MEETING: 1 Oct. 2008.

16. ADJOURNMENT: It was motioned by Roy, VE3VJF, and seconded by John, VE3GST, that the meeting be adjourned at 7:37 pm. Motion Carried.

CJ Chapman, VA3KGB
Secretary, KARC

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