the Groundwave

March 1971

A PUBLICATION OF
THE OTTAWA AMATEUR RADIO CLUB

GROUNDWAVE is the official bulletin of the Ottawa Amateur Radio Club, a noncommercial association of radio amateurs devoted to the promotion of interest in amateur radio communication and experimentation in the Ottawa regional area, and to the advancement of technical competence and achievement of club members.

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OTTAWA AMATEUR RADIO CLUB EXECUTIVE, 1970-71

Pres:	Larry Emmerson	VE3GGA	883	Dunlevie	728-7307
V.P.:	George Roach	VE3BNO	103	Strathcona	234-0885
Sec:	Dick Bonnycastle	VE3FUA	810	Edgeworth	728-8655
Treas:	Gord Grant	VE3DY	2050	Balharrie	733-4892
Directors:	Jack Bassil	VE3YT	2061	Lenester	722-8457
	Bill Ross	VE3GDW	50	Selkirk	746-4973
	John Morton	VE3ALK	1055	Cameo Dr.	225-2540

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Check into the
Capital City F.M. 2 Meter Net
Time - 2000 hrs. each Monday Evening
Frequency - 146.460 in and 146.940 out
via the VE2CRA Repeater

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CLUB MEETINGS

The Ottawa Amateur Radio Club holds regular meetings on the first Wednesday of each month for the months of September through June. The meetings are normally held at the National Research Council Auditorium, Sussex Drive, Ottawa, Ontario.

Visitors are always welcome so come along and meet the boys and girls.

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Place: National Research Council, Sussex Drive

Date: March 3rd, 1971

Time: 8:00 p.m. Local Time

Program: (a) "Canadian Amateur Radio Federation"
Guest Speaker: Mr. Arthur E. Blick, VE3AHU
President of C.A.R.F.

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(b) Mini Auction for CNIB

(c) Appointment of nomination Committee

(d) Other related Business.

MINUTES OF THE REGULAR MEETING OF THE O.A.R.C.

February 3, 1971

The meeting opened at 8:15 p.m. with the President presenting the DT23 FM transmitter-receivers which the Club has succeeded in purchasing. He told the meeting that there were only two of these currently available but that further equipment would be available at subsequent meetings. He indicated that they would cost $30 and the first two to ask would get them.

The President then spoke briefly on the "SET" which was recently held as an emergency test and sponsored by the ARRL. He pointed out that it has become apparent that the two meter equipment should have been used in the "SET" as it was certainly a very efficient method of moving traffic in Eastern Ontario. It is likely the 2 meter repeaters will be pressed into the emergency nets in the future.

Larry then brought up the subject of the "no code" Ham License which was being proposed by the Canadian Radio Federation. The meeting was informed that the Club Executive was definitely not in favour of a no code license but would like opinions from the meeting. There was some discussion from the floor but generally no strong support of a no code license. It was suggested that there was a lack of ham population and little or no increase in the past few years. This perhaps was a reason to sponsor such a proposal.

It was also announced that the Club owned a large volume of older Ham equipment which the Executive had decided to sell and to purchase some type of compact transceiver which could be used for emergencies and for field day. This equipment will be shown at the next meeting after which the Executive will be prepared to sell it to the person making the best offer.

Ken Watkin, VE3CAL, took on the job of auctioning the various pieces of equipment, in the form of junk, which had been donated to the Club. It became an interesting exercise for Ken as he tried to extract a few cents for this material. In one instance, Vern McCourt bid on some "equipment" and after purchasing it, donated it to a young ham sitting close by. The proceeds were most generous and will go to the CNIB at the end of the season.

The meeting was then presented with another series of ARRL slides on the adjustment of a linear amplifier. This was much more interesting than the previous series on the tour of the ARRL Headquarters. The visitors were welcomed to the Club and assured that the members would be pleased to meet them afterwards.

The Guest Speaker for the evening was Mr. George Roach, VE3BNO, Vice-President of the Club. He spoke on the methods used in Commercial Radio to distribute news from one station to another all across the country. His slides showed the equipment used and how the encoder-decoders were used to trigger a remote recording unit at a distant station.

The meeting was closed at 10:15 p.m. for coffee.

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SIMULATED EMERGENCY TEST 1971 & THE ONTARIO AMATEUR RADIO EMERGENCY CORPS

From: H. Shepherd, VE3DV, SCM Ontario

Early returns point to another successful effort by the Ontario AREC members and their National Traffic System compatriots.

That short sentence puts one of the most important events on an amateur's calendar in its proper perspective as far as the average Ontario amateur is concerned.

Why is it that 95% of all Ontario amateurs fail to participate in The Simulated Emergency Test? Is the timing at fault? Is it lack of publicity? Is it because it is an ARRL sponsored field activity? Does it interfere with an amateur 'doing his own thing'? Is he apprehensive that he might find himself committed to a public service function? Personally I think that the average amateur just doesn't want to get involved and that is not good.

I spoke of the Simulated Emergency Test as being one of the most important events on an amateur's calendar. The other one is Field Day. Both exercises are similar and are designed to test the amateur and his equipment under an emergency environment in order that we can prove to our civil authorities that the Ontario amateur can provide them with a competent, efficient communication system in an emergency.

Is this a worthwhile goal? Is it worth two weekends a year of your time?

Specifically, the SET is designed to exercise the Ontario AREC in the handling of volume traffic using all modes and types of equipment, preferably supplied from an emergency power source.

The Ontario AREC under the direct supervision of the Ontario Section Emergency Coordinator, Mr. Ed W. Doyle, VE3EWD, Tecumseh, and supported by a number of Emergency Coordinators with responsibility for organizing an amateur radio communication system within their county. They in turn are supported by Assistant Emergencies Coordinators in the various communities within the county. Bolstering the Ontario AREC by providing it with a long-haul traffic capability are the Ontario Section Nets (i) The Grey-Bruce Net (GBN) 3645 KHz. (ii) The Ontario-Quebec Net (OQN) 3535 KHz. (iii) The Ontario Phone Net (OPN) 3770 KHz. (iv) The Eastern Canada (Region) Net 3540 KHz providing entre to the Eastern Area Net (EAN) 3670 KHz and the rest of Canada and the United States.

This then is the exercise and the organization that we have built up to do the job. Is it working? Can I go to the civil authorities and offer them a first class communication system as a backup to exising communications networks? The truth is a very qualified 'perhaps, if the emergency exists in an area that we have proper coverage.' Only about six counties are adequately organized and supported in the whole province! Not a very good record for a group of people whose very existence depends, in great measure, on our ability to serve the public in an emergency.

Obviously, the present organization, and its members, is doing only part of the job but, before we start tearing anything down let's review our present setup and see if we can't put a finger on some possible problem areas.

THE EMERGENCY COORDINATOR

The key-man in the AREC, he must be a combination administrator, public relations man and an active amateur preferably with a solid background in traffic handling. (And in that order of precedence too.) The Ontario ECs have county or district responsibility, notwithstanding that some of these counties have a number of large cities and towns within their boundaries.

Are we asking too much of one man? Is it fair to ask one person to maintain personal contact with all officials of agencies within his county which his AREC group hopes to serve in an emergency? By reducing his area of responsibility to a single city or town or village would we end up with a better system or a more disjointed one?

Certainly, it could be argued, it would make his job easier if he only had responsibility for his own community, but this would mean a greater number of ECs with a greater need for intimate liaison with adjacent communities. Total coordination at the provincial level would be more complex and therefore most difficult to achieve. Should we cover the major population centres first and let the smaller places uncovered?

THE ASSISTANT EMERGENCY COORDINATOR

Designated by the EC to supervise special activities groups i.e., mobiles, VHF, etc., or other cities, towns or communities within the county. The A/EC must have a lot of the qualities required of an EC and is therefore a very important link in the organization chain.

Do the ECs need more A/ECs? The answer is a resounding 'YES', but are the ECs looking hard enough? What about incentives to become an A/EC? Could we do more?

THE AREC MEMBER

The requirement to become a member of the AREC is very simple--you must be a licensed amateur. While the possession of emergency powered equipment is desirable it is not a requirement. No problem here but why does Ontario lag in active AREC members?

Certainly, none can deny the need for the AREC with our newspapers full of the events of the recent California earthquake. The organization is fluid and we know that it can and does work. Membership requirements are no hindrance. So what do you think is wrong? Are we prepared to relinquish our historical image in the emergency field without a fight? I hope not!

Now what can we do to improve our membership in the AREC? How shall we tackle the job of securing qualified ECs and A/ECs? Publicity should help but it must be regularly reinforced by the whole hearted support of every Ontario Amateur Radio Club Executive by guest speakers and by articles of interest in their bulletins. Regardless of affiliation the ARCs are the backbone of amateur radio in Ontario and only their sponsorship of the AREC will give us the first class backup communications system we are seeking.

As for our present ECs and A/ECs, how do you feel about some of the points I have raised? I know you are dedicated or you would not have volunteered your talents and equipment to the cause. What are your views and suggestions?

I think the AREC (or whatever you wish to name it) is important to ham radio and I hope you do too. Important enough to write me and let me know your feelings on the subject. 73

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C A R F

8 February 1971

CARF BULLETIN #1/1971

Gentlemen:

Two recent releases from the Department of Communications are enclosed. One deals with changes in the "Banned Country List" giving welcome news that BURUNDI is now off this list and the other gives the full text of the revised guidelines pertaining to Amateur radio automatic repeater stations.

Note particularly that the revised guidelines detail almost exactly those suggested by your Federation and submissions from Canadian Amateur radio VHF repeater groups. In particular, the originally proposed guidelines re original licencing by clubs, no use of phone patches by stations working through repeaters and no access by "foreign" Amateurs have been removed. Full credit must be given to the officials of the Department for not acceeding to the initial requests made for changes but allowing the Amateurs of our country to express opinions before making any revision. Credit must also be given to those groups who, along with the Federation, took the necessary time and trouble to send in their comments on the proposed guidelines.

Please publish and publicise the contents of the enclosed letters as wide as possible and would appreciate credit given to CARF for the bulletin.

vy 73,

(Signed: Arthur E. Blick, VE3AHU)
President

P.O. Box 204
AMHERST VIEW
Ontario

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INTERIM LICENSING POLICY - AMATEUR AUTOMATIC REPEATERS

1. General

As a result of a review of policy concerning the operation of repeaters in the amateur experimental service including point-to-point tandem operation, it was decided to permit the development of such repeater systems on a trial basis with the object of developing a firm policy at a later date. On the basis of experience and comments received to date and pending their incorporation into the regulations, the interim guidelines are revised to read as follows.

2. Definition

1) An amateur automatic repeater is a station in the amateur experimental service providing for the automatic reception and retransmission of amateur radiocommunications.

2) For the purposes of these guidelines, the term amateur automatic repeater refers to "terrestrial" repeaters only and does not include "satellite" repeaters or "remotely controlled base stations".

3. Responsibility of the licensee

1) Responsibility for the technical operation of an amateur automatic repeater lies with the licensee and shall include the maintenance of a technical log showing malfunctions, servicing and on-the-air tests, etc.

2) For purposes of continuity of operation and maintenance of more effective control over the repeater, the licensee may, in consultation with the local Telecommunications Regulation office, designate not more than three qualified persons to share with him the responsibility of controlling the amateur automatic repeater.

3) The licensee, or persons so designated by him, shall provide a means to automatically disable any repeater transmitter, regardless of frequency, when on-the-air time exceeds five minutes and shall be responsible for its reactivation by physical or remote control means.

4) Unless specifically authorized by the Department of Communications, the licensee of the amateur automatic repeater shall not permit the repeater to be used for the delivery of traffic to or the acceptance of traffic from external points by means other than radio.

5) Amateur automatic repeaters may be controlled by means other than radio where it is practical to do so.

4. Identification

1) All emissions from amateur automatic repeaters on 50 - 54 Mc/s or 144 - 148 Mc/s shall be identified by a keyed tone transmission of the station call sign at reduced amplitude at intervals not exceeding two minutes. Such identification is not required on point-to-point circuits between repeaters (above 220 Mc/s).

2) Users of the repeater shall continue to identify their respective stations in the usual manner.

5. Frequency Bands Available

1) Amateur automatic repeaters shall transmit in the 50 - 54 Mc/s or higher frequency amateur bands.

2) Remote control emissions shall be within the 50 - 54 Mc/s or higher bands.

3) Point-to-point circuits between repeaters shall use the frequency bands 220 - 225 Mc/s, 420 - 450 Mc/s or higher frequency bands.

6. The Department of Communications will apply these guidelines to all automatic repeaters authorized after February 1, 1971 but will exercise discretion in applying them to repeaters authorized before that date.

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ANTENNAS

as seen by Doug Blakeslee

A very interesting and informative meeting was held at the Bell Northern Development Laboratory at Crystal Bay on January 26th last. The Guest Speaker was Doug Blakeslee from the ARRL Headquarters who spoke on antennas and the facts and fantasies surrounding them. Doug is well qualified to speak on the subject as he is an Assistant Editor of QST and an experienced amateur experimenter.

Doug gave a verbal and picture tour of ARRL Headquarters before he began his lecture on antennas and showed how the ARRL labs check out their projects before they are printed.

The following is an extract from a recording of Doug's lecture in Ottawa and it will appear in a series of articles on each type of antenna he spoke about.

Inverted "V"

The first antenna we want to talk about is the Inverted "V". This is an interesting antenna because there is a lot of folk lore connected with it that is not necessarily true. The first thing you have to accept on the Inverted "V" is that it is less efficient than either a vertical or horizontal dipole. As a rule of thumb, it is usually down 1 - 1½ db. That's what you loose by bending the ends down. This doesn't mean that 1½ db on 80 meters is going to make much difference and if this is the only way you can put up an antenna you must do so. The other thing about an Inverted "V" is that it is down in both the horizontal and vertical patterns. There has been a lot of folk lore around about an Inverted "V" being a great DX antenna but there is no factual basis for that statement as it has less vertical radiation than a standard horizontal dipole. It is omnidirectional but this is true only if the elements are longer than a dipole. When the length is a wavelength it then becomes unidirectional and is known as a quadrant antenna.

In general you can run almost any angle, but the optimum seems to be 2/10 to a full wavelength above ground at the centre with an angle at the centre of 110°. What the impedence will run depends a lot on what metal it is near and how high it is above ground, but 30 ohms to 80 ohms is the usual range. Where there is a very severe bend the impedence can get down as low as 15 ohms and therefore matching it, on occasion, can be a little tricky and using tuned feeders isn't a bad idea if you can't predict ahead of time what your antenna impedence is going to be. A 50 ohm coax is usually a pretty good compromise if you are going to use it on a single band.

Groundplane

The next antenna which is very popular, especially with those working DX on the low bands, is the Groundplane. Its proper name is a monopole and it is half of a dipole worked against a ground screen. To have a proper ground screen would require a flat sheet of metal about 10 wavelengths in every direction. Obviously that is a little tough to do unless you have an airport hanger with a metal roof. So the average ham is left with putting up some radials.

Most of the antenna manufacturers who make vertical antennas will

tell you that 4 radials are sufficient, well believe me, 4 radials are not enough. 4 radials would cause the ground impedence to be higher than the vertical, about 30 ohms, thus creating a very inefficient radiation system. Most of your power would not be going out the radiating part of the antenna where you want it.

It can be stated that 12 radials are considered to be about a minimum but now the question is what kind of radials? The radials must be at least one third of a wavelength long and generally it is better to have a lot of short radials around the base of the antenna where the current is high than to have 1 or 2 very long ones.

If one has a proper type of bridge, one can have some fun measuring the S.W.R. on the radials. One of the problems with radials is that you want them to handle high currents but not send it back to you. One very good trick which Siemans do is to take 8 or 10 ground rods and make a star arrangement at the very end of each radial thus causing a very high lose from the radials. They find that the current you pump down these radials won't come back to you. They use radials which are about ½ a wavelength long.

One measure of radial efficiency is to put a small toroid core on the top end of the radial and see what your forward and reflected components look like.

If you are going to use a vertical on a single band then use a folded dipole type and, incidently, this for some reason is called a monopole by hams, which of course is not correct. The folded dipole type brings the impedence of the base up and is much easier to feed thereby improving the overall efficiency of the antenna.

Recently a leading magazine published a vertical which they claimed worked like a corner reflector to give a 14 - 25 db gain. It had a quarter wave element in the centre with a half-wave square box on the back to reflect the signal. If you wish to see that the claims are impossible all one has to do is turn it up and you have a vertical sitting on a slightly inclined groundplane, giving no gain. It is doubtful if this antenna was ever built and tested but rather something designed on paper. He probably read about 400 - 500 MHz corner reflectors and how they could provide gain and designed one for 20 to 10 meters on paper. It is obvious that a mite larger reflector than ½ wavelength would be needed to have any gain at all. The reflector would have to be a tremendous and impractical size.

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NOTICE

The Ottawa Valley Mobile Radio Club Inc. invites hams to participate in the Pot Hole Net on 3760 kHz at 10:00 EST each Saturday and Sunday morning.

The Saturday net features the very popular Swap Service where you may list equipment which you wish to sell or trade. All equipment is listed for a period of one month and those wishing to make use of the service should contact Ed Morgan, VE3GX, telephone 733-1721 or for those living beyond the Ottawa telephone exchange contact Ed on the air on 3760 kHz or on 146.940 MHz.

The Swap service is also featured on the Capital City 2 Meter Net on Monday evenings at 8 p.m. local time via the VE2CRA repeater. These nets also provide a "wanted" service for those who are looking for equipment and so the next time you want some gear try the Net Services and call Ed Morgan.

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DX TOPICS

by R. John Athey, VE3CTX

Who are the best DX'ers in Canada? According to the latest DX Century Club standings, the top twenty practitioners of the art break down by province as follows: one VE1, four VE2's, eleven VE3's and one each from VE4, 5, 6 and 7. The list looks a bit lop-sided in favour of the Ontario boys, even taking into account the ham population in the various provinces. However before the VE3 operators get swollen heads note that all of the Quebec contingent are in the five positions. Is Quebec a better DX location or bilingualism an aid to country collecting?

In the phone only section, a distinguished member of the O.A.R.C., namely Hal VE3QA, still holds a substantial lead for the number one spot in Canada. It takes a confirmed country score of about 270 to make the twentieth place in the mixed Phone/C.W. category and 240 for the Phone only. The DX standards are rising.

On the DX scene for January the welcome appearance of the Laccadive Islands two hundred miles from India provided excitement after an otherwise dull winter. This one was not easy to work due to unfavorable propagation to this area. A long path opening between 1200 and 1330 proved difficult for most VE's. Better was the short path at lunch time when VU5KV listened on or near his own frequency. Most North Americans missed the brief polar opening at about 2230 G.M.T. which lasted about fifteen minutes, maybe because European/South American QRM was severe at this time.

Generally conditions are improving especially on 14 MHz which is staying open longer in the evenings now, a sign of things to come.

DX for the month included the stations listed below.

14 MHz SSB

VU5KV	Laccadive Is.	14.195 at 2235 GMT	QSL to P.O. 3031 New Delhi
ZE6JP	Rhodesia	14.158 at 1847 "	Harry in Salisbury
5H3MV	Tanganyika	14.189 at 2052 "	Gordon. Cards via VE7SE
JW5NM	Svalbard	14.193 at 2310 "	QSL to LA7RB
ET3DS	Ethiopia	14.180 at 2359 "	Dave
9F3USA	"	14.193 at 0024 "	John in Asmara, QSL VE3IG
9NIMM	Nepal	14.220 at 0150 "	
KJ6CF	Johnston Is.	14.302 at 0410 "	
KC4USP	Antarctica	14.300 at 0152 "	
ZD8CS	Ascension Is.	14.217 at 2227 "	Keith QSL's go to KIBTD

21 MHz SSB

9J2WR	Zambia	21.270 at 2000 "	
9Q5EA	Rep. Congo	21.283 at 2015 "	

28 MHz SSB

FY7AE	Fr. Guiana	28.555 at 1800 "	Cesar, P.O. Box 496, Kourou
MIB	San Marino	28.560 at 1610 "	

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AMENDMENT OF THE O.A.R.C. CONSTITUTION

The Executive of the Ottawa Amateur Radio Club proposes a change in the Constitution, Article VI, paragraph 3, regarding a Meeting Quorum.

The present Article VI, paragraph 3, reads as follows:

"A quorum will be present at any meeting of members that is attended by at least forty Full Members."

It is proposed that this paragraph be revised to read as follows:

"A quorum will be present at any meeting of members that is attended by at least twenty-five Full Members."

This change is proposed in order to avoid problems due to low attendance at some meetings, for example, at the June 1970 meeting it was not possible to elect the Executive because there were less than the quorum of Full Members present.

In accordance with the Constitution, Article XII, this proposed amendment is published in order to meet the 14 day notice requirement.

It will be considered at the April meeting, so bring your your friends and vote at least twice thereby ensuring the 40 Full Member requirement.

Secretary,
Dick Bonnycastle, VE3FUA.

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HEATHKIT

Now available

The new HM-102 RF Power Meter and SWR Bridge priced at $39.95. The HM 102 replaces the HM-15 SWR bridge which has been discontinued and is no longer available.

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The new HW-101 transceiver priced at $359.95. The HW-101 replaces the HW-100 which is now discontinued.

Please note that the Jackson Ball Dial Drive used in the HW-101 cannot be easily adapted for use in the HW-100

.....

NOW DISCONTINUED

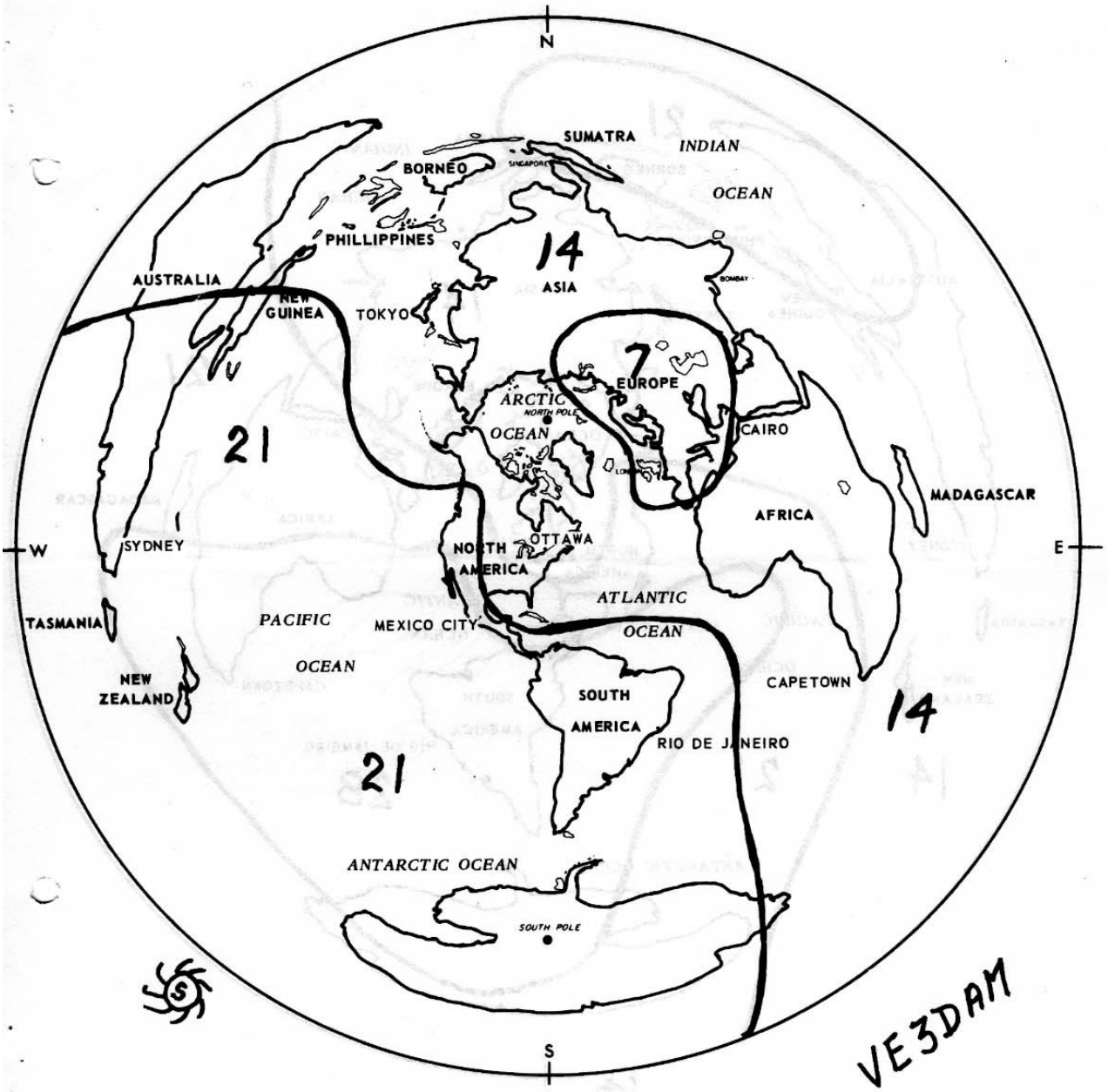
The HM-15 replaced by the HM-102
The HW-100 replaced by the HW-101
The HM-10A Tunnel dipper - No replacement.

HEATH COMPANY
A division of Schlumberger Canada Limited.
MISSISSAUGA ONTARIO.

0000 GMT - MARCH - 1971

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD

(POLE OF PROJECTION AT OTTAWA)



VE3DAM

Scale of kilometers

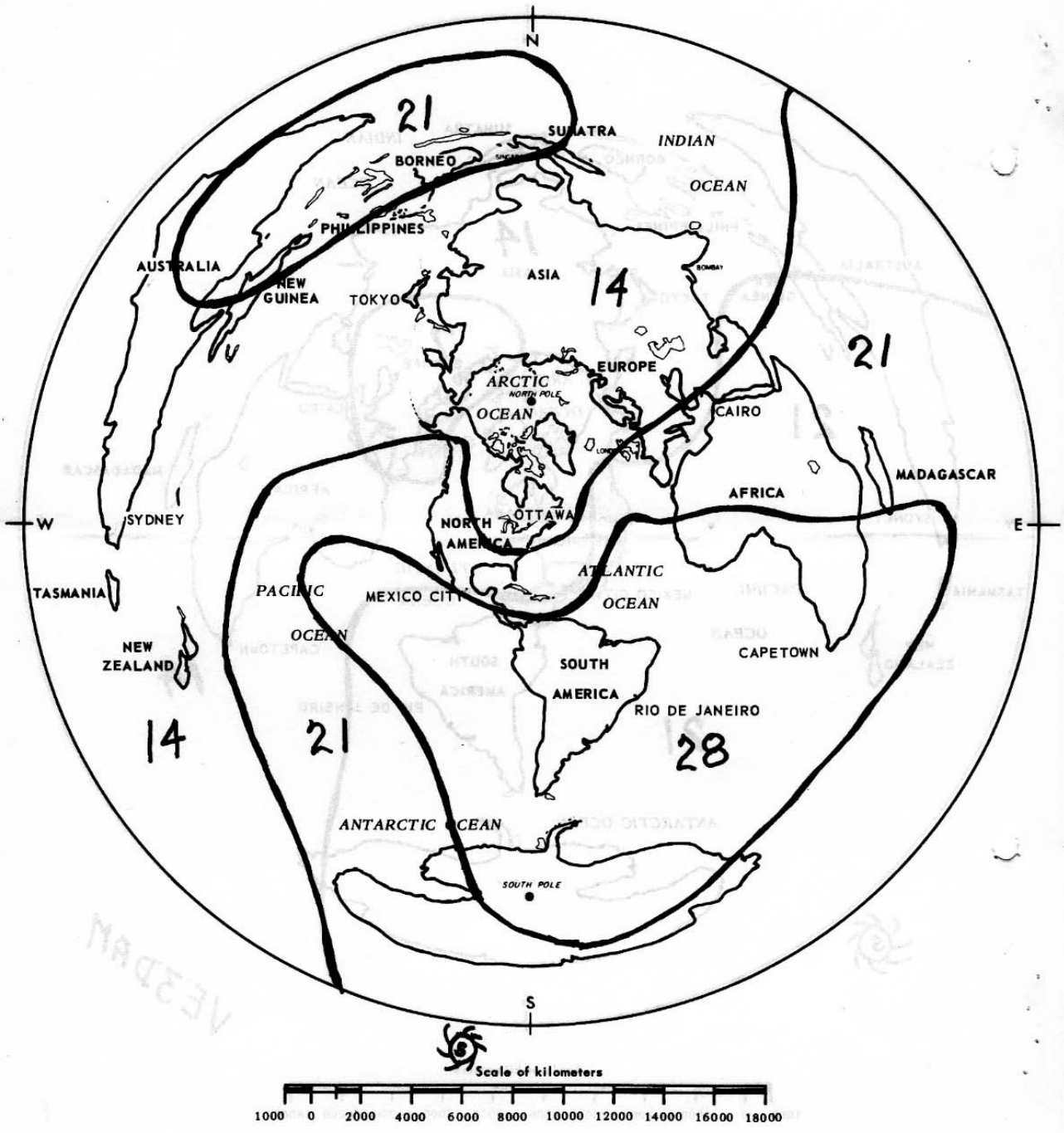
1000 0 2000 4000 6000 8000 10000 12000 14000 16000 18000

1900 EST

1800 GMT - MARCH - 1971

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD

(POLE OF PROJECTION AT OTTAWA)

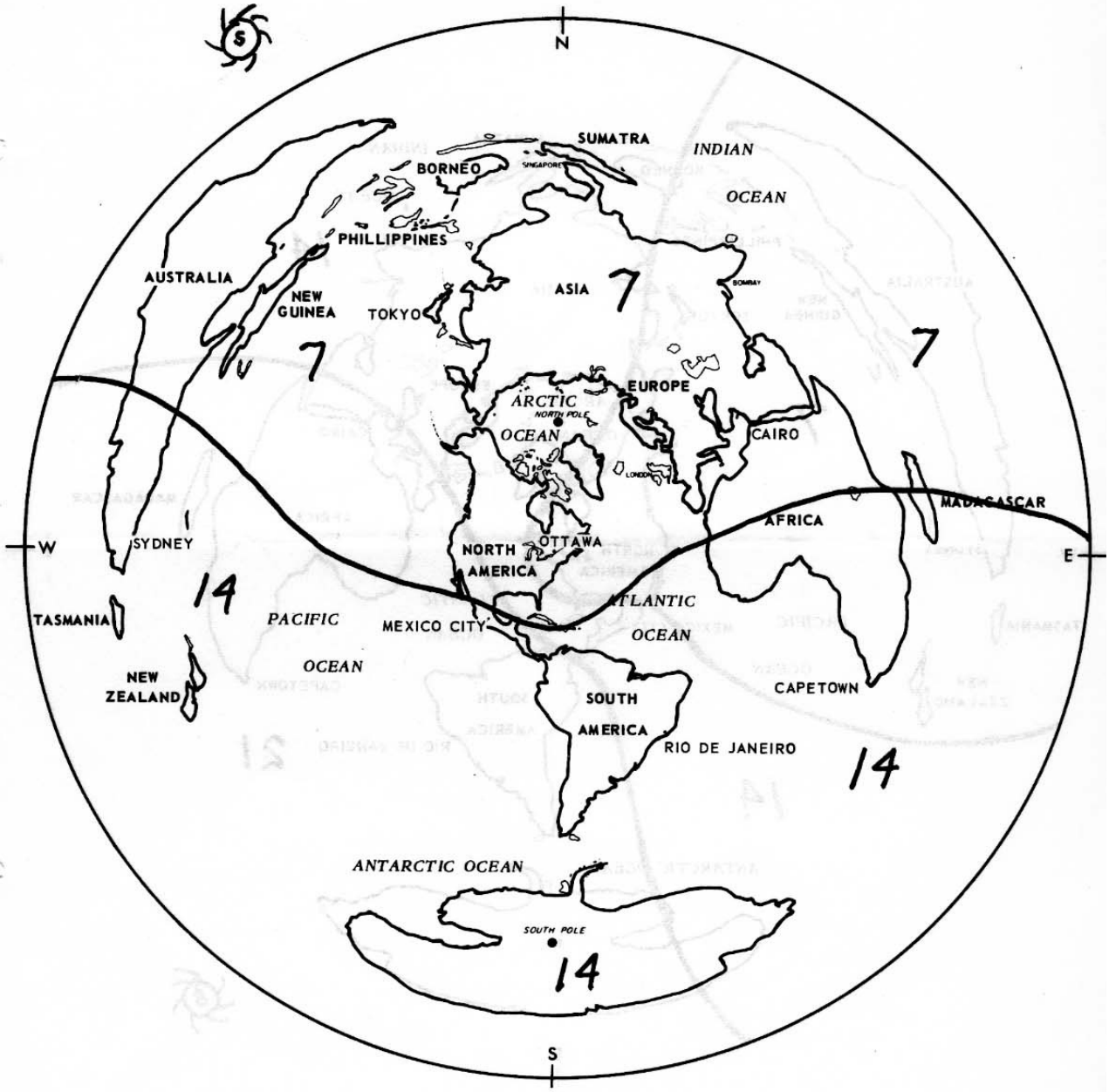


1300 EST

0600 GMT - MARCH - 1971

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD

(POLE OF PROJECTION AT OTTAWA)



Scale of kilometers

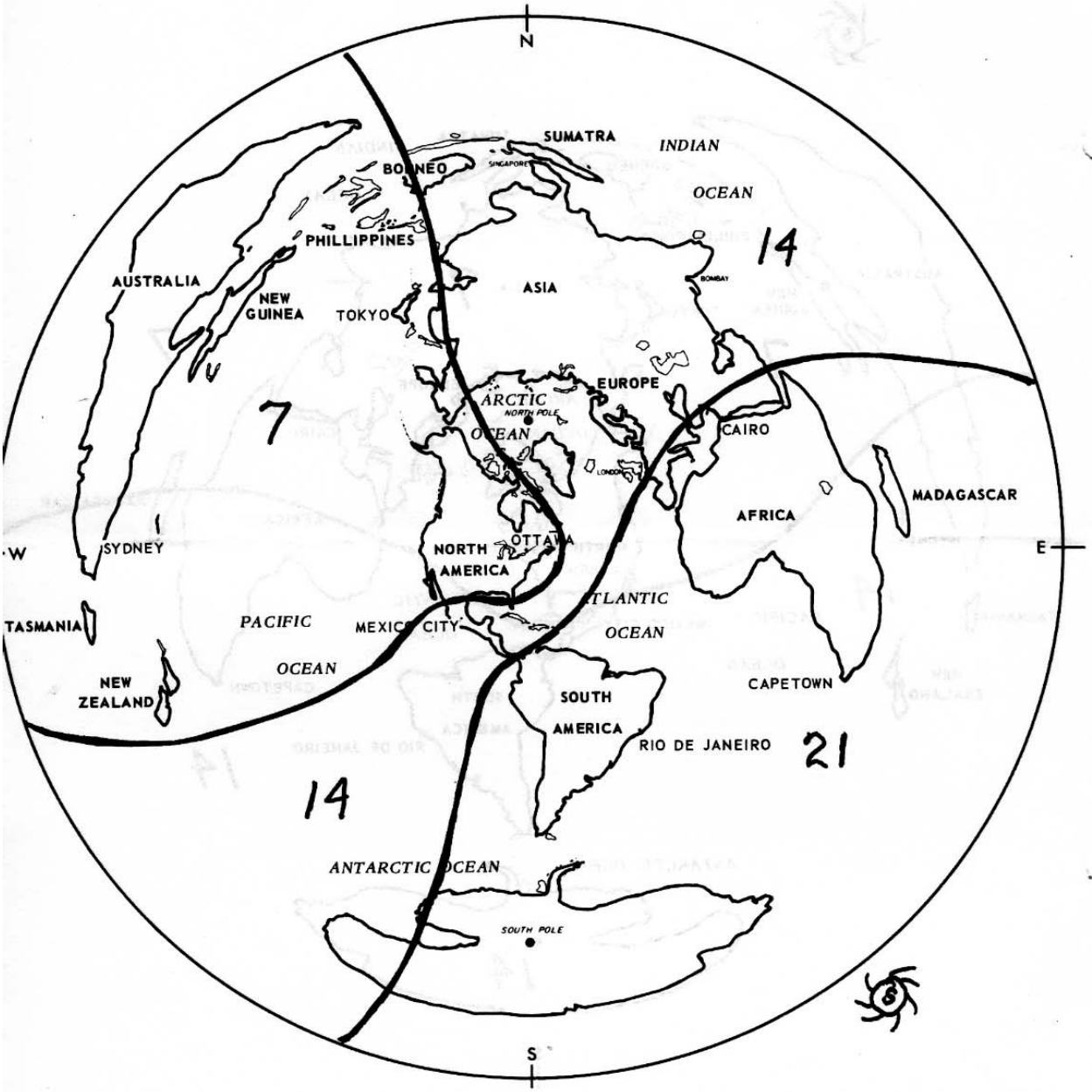
1000 0 2000 4000 6000 8000 10000 12000 14000 16000 18000

0100 EST

1200 GMT - MARCH - 1971

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD

(POLE OF PROJECTION AT OTTAWA)



Scale of kilometers

1000 0 2000 4000 6000 8000 10000 12000 14000 16000 18000

0700 EST

OTTAWA AMATEUR RADIO CLUB

MEMBERSHIP LIST - 1970/71 (Alphabetical)

CALL	NAME	ADDRESS	TEL.NO.
VE3EQH	ACTON, George	479 Pleasant Park, Ottawa 8	733-1865
VE3DIY	ALEXANDER, J.E.	R.R. #2, Almonte, Ontario	
WB2ERK	ALTER, Richard J. (Rich)	R.R. #4, Box 10, Potsdam, N.Y.	315-265-5811
VE3CNM	ARCHER, R.H. (Ron)	1290 Firestone Cr., Ottawa 5	828-5834
			Bus. 728-3745
VE3CTX	ATHEY, John	973 Drew Ave., Ottawa 8	731-8047
VE3AZF	BARKER, J.R. (Ross)	2144 Delmar Dr., Ottawa 8	733-1525
			Bus. 239-2938
	BARTELS, Ernst	1124 Meadowlands Dr.E.,	224-0437
		Apt. 318, Ottawa 5	Bus. 224-7922
VE3YT	BASSIL, J.R. (Jack)	2061 Lenester Ave., Ottawa 13	722-8457
VE3BI	BAXTER, A.M. (Art)	23 South Park Dr., Ottawa 15	824-3614
			Bus. 997-8078
	BEATON, Dan	17 Scotia Place, Ottawa 1	232-3380
VE3DQP	BEATON, W.D. (Bill)	79 Meadowlands Dr., W., Ott. 5	224-1789
VE3GFI	BEDAL, Keith	125 Ridgefield Cr., Ottawa 6	828-1870
	BELL, John	3370 Clearwater Cr., Ottawa 10	828-1319
VE3SH	BEST, Bernard A.	1 Crownhill St., Ottawa 9	745-3151
	BIGRAS, Gilles	17 Aline St., Gatineau Pt., Que.	771-0020
			Bus. 239-2517
	BLACK, Bill	P.O. Box 31, Shawville, Que.	813-647-2298
			Bus. 813-647-2762
VE3DOE	BLAIS, David	2186B St. Laurent Blvd., Ott. 8	731-4303
			Bus. 733-2040
VE2SY	BONHOMME, L. (Lionel)	22 Cinq-Mars, Hull, Quebec	771-3386
VE3FUA	BONNYCASTLE, R. (Dick)	810 Edgeworth Ave., Apt. 705, Ottawa 14	728-8655
VE3YA	BOURNE, Bruce E.	1936 Hais Dr., Ottawa 8	733-4836
			Bus. 993-2559
VE3CAZ	BOYD, Carle E.	985 Mountain View Ave., Ott. 14	729-5512
VE3EZD	BREESE, Mrs. Margaret (Peggy)	8 Ash Street, Ottawa 6	828-0213
	BROOKS, Peter	3539 Revelstoke Dr., Ottawa 10	731-3233
	BROWN, Bob	R.R. #2, Greely, Ontario	821-2235
VE3FXI	BRUCE, D. (Dwayne)	797 Raglan Ave., Ottawa 8	733-1651
	BRYAN, Michael (Mike)	830 Canterbury Ave., Apt. 210,	737-4852
		Ottawa 8 Ext. 245,	Bus. 236-7511
VE3CDC	BURRILL, D.R. (Doug)	151 Fanshaw Ave., Ottawa 8	733-7108
			Bus. 992-8001
VE3BFW	CABLE, Fred	Box 126, R.R. #2, Ottawa	825-1330
			Bus. 725-2041
VE3AWF	CAHILL, D.J. (Dillon)	330 Driveway, Ottawa 1	236-3526
VE3FFC	CAVE, Leo. V.	1516 Caledon St., Ottawa 8	731-3449
	CHAPMAN, C.E.	2244 Kipling St., Ottawa 8	731-6172
	CHIASSON, J. (Jacques)	2045 Valley Dr., Ottawa 8	731-4126
VE2ZM	CHISOLM, S.T. (Steve)	142 Sherbrooke St., Beaconsfield, Quebec	
	CHOMA, Christine	751 Parkdale Ave., Apt. 306, Ottawa 3	728-0122
VE3DRX	COCHRANE, S.B.	1983 Olympis Cr., Ottawa 8	733-0264
			Bus. 992-0741
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			Bus. 225-3626
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VE3GBG	COVINGTON, Mrs. Charlotte	269 Pleasant Park Rd., Ottawa 8	733-6598
VE3GI	COY, B.A. (Burt)	Box 160, R.R. #3, Manotick, Ont.	692-3135
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VE3FJI	CRAMPTON, Daniel	P.O. Box 2, Altamont, Manitoba	
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VE3CJD	CROSBY, E.L. (Ed)	569 Eastvale Dr., Ottawa 9	749-4350
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	CRUISE, Stanley	278 Currell Ave., Ottawa 3	729-1739
	CYBANSKI, John	2640 Colman Ave., Ottawa 3	
VE3DEP	CYR, V.F. (Victor)	1969 Belcourt Blvd., Box 2515, Orleans, Ontario.	824-1204
			Bus. 993-2559
VE3ARJ	DAGENAIS, D. (Ray)	14 Petty St., Ottawa 12	825-1920
			Bus. 232-5706
	DANIELSON, Gordon A.	813 Quinlan Rd., Ottawa 8	731-6551
VE3YQ	DAVIES, J.V. (Joe)	1674 Gage Cr., Ottawa 5	722-6267
			Bus. 992-6763
VE3DRV	DEAN, Jim	1752 Laxton Cr., Ottawa 5	722-0422
	DEEKS, Carol	47 Hopewell Ave, Ottawa 1	233-2719
	DESMOND, John	35 Woodridge Cr., Apt. 307, Ottawa 14	828-0082
		Bus.:	Ext. 329, 836-3200
VE3GLQ	DORMER, R.E.W. (Bob)	2073 Maywood St., Ottawa 8	731-5641
			Bus. 239-5362
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	DRAKE, Ron	186F Woodridge Cr., Ottawa 14	
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	DUMAIS, Daniel	55 Russell Ave., Ottawa 2	233-8870
VE3GGQ	DUNCAN, E. (Ted)	1374 Viking Dr., Ottawa 10	822-6428
VE3CJ	EATON, Noel B.	Box 660, Waterdown, Ontario	
	EBSEN, Peter	90 Woodridge Cres., Apt. 110, Ottawa 14	
VE3GGA	EMMERSON, L.W. (Larry)	883 Dunlevie Ave., Ottawa 13	728-7307
			Bus. 992-3354
VE3LM	EON, L. Guy	2262 Highway 16, Ottawa 12	825-1707
			Bus. 992-5323
VE3BHW	ERWIN, Jack	281 Dufferin Ave., Belleville, Ontario	613-968-7003
VE3BYX	EVERSON, Carl	Box 4, Osgoode, Ontario	613-826-2426
VE3AOE	EWERT, A.G. (Arlyn)	664 Glenhurst St., Ottawa 9	745-9221
			Bus. 993-2069
	FINN, Joe	1168 Sherman Dr., Ottawa 5	225-2505
	FREEMAN, J.	35 Laurentide Rd., Ottawa 6	828-7423
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			Bus. 996-2037
	GETCHELL, W.	35 Woodridge Cr., Apt. 311, Ottawa 14	828-0286
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	GILLIES, R.	236 Fourth Ave., Ottawa 1	235-8669
			Bus. 725-4676
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VE3ADC	GRAINGER, G.E. (Mike)	588 Donald St., Ottawa 7	729-2984
VE3DY	GRANT, G.A. (Gordon)	2050 Balharrie Ave., Ottawa 8	733-4892

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			Bus. 829-1800
	GRUNDY, H.T.	208 Faraday St., Ottawa 3	722-6693
			Bus. 992-7478
	GRYNDAHL, Irene	90 Woodridge Cr., Apt. 312,	829-4736
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	HAMILTON, J.O.	128 Osgoode St., Ottawa 2	232-9110
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	HARDY, B.A.	30 Monteray Dr., Ottawa 6	829-4160
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VE3GSA	PARKES, D.R. (Dave)	743 Canterbury Ave., Ottawa 8	733-0053
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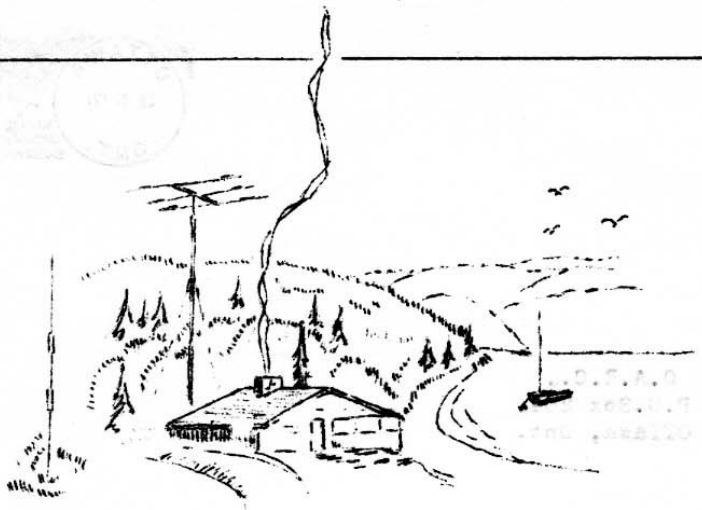

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