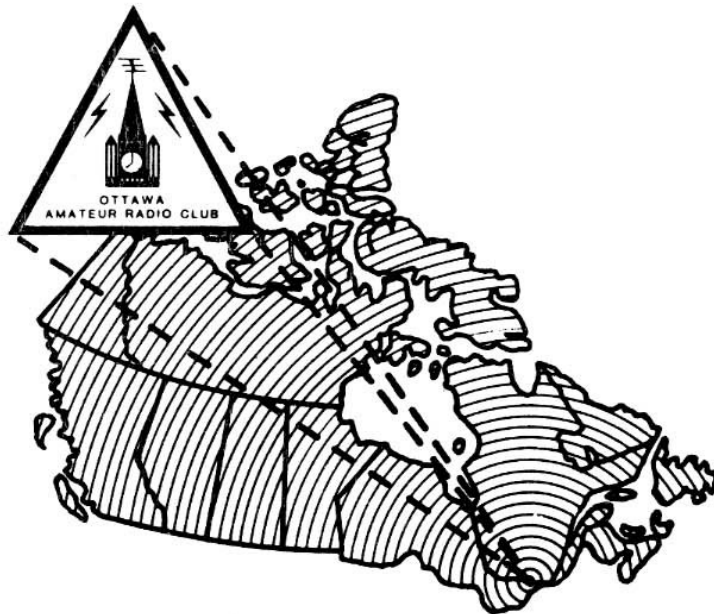


DECEMBER 1988

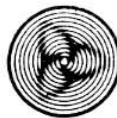
# THE GROUNDWAVE



NEXT MEETING WILL BE ON  
WEDNESDAY, DEC. 7, 1988

Club Call VE3RC

Repeater VE2CRA



Official Bulletin of the Ottawa Amateur Radio Club, Inc.

Managing Editor	Mike James VE3PDE	11 Pommel Crescent Kanata, Ont. K2M 1A3	592-2962 995-2730
Graphic Design	Maria Townson VE3KIP		828-9573
Contributing Editor	J. Gord MacKay VE3JMT	P. O. Box 1204 Stittsville, Ont., KOA 3G0	831-1004
Production Committee	Bill Hall VE3JMC Chuck Baker VE3PAP Ted May VE3ADZ	69 Canter Blvd. Nepean, Ont., K2G 2M4 2061 Belcourt Blvd. Orleans, Ont., K1C 1M7 116B Laval St. Vanier, Ont., K1L 7Z4	224-2107 824-1941 741-0862 993-9132

**THE OTTAWA AMATEUR RADIO CLUB, INC.** is an association of Radio Amateurs devoted to the promotion of interest in Amateur Radio communications in the National Capital Area; and to the advancement and achievement of club members.

**REGULAR MEETINGS** of the OARC, Inc., are held on the first Wednesday of each month (except July and August) at the National Research Council Auditorium, 100 Sussex Drive, Ottawa, at 2000 hours. A bulletin board is available for posting notices of interest to other members about 1915 hours. Further details about each meeting is elsewhere in this publication.

**PACKET RADIO MEETINGS** are held at 19h30 on the last Wednesday of every second month beginning in September, at the Museum of Science and Technology, St. Laurent and Lancaster Roads. This is an OARC technical meeting open to all who have an interest in packet radio.

**THE OARC EXECUTIVE** normally meets on the second Wednesday of each month in the Board Room of CFRA, 150 Isabella St., Ottawa, at 1930 hours. Contact the President to confirm the date of the next meeting.

**DEADLINE FOR COPY** is the second Wednesday of each month. Make yourself better known to fellow members and other amateurs, too, by giving us an article, technical or otherwise, relative to our hobby. They may get reprinted in far away places; and the family will be proud of you.

**MATERIAL PUBLISHED** herein does not necessarily represent the official OARC viewpoint. Items may be reprinted by Amateur Radio or other publications provided that proper credit is given to the author and to the OARC, Inc.

**JUNIOR MEMBERSHIPS:** To encourage young people to join the club and to participate in amateur radio, the club is opening a junior class of membership. Dues will be at a 50% discount but the junior member must pick up his/her copy of the Groundwave (preferably at the meeting).

**RADIO AMATEUR CALL BOOKS** are available at many local libraries. Ask at the information desk.

**SAFETY BELTS, 2-METER RIG AND AN ENGRAVING PENCIL** are available for loan to club members. The 2-meter rig may be borrowed by members who are hospitalized. The engraving pencil (to mark valuables for identification in case of loss or theft) and the safety belts with pole straps are available to any member.

A \$100 refundable deposit is required for the belts. Contact the President for the 2-meter rig or the engraving pencil; and Paul, VE3ICV, at 820-6643 (West End) or Brian, VE3JKZ, at 523-1535 (East End) for the belts.

**THE CAPITAL CITY NET** meets every Monday at 2000 hours on the Club Repeater VE2CRA (146.34/.94) to pass traffic and to make announcements of interest to Amateurs in the National Capital Region.

**PACKET RADIO VOICE NET** meets following the Capital City Net on VE2CRA at 2040 hours. This is an informal net to answer questions about packet radio, pass along operating hints and provide information for future packet operators.

**THE SWAP NET**, is a service provided and conducted by Ed Morgan, VE3GX. This feature appears on the Capital City Net, noted in the foregoing paragraph. To list items and make inquiries, call Ed Morgan at 733-1721.

**POT-HOLE NET** is a SSB/HF net sponsored by the Ottawa Valley Mobile Radio Club, and conducted every Sunday at 1000 hours on 3.760 MHz. All amateurs are welcome to check in. The Swap-Net is a regular feature.

**POT-LID CW NET** is an informal slow-speed CW net sponsored and conducted by Ed, VE3GX, and meeting every Sunday, except during July and August, at 1100 hours on 3.620 MHz, to promote interest in CW and CW procedures.

**REPEATERS**

VE2CRA	Voice	146.94/34	443.300/448.300
VE3NCR	Packet	145.01(sx)	Inter city links
VE3OCR	Packet	145.07(sx)	Local Area Net for QSO and Packet BBS

For further information, please contact repeater chairman.



PCB'S IN DUMMY LOADS AND CAPACITORS

by George Spencer, VE3OZW

The hysteria created by the news media and some pseudo-environmentalists regarding PCB's has caused many radio amateurs to become concerned. Many suspect that their dummy load contains a PCB and that the same might be true of some oil-filled capacitors which many of us have from World War II and later surplus and often found on tables at hamfests.

I have had words with some journalists on the subject and my suggestions fell on stony ground. I concluded that the truth makes a dull story, not what they want to write about nor does it sell newspapers. Correct information is available in most public libraries contained in technical electrical and chemical handbooks. Of course the terminology in these books is such that a journalist is bound to conclude that it couldn't be anything but dull.

Anyhow, during my working career I have relocated many times and found that movers will not accept a number of inflammable or corrosive items for transport for obvious reasons. Banned items include paints, solvents, oils, and wet batteries.

This meant that I always had to empty my dummy load and buy some new coolant at the new location. It is not possible to purchase one gallon amounts of transformer oil and I always had to buy a five gallon or as now, a twenty litre pail. I then had to sell or give away the balance after filling my one gallon Heathkit dummy load. Subsequently I was accused by some of the recipients of having sold them a PCB. This accusation arose from the use of improper terminology by certain writers, especially those not capable of discerning the difference between a mineral oil and a PCB.

Now, let's deal with some facts. PCB's in this case are not printed circuit boards but poly-chlorinated biphenyls. The type most commonly produced in large volume was developed for use in the cooling of large electrical transformers. The purpose of such development was to create a fireproof liquid coolant to replace a mineral oil called transformer oil. Transformer oil has been around since near the turn of this century and is used in large power and smaller pole-type transformers. Primarily, it convects the heat away from the winding and iron core which comes from the I squared R losses in the copper and the hysteresis losses in the iron. The coolant also has a high dielectric strength and makes possible closer spacing between turns and windings within the transformer.

The big problem with oil is that it is inflammable and would create a fire hazard in indoor installations. The Canadian Electrical Code requires such transformers to be located in a tub capable of containing all the oil and to be surrounded by a fire resistant vault. Of course these expensive specifications provided an incentive to come up with a liquid coolant which would not burn and would have all the desirable characteristics of transformer oil.

A PCB having the desired insulating and heat transfer characteristics was developed in 1932 but did not reach the market in any significant volume until after WW II. Probably the most installations were made during construction of industrial and commercial buildings in the 1960-1970 era. Although transformers cooled with PCB were more expensive than the oil filled types, construction savings more than offset the extra cost.

This product was sold under various trade names. For example, GE called it Pyranol, Westinghouse called it Inerteen, and many used the generic term of

Askarel. The important thing to remember is that it is not an oil. It is a synthetic chemical compound created for a specific purpose.

It was not known at the time that continued exposure at high levels of concentration of PCB's (and many other substances) produced cancer in rats. When this was established, an ideal subject for inflammatory journalism was created.

The specific gravity of transformer oil is 0.88 while the S.G. of Askarel is 1.56, almost twice as heavy. The flash point of transformer oil is 135 degrees Cent. or 275 degrees Fahrenheit while no flash point is given for the extremely stable Askarel. The difference in S.G. provides an easy test for finding out what is in your dummy load. Put some water in a glass container and take the lid off your dummy load. Dip a piece of wire into the liquid in the dummy load and shake a drop off the wire into the water. If it sinks, it is most likely a PCB. If it flattens out on the surface, it is oil.

The lack of a flash point indicates that it is very difficult to destroy a PCB but it can be converted to a different substance at extremely high temperatures.

Askarel is a strong solvent for some of the varnishes and other materials used for insulation in oil-filled transformers so different materials had to be used for askarel filled transformers. This meant that it was not possible to simply drain the oil from an oil filled unit and substitute askarel to obtain an indoor transformer. The reverse procedure is possible but consideration would have to be given to reduced dielectric strength and to housing requirements outdoors.

There has been mention in the news media of oil contaminated with PCBs. The small number of parts per million found suggests that this may have been caused by the fact that during the early days of

its use, the same hoses and pumps were used for both oil and askarel in many cases. This may have caused some journalists to create a new term -- "PCB oil." There is no such thing. Askarel for use in capacitors is more viscous than that used for transformers and has a higher dielectric constant. Although askarel was more expensive than oil, its use produced a smaller capacitor for the very large units required for power factor correction in industrial and utility applications.

The relatively small oil filled capacitors used in radio and electronic circuits (0.1 mf to say 10 mf) do not fall under the CSA and NEC code requirements for vaults, etc. They are still made and may be purchased new today. It says "oil filled" on the case and that means mineral oil. PCBs are now forbidden by law. The cost of askarel was always higher than that of oil when it was permitted to be sold so small capacitors having no need for code requirements were not filled with askarel. Likewise for reasons of cost, amateurs did not purchase askarel for use in dummy loads but some may have wandered out the back door of some industrial plant or utility.

Power capacitors are used in industry and by utilities for power factor correction. We use smaller, usually variable, capacitors in transmatches to do exactly the same thing but we call it cancelling out inductive reactance or impedance matching. Power capacitors at 60 Hz, when required to be indoors, were filled with askarel and because of the advantages given above were also installed outdoors. The smallest of these would be rated at 10KVA which at 60 Hz and on 600 volts would consist of three banks, each of 74 mfd connected in a three phase wye connection. Such capacitors are often 100 KVA rated and more in industrial applications and even larger at higher voltages in utility applications. You can see why the fire hazard develops if such large capacitors

are installed indoors and use oil as a dielectric.

If you want some transformer oil for your dummy load, Imperial Oil and probably others have it in 20 litre pails. Imperial calls theirs "Voltesa 35". Have a talk with someone in the sales department at a main distribution terminal. They will tell you that their product is pure mineral oil and does not contain any PCBs. Some may tell you that they have given up on trying to educate the news media.

de FEEDLINE  
Niagara Peninsula ARC Inc

(NOTE: you can buy mineral oil in litre bottles at most large drug stores but be prepared to assure the druggist that you have no intention of drinking four litres of the stuff. Ed.)

ON THE LIGHTER SIDE

FAMOUS FIBS:

- ...the cheque is in the mail
- ...we service what we sell
- ...money cheerfully refunded
- ...this hurts me more than it does you
- ...your table will be ready in a few minutes
- ...let's have lunch sometime
- ...it's not the money, it's the principle
- ...one size fits all

de SPLATTER of the  
York Region Amateur Radio Club

NEW TARIFF NUMBERS FOR HAM GEAR

Canada Customs has adopted the International Tariff Item Numbering System. The following NEW numbers are of interest to hams. Keep them handy, as Custom Officers are sometimes confused by the new system.

Amateur equipment	
Tx and TxRx	8525.20.10.00
Antennas	8529.10.10.00
Electronic test equipment	9030. group
Electronic parts	8530 to 8542 group
Computers, data processing equipment	8471.99.90.10
Video displays	8471.93.10.10
Disk drives	8471.93.10.10
Diskettes	8524.90.20.00

Note: the first four digits indicate the primary group and will help to find the exact items, if not known. TARIFFS HAVE NOT CHANGED!


de MARCOGRAM  
publication of the Montreal Radio Club  
by way of the Toronto FM  
Communications Society News Letter

NEED MONEY? NEED WORK? NEED EXPERIENCE?

JOIN THE **FUTURES 'PEP' PROGRAM**

IF YOU ARE 16-24 YEARS OLD - OUT OF SCHOOL AND FULL-TIME WORK - FUTURES CAN PROVIDE YOU WITH "PRE-EMPLOYMENT PREPARATION" - WE'LL PAY YOU \$125<sup>00</sup> A WEEK FOR 16 WKS - AND A JOB AFTER - CALL 738-6120 - INFORMATION SESSIONS EACH WEEK

**ALGONQUIN**

SPONSORED BY THE MINISTRY OF SKILLS DEVELOPMENT 

NOTE: The piece that follows is taken from the Rambler, published by the Ottawa Valley Mobile Radio Club. There is considerable overlap in membership between the OVMRC and the OARC. Members of the latter are welcomed on the net and may even be welcomed as a volunteer net controller. In any case join in the net. The communication discipline involved is good practice to practise...(Ed.)

THE POT-HOLE NET  
by Norm, VE3JDJ

Several years ago I offered to assist the OVMRC POT-HOLE NET manager by acting as Net Controller every third Sunday. My log indicates that over the past 260 Sundays I have dedicated an average of 25 minutes acting as the POT-HOLE NET Control station for 230 of them. During that interval, the Net Manager, Merv, VE3CV, and myself have appealed for additional Net Controllers with minimal response as indicated by these statistics.

In consultation with the Net Manager, we have decided to simplify and publish the net controller's procedure to encourage operators to give it a try. They may even find it is fun. The results are published below. Why not cut it out and post it near your rig.

Here is the operating guide. Join the net and follow the procedure. Then volunteer to try it with your own call sign filled in for the blanks.

NET CONTROL OPERATING PROCEDURE

GOOD MORNING. THIS IS VE3-... NET CONTROL STATION FOR THE OTTAWA VALLEY MOBILE RADIO CLUB POT-HOLE NETWORK. THIS NET WAS ESTABLISHED IN MAY OF 1959 AND SINCE THEN HAS MET EACH SUNDAY AT 10 AM, LOCAL TIME ON 3760 KHZ. ALL STATIONS ARE WELCOME TO CALL INTO THE NET: MEMBERSHIP IN THE CLUB IS NOT A REQUIREMENT.

THE PURPOSE OF THE NET IS TO ANNOUNCE FORTHCOMING AMATEUR ACTIVITIES, PERTINENT BULLETINS, AND TO PROVIDE AN OPPORTUNITY FOR PARTICIPANTS TO ARRANGE TECHNICAL OR OTHER AMATEUR RELATED ACTIVITIES. THE NET PROCEDURES ARE AS FOLLOWS: FIRST THERE WILL BE AN OPPORTUNITY FOR STATIONS TO CHECK IN WITH PRIORITY GRANTED TO MOBILE STATIONS.

THIS WILL BE FOLLOWED BY ANNOUNCEMENTS. STATIONS WITH ANNOUNCEMENTS ARE ENCOURAGED TO PARTICIPATE. THE ANNOUNCEMENTS WILL BE FOLLOWED BY THE SWAP NET. A BRIEF INFORMAL RAG CHEW WILL FOLLOW FOR THOSE STATIONS WISHING TO PARTICIPATE.

YOUR NET CONTROL STATION THIS MORNING IS VE3... , THE HANDLE IS ..... AND THE QTH IS ..... BEFORE WE CARRY ON, DO WE HAVE ANY URGENT OR PRIORITY TRAFFIC?

Then:

1. Call for mobile check-ins. Keep a list.
2. Call for fixed station check-ins. Keep a list.
3. About 1005 hrs., ask Merv, VE3CV, for announcements.
4. Ask the net for additional announcements.
5. About 1010 hrs. ask ED, VE3GX, to conduct the Swap Net.
6. Following the Swap Net, call for "ADDITIONAL CHECK-INS BEFORE WE GET TO THE RAG CHEW PORTION OF THE POT HOLE NET."
7. Call stations in for the rag chew in order of check-in.
8. When the list is complete, announce "THAT IS MY LIST AS I HAVE IT, DO I HAVE ANY FURTHER CHECK-INS OR RECHECKS BEFORE I CLOSE." If none, then
9. 'THIS IS VE3... NET CONTROL STATION FOR THE OTTAWA VALLEY MOBILE RADIO CLUB POT HOLE NET SIGNING THE NET AT .... HOURS. GOOD MORNING."

**ON AIR VIOLATIONS**

The following letter was issued as an insert to the June 1988 issue of the bulletin of the London Amateur Radio Club.

Letter to the Editor: We as Amateurs, have had to work hard for our licenses. As a group, we tend to protect and police the privileges allowed by our license class.

When violations occur, it reflects not only on the violator, but on the whole amateur fraternity.

In the event that a violation is noted on the Amateur bands, the following steps are suggested:

1. Tape the infraction.
2. Log the time, date, band and transmission type and length.
3. Report the incident to Communications Canada for processing.

73, John, VE3MGR, ARES

**WIRE ANTENNAS AND TREES --- GETTING THEM UP**

by Edward Swyner, VE3CUI

If you're like me, blessed with a bounty of curiosity when it comes to antennas and gifted with an assortment of tall trees to "try them on", then you have probably tried many different ways of erecting your wired creations up into the uppermost branches.

I have had my greatest successes with a LACROSSE ball, available at better sporting goods emporiums. This ball is about the size of a hardball and is composed of heavy "India" rubber.

To get the best usage out of the ball, you must first drill a small (1/8") hole right through the center. A small "fishwire"

is constructed of a scrap piece of copper wire by forming a small hook on one end that will fit through the ball and "fish" back the start of a long length of lightweight nylon twine.

Tie this twine to the ball and then uncoil long loops of the line onto the ground, being careful not to lay it on twigs, etc., which might impede the flight of the twine up to its destination. The balance of the line can be staked to the ground by a long screwdriver driven through the spool and pointing roughly in the direction of your throw to facilitate unwinding of the additional line. Take careful aim of your target branch and throw the ball such that it sails up and over the limb. If you miss the first time, don't worry; the lacrosse ball is heavy enough that it won't "hang up" halfway during its descent to ground. Also it's a simple matter to snip off the twine at the ball and pull the string back to your original launch pad to start the process all over again with nothing wasted.

Belleve me, I've tried everything from bows and arrows and slingshots to empty beer bottles in my efforts at erecting the ultimate skywire. Nothing approaches the success I've had with the lacrosse ball. Oh yes, it helps if you've been accustomed to throwing baseballs in your day; the highest branch in my trees checks in at about 70 feet.

de SPARC-GAP  
South Pickering ARC Inc.



NEWS FROM LOYALIST CITY

The exchange mail this month brought us a breath of salty air from Saint John, New Brunswick, regularly confused by inlanders with St. John's, Newfoundland. This borne in a salty bulletin published by the Loyalist City Amateur Radio Club. The masthead slogan, "Where Our Only Emissions are Harmonic" gives one pause for thought and may explain some attachment to cross band working.

We note a 'tip of the hat' to retiring Club President Charlie, VE1BTG, for the work he did during his term of office. The bulletin offers that "the reason that organizations elect presidents is to have someone to complain about. Charlie wants you to know that this Free Trade is none of his responsibility. He had enough trouble with the characters who are members of this organization. He did say, however, that he would have traded many of them freely or otherwise."

The bulletin continues, "Thanks for a damn fine job Charlie. Now you can go to that place where all lost signals go," and then adds, "Actually it is not true that Charlie knew Marconi personally."

The announcement of the coming program is a model of restraint. "The topic for the month of November will be 'Modern Electronics Applied to the Protection of Life and Property.' You certainly have things that you would like to protect. Here is the opportunity to come out and obtain this information. Undoubtedly some of the things that you might like to protect are worn and dilapidated but come anyway. Use your imagination."

"The speaker for November is VE1 something or other. Actually imported for this occasion only from one of our leading security institutions. You know, those government run ones."

Loyalist City ARC is once again operating a course for would-be hams. In addition,

club members are participating in civil events, assisting club members with test equipment, organizing for EMO, running a swapping program, running a Christmas project at the hospitals, helping out the Scouts on Apple Day, etc.

A final crib from the bulletin-- "as the young gym teacher said at a PTA meeting: when you have five hundred young people, male and female taking off and putting on their clothes several times a week someone is bound to lose something."

Tnx to Saint John ARC

DO YOU WANT TO READ ABOUT CONFLICT?

Try to decide how many radial elements you require to have a good ground system - few people really agree. G6XN's solution appeals, he says you can get away with as few as two, while others say not less than 120. An alternative has been suggested by KB8I in the August issue of QST. He has done a computer model of a vertical antenna with just four radials. His approach is to raise the antenna and radials about 10 feet off the ground to achieve a predicted performance that exceeds that which is obtainable with 120 radials buried in the ground. He has not had the opportunity to confirm the model but VHF antennas stuck at the end of a mast intuitively confirm the prediction as being acceptable. It will be interesting to see the results of his tests. This means I can run my lawn mower under the ground plane instead of through it. . . .

de "Antenna Works" by  
Doug, VE3ATY, in the RAMBLER,  
Ottawa Valley Mobile Radio Club, Inc.

**OARC FINANCES**  
**AND**  
**DISTRIBUTION OF THE "GROUNDWAVE"**  
**AND NRC AUDITORIUM RENT(!)**

1. Your executive has been studying how we might better use the very limited funds the club has at its disposal.
2. This review has been prompted by two developments, the first is that we have just heard that starting in 1989 we shall no longer be able to have the use of the NRC Auditorium for free. While the exact rental figure is still under review the figure that went up the line for approval was \$85.00 for an evening! This would completely unbalance our budget and force a significant change, on either the expenditure or revenue side. Alternatively, the club could look for a less expensive venue for our monthly meetings.
3. The second development is that there is general agreement that the club's technical program, which consists of packet radio, voice linking of 2 metre repeaters and upgrading the present 2 metre repeater, are seriously strapped for funds. The 1988/89 budget published in the November Groundwave indicates that we are hoping to find budget surpluses, later in the year, that will allow our technical programs to move forward. However, it will very much depend on just how the various revenues and expenditures balance out.
4. The executive points out that there are two obvious ways of generating the funds necessary to bring our budget back into balance, pay for the NRC Auditorium, and develop a useful surplus during the year to fund our technical programs. We either have to cut expenditures or raise revenues.
5. The only practical way of raising revenues is for the club to increase its annual dues. This will clearly be a contentious step to take but it may be inevitable.
6. Cutting expenditures only makes sense if we address the major expense items in the club's budget, namely the proposed rental charges for the auditorium and the production and mailing costs of the Groundwave. Production costs, thanks largely to the generosity of a well known local radio station, could hardly be lower. This leaves us with the mailing costs which are currently running at over \$800.00 for a club year. These costs are likely to rise as we are currently mailing the magazine for a rate that may well be incorrect...(but who are we to correct "Canada Post's" mistakes?!)
7. If the Groundwave was distributed at the monthly club meetings, a practice followed by a number of other Ottawa hobby clubs, we could save at least \$800 this year and possibly more in future years. However, a straw poll at the October meeting showed that this would be a contentious move.
8. We need your views on this subject in order that we may develop a plan that has the general support of all club members.
9. With this in view we strongly urge all club members to complete the questionnaire on the next page and leave it with a member of the executive at the next meeting, or alternatively mail it to the club.

OARC QUESTIONNAIRE

YES

NO

- 1. I believe that the OARC should continue to hold its monthly meeting in the NRC auditorium even if this would require an increase in annual dues to \$17.00.
- 2. I would be willing to see my annual dues increased to \$17.00, the additional money being used to develop a modest cash surplus to support technical programs. This would be on the condition that we would find a low-cost meeting place.
- 3. I would be willing to pay dues of as much as \$23.00 per year to support both an increased technical program and continued use of the NRC auditorium.
- 4. I would be happy to pick up my copy of the GROUNDWAVE at monthly meetings in order to save about \$4.00 per year in dues. (This would be instituted on a club-wide, not individual, basis.)

5. The dues should be held to no more than \$\_\_\_\_\_!!!

6. I suggest that the following place might be a good meeting place at a lower price.

\_\_\_\_\_

NAME \_\_\_\_\_

CALL \_\_\_\_\_

COMMENTS:

**PLEASE LEAVE THIS WITH A MEMBER OF THE EXECUTIVE AT THE NEXT MEETING OR MAIL IT TO THE CLUB.**

<b>The Ottawa Amateur Radio Club, Inc., Box 8873, Ottawa, Ont.</b>			<b>K1G 2J2</b>
<b>President</b>	<b>Paul Cooper</b>	<b>R.R. 2</b>	<b>821-2167</b>
	<b>VE3JLP</b>	<b>Metcalfe, Ont., KOA 2P0</b>	
<b>Vice-President</b>	<b>Kees Kaper</b>	<b>4204-4000 Hungerford Gate</b>	<b>592-0474</b>
	<b>PAOKKZ/VE3</b>	<b>Kanata, Ont., K2L 2T4</b>	<b>592-8500</b>
<b>Secretary</b>	<b>Mike Hughson</b>	<b>P.O. Box 103, 6135 Frank</b>	<b>835-3093</b>
	<b>VE3DVH</b>	<b>Kenny Dr., Vars, Ont., KOA 3H0</b>	
<b>Treasurer</b>	<b>George Caskey</b>	<b>19 Argue Drive</b>	<b>224-6415</b>
	<b>VE3NJK</b>	<b>Nepean, Ont., K2E 6B2</b>	
<b>Past-President</b>	<b>John Drzejewicz</b>	<b>38 Fuller Street</b>	<b>722-1854</b>
	<b>VE3NVF</b>	<b>Ottawa, Ont., K1Y 3R8</b>	<b>952-1847</b>
<b>Directors</b>	<b>Fred Chilton</b>	<b>1718 Ambrose St.</b>	<b>744-2096</b>
	<b>VE3PFX</b>	<b>Gloucester, Ont., K1B 5J6</b>	<b>953-0207</b>
	<b>Peter Jago</b>	<b>8 Eagle Rock Way</b>	<b>836-1013</b>
	<b>VE3PWJ</b>	<b>Stittville, Ont., KOA 3Q0</b>	
	<b>Wayne Greenough</b>	<b>5 Summer St.</b>	<b>836-5320</b>
	<b>VE3JSQ</b>	<b>Kanata, Ont., K2L 2L3</b>	
<b>Packet Group</b>	<b>Dick Atkinson</b>	<b>20 Mancil Drive</b>	<b>825-5619</b>
<b>Chairman</b>	<b>VE3JBO</b>	<b>Nepean, Ont., K2J 2J5</b>	
<b>Repeater</b>	<b>Harrie Jones</b>	<b>8 Haxy Private</b>	<b>739-9365</b>
<b>Chairman</b>	<b>VE3HYS</b>	<b>Ottawa, Ont., K1T 3B4</b>	<b>233-6241</b>
<b>Net Manager</b>	<b>Bruce Lauer</b>	<b>10 Winlock Crescent</b>	<b>829-9471</b>
	<b>VE3HJV</b>	<b>Nepean, Ont., K2G 3X4</b>	
<b>Emergency</b>	<b>Ken Kendall</b>	<b>777B Springland Drive</b>	<b>731-0892</b>
<b>Coordinator</b>	<b>VE3INX</b>	<b>Ottawa, Ont., K1V 6L9</b>	
<b>EMI Committee</b>	<b>Ralph Cameron</b>	<b>30 St. Remy Drive</b>	<b>825-1634</b>
<b>Chairman</b>	<b>VE3BBM</b>	<b>Nepean, Ont., K2J 1A3</b>	<b>225-2850</b>
<b>Membership</b>	<b>Mike Kelly</b>	<b>25 Stevenson Ave.,</b>	<b>722-5918</b>
<b>Chairman</b>	<b>VE3FFK</b>	<b>Ottawa, Ont., K1Z 6M9</b>	
<b>National Cap.</b>	<b>Brian Summers</b>	<b>2231 Hillary Avenue</b>	<b>523-1535</b>
<b>Award Manager</b>	<b>VE3JKZ</b>	<b>Ottawa, Ont., K1H 7H7</b>	<b>996-7885</b>
<b>Publicity</b>	<b>Mike Pilon</b>		<b>731-1567</b>
	<b>VE3BUP</b>		<b>996-3311</b>
<b>Photography</b>	<b>Chris Rochefort</b>	<b>2203 Hamelin Crescent</b>	<b>749-3625</b>
	<b>VE3PAE</b>	<b>Gloucester, Ont., K1J 8K9</b>	