JUNE 2015   Volume 4 Issue 6

VE3ERC-LUB

_____

IN THIS ISSUE

Al VA3TET and Bruce VE3QB securing the 80 M dipole antenna to run ONTARS at the Central Ontario Hamfest.

THE PREZ SEZ!

This club is Radio-ACTIVE

President Update June 2015

The Future (and the past)

   As we end our "fiscal" Ham Radio year, I thought I would take a few moments to reflect on where we have come and where we hope to go.

   I shared a photo with you recently that was taken back in Sept. 1997 -- I offered to buy a coffee for the first one who could name all of the participants. Since I am writing this prior to our June meeting, I am unsure if anyone collected—I suspect, "yes". . Back to the photo---It was actually not a photo—I had a VHS-C video camera and so I taped a few moments of our members posing for the camera. In retrospect, it is odd that back then folks PAUSED and POSED for the video "photo" , when ,in fact, the video was real-time. It was a product of the mind- set of the times. The frame I extracted is the one included in this article.

        The pervasive nature of cell phones, cell cameras, cell text messages etc. was just an emerging "shift" back then . We now realize that the mass-marketing of technology for com-munication has changed the way we "pose" and interact with the world. Communication is now a sport indulged in by the masses—and children too! A recent book which I read , "Losing the Signal", is the story of Blackberry and the ad hoc scramble to make and sell that product. I recognized those names and stories(and the references to HAM radio operators).   Again, I was reminded of the nature of technical innovation and the nay-sayers and road blocks that

get in the way of folks with a vision. It is refreshing to be part of a hobby that is at the fore-front of knowledge and technology. Our club has evolved, and our "Hamsters" continue to be both "radio-active" and at the leading edge!

In this past year, ve3ERC has established a framework for: -incorporation, -affiliation with RAC and access to club insurance, -a relationship with the township regarding emergency services, -successful participation in the Maple Syrup festival, -an affiliation with the Scouts via JOTA and an opportunity to support their radio badge, -purchase of 2 repeaters, -application for a 2 metre frequency and permission to put up antennae at the fire hall as well as continuing with those traditional activities our club has always executed. The energy and leadership of our members has been the key to these successes.

As we look to the future, we will finesse these items, continue with traditions and, I hope, establish a solid technical presence at the Fire Hall so we can be part of the new building plans. We will also encourage and facilitate the "hands-on" projects that are the roots of this club.

I thank you, on behalf of your executive, for your participation, leadership and membership in VE3ERC.

73, Rich, ve3DCC.

_____

DIRECTIONS TO FIELD DAY

GPS ADRESS :   *6463 6TH LINE*

                          CENTRE WELLINGTON

6463 6th Line (second drive on the right)

Go north on Hwy 6 from Guelph. In Fergus turn right on Belsyde Ave. (County Road 18). Go to 6th Line and turn left. Second driveway on right.

"A DECADE OF SIN (PLUS THIRTEEN)"
A BOOK Written by Phil Eastman in 1992

Several years ago, a wonderful family friend, Phil Eastman, passed away. Phil was a former Physics professor at the University of Waterloo and we got to know him much better in his retirement years. An avid pilot, he gave us rides in the rented Cessna from the then Waterloo-Wellington Airport, and other times would, when flying, circle our farm property and give us his characteristic back and forth wave before carrying on.

He was the master of jokes (puns being his favourites) and would demonstrate great physics tricks and experiments to our children when they were much younger. I recall a particularly fun little box he invented. It was an ordinary wooden box with a lightbulb and switch attached to the side. He told the young people that he was going to demonstrate how a light switch worked. First he would ask a volunteer to come and turn on the switch and light the bulb. While this was happening he would keep chattering to the children but with his back to the box. As soon as the switch was turned on, the top lid opened, a mechanical hand came out of the lid and turned the switch and light bulb off before returning to the box. Then Phil would turn around surprised and say "I thought you were going to turn on the light!" while everyone was giggling. He could repeat this process several times never seeming to understand what the problem was.

While doing our Spring clean-up I happened across his book "A Decade of SIN (Plus Thirteen)" published in 1992. This book was an update from what he and the University of Waterloo Physics Department had begun way back in 1969. At that time, the department was giving several scholarships to bright high school students based on academic record and proficiency tests. They wanted a better measurement. The department decided to develop an interest in physics for highschool students and use the results for their scholarships. Thus they published a book of fun and interesting physics questions. And so was born, "The Sir Isaac Newton (SIN) test." The exam had to be such that no student could completely finish the test while presenting challenging questions which forced students to think outside of the box.

While looking over this book and thinking about our friend Phil Eastman, I opened it up to what was a question on Ohm's Law. Immediately, I got out paper and pencil to work out the answer. It took a bit of head scratching and then my wife Bonnie suggested this might be a fun question to include for readers. So here it is. I'll include the answer on the last page of the newsletter.

If you don't know anything about electricity, read the next bit to learn all you need to know to solve the following problem. The Voltage, *V*, between the ends of a resistor, *R*, is related to the current, *I,* flowing through the resistor by Ohm's Law, *V=IR* (volts = amperes x ohms). Voltages in series add up, and whatever current flows into a point must flow out. A good ammeter has essentially zero resistance.
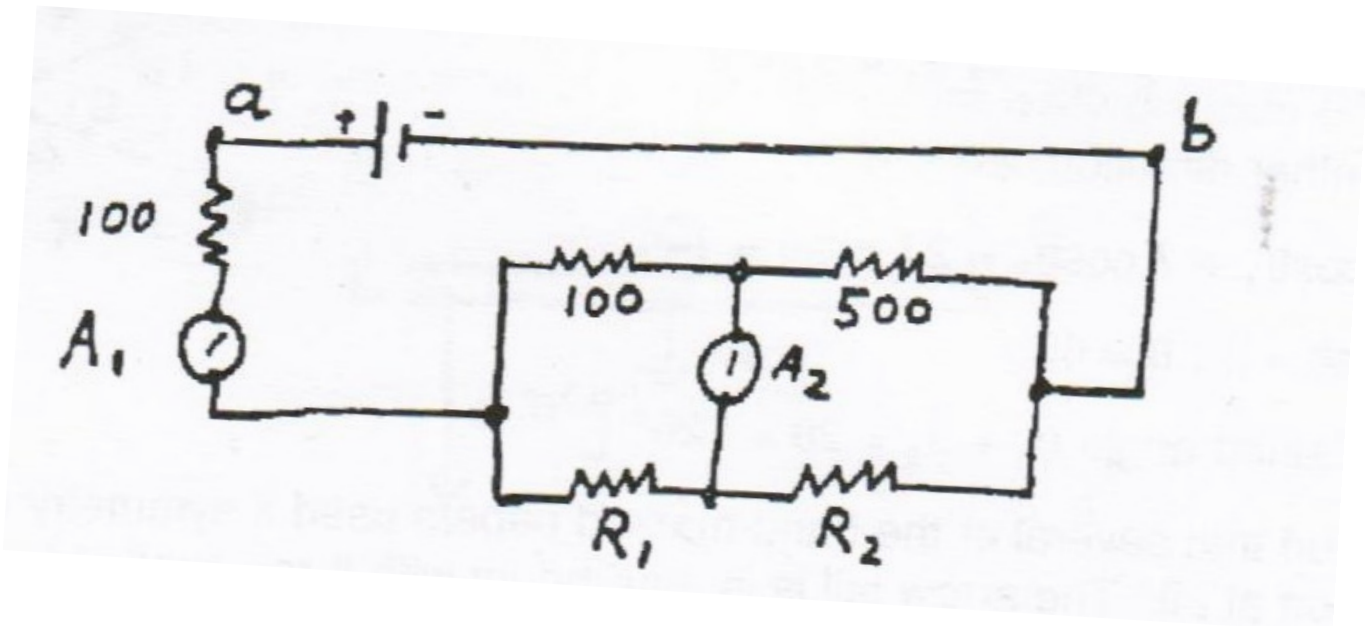
A battery maintains two volts between points a and b. The value of the resistors are shown in ohms. Ammeter A_1 reads 8 milliamperes and ammeter A_2 reads zero. What is the value of R_1 in ohms?

A) 33.3   B) 50   C) 66.7   D) 166.7   E) 300
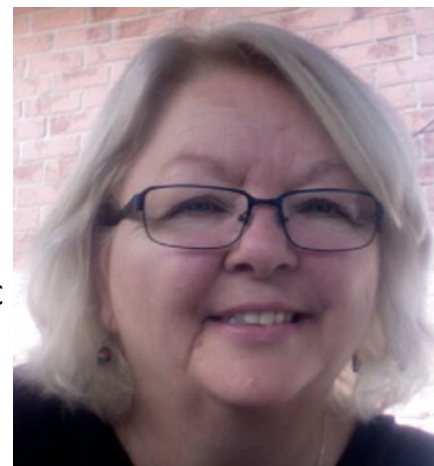
Good Luck !

Bob VE3IXX

_____

After a major clean-out of the basement and a new facelift for my hamshack, it was recommended that I take a picture, for it may never again appear so neat and uncluttered.   VE3IXX

CENTRAL ONTARIO HAMFEST
BY JOYCE HODGE

The Central Ontario Hamfest was held at the Police Association and was attended by a large crowd made up of both sellers and buyers. Several ERC members were spotted at the hamfest who were there to either work, shop, sell, buy, or just commune with others. These members included were Al VA3TET, Reg VE3RVH, Bruce VE3QB, Paul VA3PDC, Bob VE3IXX, Jim VE3JMU, Judd VE3WXU, Joyce VA3WXU, Ted VE3TRQ, Tom VE3DXQ, Doug VE3CXU, Gord VVA3GWM, Terrry VE3XTM, and Jim VE3JLC.

Kudos go to Reg VE3RVH, for having done the majority of the organization and promotion of the club's representation at the hamfest. With military precision he assembled the accumulation of items that were for sale and then provided the storage, and transportation of those articles to and from the venue. He also, in tandem with Jim VE3JMU, manned the two tables that had been rented by ERC. When the hamfest ended, Reg also dealt with the monetary accounting of all the sales.

The tables ERC rented were overflowing with every kind of gizmo and gadget that a Ham could ever possibly want. There was an array of radios from which to choose, to include even a mystery spy radio, an amplifier, a Marconi HF receiver, HTs, feed-line, connectors, tubes, resistors, and a miscellany of literature of all sorts. Both Jim, VE3JMU and Reg, VE3RVH turned out to be extraordinary salesmen. It seemed that most of the buyers who talked to either one of them, left our tables satisfied with a purchase in their hands.

Because Bob, VE3IXX planned to run ONTARS at the venue, a group consisting of Al VA3TET, Paul VA3PDC, Bruce VE3QB, Ted VE3TRQ, Tom VE3DXQ, Judd VE3WXU, and myself VA3WXU gathered at the site the day before to help erect the antenna that Bob VE3IXX, would need the next day. Upon arrival, however, the group was met by an unexpected sea of multicolour motorcycles filling up most of the parking area. Added to that was a very large party going on in the back of the building, The people there were being entertained by a band in full force and several dancers were gyrating in the exact spot where we needed to set up. Needless to say, that ultimately ended our ability to raise the antenna that day.

Plan B. Very early the next morning, Al VA3TET, Paul VA3PDC, Bruce VE3QB, Judd VE3WXU, and myself re-assembled and we were able to erect the club's 80 metre antenna and, did so rather quickly. I felt very

lucky to be photographing the others while they put together the antenna. I acquired a treasure trove of very important things to know about erecting antennas. For example, using a BBQ brush to help heave the rope over the tree branch is way preferable than using a brick. I also gained a lesson from Paul's VA3PDC amazing technique that resembled a professional softball pitcher's wind-up. It only took him three or four

attempts before he was able to soar that BBQ brush

tethered to the rope, flying high enough over the branch, where it was needed.

When we finished erecting the antenna, the group concurred that the tree that was used this year would likely be too tall to use next year. A smaller tree was chosen to be the host of our antenna in the future.

Bob, VE3IXX, successfully ran ONTARS in the morning and reported that the antenna worked well for him. He reported that he had contacted twenty plus people checking-in to the net.

All in all, the hamfest was a good event for our members. Without a doubt, we will come back again next year.

Amateur Mesh Networks
By Ted Rypma VE3TRQ

Introduction

Just what is an Amateur Radio Mesh Network, and why do we care? Well, it is a successor to a number of attempts at digital or packet radio in the past. And the good thing is, it does not need to cost a lot of money to implement, and the knowledge barrier is as small as you want it to be. The Mesh Networks available today configure themselves with almost no intervention. Expanding your network is as simple as putting a new mesh node (or access point) on a pole in sight of another node. The uses that these networks can be put to are as varied as the amateur operators implementing them. I will try to expand below on some of these points.

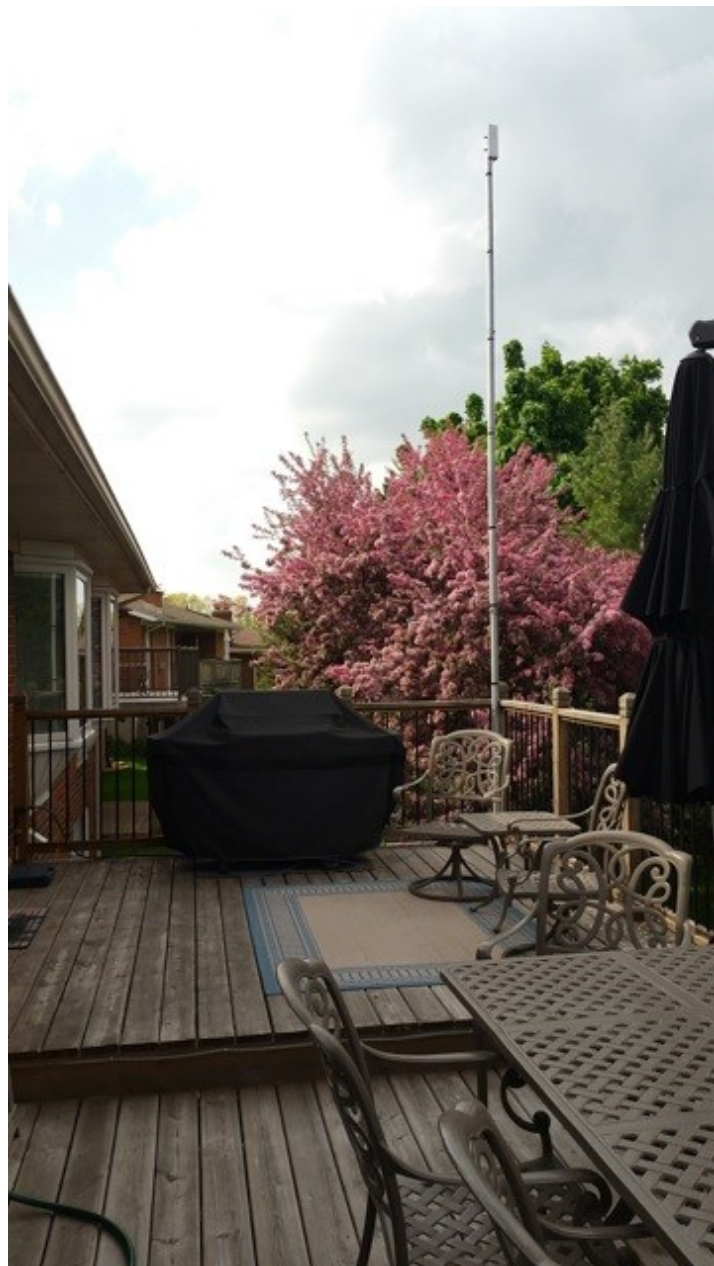### Why would you want a mesh network?

An amateur mesh network is a private, high speed, digital network implementing the Internet Protocol (TCP/IP). As such, it can carry anything that the *Internet* can! The following are two ways that mesh networks are often used:

Private high speed network to replace the Internet when it is not available

High speed, portable communications network to be used at events to carry streaming video, voice and data.

What exactly is a Mesh Network?

A mesh network consists of any number of commercial off-the-shelf wireless access points running special software (or *firmware*) and op-

My simple experimental mesh node installation, a Ubiquiti NanoStation M2 (2.4 GHz, 27 dBm, 11 dBi MIMO antenna - $103).

erating on a common SSID (Service Set Identifier - the WiFi network identifier). These special software installs are based on *OpenWRT*, Open Source Software for wireless access points, plus a suite of routing software called OLSRD (Optimized Link State Routing Daemon). Together with these two sets of software and a collection of configuration scripts and files, the groups creating Mesh Networks have made it possible for any amateur radio operator to install and run a mesh node. The software automatically detects adjacent nodes, builds the routes, and

manages the best path from one place to another on the mesh network.

Adding a new node is as simple as putting an access point on a pole. Any unreachable node (one that fails or drops out for any reason) will be automatically removed from the routing lists, and new paths will be calculated.

A mesh network is nothing more than a TCP/IP network (i.e. the Internet) connected by RF instead of wires and fiber optic cables - by itself it does nothing. To be useful, it needs applications to run on it. It is also possible to connect a mesh network node to the Internet, so that it can be a gateway to the world.

Building a Mesh Network

To be robust, a robust mesh network should be used regularly, and should be capable of running without AC power, i.e. run from batteries. There are two broad types of mesh networks that can be built:

Permanent Mesh Networks
These are a mesh networks intended to be there when the power fails, or when some event takes out the public Internet. It provides the ability to link sites, usually within a city or local area, so that high speed communication can continue.

To create this kind of mesh network, it is necessary to find high places for the nodes: towers, tall buildings, and hills. The network can be built out node-by-node, each new node pointing to an existing node. The only requirement is that the nodes be LOS (Line-of-Site) to each other, and that they be close enough that they can reliably receive each other. This distance can be as far as 10 to 50 Km. The idea is to cover as great an area as possible, based on the density of amateur radio operators in the area. Distant groups of nodes can be connected to each other using *Internet Tunneling*, using the Internet instead of RF to connect distant nodes. As an example, if it was not possible to connect Waterloo and Guelph by RF between nodes, a node in each city could be connected through Internet gateways, thus creating a single larger, multi-city mesh. This interconnect would, of course, be dependent on the Internet being operational.

Temporary Mesh Networks
These mesh networks are intended to support special events, or emergency situations.

The mesh network is put together when needed, using portable equipment, all preferably battery operated. Poles with access points installed are usually mounted in pails of sand or concrete, or clamped to vehicles or other supports. The deployed equipment could consist of access points (nodes), computers, printers, cameras (still and video), and even VOIP (IP) phones.

Access Point Hardware

Linksys Access Points - WRT54G - ***Not a preferred device to use***
These are cheap, obsolete, and low power (18-20 dBm). They were the first devices put to use by amateur radio operators. They are not waterproof, have lousy antennas (i.e. they need external antennas), and need separate power cords. They can mostly operate on 12 volts.

Ubiquiti Access Points - NanoStation, AirGrid, Rocket, Bullet
These are the access points used by the Wireless Internet Service Providers (WISPs) - you will see them all over the countryside on silos and towers. They are waterproof, high power

(28-29 dBm), and are powered through the Cat5 Ethernet cable. They are mostly available with high-gain antennas (up to 28 dBi).

TP-Link - Only supported by AREDN. Available as a weatherproof device.

Software / Firmware

BBHN - **B**road**b**and **H**am**n**et - http://broadband-hamnet.org
This group was first to start amateur radio mesh networking. They made the Linksys WRT54G popular as a mesh node device and support the Linksys wireless access points and some Ubiquiti access points. Their software works well.

AREDN - **A**mateur **R**adio **E**mergency **D**igital **N**etwork - http://www.aredn.org
This is a splinter group from BBHN - these were the BBHN developers of Ubiquiti device support. There was a difference of opinion about development philosophy, and they went their own way. They tend to be more on the *bleeding edge* of hardware and software and support the newer Ubiquiti hardware, plus the TP-Link hardware, whereas BBHN does not. They do still support the Linksys WRT54G, but it is not a priority (obsolete, and not enough memory).

BBHN and AREDN will still interoperate in the same mesh network, as long as the SSID is the same for all nodes. This situation may not continue if AREDN creates versions that do not maintain compatibility to the older BBHN software. Any incompatibility is managed by having the major version of the software (currently "V3") as part of the SSID.

How will we use a Mesh Network at Field Day?

The intention is to use a mesh network at Field Day to extend the Internet connection from Bob VE3IXX's house to the various areas where radios are being operated. This should allow logging to Internet logging sites, use of spotting web sites, and use of e-mail as if in the shack.

We would like to operate everything from batteries, although we will need some DC connectors and batteries to get this done - DC PoE (Power over Ethernet) adapters are available for all Ubiquiti equipment. In a pinch, we can use inverters to use the Ubiquiti AC power adapters.

The plan is to have one Ubiquiti mesh node as an Internet gateway at Bob's house, then another one or two Ubiquiti access points to provide network services at radio sites.

The future of Mesh Networks locally

I would eventually like to see as many amateur operators as possible in the K-W, Elmira, Guelph area have mesh nodes mounted on the tops of their antenna towers or on their roofs. The more we have, the better it will work. I expect this will be a long-term project because of the need for line-of-site from node to node. But if we don't try, we'll never get there.

Ted Rypma   VE3TRQ

Waterloo, Ontario

WEDNESDAY NITE NET CONTROLLERS

JUNE 24 - M E E T I N G

JULY 1 - REG VE3RVH

JULY 8 - PAUL VE3PVB

JULY 15 - BOB VE3IXX

JULY 22 - JUD VE3WXU

JULY 29 - TED VE3TRQ

AUGUST 5 - AL VA3TET

AUGUST 12 - REG VE3RVH

AUGUST 19 - PAUL VE3PVB

AUGUST 26 - BOB VE3IXX

Elmira Radio Club
Minutes from June 24, 2015
BY TOM VE3DXQ

Present:

VA3TET Al, VA3GWM Gord, VE3WXU Jud, VA3WXU Joyce, Ken VE3KCY, VE3TRQ Ted
VE3DCC Rich, VE3DXQ Tom, VE3CXU Doug, VE3JLC Jim,VA3PDC Paul, VE3JXX John, VE3EIX
Harry, VE3KCY Ken, VE3TRQ Ted, VE3JMU Jim, VE3UTN Dennis, VA3JBO Johan, VA3FJM Frank,
VE3NUL Richard,

The meeting was opened at 7:30 pm by our Club President Rich VE3DCC.

Rich had a picture (VHS-Still) of some club members from 1997. Anyone to get all names in the
picture would get a free coffee from Rich.

 Club members present posed for a group picture outside the fire hall for a New QSL Card.

Minutes from previous meeting; Tom VE3DXQ asked if there were any errors or Omissions.
None were mentioned. Tom made a motion to have minutes accepted. That was seconded by Al
VA3TET carried.

Repeater Status: Judd VE3WXU found a letter on line of our repeater status in 2004. Al VA3TET
spoke to Ralph and Ralph advised there are records showing the 440 repeater in operation in
1996. Also there are records showing changing of call sign from VE3EUC to VE3ERC in 1999. Al
has advised he has sent the application in to WNYSORC (Western New York-Southern Ontario
Repeater Council) for our new 2 Meter frequency. He also sent a cheque, but it has not been

cashed as yet. The new Yaesu Repeaters are on order. One repeater is for 440 and the other for 2 Meter.

Treasurer Report: Includes Ham Fest Sales

Sales		Elmira	Paid
Bob	75.00		
ERC	95.75	13.40	109.15
Ralph	604.00	20.00	624.00
Bill	1.75	55.00	56.75
Wally	410.25	95.00	505.25
Total Ham fest day	1,186.75	183.40	1,295.15
			75.00
Total sales on equipment		1,370.15	
Bank Balance	5,098.34		
Cheques	- 183.25		
	4,915.09		

Ralph, Bill & Wally Sales still have to be paid.

Nominations Committee: All Executives are now elected. Let Rich know if you are interested in being involved in any committees. Paul VE3PVB was not present.

Incorporation and Constitution Committee: Motion is be it Resolved that the Elmira Amateur Radio Club apply for incorporation as a non-profit organization under the name: ERC The Elmira Amateur Club Inc. Rich advised he got all the necessary paper work from Terry VE3XTM, and also a check from AL VA3TET. He will be sending the application to the government tomorrow. Terry VE3XTM has the paperwork for RAC after this goes through we can get the RAC Insurance.

Elmira Maple Syrup Day: Jud VE3WXU and Joyce VA3WXU showed us the New Club Banner which we also used for the club member picture taken this evening.

Safety Officer Committee: Tom VE3DXQ asked about the need for safety vests and cones. Al VA3TET advised that the vest is required for Emergency situations and identification. Al VA3TET advised we have 10 vests, but they do have identification on them. Tom VE3DXQ said he did not see a need for cones, but some members present advised they do have some available, if required.

Lighthouse Project: Al VA3TET said that he was trying to get a hold of Bill Wallace, but Bill is away and everything is a go ahead. Al also advised we should have a group from the club to go

up a few weeks ahead of time to meet the people there and make sure everything is good to go. The date for this event is Aug 15-16, 2015. See http://www.illw.net/

Retrofit for the Fire Hall: John VE3JXX we need to start gathering the materials required for the Retrofit. We have acquired a 20 ft mast pole already. We have a number of 440 Antennas available from club members. John advised he will put Al VA3TET in charge of getting a 2Meter Antenna. John VE3JXX drew a diagram of the hose tower and explained how we should run the coax. The repeaters would have to go up on a shelf on the girders in the ceiling, as well as the cans. Power will have to be routed there from a breaker panel using BX. John advised that the VHF and UHF could go on one of the top corners of the tower and likely an End Fed Antenna for HF.

Al VA3TET asked john if it would be possible to have space available for equipment. John advised he would look into it.

Rich VE3DCC reminded us the Fire hall will be moving in 4 years time. John drew a sketch of where the new fire hall will be. When we relocate we could probably have the new tower installed in the concrete being poured at the new site. We might acquire a tower from West Tower.

Al advised we will need Heliax for the VHF UHF. We need hundred feet for each.

Frank VA3FJM advised he could make brackets if required for mounting the repeaters in the ceiling.

There was a consensus seem to be a long wire end fed antenna would be best for HF.

Johan VA3JBO made a motion that AL VE3TET and John VE3JXX investigate and acquire equipment needed for fire hall antennas subject to approval by Rich VE3DCC and Reg VE3RVH. Seconded by Judd and carried.

Technical Reports: Covered already.

Emergency plan update: Rich said possibly a presentation with the township and demo in the fall.

Tom VE3DXQ mentioned that Amateur Radio operators at home should have a battery backup system in case of extended power outages. These backup systems could use solar panels to trickle charge the battery. Rich asked Tom to compile a list of what may be needed for this.

Field Day: Al VA3TET advised they would like to put the tower up on Friday afternoon and is looking for helpers to show up for 2:00 pm. There will be food at the Field day and a BBQ for Helpers on Sunday. There will be an email going out with directions to get to the field day. People coming out on Saturday should be there for 11:00 am.

Tom VE3DXQ mentioned that he will be unable to attend the field day and asked for volunteers to take on his role for Health & Safety. Jim VE3JMU volunteered.

ERC photo: Rich advised he will email photo that was taken at this meeting to everyone.

We also have the maple syrup card and the Point Clark light house card.

Talk on Bill Tutte and Code by Rich VE3DCC: Rich read an Article from Bill Tutte that explained his method of trying to find patterns in the code relating to how the wheels on the code machine moved.

Meeting ended at 9:10 pm.

ANSWER TO QUIZZ ON
PAGE 5

Once again an electrical problem rears its ugly head and only one third answer it, with one third of them correct. All you need to know was given to you. Since 8 ma flows through the left hand 100 Ohm resistor, it drops .008 x 100 = 0.8 volts. This leaves 2—0.8 = 1.2 volts drop across the rest of the circuit. Ohm's Law again tells us that 1.2 / 600 = .002 amps flows via the top branch (100 + 500) Ohms, leaving the rest, .008—.002 = .006 amps, to flow through the bottom branch (R_1 + R_2). Since no current flows via A_2, the voltage drop across the 100 ohms in the top branch must equal the voltage drop across R_1 in the bottom. But we now know the current in each resistor.

Therefore: (.002) x (100) = (.006) x R_1

So R_1 = 33.3 Ohms
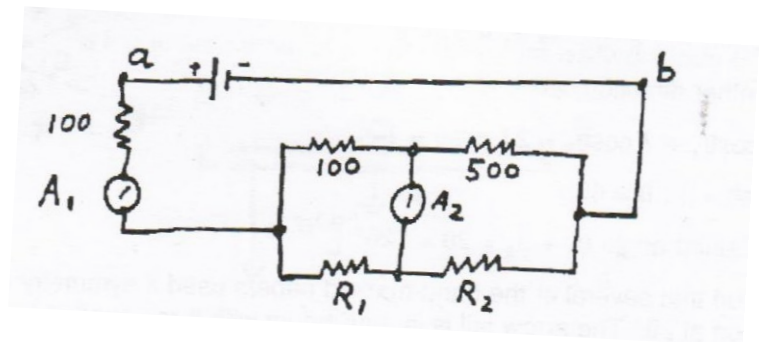
Come out to Field Day

JUNE 27 AND 28
Directions on Page 2

MARK YOUR CALENDAR
LIGHTHOUSE WEEKEND
AUGUST 15 AND 16
AT   POINT CLARK