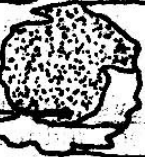


# THE GROUNDWAVE



The Official Bulletin of the  
**OTTAWA AMATEUR RADIO CLUB**  
p.o. box 8873 Ottawa, Ont. K1G 3J2

*The Ottawa Amateur Radio Club is an association of Radio Amateurs devoted to the promotion of interest in Amateur Radio Communications in the Ottawa regional area and the advancement of the technical competence and achievements of Club members.*



:-THE GROUNDWAVE-- OFFICIAL BULLETIN OF THE OTTAWA AMATEUR RADIO CLUB INC.:-

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The Ottawa Amateur Radio Club Inc.

is an association of radio amateurs devoted to the promotion of interest in amateur radio communications in the Ottawa regional area and to the advancement of the technical competence and achievement of club members.

The Capital City Net meets every Monday evening at 2000 hours on the club repeater VE2CRA (146.34/146.94), to pass traffic and make announcements of interest to amateurs in the Ottawa regional area.

The Swap Net is a service of the Ottawa Valley Mobile Radio Club Inc. and conducted by Ed Morgan, VE3GX is repeated on the Capital City Net. To list items or make inquiries call Ed at 733-1721.

An Engraving Pencil is available to OARC members to mark their valuables for positive identification in case of loss or theft. For further information contact Penny Robinson at 225-1276.

Hospital Visitations to any amateur confined to the Civic Hospital will be made by Maureen Neill VE3FZY. If you know of any amateur confined there who would appreciate a visit, call Maureen at 725-4581. (233-9941 after 5:30)

Dominion Store Cash Register Tapes are being saved by the OARC so save up your tapes (your neighbours and friends as well) and contact members of the Executive for further details.

Material Published Herein

does not necessarily represent the official OARC viewpoint. Items may be reprinted by Amateur Radio or similar publications provided that Proper credit is given.

Deadline for Copy for regular issues is the third Saturday before the regular Club meeting for articles of length and the second Saturday before the regular club meeting for short paragraphs and announcements.

The Regular Meetings of the Ottawa radio Club Inc. are held on the first Wednesday of every month except July and August. Meetings are held in the Auditorium of the National Research Council 100 Sussex Dr. Ottawa at 2000 hours. See details of the next regular meeting on page 5.

The OARC Executive meets normally on the second Wednesday following regular Club meetings in the Board room of CFR 150 Isabella St. Ottawa at 1930 hours. Contact the executive for confirmation of the next meeting date.

Renew Your ARRL and CARR Memberships Through the OARC and save M.O. fees, postage etc. The Club also benefits. Contact Brian Barsalou, VE3LBX at any of the Club meetings or at 829-7340 for further details or remittance forms

Minutes of theOTTAWA AMATEUR RADIO CLUB, Inc.

April 2, 1980

The meeting was brought to order by Paul VE3ICV, the president, at 2000 hours. Visitors VE3BAX, VE3MJC and VE3KLX were welcomed. The minutes of the February meeting as printed in the Groundwave were adopted as read on a motion by VE2DZT, seconded by VE3OR.

Paul announced that there would be no coffee at the end of the meeting unless someone volunteered to make it, whereupon Larry VE3QB offered to do so. Paul announced that a few copies of the constitution were available for examination at the front of the meeting room.

The treasurer, John VE3CXL, reported that the Club had \$4278.05 on deposit. Ken VE3PU, membership chairman reported that total membership at present is 269. John VE3DYJ, chairman of the Field Day Committee reminded the membership that this annual event will be held on June 28th and 29th and that volunteers are needed to make the event a success. For the past few years, the OARC has been the Canadian leader in the event for its class.

Paul reminded the members that he has custody of a two meter rig which is available for the use of shutins or those who are hospitalized. Maureen Neil will visit amateurs in the Civic Hospital if she is contacted at 725-4748.

The OARC Banquet will be held on Friday April 18th at the RA Centre at 7:30 pm. There will be a roast beef dinner with guest speaker Hal Anthony, followed by dancing. Tickets were still available at the meeting.

Art VE3ZS announced that the Jock River Canoe Race was planned for the 13th of April, water willing, and that volunteers were needed to assist with the communications.

Sydney VE3GYZ announced that the annual OVMRC Auction will be held on April 26th at the Royal Canadian Legion, Bells Corners. Flea market tables will be available at \$5.00 each.

Paul stated that intruder watch reports for 20 and 10 meters had been filed, and he requested that if members should hear intruders on the amateur bands they should file reports with the DOC.

Bob VE3KLG announced that he would be interested in hearing from any amateurs who would be interested in sailing from the Great Lakes to the East Coast during July and August. He may be reached at 729-7536.

Ron VE3AUM informed the membership that the RSO delegates meeting will be held in Toronto in two weeks and that he would like to hear from any members of issues that should be raised at the meeting.

Larry VE3CRX announced that he had been advised by EMO that they were forming a group of amateurs independent of the OARC to provide communications for the Ottawa area in the event of a local emergency; therefore, he felt obliged to resign from his post of Club Emergency Coordinator, effective immediately. He extended his thanks to all who had assisted him over the years. Paul VE3ICV proposed a motion of thanks to Larry for his efforts over the years as EC, which was carried.

The raffle prizes were won by VE3ZS, VE3ARZ and VE3KLY.

Rick VE3HVA advised that considerable interest had been expressed in the bulk purchase of Weller Soldering Stations and Luxo illuminated magnifiers and that he now needed a list of names of those individuals wishing to make firm commitments.

Croft VE3OR advised that because of a distribution problem with The Ontario Amateur, there would be a re-mailing to those in the Ottawa area.

--continued on page 4.



NEXT MEETING

The next regular meeting of the Ottawa Amateur Radio Club, Inc. will be held on Wednesday May 7th, 1980 in the Auditorium of the National Research Council, 100 Sussex Drive, Ottawa, at 2000 hours.

The main item on the agenda will be a commercial equipment "show and tell" where it is hoped that we will have several of the latest pieces of ham gear on display. The proud owners of the equipment will tell us all about each item.

AMSAT - continued

new AMSAT/OSCAR 9 satellite. To access during its six to eight hour apogee at 34,000 km will require 400 to 1000 watts of Effective Radiated Power (ERP) at 435.22 MHz. This can be achieved with a 50 watt transmitter with an antenna having at least 9 db gain. Fortunately, high gain antennae are physically small at 435 MHz. A circularly polarized, six turn helical antenna with a gain of 13 db would be only four feet long. As with the downlink antenna, the uplink one will have to point upwards. Thus, azimuth and elevation control will permit longer access to the satellite.

In addition to being the first of the AMSAT Phase 3 launches, that of OSCAR 9 will be the first amateur radio activity broadcast on a world wide basis. The Amsat Launch Information Network Service (ALINS) will broadcast pre- and post-launch information on amateur radio around the world. Commencing five days before the launch, May 23rd, daily five minute bulletins will be broadcast to specific parts of the world as follows:

28.555 MHz: 1800Z - Europe  
1805Z - Africa  
1900Z - South Pacific  
2300Z - Asia

21.260 MHz: 1820Z - Europe  
1815Z - Africa  
1910Z - South Pacific  
2310Z - Asia

14.260 MHz: 1830Z - Europe  
1835Z - Africa  
1920Z - South Pacific  
2320Z - Asia

The bulletins will continue until the satellite is available for service, about four weeks after launch. The actual launch broadcast will start half an hour before launch at about 1100Z and last through the launch on the following frequencies: 1.835, 3.990, 7.290, 21.390 and 28.590 MHz. The broadcast will be from W1AW, the North Jersey DX Association and the Lockheed Missile and Space Co. Amateur Radio Club. Current satellite information can be obtained weekly at 0100Z Wednesday (Tuesday evening local time) at 3.850 MHz and 1800Z Sunday at 14.280 MHz.

The next Amateur Satellite launches will be later this year when the Sports Federation of the USSR will launch their RS3 and RS4 satellites. In the summer of 1982, the AMSAT-UK (University of Surrey) will launch the first Amateur Scientific Satellite.

FIELD DAY 1980

Remember that Field Day will be held this year on the weekend of June 28-29. The OARC has an excellent record in this fun-filled event. Last year, the Club was again the winner in its class. Last word was that a manager was still needed for the 20 - 80 metre phone station. Of course, there are several openings for operators and loggers.

Come out to the June meeting to see a few slides taken at previous Field Days--and be sure to sign up as an operator by contacting John VE3DYJ at 829-1272.

30-METRE CW

Amateur Radio's new 10-MHz band should be limited to CW only, the IARU Region 1 Executive Committee agreed at its London meeting in early March, to provide maximum utilization of the shared 50-KHz allocation when it becomes available January 1, 1982. No action is likely by Region 1 Amateur organizations until April, 1981, however, when the next Region 1 Triennial meeting is scheduled.

Strong support for an all-CW "30-metre" band has also been registered by U.S. Amateurs who have written ARRL headquarters on the subject, with only a small minority advocating setting aside sub-bands for other modes. A few have suggested it have a lower power limit, a desirable idea since lower power would tend to reduce interference with other services sharing the band.

Further strengthening of the IARU and the international Amateur Radio bonds established during WARC was the principle topic of the meeting, at which IARU President VE3CJ and Secretary W1RU were the only non-Region 1 attendees.

de St. Paul Ground Wave  
/HR Reprint

RTL AND LIFETIME BUYS

Motorola has announced that they will be terminating manufacture of resistor-transistor logic (RTL) at the end of this year. Orders will be accepted until May 26, 1980. RTL has been a commodity product for nearly two decades and widely used in industrial process control equipment vintage mid 60's.

In order to maintain equipment with RTL circuitry, it is necessary to estimate the total number of spares required over the remaining life for a final "lifetime buy". For this tricky calculation, a rule of thumb is to inventory 10% of the

total parts count by circuit type or two pieces, whichever is greater, for every five years of expected life.

So check your schematics for the following part number series; MC815-MC826, MC864-MC899, MC900-MC999, MC9801-MC9825 and any MC700 numbers (these were deleted from manufacture years ago but can usually be replaced by M800 types). One last complication: Much of the RTL out there is "house-numbered" --- numbers assigned by the original equipment manufacturers to send technicians everywhere into a state of utter frustration.

de The Hamilton Amateur  
/Varah's Up Date

AMATEUR RESEARCH CLUB

When the possibility arose of launching an amateur radio experiment of a National Research Council balloon, the Canadian Amateur Radio Research Club (CARRC) was born because NRC could not deal with individuals. The first result was the Skyhook operation of last July, when a two-metre simplex repeater was launched on a balloon from Gimli Manitoba, and rose to an altitude of 102,000 feet.

Among future projects in hand or being discussed, are the development of a balloon package in which an RCA 1802 CPU will be remotely programmed to perform various on-board physical functions, and a scheme to install UHF links between three Manitoba Repeaters to provide what can only be described as dramatic coverage.

The club invites applications for membership. Your membership fee of \$25 entitles you to input to future projects and access to test equipment and technical know-how. Contact the club at PO Box 1785, Gimli, Manitoba R0C 1B0.

de The Manitoba Amateur

BARGAIN(?) COAX

Buyers, beware of bargain coax. Cable labeled as, for example, "RG8/U type" does not meet RG8/U specs. Although the dimensions may be similar, the characteristics may be significantly different.

For example, a cable advertised as "CB/Ham Cable Assembly - Home Use - RG8/U type foam ..." measured 57.5 ohms instead of the standard 52 ohms. Although this cable may be used alone, VSWR problems could arise when connected to standard RG8/U.

The higher impedance usually results from the manufacturer maintaining the same dimensions of inner and outer conductors but substituting foamed polyethylene, with a lower dielectric coefficient, for regular polyethylene. This not only raises the characteristic impedance but also increases the electrical length (reduces the loading factor.)  
de Worldradio/QSP

PIRATE SILENCED

Station EI8H, one of the biggest sources of QRM for DX for years, has been silenced. EI8H has been creating chaos by placing a carrier on the frequencies of DX nets and occasionally adding music, bells, chiming or buzz-saw noises to disrupt communications. In addition, he was linked to several bogus calls which resulted in wasted IRCs and frustration.

His downfall came last August when when P29JS and several European stations set up a trap, announcing a special station would appear on the net, and alerting EI Post Office officials who set up tracking stations in southwest England, CT2 and SM. The culprit was caught and his licence cancelled. Success was largely due to SM5BBC who put diplomatic pressure on the EI Post Office to act.  
de St. Paul Ground Wave/ZL2HE

AMATEUR RADIO SCORES AGAIN

One evening last January, as Jim VE4QH was entering a supermarket, two suspicious men came in, pointed a rifle at the cashier and demanded the day's cash. Jim slipped out of the store unnoticed, ran to his car and used autopatch to call the police. When the bandits left the store, Jim followed, obtaining the licence number and the description of the getaway vehicle and relaying this information to the police over the VE4WPG repeater. When the police arrived, he gave them the facts of the robbery. His actions were instrumental in the early capture of the robbers. congrats, Jim.

In reporting the robbery, the Winnipeg Free Press attributed the ham's actions to a CBer. When the difference was pointed out to the reporter, he commented "so what." The Winnipeg ARC is engaged in some PR work directed at the general public to correct such misconceptions.  
de VE4HK, The Manitoba Amateur

CLUB PROJECT

Joe Couttemanche, VE3DZT, reports that the Club project to build power supplies now has a quorum of participants. Joe is now shopping and pricing components for one 5-amp and three 10-amp supplies. The group is aiming at having something to show at project night in the fall.

AROUND THE CLUBS

Windsor ARC heard Fred Hammond talk on antique radios, with demo, at the regular meeting.

Kitchener-Waterloo ARC viewed BBC film "When the Chips are Down" at their regular meeting.

Peel ARC holds two meetings each month, one business, one technical, with talk/film at business mt.

Nortwoon ARC (Toronto) holds two meetings each month with films or talks.

SOME THOUGHTS ON QSL CARDS

## A Two Part Series

by John Gilbert, VE3 CXL.

The origins of the QSL card can be traced to the early days of radio communications. The exchange of cards to confirm that two stations had made an actual contact by radio was both a courtesy and a necessity since in those early days some of the QSOs were, to put it mildly, marginal. (To relive those early days, try 80 meter DXing!). These days, most contacts are quite solid with the only exceptions that come to mind being experimental contacts, really marginal DX and the fact that there is a strange breed of amateur extant known as the "pirate". Pirates are operators who would like to fool you into believing that you have, for example just worked Clipperton Island at 12 noon on 80 meters. Needless to say, you and several thousand other hopeful DXers will be frustrated in your efforts to confirm this feat. It is a sad commentary on human nature, but the fact is that pirates will never QSL, and most legitimate stations will, and to a large degree the continuation of the QSL tradition today is because of the need to make this distinction.

QSL cards have several uses, such as decorating the wall of the hamshack, demonstrating to non-amateurs the interesting places we can reach or just simply to keep as a reminder of having worked a very special station (I have one commemorating the inauguration of Jimmy Carter). Eventually, however many amateurs turn to using the cards as proof of contacts for obtaining amateur awards. At this point it becomes painfully clear that cards, envelopes and postage stamps can add up to a considerable cost, especially in the case of the major awards.

Before dealing with the matter of cost, I would like to review the three basic ways of obtaining a QSL card from a DX station. These are:

1. Through the QSL bureau.

This is the cheapest route. As long as you have an envelope on file with the bureau they will send you your cards

when sufficient cards have accumulated to make it worth the postage. You can, of course send your outgoing QSLs through the outgoing QSL services which are provided by CARF, Canad-X or the ARRL.

2. Through a QSL Manager.  
(In the U.S. or Canada)

In this case you send your card, with a self addressed stamped envelope (sase) to another amateur who handles the QSL chores for the DX station.

3. Direct or through a DX QSL manager.

In this case you send your card to the DX station, or to a DX QSL manager either with a sase or, more likely with two international reply coupons (IRCs) if you want to receive a card by air mail.

The choice is really a very simple one of cost versus time. If you send the card via the bureau it can take anything from 12 months to 36 months to see a card in return, but the cost to you per card will be pennies. On the other hand, if you are lucky enough to work a DX station with a Canadian or U.S. QSL manager it will cost you two stamps, two envelopes and the cost of a card or around 45 cents per QSL. If the route is direct, or via a DX QSL manager the cost will be a 35 cent stamp, two IRCs at 45 cents each, two envelopes and a card or around \$1.35 per QSL card. There is a significant gain in time with latter two routes with a reply averaging from 2 to 6 months through a QSL manager and from 2 to 3 months by a direct route.

I think most people would agree with using the bureau route and, where available, the QSL manager route at least in the early stages of working towards an award. However, when an award is within sight of being completed, the pressure to get it over with tends to cloud one's judgement resulting in the use of more direct methods to get quick results. From experience I would judge that for any given DX award the distribution of the three alternatives would be 50% via the bureau, 20% direct or via a DX QSL manager and 30% via Canadian or U.S. QSL Managers. On this basis, and using

the rough costs outlined earlier the cost of two of the leading DX awards would work out as follows:

DXCC (100 Cards) = \$ 43.00

5 Band DXCC (500 Cards) = \$215.00

As far as the North American awards are concerned, the bureau alternative is not always practical and the direct method is more likely. Thus each QSL will cost two stamps, two envelopes and a QSL card or around 45 cents. On this basis the cost of three leading North American awards would be:

Canad-Award (60 Cards) \$27.00

Worked all States ( 50 Cards) \$22.50

5 Band Worked all States  
(250 cards) \$112.50

These costs are, unfortunately underestimated as they do not include some optional costs ( donations to DXpeditions, registered mail and return registered mail to send in the cards etc). Nor do they include the fact that some stations do not send QSL cards resulting in the need to send a second card to another station in a country which has already been worked.

Are there ways of reducing the costs?

One could, I suppose be patient and make better use of the bureau route, but an avid award hunter is not likely to be too patient and is more likely to want to see the results of his efforts before he has forgotten the circumstances of the earlier contacts gained in chasing the award. There is the advantage for the really avid award hunter that many of the cards can be used several times over for different awards (I am still using cards from 25 years ago!) Finally, for the 5 band awards one useful technique is to try to work the same station on more than one band and then send the QSLs in the same envelope. This is quite feasible when a station is being worked in a contest or where a DXpedition is involved. In practice though I doubt if these savings would be very significant.

Is it worth it?

The answer to this question can only be an individual one. Certainly, in my case I have received far more than \$215 worth of fun from chasing after the 5 Band DXCC and the cost is not exorbitant spread over five years and if compared to the costs of other hobbies (flying, golf, etc.). I have some sympathy however for the argument that one has to be reasonably well off to afford to get into award hunting, but then I suppose the same point could be made about our hobby in general..

Are there any options?

There are indeed, and these will be discussed in part 11 of this article..

HF Awards for the Deserving Amateur  
- DXCC.

Brian Summers VE3JKZ

Next to the worked all Continents award WAC, the most popular HF DX award is the ARRL sponsored DX Century Club (DXCC). If you are using ARRL type logbooks, details of the award can be found in the last few pages, but here's a brief rundown.

The basic award is for one hundred countries as defined in the ARRL countries list. The Award is given for all phone, all CW or mixed mode. You can also receive it for 100 countries on RTTY, SSTV and the 160 metre band. The latter are very difficult to achieve. The piece de resistance in the 5 Band DXCC - one hundred countries on each of the 5 main HF bands, which was recently achieved by OARC member John Gilbert VE3 CXL using a TS 520 barefoot and a trap dipole. Stand up and be counted, ye who say that beams and linears are essentials.

After 100 countries you can receive endorsements for additional contracts, multiples of 25. The award is free ( at the moment), but you must belong to ARRL to be eligible. DXCC is one of those awards for which your cards must be sent to the DXCC desk at ARRL for checking. There is a backlog of many weeks, and in my case it was over three months before I got my cards back. During this time you tend to become quite religious. If you

want to know that your cards arrived safely at the DXCC desk, enclose an SASE with them to get a return reply. Remember--Canadian stamps are worthless in the U.S. so if you don't have a US stamp, send an IRC.

Now that we've covered the basics, let's discuss a few specifics. Many amateurs fail to realize that the ARRL definition of a country is far removed from the political one. In practice, this means that places such as Alaska and Hawaii count as separate countries, even though they are part of the United States. Similarly, England, Scotland, Wales, Northern Ireland, the Isle of Man, Jersey and Guernsey count as seven different countries. Look at the listings for the USSR and you will find eighteen different "countries". In the extreme case, there are pieces of rock which are literally under water at high tide which can also count as separate countries--that is why there are 319 on the list!

Once you realize that each of the listings shown in the back of your log book counts as a separate country, you will see that to run up a total of 100 is not too difficult. Work all of North, Central and South America, the Caribbean Islands, most of Europe and the Soviet Republics, mix in a dash of Australia, New Zealand and Japan. Then spice with a little Africa and Oceania and you have done it in only a few months. Expect to wait a little longer to get the QSLs!

A major point of contention in the DX community is the DXCC Honour Roll. If you look at the listings in QST, you will find several amateurs with DXCC totals considerably greater than 319. How come? Simply those amateurs fortunate enough to have worked and confirmed countries prior to their political demise are still credited with them, despite the fact that they no longer exist! This means that the likes of you and I will never displace the top dogs from their Honour Roll Standings because there aren't that many

countries available to work. We must wait until they QSY to that "Great Hamfest in the Sky" before we can hope to replace them at the top of the list.

Many amateurs feel so strongly about this situation that parallel awards similar to the DXCC but which exclude non-existent countries have come into being. CQ Magazine sponsors some of these awards which will be reviewed in the next article in this series.

### EMERGENCY MEASURES ORGANIZATION

#### PRIME COMMUNICATIONS FACILITY

For several years, the local EMO has used the services of a non-amateur group to provide its primary local communications services, aided on a backup basis by the Amateur Radio Emergency Corps as organized by the local Emergency Coordinator. Because of the changing interests of and other matters concerning the non-amateurs, the EMO has decided to enlist the aid of a small group of amateurs to provide their primary communications under EMO control and direction. It must be stressed that there is no intention to supplant existing arrangements of other amateur organizations involved in emergency communications. Rather, it would cooperate with and work alongside fellow amateurs organized by the local EC in the normal manner. This new structure will have the obvious advantage that amateurs will now be working with other hams rather than non-amateur communications groups. In addition, there will now be an amateur radio function directly tied into the EMO support organization.

Initially envisaged as a mobile/portable two meter group, it would provide *official* communications between the emergency site and EMO headquarters and would be issued official Emergency Planning Canada special passes authorizing entry to restricted zones for use in the

event that they had emergency duties to perform in those areas. The group would also provide a VHF link with the COMSONT province-wide H.F. Net which was established by EMO after their own Commercial Frequency side-band net was dismantled.

The group will be thoroughly briefed on new special message procedures of EMO. To some limited degree, but wherever practical, emergency assignments will be made in advance and a rapid contact register of the amateurs involved will be maintained at EMO headquarters. Backup communications will be requested from the local EC and other amateurs in the event of an emergency.

Any amateurs interested in learning more about this activity are invited to contact:

Joe VE3CAT - 824-3905 (evenings)  
593-7737 (days)

Bob VE3KLLK - 729-7536

#### THE OTTAWA COMPUTER GROUP

The Ottawa Computer Group (OCG) general meeting is held at 8:00 PM on the second Monday of each month for the purpose of exchanging computer hobbyist information. Other meetings of interest are the Hardware Meeting held on the second Tuesday, following the General Meeting and the Software Meeting held on the third Tuesday following the General Meeting. All meetings are held at the National Research Council, 100 Sussex Drive, Ottawa.

The present paid membership of 170 members includes many Amateur Radio Operators. The OCG publishes a monthly Newsletter and exchanges newsletters with Computer Clubs throughout Canada and the United States.

The OCG is presently establishing a Computer Bulletin Board Service (CBBS). CBBS is a "dial-in facility"

using a MODEM and terminal in the home to access a central computer sponsored by the OCG for the purpose of leaving, storing and forwarding messages to other club members. Such a facility might be compared to the VHF FM autopatch repeaters presently being used by amateur radio hobbyists. For further information on this activity, write to the Club or contact Norm Rashleigh (VE3DVF) at 837-1733.

Other areas of interest to members are:

- Lessons in basic which are presented at the Software Meetings;
- "Show and Tell" where the hobbyist can share achievements (or blunders!) with other members;
- Guest speakers at the General Meetings;
- Opportunities to purchase parts at significant savings through Club bulk purchasing;
- The opportunity to learn and keep abreast of a fascinating and rapidly changing microprocessor world.

The OCG participates in an annual Computer Fair sponsored by the IEEE and Carleton University.

The membership fee of \$5.00 per year includes a monthly newsletter. For new members, there is a \$5.00 initiation fee. For additional information, write to the Ottawa Computer Group, P.O. Box 5691, Station F OTTAWA, K2C 3M1.

73,

Frank Gushue VE3KHF  
Membership Director,  
Ottawa Computer Group

The OCG is presently establishing a Computer Bulletin Board Service (CBBS). CBBS is a "dial-in facility" DEADLINE for June Groundwave is May 12.

THE OTTAWA AMATEUR RADIO CLUB INC.  
 BOX 8873, OTTAWA, ONTARIO, CANADA  
 K1G 3J2



FIRST CLASS MAIL  
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 : Chairman      VE3PU      Ontario, K2C 2N3      993-1992 :  
 : Custodian &      Gerry Martin      1771 Hufton Ave., Ottawa      751-3220 :  
 : Archivist      VE3CNU      Ontario, K1G 1M1 :  
 : Net Manager      Larry Bradley      1377 Chartrand Ave., Orleans      824-3753 :  
 : & Emerg. Comm.      VE3CRX      Ontario, K1E 1H9      993-3238 :  
 :-----