

# the canadian amateur

February 1978

No. 2

## Equipment Tariff under study

The perennial question of duties on Amateur equipment will at last be receiving official action. The Tariff Board will be conducting a study on the present Customs Tariff on "Antiques, Collectibles and Hobby Equipment". This study will recommend definitions, for tariff purposes, of terms such as "hobby equipment" and may also recommend new rates of duty to the Minister of Finance.

The text of the Minister's letter of reference to the Board included the following important information:

"I have received numerous representations in recent years for the duty-free entry of a number of products which are of special interest to collectors and hobbyists. For example, representations

Continued on Page 17

## Troubles ahead?

Two factors appearing on the radio scene are going to affect the future development of radio communication.

The first is the upcoming WARC '79 and the re-allocation of frequencies and the other factor looming larger and larger on the horizon is an old one ... radio frequency interference, which as time goes on will probably have more and more impact on telecommunications than WARC '79.

The problem extends far beyond the odd unfortunate splatter on a neighbour's TV or disembodied voice calling "CQ" emanating from the local church organ. As electronic technology takes off in an exponential upward curve and more and more devices are hitting the market that are susceptible to the ever increasing sources of radio interference, steps are going to have to be taken by industry and government to meet the situation.

Continued on Page 12

Ready to work the AMSAT-OSCAR D spacecraft? See Page 41 for details on the new satellite.



# AMSAT

# CARF the canadian amateur

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Editor:  
VE3CDC Doug Burrill

Publisher:  
Steve Campbell

The Canadian Amateur is the official monthly publication of the Canadian Amateur Radio Federation, Inc. It is distributed to members and is available to others for \$7.00 per year. The Federation is incorporated and operates under a federal charter, with the following objectives:

1. To act as a coordinating body for Amateur radio organizations in Canada;
2. To act as a liaison agency between its members and other Amateur organizations in Canada and other countries;
3. To act as a liaison and advisory agency between its members and the Department of Communications;
4. To promote the interests of Amateur radio operators through a program of technical and general education in Amateur matters.

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(If you want to contact the Federation, write or call a Director in your region or write to CARF, Box 356, Kingston, Ont. K7L 4W2.)

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Any club wishing to become an Affiliate Member of CARF should submit the names and call signs of five or more club members who are CARF members.

Affiliation includes free, a subscription to the CARF News Service bulletins, the CARF News Release service, and use of the CARF Out-going QSL service for the club station. (A club subscription to The Canadian Amateur is available for \$7.00 per year.)

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# CARF at CSA EMI meeting

The Canadian Standards Association committee dealing with interference to electronic home entertainment committee met in Toronto on January 26. Your Federation representative, Barc Dowden VE3TT, was present and reported that the committee plans to take more vigorous action than has characterized its progress in the past.

A working group has been set up to re-vamp the terms of reference with accent on planning for some standard of performance for rejection of radio interference by home entertainment equipment.

The Canadian Radio Technical Planning Board committee working on interference problems as a whole will meet in Toronto on February 15. Barc also represents CARF on that committee.

CARF has established a national EMI (interference) committee. Chairman is Barc Dowden. First member to be recruited is VE3EKA, Bill Westbrook. Barc is looking for contacts with provincial EMI and club EMI committees. The objective is to provide, on a national basis, a clearing-house or information centre on EMI as it affects Amateurs and to make it available to them or to individuals where the situation warrants it.

## PLEASE DON'T SHOOT THE EDITOR!

The increase in size of the January issue was not without its problems; here are a few errors that escaped us during production:

On page 4, the call sign of the author of Chain Reaction Classes is VE3AHN; on page 37, for 22 MHz read 220 MHz; on page 45, note that the Advanced Certificate Study Guide is available now for \$4.00. The credit for our cover feature, Arctic Adventure, goes to Harry Beardsell VE7ZQ and Dave Bennett VE7AXG; Regrets! -- two inadvertent omissions -- in the Symposium story, the Calgary ARC was missed in the list of those represented, as was a paper from BCARA President Peter Dreissen VE7BBQ.

The CARF National QSL Bureau address is P.O. Box 66, Islington, Ont. M9A 4X1.

## Warning—

With the advent of electronic gadgets in automobiles, Amateurs should note that electronic cruise controls have been reported as being susceptible to mobile radio transmissions. One such device set at 55 mph, upon receiving interference from a passing mobile took off and was running the car up to 85 mph before it was overridden.

Electronic fuel injection systems are also malfunctioning in the presence of mobile transmissions. One member remarks his product develops the staggers when he hits the two metre button and another one reports his motor quits when he fires up the FT-101 on twenty metres. Owners of fancy vehicles with electronic anti-skid controls should test out the effect of their transmitters on that device.

## SONRA remembers

### Marconi

A group from the Society of Newfoundland Radio Amateurs observed the 75th Anniversary of the first Trans-Atlantic two-way radio contact by Marconi in January, 1903.

Using the special call VO1CC, the group led by John Walsh VO1MR and Eric Salter VO1IM set up a station on Signal Hill in St. John's. They contacted more than 1300 stations using CW, Sideband and Slow-Scan Television.

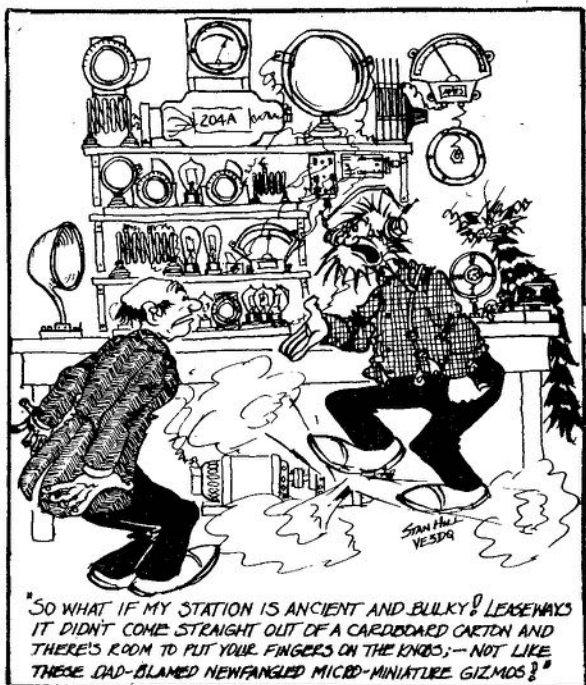
All contacts will receive a special QSL card and some material about St. John's and its famous Signal Hill.

## Words to the wise

A recent Canadian Press story noted that Toronto police have laid 126 charges under the new anti-'Fuzzbuster' provision (Police Radar Detectors) of the Highway Act. Fines for drivers convicted are between \$50 and \$500. Ottawa police have also laid several charges.

Another story, datelined Montreal, told of the mistaken arrest of a young man when police "...were looking for another who is wanted in connection with the operation of a radio scanner which picks up police calls."

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## Contests

### CLARA AC/DC CONTEST WINNERS

Here are the results of the last Canadian Ladies Amateur Radio Assoc. "AC/DC" Contest held September 10 and 11 last year.

We were especially pleased to have so many OM's participate this year and had several white-caners submit logs as well.

The AC/DC is an annual event and a good way to start contest operating.

Top scoring CLARA member - Thelma Woodhouse VE3CLT

Non-member winners:

First - Garry Hammond VF3GCO

Second - Roy Tuttle VE3BNV

Third - Wydney Jones VE6MJ

"Mini-Draw" - (all entrants eligible) - Diana Vanderzande VE7DTO.

Many thanks to all those who participated.

Ann Nutter VE3HAI  
Contest Organizer

### ONTARIO TRILLIUM CONTEST

The winners of the Ontario Trilliums Contest are: First, Sid Wheat VE3CQY; Second, John Whitfield VE3CYK; Third, Malcolm Timlick VE4TMJ. The most contacts were made by Audrey VE3ILT.





Canadian  
Repeater  
Advisory Group

### VE3DWL Hugh Lines

The FCC has announced a stay on Docket 21033 involving the expansion of VHF FM activity below 146 MHz. As a result of many petitions, primarily arguing against expansion because of satellite, moon-bounce, and other forms of "weak-signal" communications, Docket 21033 has been stayed until further notice.

From the International Repeater Group bulletin, lots of news from down east. VE1TWO (10/70) on Mt. Champlain has been doing well with a new antenna on the receiver, but noise from intermod at that location is sometimes a problem. American repeaters in Maine that are used by the boys in N.B. are in the news this month as well. A new repeater location for the old Booth Bay machine (19/79) is in the Augusta (Maine) area and it is waiting for an autopatch. The Rockland (Maine) repeater is now on 146.385/146.985 atop Ragged Mtn. The

31/91 machine on Bald Mtn. is doing well and is used to get into the Banger area from the border.

From the London, Ont. ARC we find out that those of you with the 77/78 ARRL repeater director (with the orange cover) should be advised that the Windsor Ont. repeater listings are "all screwed up... even Windsor is spelled wrong!" The correct listings are: VE3III 146/147.06, VE3WIN 146.40/147.00, VE3RRR 147.90/147.30 and VE3HFR does not exist. A new repeater VE3OBC (Ontario's Bean Capital) is operating from the Co-op elevators in Hensall, Ont. on 146.31/146.91, VE3MSR now has an auxiliary transmitter and receiver, both on 147.66. Stations on both 52.76 and 147.66 are repeated on 52.525 and stations on 52.76 are repeated on 52.525 and 147.66.

Gord, VE3EYW reports that the Elliot Lake repeater is not on the air yet. It was supposed to have gone in last summer but has been delayed indefinitely.

In the Sault Ste. Marie area, VE3SSM is working well and VE3SJI is on 28/88 from St. Joe's Island, 30 miles to the east. The autopatch repeater VE3SAP is in limbo and probably will not be up until next summer. There is apparently a new machine north-west of Sudbury on 16/76 but no other info is available (anyone know anything about it?)

Out west, there is a new ATV repeater going up in Calgary. Inputs are video 427.0, audio 431.5 and outputs are video 439.25, audio 443.75. It will probably be located at the VE6HM repeater site.

The VE6SS repeater was a pilot project and as such was a great success. Improvements in the mill for it are: (a) an automatic transmitter netting aid, (b) an updated tone decoder and (c) a back-up repeater package.

That's it for this month. Keep the news coming in. We expect to publish an updated list soon.

## TECH TIPS

Six-volt dry cell batteries may be obtained from used Polaroid SX-70 film packs. Even after taking the ten pictures in the pack, these batteries are still good and may be easily removed. Two or more may be connected in series for higher voltages, or in parallel for longer life. The Ottawa Groundwave

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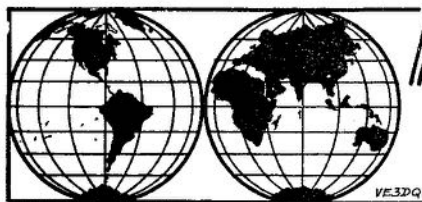
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# INTERNATIONAL NEWS

- The world's largest telecommunications exposition, Telecomm '79, will be held in Geneva in September next year while the ITU World Administrative Radio Conference (WARC '79) is in progress.

- A proposal in 73 Magazine suggests that some U.S. Amateur ask the FCC to extend the 'U.S. phone band' down to 14.100 MHz!

- 'Fox hunts' can pay off in California. The 'Happy Flyers', an organization of Amateurs who are pilots, are offering cash rewards to anyone whose information leads to nailing jammers.

- Special event call signs are likely to bite the dust in the U.S. in a forthcoming ruling by the FCC.

- CB sales are nose-diving in the U.S. A number of manufacturers are close to the wall according to HR Report.

- The International Association of Police Chiefs, at a meeting in Chicago, passed a resolution "encouraging and supporting legislation by the U.S. Congress and the Dominion of Canada pro-

hibiting the manufacture and sale of electronic radar detection devices...". This would be news to federal legislators in this country where no such laws are contemplated. Their possession is illegal anyway, under the Radio Act and its regulations.

- The 'woodpecker' noise interference originating in Russia is causing so much trouble to European communications that professional radio operators in 10 countries have, according to HR Report, threatened a boycott of radio communication with all Russian shipping.

- As reported in our last issue, the grab for 220 MHz 'ain't dead yet' despite assertions by ARRL that they 'slew it': two large U.S. CB set makers and a car maker hold current FCC experimental licences for that band.

- The 450 band is shared with radio-location and a Louisiana firm has been authorized to operate on frequencies between 230 and 435 MHz for an experimental station to test equipment for use in 'foreign countries'.

## WARC '79 News

The second draft of the Canadian Interdepartmental Committee's proposals for a Canadian position at the frequency re-allocation conference (World Administrative Radio Conference) has not yet appeared.

The DOC paper on the proposals for re-allocation of domestic use of the bands from 406 to 960 MHz (see your January issue), which will have some bearing on the Canadian position aroused wide comment south of the border when it became public. According to "Industrial Communications", a Washington newsletter, U.S. officials who were negotiating with DOC concerning more latitude for U.S. mobile services along the border expressed "strong displeasure" with the DOC proposals in the paper. In fact the paper was deemed important enough to be reproduced in whole in that publica-

tion, including the reference to the proposed taking away of part of the 450 MHz Amateur band and the proposal for a new one at 902 to 928 MHz.

The U.S. next draft proposals for WARC '79 are about to be released. It will be interesting to compare the CIC and the FCC proposals.

There's not much time left as these things go ... WARC '79 will convene in Geneva on September 24, 1979 for about ten weeks of long working days and nights.

### TURNAROUND ON 'TURNABOUT'...

...our goof...the sub-title on the story on page 19 of December issue, "Turnabout" should have read "Converting CB Stuff to Ham Stuff".

### CANADAWARD UPDATE

To date there have been the following five CANADAWARDS issued.

|            |            |             |
|------------|------------|-------------|
| 14 MHz     | 21 MHz     | other bands |
| VE3ET SSB  | VE3GCO SSB | none yet    |
| VE2QO SSB  |            |             |
| VE3GCO SSB |            |             |
| W6BZ CW    |            |             |

VE3GCO is the first to obtain a CANADAWARD on more than one band, and W6BZ is the first non-VE to qualify as well as the first one with a CW endorsement.

All VE provinces and territories can be worked on one band. It can easily be done on the 14 MHz via the TransCanada net when the conditions are good. The net is at 1800z (Sat. 14.135 MHz and Sun. 14.140 MHz). The other bands will require more effort. Hundreds of 5 Band DXCCs and 5 Band Worked All States (USA) have been awarded, so the requirements for the 5 Band CANADA-

WARD are reasonable. The first Oscar satellite DXCC is about to be awarded, so what about the first satellite CANADAWARD?

Some Amateurs have suggested that the QSL card requirement is too stringent. However, the most prestigious operating awards, such as DXCC, have always required QSLs. Obtaining cards should not be too difficult, and CARF offers a free VE-to-VE QSL service to its members.

Application forms may be obtained from CARF Inc. Box 356, Kingston, Ont. K7L 4W2.

## Experimental Service ~

The following appears in the front cover of the Victoria Short Wave Club bulletin 'Zero Beat' every month. It is credited to Pat Hawker G3VA in a U.K. publication in 1969 but may hold some valid philosophy for 1979:

"...I am not suggesting that amateur radio has deteriorated or that, in the Thirties, it was any better than today (after all, there were the 'baby broadcasters'). Most of us appreciate that such operating awards are not meant to be taken too seriously. But what worries some of us is whether Robinson Crusoe certificates and complete factory-built phone stations are going to convince the International Telecommunications Union that the Amateur Service is still ... 'A service of self-training, intercommunication and technical investigations carried on by amateurs; that is, by duly authorized persons interested in radio techniques solely with a personal aim and without pecuniary interest.'"

"Intercommunication, by itself, is hardly likely to impress the ITU when it comes to keeping our frequencies: we must not forget the equally essential elements of self-training, technical investigations, and an interest in radio techniques."

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# Anti-'Fuzzbuster' Law

Amateurs share the same band (10 GHz) as police radar speed measuring devices and, for the 40% of our readers in Ontario, here is the legislation referred to in our January issue story, 'Fuzzbusters Busted'.

The Ontario Highway Traffic Act was amended, effective Dec. 16, 1977, by adding the following:

52a - (1) In this section, 'radar warning device' means any device or equipment designed or intended for use in a motor vehicle to warn the driver of the presence of radar speed measuring equipment in the vicinity and includes any device or equipment designed or intended for use in a motor vehicle to interfere with the transmissions of radar speed measuring equipment.

(2) No person shall drive on a highway a motor vehicle that is equipped with or that carries or contains a radar warning device.

(3) A police officer may at any time, without a warrant, stop, enter and search a motor vehicle that he has reasonable grounds to believe is equipped with or carries or contains a radar warning device contrary to subsection 2 and may seize and take away any radar warning device found in or upon the motor vehicle.

(4) Where a person is convicted of an offense under this section, any device seized under subsection 3 by means of which the offense was committed is forfeited to the Crown.

(5) Every person who contravenes subsection 2 is guilty of an offense and on summary conviction is liable to a fine of not less than \$50 and not more than \$500.

(6) Subsection 2 does not apply to a person who is transporting radar warning devices in sealed packages in a motor vehicle from a manufacturer to a consignee.



## Procedure

The following observations have been made during the past few years involving procedures used on the two metre band. We believe that procedures used on other Ham bands should be used on 2 metres.

1) "VE1AHW mobile": OK, so he or she is mobile; this does not indicate anything other than the driver is mobile.

2) "VE1AHW mobile on frequency": (It is certainly hoped he is reasonably close!) Here again, the announcement is only stating a fact and does not express a desire to make contact.

3) "VE1AHW here": Sometimes this is followed by "mobile" along with "in motion". It does not matter if he is in motion or motionless. Here again, it is only a statement of fact and not the correct way to initiate a contact.

4) "VE1AHW monitoring": Fine, so we've got a listener! Here again, it's

an improper way to initiate a contact. If the above holds true, then by the same token the operator should, when arriving at his house, make the same announcement from the base station -- it makes just as much sense.

5) "VE1AHW mobile, anyone around?": This announcement is sort of a feeble attempt to make a contact.

Comments: It is felt that any other method than that used on HF bands is incorrect.

There are three ways to initiate a contact: 1. call CQ and state the place or person being called; 2. A directed call to a known station; and 3. "VE1AHW mobile and would appreciate a contact, someone please."

A further comment: if you have nothing to say -- LISTEN. It also should be noted that keying of any repeater should be followed by the Amateur station doing it or he should make the announcement that he is testing, followed by his



call. It is very poor practice and contrary to regulations to make any transmission without identification.\*

If the above will help keep our operating practice on a high accepted level and not relegate to mediocre methods, I feel I have done a small part for the Amateur fraternity.

R.A. Freeman,  
Truro, N.S.

(\*Canadian regs require identification every half hour or at the end of a test or of a series of transmissions... Ed.)

Dear Sir:

I was glad to see the short article about correct radiotelephone procedure in the November "Canadian Amateur". I would like to suggest also the use of standard phonetics as a means of ensuring speed and accuracy. It would also present a much more professional image to non-Amateurs.

It bothers me to hear all the different phonetics in use by Amateurs. Some are using early World War 2 phonetics. Some use late World War 2 phonetics. Some seem to think the names of countries or cities are better. Some use a mixture, or words of their own choosing.

Most of the world (other than the Amateurs) has standardized on the International Telecommunication Union list, Alpha, Bravo, Charlie, Delta, echo, etc.

I notice a growing number of Amateurs who are using this list exclusively. Possible these are people like me who fly aeroplanes or have some other contact with commercial radio. I have never heard any pilot use any of the crazy phonetics some Amateurs use...I would like to see all Amateurs using the ITU standard phonetics.

Charles Smythies VE7NP

(Right on, Charles. I had to "unlearn" Ack, Beer, Charlie, Don and Able, Baker, Charlie, Dog, for Alpha, Bravo, Charlie, Delta ... note that old "Charlie" staged a comeback even when for one horrible, short period he was replaced by "Coca". That's when I dropped the ITU phonetics for my call ... "Coca Delta Coca" was just too much ... and went back to my original "Canada, Denmark, Canada" routine! VE3CDC Editor)

## An honest lot

CARF Treasurer Bernie Burdsall, VE3NB, reports that Amateurs are an honest group. In 1977 more than eighty thousand dollars was received by CARF and it must be a record of some kind that in those thousands of cheques there was only one that bounced ... it was for \$9.00 for handbooks ... from a non-licensed person!

## Advanced Technology for the Discerning Amateur



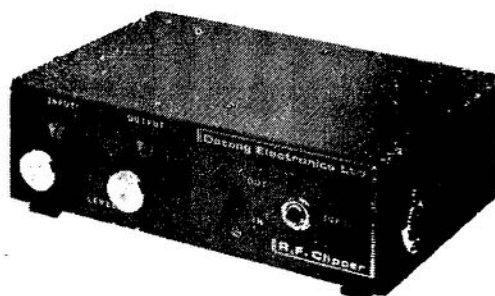
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# What progress, Esperanto?

Since the article CU VI PAROLAS ESPERANTON? appeared in the April 1976 edition of The Canadian Amateur, a half dozen Amateurs across Canada have written to Bruce VE3BRS for further information and study books for the language. In Ottawa, another dozen Amateurs have obtained study books from VE3BRS.

In October 1977, an Esperanto study group was begun there to assist Amateurs in the correct speaking of the language.

A regular radio schedule or net is contemplated in the future for Canadian Amateurs wishing to practice their International Language skill over the air. Esperanto nets or skeds have existed for a few years in Europe, Central and South America, Hawaii, New Zealand and Australia.

A matter of interest to Amateurs is that the Esperantists hold an annual week-long world congress; each year in a different country. At these congresses, only one language is spoken - Esperanto. During part of the congress, they break up into meetings according to their hobbies, professions or special interests. One of these groups is composed of radio Amateurs. When it has been possible to make the necessary pre-arrangements, Amateurs at the congress have operated a station to demonstrate Amateur radio, and to signal the rest of the world about the important event of an annual world congress using only one language. Amateurs who know Esperanto are usually given some priority for a QSO with the Congress station. In 1972, the Congress was held in Portland, Oregon and a special call sign, WI7UKE (Universal Kongress of Esperantists), was on the QSL card sent out to those who contacted the station.

For several years there has been a group of about 75 very active Esperantist radio Amateurs. DF1NR has been compiling a list of Amateurs who know and support Esperanto, and in July of last year the list had grown to more than 300 names and was still growing. He intended to print and circulate the list at the end of 1977 to those interested.

The annual Esperanto world congress

for 1978 will be held at Varna, Bulgaria about July 29 to Aug. 6. The Canadian and American Esperantists will hold their annual congresses jointly at Milwaukee July 1-4 this year. A station will probably be operated from each of the congress sites.

Many Amateurs who have discussed the subject with Bruce VE3BRS over the air have agreed that there is a serious need in the world today for an international language such as Esperanto, and that the language has a very practical use in Amateur radio where improved communication is the main goal.

VE3BRS, Bruce Spanto

(Bruce's QTH is 1325 Essex St., Ottawa, Ont. K1H 7P1).

## Belleville

### Centennial Award

Amateurs in Belleville, Ontario are celebrating its Centennial Year and are authorized to use the prefix CZ3. The Quinte Amateur Radio Club is offering a certificate to stations working the CZ3 calls.

For stations outside the North American continent three 'CZ3' contacts are required and for the North American stations, four 'CZ3' contacts will qualify for the award. Contacts may be made on any band and in any mode with the exception of 2 metre repeaters and 146.52 simplex.

A copy of the logged information and 2 IRC's are required with each application. Send them to Sandra Campbell, CZ3HON, 149 Wright Ave., Belleville, Ont. K8P 4E7 or ask her for more information.

## Printing Errors

For anyone who has a Yaesu shop Service manual for the FT101 series, there are errors on pages 5-6 and 5-7. At the bottom of these pages on the pictorial views, the capacitor and RF choke designations are interchanged. C67 and L6 should read C68 and L7 and vice versa. These are views of the VFO.

Quinte QRM

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# To VE or not to VE? (THAT IS THE QUESTION!)

The Shakespearean pun was intended because I am one of a number of Stratford and Perth County Ontario Amateurs who paid tribute to the 25th anniversary of the Stratford Shakespearean Festival here in Canada. Instead of using our usual VE prefix our local clubs requested DOC to give us VF (for Festival) during 1977. This they granted, as it did qualify according to the criteria established for allocation of special prefixes.

In spite of what some people think we had fun using the prefix. We even went so far as to have special QSL's printed and attractive parchment certificates available to any Amateur contacting two of us in the county.

The fact that we have been using VF is not a crime. Some of us have become increasingly alarmed by the criticism levelled against Amateurs using one of Canada's prefixes allocated by the International Telecommunications Union.

The old axiom, "Know your country first and best" certainly doesn't hold

true for a lot of Canada's 17,000 Amateurs. Few Canadian Amateurs are aware that our country has twenty-four series of prefixes available for use by the radio service in Canada. Beginning at CF and CG they go through VA, VB, VC, all the way to XN and XO.

Do you remember the 3B and 3C calls from 1967? Well, we can no longer use them ... for you see ITU has re-assigned them to other countries -- 3B8 Mauritius, 3C Equatorial Guinea, etc.

In my opinion, one positive reason for using these special prefixes is to indicate to the world and the ITU that we indeed are using what is ours. (For the time being, at least, they are ours.)

We've all heard of WARC '79 and the efforts being taken to keep our Amateur frequencies. Should we as Canadians not be as concerned about our call allocations?

People talk of the lack of activity on some of the bands. It has been my experience that new prefixes stimulate more Amateur activity on all LF and HF bands.

Special prefixes help direct attention to significant events within our provinces and country. 3B and 3C, our centennial calls proved to be a terrific way of publicizing our pride for our country. Initiated by Canada the idea had such widespread appeal that it no doubt prompted other countries to use the idea of new prefixes when happenings of a significant nature deserved attention and publicity. Australia's AX, and New Zealand's ZM calls commemorated Captain Cook's exploration of Down Under. "A" calls were used for Uncle Sam's bicentennial. OF from Finland, U6O Russian calls, YZ Yugoslavia, etc. are all examples of "independence" call prefixes. Many more examples could be cited.

Today, and years from now there will still be validity in using unique prefixes. Even using some over again for different purposes is acceptable with this Amateur. Let's be proud! Let's draw attention to our special anniversaries, centennials, events, long-standing radio clubs, etc., so that fellow Canadians and the rest of the world will know us better.

One needs only to listen on the bands

## THE MAGNUM LINEAR/PREAMP EDL 144



### EDL144

Drive Power 20 W PEP max  
Output Power 100 W PEP max  
Rx Pre-Amp Gain 20 dB typ  
N.F. 2.5 dB typ  
Power Supply 115 V A.C.  
Size: 10" x 6" x 7"



MASTER  
CHARGE

The EDL144 amplifier contains a high power transmit linear amplifier (5894 PA) and power supply (115v) together with a low noise receive pre-amplifier (2.5 dB NF). T/R switching is automatic by an internal VOX circuit; no changes are needed to your existing transceiver.

## CANLON

ELECTRONICS (LONDON) KOMOKA, ONTARIO N0L 1R0

P. O. BOX 65



to hear the all-too-evident apathy of most Canadian Amateurs. Few of our colleagues on the air used XJ or XN for the XXI Olympiad and even fewer have been using CK and CY for our Queen Elizabeth's Silver Jubilee.

There are those who say it is confusing.

There are those who do not want to change the status-quo of VE.

There are those who say they'd have to get new QSL's.

There are those who don't want to try anything new.

I am sure these statements could stimulate much discussion at club meetings. With respect to QSL's I'd go so far as to say the 25% of Canada's hams have never had any QSL's hi.

In the case of the Jubilee prefix for Canada, it is too bad that our use of the commemorative calls CK and CY had not happened to coincide with the "George Elizabeth" GE calls which were so popular in June. The bands were alive with activity and good wishes. Even if many a beam was aimed toward GE and numerous other QSO's were made while turning for the GE hams. Amateurs all over the world got caught up in the GE hunt.

The key to any successful operation is activity and lots of it. There is a message there for all Amateurs interested in a special prefix operation. Don't get a call unless you and your club will be active. It is frustrating to thousands of Amateurs interested in working these special calls to never hear them on the bands.

Planning is essential. In my opinion some forethought must be given as to the choice of prefixes. "CJ" was appropriate for Canada-Japan (Canadians of Japanese ancestry celebrating 100 years of Japanese in Canada. "VG" should have been for Guelph's 150th birthday and VB for Brantford's centennial instead of the other way around.

There must be consistency in allocations also. Consider or ask yourself why a VC9 call was given to the University of Manitoba. I take no special exception to the prefix other than the use of 9 in it. Then there was the matter of VX9 and VYO being allocated to Sable and St. Paul Islands. In view of these islands being given separate DXCC status it was only fitting that they be assigned unique prefixes. Bravo for the DOC on this

occasion. But why was the use of the 9 allowed or the 0 which indicates a station of a maritime mobile nature? Consistency should be the key to allocation. Since those 1975 operations the DOC has been reluctant to issue other suffix calls in the VX and VY prefix allocations for the islands.

"VC", appropriately enough is being used by the Vancouver Island hams in 1978 to commemorate Cook's west coast explorations.

"CG6" prefix may be used this year by Edmonton operators ... CG is the perfect prefix for drawing attention to the Commonwealth Games to be held in our country.

Perhaps the time has come for us to re-evaluate the entire role or function of prefixes in our Canadian Amateur radio service. Should we be thinking of making better use of a number of these prefix blocks on a permanent basis?

Recently, concern has been expressed by a number of Ontario Amateurs that there are no longer any two-letter calls available. We are pleased with the longevity record of our VE3 old-timers! Would it not be all right, however to issue two-letter suffix calls from other Canadian call allocations to those who qualify for them? The West Germans have long seen fit to issue two-letter suffixes to all Amateurs. Hence the use of DA, DF, DK, and DJ prefixes to supplement the DL calls.

Consider Canada's 3.8 million square miles of area. We are the second largest country in area in the world. It is my conviction that better use could be made of our prefixes by assigning more of the relatively unused ones to supplement the present VE1 to VE8 ones.

For a starter, distinctive prefixes could be assigned to each of the VE1 Maritime Provinces to distinguish one from the other! and how about the different territories and districts of the vast VE8 call area? Reference has already been made to the need for distinctive calls for Sable and St. Paul now that they have DXCC status separate from the rest of VE.

Perhaps, you too, have had your QSO interrupted by someone asking if you were in Toronto, or Ottawa, or on Vancouver Island, or wherever ... maybe for a phone patch or the purpose of awards, only to have to say, "Sorry, no, OM".

I feel a country-wide plan based on the expanded use of prefixes for all provinces, territories, and metropolitan areas would help give a understanding of a station's location. The Brazilians have, just recently, re-organized their geographical call sign allocations making excellent use of the PP, PT, PY prefixes.

Yes, it would take some time to set up. Yes, it might be confusing a first.

## Troubles

Continued from  
Page One

DOC has produced an interesting study on the problem entitled "Electromagnetic Compatibility Advisory Bulletin No. 1" (EMCAB-1) which gives the results of studies to the typical electromagnetic radiation environment in Canadian metro areas.

The enormity of the problem becomes apparent upon studying the paper. Its worth can be judged by the fact that it was quoted at length in a recent U.S. FCC hearing because there was nothing available of the same nature outlining the problem to public and manufacturers in the U.S.

Briefly the paper suggests to manufacturers that their equipment should be produced to meet three grades of rejection or immunity to interference. Grade 1 would be designed to be immune to RFI in a typical urban environment as found in the study. Grade 2 would be "unlikely" to have problems and Grade 3 could have problems with interference of a severe nature.

A full story on this important paper will appear in later issues.

## NEWS BRIEFS

A new 20 metre monitoring frequency for Canadian stations is being introduced to assist Amateurs across Canada during the week. The frequency is 14.140, the same one used by the Trans-Canada net on weekends. The idea comes from Earl Weiss VE3ATW of Burlington, Ont. (Tx to RSO Bulletin).

- Garry Hammond VE3GCO, 16 242 Inkerman St. E., Listowel, Ont. and VE3HLL are preparing a list of awards for Canada. They would appreciate clubs sponsoring awards to send them the details.

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Yes, there may even have to be a grandfather clause/option for the dyed-in-the-VEtypes. But let's look to the needs of the future!

To VE or not to VE? That is indeed the question!

73 de Garry VE3GCO, 3C3GCO, CG3GCO, XJ3GCO, VF3GCO, CY3GCO.

(The smoke you smell is from the DOC computer which just blew the main fuse! Ed.)

- Canadians on ARRL committees are: DX, Hal Parsons VE3QA; Emergency Communications, Bill Parker VE5 CU; Contest, VE7TT; Repeater, Al Thurber VE1AKT; and VHF/UHF, Les Weir VE3AIB. (Sorry, no handle available for VE7TT).

- A new club has been formed at Minden, Ontario. President is Phil Graham VE3APL. The club is proposing a two metre repeater with the call to be VE3MIN; frequency not yet chosen.

### ADVANCED

## STUDY GUIDE

### OWNERS - NOTE:

In the foreword to the CARF Advanced Certificate Study Guide it states that "the Advanced exam takes the form of a 50 question multiple choice paper, a 15 wpm sending and receiving test and an oral examination".

This latter part is not, however, correct. There is no oral examination called for in the syllabus. Some examiners used to read over the old essay type exam and ask a few questions -- but not any more; there is NO oral exam, according to Bert Hovey, one of the authors, who checked this with DOC.

## Report available

The report of the recent National Amateur Radio Symposium prepared by the Moderator, W. J. (Bill) Wilson, VE3NR, former Director-General, Telecommunication Regulation, now retired, can be obtained free by writing to the Information Service Department of Communications, 390 Slater St., Ottawa, Ont., K1A 0C8. The report is also being sent out to all those who attended the event last November.

# If 'Bell' doesn't ring!

A recurring nightmare of telephone outside plant men features the backhoe operator who accidentally bites into a multi-pair telephone buried cable and cuts off service to hundreds or thousands of subscribers leaving them without even emergency service.

Such interruptions can occur from natural or other disasters as well and the Ottawa Emergency Measures Organization is co-ordinating a radio telephone backup system to handle emergency calls out of areas where phone service has been disable.

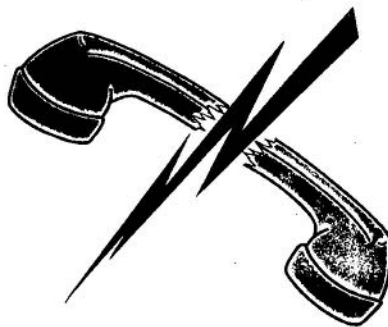
The phone company (Bell in this instance) will notify the city EMO, the fire and police departments of the outage and EMO will then set up a system of radiotelephone equipped vehicles to patrol the area, offering emergency service to the residents. Each vehicle engaged in the operation will bear the sign shown in the illustration.

Amateurs, GRS operators, public service and utility vehicles will all be pressed into service; the first two services will be co-ordinated through local clubs and their emergency co-ordinators.

The theoretical plan that was worked out was given a trial run in an exercise held in October. The scenario for the workout was triggered by an accident which, as any telephone outside-plant person will tell you, is too common an occurrence ... a cable cut by a construction equipment operator. In this case, the break was supposed to have cut off 3,000 telephones in the west end of Ottawa.

The exercise got under way with the operating company (Bell Canada) notifying the local Emergency Measures Co-ordinator. The Ottawa Amateur radio emergency co-ordinator, Larry Bradley VE3CRX, activated the fan-out alert system and within a few minutes had 13 stations reporting to the fire hall selected as emergency headquarters from where the Amateur mobiles were dispatched to their patrol areas. Utilizing the local repeater VE2CRA, the Amateur net was soon in operation.

The Amateurs were assisted by the local GRS club, the '49ers' who have an excellent communications trailer fitted



with Amateur VHF gear, their own commercial public service frequency VHF rigs, the EMO VHF and 27 MHz GRS stations. (The 49ers have both Amateurs and qualified operators and licences for commercial station equipment.)

Some 20 patrols were established with 10 Amateurs and 10 GRS operators to provide emergency communications for the people in the affected area. About 40 simulated incidents were 'played' in the course of the exercise, ranging from car accidents to heart attacks.

The three-hour exercise worked out well and the phone company the EMO people, police and fire officials were favorably impressed with the way the exercise went and proved out the idea as being feasible.

## Radio Act Notes

The more vigorous enforcement action by DOC promised late last year seems to be for real. Two Halifax policemen and a DOC inspector paid an unexpected call on a Halifax bootlegger and his New Year's started off with a \$250 fine or 90 days. The charge was unlicensed possession of a CB set and a VHF scanning monitor.

A Glace Bay, N.S. man played at being a SWL with the wrong sort of gear. He was nicked for unlicensed possession of a scanner unit tuned to police and fire department frequencies on an appeal by DOC after an original dismissal of his case. He was stopped by an RCMP officer and when a second constable called his dispatcher from the police car, number one policeman heard his buddie's voice five by nine on the accused's car!



# Life Memberships

## CHARTER MEMBERS

LIFE MEMBERSHIP is available in Canada's national Amateur Radio society for \$100.00 and \$15.00 for additional immediate Family members. A rebate is made for any full years of unexpired membership.

The Board of Directors approved this class of membership in mid 1977 with the added proviso that any person obtaining Life Membership before the end of 1977 could use the appellation "CHARTER LIFE MEMBER". The qualifying period for obtaining this unique distinction is now passed and it is with great pleasure that the Federation informs that

To avoid confusion and a returned cheque, please write the month abbreviation or in full ... e.g. 2/1/78 could be 2 Jan 78 or Feb 1, 78 depending on the interpretation that the banks put on it.

QSL CARDS are available from CARF ... send 25¢ in coin or stamps for a sample sheet and order form. (French texts are available.)

the following are CHARTER Life Members ... a total of 79 or approximately 2% of our membership.

|                         |                          |
|-------------------------|--------------------------|
| Nate Penny VO1NP        | K.D. Baker VE2XL         |
| Bonnie MacEachern VE1TY | Frank Bell VE3FMP        |
| Darell H. Porter VE1AFS | Harold E. Brown VE3DMB   |
| G.W. Goodwin VE2DQ      | Bert Hovey VE3EW         |
| Joan Powell VE3FVO      | Lorna Hill VE3IWH        |
| A.E. Blick VE3AHU       | Croft Taylor VE3OR       |
| David G. Evans VE3BAR   | W.A. Crabbe VE3CUK       |
| Bob Hulme VE3DNG        | Harry Raby VE3FJJ        |
| B.H. Burdall VE3FNB     | Grace R. Penney VO1NB    |
| W.E. Braithwaite VE3FWM | John Henry VE2DNM        |
| Norman Lawton VE3ON     | Patricia Baker VE2XS     |
| Hersh Goldberg VE3JBU   | William Hardie VE3EFX    |
| Thelma Woodhouse VE3CLT | Vic Naderer VE3IHK       |
| Malcolm Tuttle VE4MG    | Harrie F. Jones VE3HYS   |
| Jim McKenna VE6HO       | Pamela L. Gorham VE3BVG  |
| Dave Bennett VE7AXG     | Morley Wiltse VE3CYW     |
| E.A. Osberg VE7AXJ      | Myrtle Manning VE3FXM    |
| J.J. MacEachern VE1UA   | J.R. Burke VO2CW         |
| Frank MacEachern VE1AWL | John M. Mann VE2ADZ      |
| Ralph Hindle VE2BMH     | Farrell Chown VE3KL      |
| R.F. Poulter VE2ANE     | Carl Thorsteinson VE3IAH |
| K.E. Rolison VE3CRL     | Wulf Hill VE3ICQ         |
| Jean Evans VE3DGG       | John W. Woodfield VE3CYK |
| Laetitia Hardie VE3HIR  | Fred Strang VE3CMS       |
| William B. Kent VE3HSK  | John Neumann VE3DDN      |
| J.L. Ferns VE3BZF       | Roy Manning VE3PM        |
| Dave Noon VE3IAE        | W.L. Morris VE3DEV       |
| E.L. Crosby VE3CJD      | C.W. Bushell VE3DKY      |
| J.A. Fegan VE3BUI       | Leon Blazek VE6CGR       |
| Kent Chown VE3JJC       | T.R. Talbot VE6ATT       |
| J.R. Sandercock VE5CS   | Henry Thel VE7WJ         |
| Liz McKenna VE6APD      | Phil Muncaster VE7AWJ    |
| R.G. Skegg VE7AIL       | D.R. Jenkins VE7IU       |
| Roy Cable VE7ZR         | Peter M. Smith VE3DEX    |
| A. Len Tuckey VE6TF     | Ken Yeathead VE6KY       |
| Mildred Cable           | Don MacDonald VE7AKW     |
| Peter Dreissen VE7BBQ   | Richard Thompson VE7CNY  |
| James L. Voigt VE7CWC   | Don E. Cosby VE7DAM      |
| W.A. Parker VE7IX       | M.A.F. Dier VE3BCO       |
| Barry Baggs VE3IVW      | Jim Nazar VE4NC          |
| Patricia Baggs VE3IWI   | Edward E. Johns VE3IWS   |

## Advice for 'Cliff Dwellers'

I became an Amateur while living in a high-rise and decided that since I preferred living in a vertical roost that I would have to adapt my hobby to my surroundings. After almost 3 years and two apartment buildings later, I believe that I have produced a good antenna system. By definition a good system is one which both myself and the building management can live with! This definition came to light after trying to erect a four-element quad on the roof of my previous apartment.

Ah well! The lease was due for renewal anyway!

The next apartment I moved into was truthfully a "shoo-in". The superintendent was into GRS with a 5/8th ground plane on the elevator penthouse, and another Amateur had two towers (2 and 3 sections) on either end of the roof with dipoles running everywhere and 300  
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foot coax runs snaking down the front of the building to the ground floor.

This, I figured, was going to be easy to improve on.

I moved into a two bedroom apartment on the 14th floor, three below the rooftop penthouse. As luck would have it the spare room/radio shack had a projecting end window. (Very easy to hide coax from the street when you are behind a 4 foot projection.)

The first order of business was to drop two runs of coax and two rotor control cables -- all neatly bundled of course -- down to my apartment and terminate them at antenna switches just below the window.

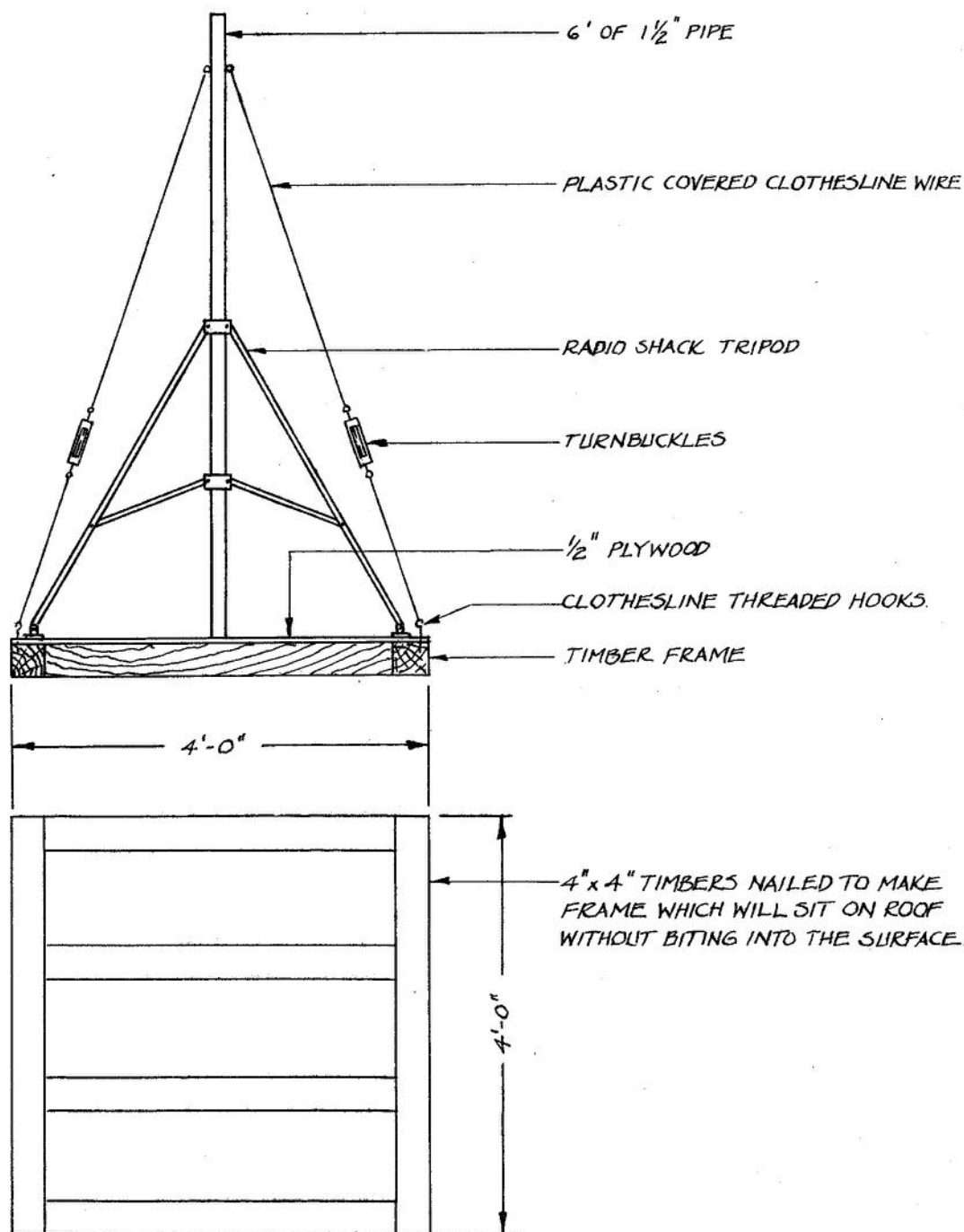
Placing strap hanger into the mortar at roof level and a double set at my window was no problem.

Next move was to meet the neighbors above me -- "Excuse me m'am, but

I'm on the 14th and I want to get into your bedroom". In a predominantly singles building this can have a variety of results; some of which can set back antenna work from a few hours, or even weeks if a boyfriend is within earshot.

Now that I had my coax and control

runs up to the roof and no one was complaining about the cables slapping against the windows, I decided it was time to look at an antenna system that would work and be as unobtrusive as possible - preferably one not visible from the street or one that made great



VE3DQ

clanking noises as it attempted to rotate the roof. You see I realized that the management has to make 160 apartments denizens happy; I only had to make the management happy.

The first antenna to go up was a pair of eleven-element two-metre beams in phase because my two-metre gear has CW and SSB capabilities and I had decided to "have a go" at our southern friends and perhaps the Oscar satellite.

After three months of keying up repeaters and logging CW identifiers I felt that perhaps the HF band had been without the benefit of my fist long enough. Having perused back issues of numerous Ham Mags. I found an article on the Hustler 4BTV. I quickly dashed off an enquiry letter stating my credit card number and lo! 10 days later my living room had 23 feet of assorted traps, tubing, clamps, etc. spread from cupboard to balcony.

Having watched the other Amateur's tower section almost blown over the 4 foot parapet edge during a summer thunderstorm I decided that low profile (wind, this time) was the definite route to go. My support for the beams having stood up very well I decided to duplicate same for my vertical.

Taking one Radio Shack standard tripod mount, a 4 x 4 sheet of half-inch plywood, 6 lengths of 4 x 4 inch timber, one 6 foot length of 1 1/2 inch tubing, nails and the like up to the roof I proceeded to put together one support structure, Mk A1. (see sketch)

The vertical was attached to this upright and the recommended radials were provided, with positively horrendous VSWR results. No amount of tuning would bring this below 3:0; what could be the hang up? A glimmer of an answer appeared one day while sitting in the "library", contemplating this problem. What we have is an electrically neutral 200 foot high tower with a 20 foot piece of pipe acting as an electrical quarter-wave. It was really not surprising that it was difficult to find the reflected quarter-wave over 200 feet below.

Solution? Let's form the roof into a ground plane! Eighteen hundred feet of copperweld wire in random lengths radiating every 5 degrees out from the base and being electrically insulated from the roof and the roof's metal flashing made a world of difference. I am now using the recommended spacing for the vertical and one set of radials

on 10 and 15 metres. The rest matched below 1.2:1 without radials. The worst match was on 10 metres at 1.5:1 at 28.600 MHz. The lowest dip is on 15 metres, 1.1:1 at 21.150 MHz and rises to 1.5:1 at the band edge.

Naturally the door to the roof now bears a sign attesting to the presence of "low visibility wires", "six inches above the roof." As far as I know I am the only one to ever trip over them. I mentioned to the management that the ever-present two inches of water, while not a structural problem, does add to the building's character--like a locker room after the big game. They asked for my suggestions to remedy the situation. Well now, 200 pounds of rock salt keeps that old roof so sweet smelling.....and the ground plane effect has not been hurt one little bit.

Somewhere along the way the building superintendant quit due to a new management group with their groupy management tactics taking over the building; the other resident Amateur with his roof top clothesline bought a home nearly in the country so now I am sole possessor of a private 200 foot "hill" in downtown Ottawa. Referred to occasionally as the Voice of Ottawa on two and ten metres.

It's of interest in passing, to note that while the other Amateur and I co-occupied the roof and had output powers of 200 and 250 watts respectively; we could operate within 15 kHz of each other despite the fact that there was less than ten feet horizontal and two feet vertical distance between us. His antennas being horizontal and mine being vertical definitely contributed to this lack of interference. (As an aside, his nearest Amateur neighbor is now three blocks from him and they can't work closer than 50 kHz. It may be that someone is running a linear amplifier that is less than linear.)

The latest addition to my station is an old T.M.C. linear amplifier which has such a colorful history that it could be an article in itself. Let us just say it has travelled many thousands of miles to return to its place of origin. My main concern was for TVI problems which might crop up the instant the output power began inching its way towards the 70% efficiency mark.

In order to insure that my neighbors would report any TVI or hi-fi interference only to me I prepared a simple question-



aire to be filled out anytime an interference problem was noted. I also attached a letter stating my test operating times for the next five days. Included was a means of testing for EMI (electromagnetic interference) and what EMI should look and sound like. I am happy to report that not one case of EMI has been reported in my building.

Presently I am 30 countries shy of DXCC on 10 metres; and have been very active CW on 15 and 40 metres.

An added feature to this linear is the very efficient filtering system. Previously my FT301D had been notable for its harmonics; well even 60 dB down, which it meets by the way, can be a readable signal when your antenna is at 200 feet in downtown Ottawa. Although this gives a signal of only 3 watts at the

antenna, many of our GRS good buddies "shoot skip" with the same power. I just finished working a WA6 mobile in Los Angeles using a converted CB set so we know that 3 to 4 watts can be heard.

Now the management is happy with a clean-looking roof and because there only three keys to the access stairs there is no security problem.

I have enjoyed working on an antenna system that is workable for DX and acceptable to management and I am sure that this report or ideas extracted from it may aid other cliff-dwellers in convincing their managements that Amateurs do not have to run clotheslines or rotate a barn door-size antenna to enjoy their hobby.

Keep those roofs clean, the management happy and good DXing!

## TARIFFS

Continued from Page One

have been made for the duty-free entry of (a listing of many items including) Amateur radio equipment. For the most part, these goods are not currently produced in Canada.

"Many hobbyists who import their equipment because it is not produced in Canada consider the tariff an unnecessary tax on their activities. Moreover, hobbyists who use equipment readily available from Canadian sources may be paying prices which reflect the tariff. The basic question to be resolved, therefore, is whether special tariff treatment would be accorded to any hobby equipment.

"In view of the wide range of goods involved and the varying interests of collectors and hobbyists, I believe that a public hearing in which the interested parties could participate to the fullest extent possible would be most helpful in reviewing the existing duty-free provisions and in establishing whether there is any merit in making other specific provisions in the Customs Tariff for antiques, collectibles and hobby equipment."

The Board will need to determine whether special tariff treatment should be provided, how new tariff items (if any) should be worded, what rates of duty (if any) should be imposed, and how Canadian industry and commerce might be affected. Public hearings may begin in May 1978 and formal representations

and briefs are invited prior to this time.

The Board also wishes to receive suggestions on the areas they should investigate and on the structure and agenda of its public hearing. They want opinions as to whether discussions should include two or all of the three main categories of goods (antiques, collectibles, hobby equipment) at one hearing, or hold separate hearings on each.

Organizations or individuals having views on the study, or wishing to be kept informed, are invited to notify the Board as soon as possible. All communications to the Board should indicate Reference No. 156 and be addressed to the Secretary, The Tariff Board, Ottawa, Ont. K1A 0G7.

As the national Amateur society, your Federation will present formal representations and briefs through its Tariff Committee headed by C.B. (Barc) Dowden VE3TT, and will be present at public hearings held that concern Amateur Radio equipment. To enable a maximum effort on this vital matter, CARF asks that Amateurs, either individually or through Amateur organizations, consider what representations should be made. If comment is made directly to the Tariff Board, please forward a copy to Box 356, Kingston, Ont. K7L 4W2 so that it may be added to those comments made directly to CARF for inclusion in the national submissions.

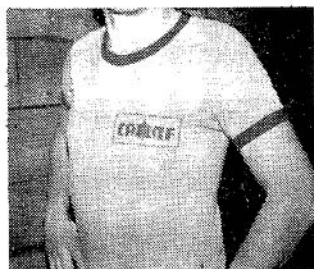
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As a further service to the membership, CARF is now offering T-Shirts and Sweatshirts imprinted with the CARF Logo at a most reasonable cost!



T-SHIRTS: Denim colour with Navy trim at collar and sleeve with logo in dark Navy Blue. 50/50% cotton/polyester - only \$5.00 per shirt including Ont. Sales Tax and third class postage in Ontario (First Class delivery to other provinces).

**\$5**



SWEATSHIRTS: Dark Navy Blue with White Logos. 50/50% polyester fleece with round neck and raglan sleeves. Only \$10 per shirt (Tax and delivery as above)

**\$10**



## **T-SHIRTS & SWEATSHIRTS**

BOTH SHIRTS AVAILABLE IN FOUR SIZES: Small (chest 34-36); Medium (38-40); Large (42-44); and Extra Large (46). PLEASE FORWARD ORDERS TO CARF, BOX 356, KINGSTON, ONTARIO K7L 4W2 with remittance and size required.

# A Challenge

TO CANADIAN AMATEURS AND CLUBS

The 1977 National Amateur Radio Symposium took a very thorough look at the Amateur-Experimental Service in Canada and found a great deal to comment on. The criticisms were timely, well based and healthy and give amateurs much to think seriously about.

Many wonder why the Novice Certificate was voted down. The reason is simple. Those who proposed it and the briefs received did not address the concerns expressed by amateurs at the symposium. They, themselves, at the symposium recognized clearly that they had to go back to the drawing board not only on the Novice Certificate but on many other things.

Below is a list of major issues which have been distilled from the results of the symposium. Amateurs should read the results of the symposium in The Canadian Amateur for more background and get cracking on them.

DOC is getting ready to react soon too.

## 1) Revision of Sub-Allotments

a) The US is considering a downward extension of their 20M phone band to 14.1 MHz. What is our position to be? (This has arisen since the symposium and is here because of its importance.)

b) The symposium was told that 15 kHz deviation should be allowed on frequencies below 146.0 MHz in the 2M band. Would it interfere with amateur satellite communications? What is the best solution?

c) What should be done about a downward extension of the Canadian phone band into the international band (7.0-7.1 MHz) so Canadians can have international phone privileges on 40 metres?

d) What should be the lower limit for the experimenter class certificate holders? At the symposium, most agreed 220MHz but many thought it should be 2M or even 6M. There was no agreement to these lower bands.

e) Should Fast Scan TV be authorized on 420 MHz and above? The symposium thought so. Club views are needed.

f) Pulse modulation should be permitted, according to the symposium, on

frequencies above 420 MHz except in the band 10.0-10.5 GHz where interference could be caused to the primary radio service Radiolocation. Clubs please provide their views.

## 2. Utilization of Higher Bands

The higher amateur bands, 220 MHz and above, are not being used. Because they are in that part of the spectrum where most other Canadian radio services operate, we are likely to lose them if we do not use them the symposium was told. What programs do amateurs and their clubs have in progress to use the bands above 144 MHz?

## 3. Putting Experimentation back in Amateur Radio.

Amateurs at the symposium expressed great concern about the fact that experimentation was being replaced by communication. The future of amateur radio will be adversely affected if this keeps up. It is desirable that Amateurs and their clubs should have programs to improve experimentation in the Amateur Experimental service. What are your plans? It is imperative that plans be formulated quickly, your clubs views should be shared with others.

## 4. Experimenter's Certificate and License.

It was agreed that there should be such a certificate but the syllabus and exam need to be developed. DOC's proposal and symposium discussions provide a reasonable starting point but much needs to be done. Club views are urgently required.

## 5. Novice Certificate

This is not dead by a long shot. Among many concerns expressed at the symposium, the following were outstanding and need to be answered, if novices are going to be introduced in large numbers to the service and not create a bad image with the public and other amateurs.

a) Interference - Novices would not understand about interference and could create EMI. Are planned training courses adequate in this regard? Do clubs have good strong EMI committees able to help





# Up Your Frequency!

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members? CARF has formed an EMI committee - can we help you form yours?

b) Safety - Again it is said novices would not understand about safety. Are amateur training courses adequate in this regard or are they purely code courses?

c) Level of Competence - The novice syllabus and exam could relate to the GRS operator syllabus and exam requested by the various GRS clubs across Canada as well as to the amateur, advanced amateur, and amateur experimenter certificates. Club views urgently needed.

d) Better Alternative to Novice Sub-Allocations - The novice sub-allocation is said to isolate novices in the spectrum from other amateurs; to create a band with an inferior class. This does not contribute to harmonious relations or good communications procedures. (Is your novice accent showing?) Views of clubs are needed here.

3) Toy - Many fear novices will include those who see Amateur Radio as a toy primarily for socializing. GRS was cited as an example of this at the symposium. Clubs should advise on how this can be controlled.

f) Enhancement of Amateur Radio - DOC told symposium it is not prepared to move on this certificate unless it is clear that the Novice Certificate will enhance Amateur Radio. Clubs should show how the novice can accomplish this

enhancement as soon as possible.

g) What benefits do you see accruing to the AES if the novice program is implemented?

## 6. Up-grading of Amateurs

Associated with the use of the higher bands experimentation and the use of new technologies, the symposium was told that clubs could help up-grade amateurs by sponsoring short courses, lectures, seminars, etc. Clubs are asked to advise us of topics, course details, length costs, etc.

## 7. Third Party Communications in National Physical Disasters

In many countries, third party traffic is forbidden. Should it be allowed, exceptionally, for short periods when disasters such as earthquakes strike? Club views are needed.

In conclusion, amateurs should not overlook the usefulness of replies to these very important questions in justifying the future of Amateur Radio and its needs for spectrum at the 1979 World Administrative Radio Conference.

Views of clubs and individuals are urgently required. Please forward your input to CARF, Box 356, Kingston, Ontario, so it can be compiled for presentation to DOC. Don't wait until next month start NOW. Tomorrow begins today!

---

# Down Intermod Alley

Barc Dowden VE3TT

When high power broadcast signals are mixed together in a conductor which has a rectifier in it, then that conductor will reradiate at new frequencies. These new frequencies are unwanted intermodulation products; and they are very ghostly emanations indeed. This article is based on the experiences of several hams in the Ottawa area together with the findings of the EMI Committee of the Ottawa Amateur Radio Club.

Unfortunately the ghosts may be generated down anyone's alley that is near two or more high power stations. Most of us have heard of humorous examples of rectifying radiators such as talking stovepipes, muttering teeth fillings, etc, caused by a single strong signal. The problem is compounded when we have two or more signals involved. Perhaps the

most difficult intermod problem today is to select VHF repeater frequencies that are intermod free. The VHF fraternity "borrow" large computers to help solve that one.

In our study, we concentrated on the re-radiated intermod of broadcast stations in the Medium Frequency band and further narrowed the investigation down to those products that showed up in the 80 metre band. Although the situation described is in the Ottawa area, "intermod alleys" undoubtedly exist across Canada wherever there is a cluster of high power stations. Solutions to the intermod problem are woefully thin and this had led to a rash of contacts with DOC people from RI's to the Minister. Hopefully our experiences may be of use in your area and will deter dark plots to blow up your local AM station.

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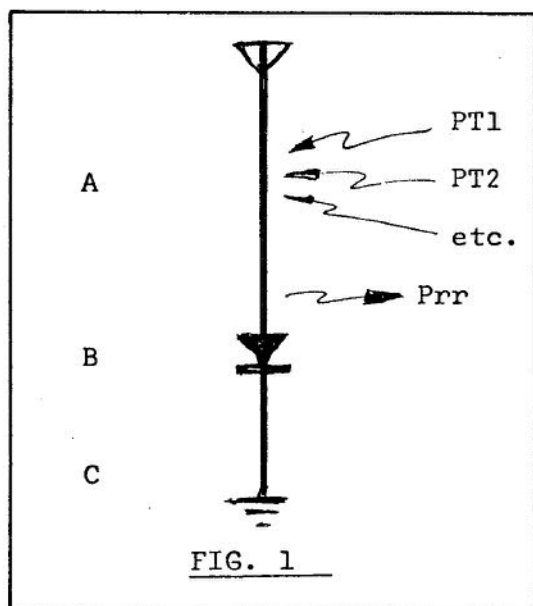


FIG. 1

It's worthwhile to take a brief and simplified look at the theory of what goes on. Referring to Figure 1; "A" is the thing that receives the signals and re-radiates the interference. It may be a guy wire, telephone or CATV cable, antenna, power line, or almost any metallic thing. "B" is the diode or rectifier that does the mixing and comes up with the intermod products. It may be a bad joint, dissimilar metals in power line wire ties or TV etc., ground rod connections, bi-metallic terminal lug, or, it could be a solid state device in equipment such as a CATV amplifier or radio receiver (your own Amateur receiver). "C" is the other side of the rectifier circuit and may or may not be grounded. "PT1", "PT2", etc., are the high power signals getting into the "thing" and "Prr" represents the re-radiated power.

With many assumptions and simplifications,  $P_{rr} = \frac{.00312 PT}{d^2}$  watts, where

"PT" is in kw, and "d" is the distance in km from the source of the weakest of the received signals to the re-radiator. e.g. if there were two 50 kw stations at 10 km each then the re-radiated power would be about 1 milliwatt. The amount of power re-radiated depends on the power of the broadcast station, the efficiency of the re-radiating wire (height, length), and the efficiency of the rectifying joint.

AM broadcasting stations in the Ottawa area including CHU are shown in Figure 2. The products that can fall in

the 80 meter band, up to third order, due to mixing of only two stations are shown in Table 1. Note that there are 14; about one every 35 khz across the band! And if we look at the mixing of three stations there are twenty-six products!

An important (and embarrassing) source of intermod production may be in your own receiver. If in Figure 1, "A" is your own antenna and "B" is a non-linear solid state device in the front end or antenna circuit then the ghosts are internal. If you are doubtful about this effect, try putting a diode in series with your antenna sometime! If you have an intermod that is, say, 20 over nine then insert a 20 dB pad in the antenna lead; the intermod should drop 20 dB. If it drops considerably more or disappears altogether then suspect your own receiver as the source.

Several hams in the Ottawa area

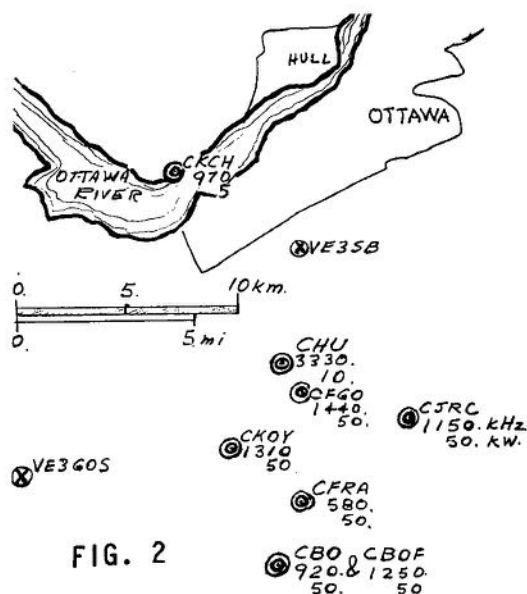


FIG. 2

TABLE 1

A+B INTERMOD PRODUCTS IN THE 80 m. BAND  
FROM OTTAWA STATIONS (UP TO 3rd ORDER)

|      | CBOF         | CKOY         | CFGO | CHU  |
|------|--------------|--------------|------|------|
| CFRA | ---          | ---          | ---  | 3910 |
| CBO  | ---          | 3540         | 3800 | ---  |
| CKCH | ---          | 3590         | 3850 | ---  |
| CJRC | 3550<br>3650 | 3610<br>3770 | 3740 | ---  |
| CBOF | 3750*        | 3810<br>3870 | 3940 | ---  |
| CKOY | ---          | 3930*        | ---  | ---  |

\* Third harmonic generated in the re-radiator.



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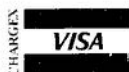
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spent a year or so energetically ferreting out the cause of this intermod interference. They were assisted by the DOC and the EMI Committee of the Ottawa club.

Two typical cases are:

VE3GOS, Stittsville -- Heinz intermittently had about a dozen intermods across the 80 meter band, some of them 20 to 30 dB over 9. His location relative to the BC stations is shown on Figure 2. Tests with a portable interference receiver showed that in his area the intermods were strongest in his backyard. It was narrowed down to something on his antenna system. Heinz is still trying to pinpoint the specific source. Just for the heck of it, we opened one of his guy wires and inserted a 1N65 diode in series. This gave products in his receiver one of which at 3810 was 20 dB above the noise.

VE3SB, Cityview -- Bill has intermod every 10 to 20 kHz on 80 at strengths up to 20 over for several years. He replaced guys, antennas, changed plumbing, and some of the electrical wiring in his house. The quantity and strength of the intermods were affected by some of the changes, but not eliminated. Tests made up and down the surrounding area with an EMI receiver point to a joint CATV and phone cable as the probable source. Poor connections to, and poor shielding of, a CATV amplifier have proven before to be a cause. Bill has a difficult situation since there are still a number of

intermod sources in his vicinity.

Solutions? They're hard to come by, but we can try the following:

1. Clean up our own backyards first. That is, either bond or insulate all metal to metal contacts in guys, antennas, clotheslines, plumbing, etc. and don't forget to check your own receiver for intermod. Check inside the house for metal-to-metal problems in plumbing, switches, thermostat contacts, and so on.

2. Inform the local DOC R.I. of the problem.

3. Use a portable receiver with a DF loop or small rod antenna that tunes from the BC band to the highest band of interest to locate the source. By the way, if "A" in Figure 1 is a power line or telephone cable it is very difficult to locate "B", the bum joint, since the whole length of the cable radiates in an unpredictable fashion.

4. Influence DOC and the CRTC (which regulates broadcasting) to put a limit in the future, on the concentration of high-power BC, MF, and HF stations near built-up areas. The Canadian Amateur Radio Federation plans to discuss this with DOC soon.

CARF's EMI Committee would be interested to hear of your efforts to lay to rest intermod ghosts from high-power stations in your part of the country.

(Barc is chairman of that committee. You can write to him, c/o CARF, Box 356 Kingston, Ont. K7L 4W2. Ed.)

## QRL/QRE - 1978

### PART ONE --- MAKING A DECISION

(This is the first in a series of articles by Don Ward of Saint John, N.B. who will give us a blow-by-blow description of his progress toward his Amateur ticket.)

I remember the first crystal set I ever saw. It was given to me by my father. He demonstrated how it worked and really fascinated me. To be able to put a small delicate piece of wire, attached to an arm, somewhere on an odd-looking piece of metal, then, hear someone speak or music being played, was pure magic. I was very young at the time and it seemed to be just as simple as that; it was very delicate to operate, you had to find just the right spot with

the end of the tiny wire...the cat's whisker.

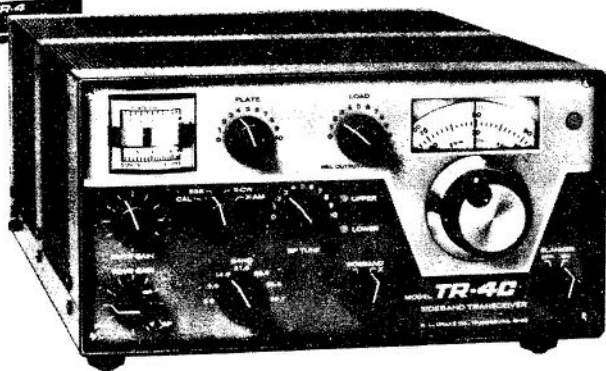
At the time this wonder was shown to me my father was involved in a small radio business in his spare time. He and a friend were bringing many types of radios into their small workshop in the basement. This area held quite a collection of old radio parts and tubes that were convenient to use as targets for my air rifle. I learned about soldering irons that took a long time to heat



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and were big, heavy to hold, and needed the tip filed from time to time. Crystal microphones, speakers, condensers and many other parts were a curiosity. There was one battery operated radio that brought in voices other than the local station, and strange noises.

My father explained then, for the first time, about 'short-wave radio' ... the funny noise was 'Morse Code'. When we showed an interest in things like that, my father was that kind of a man who knew how to nourish the seed. He built a little box with a push button and gave it to me. You simply pushed the button and could make sounds similar to that noise he called 'Code'. It became a game! When I was older, I got to play with a real key. My older brothers were to put this in its proper perspective when they joined the R.C.A.F. during the war as Wireless Operators.

Other interests led me away from those things. The memories still lingered! I never lost interest in the many faces of radio. You will find recording equipment in my home and I am involved in audio-visual work. While a Graphic Artist for twenty years, -- fifteen of them have been in ... (need you ask?) ... Television and Radio, of course.

One day, while driving home from work, I heard a radio announcement, directed to anyone interested in becoming an Amateur radio operator. I thought, at the time that it would be an interesting thing to do. Doubtful that I could accomplish anything along those lines and thinking back over the years to whatever your memory had filed away for use, I talked myself into, at least, giving it a try!

My brother had given instruction to the Wireless Operators during the war. He knew the code very well. My wife's uncle had been an Amateur operator for twenty years. A mental note was made to see them and talk it over. This 'would-be Ham' thought about this, off and on, for about a month and managed to forget the information and the address. I decided to write when, quite by accident, I heard the radio ad once again. Fate was on my side! The material would soon arrive ... if waiting for something had anything to do with making you anxious and increasing your interest, then it was doing this to me. Waiting for the material seemed a long time. The information finally came! I filled out the form and waited

for the reply to arrive once again. While I was waiting, something was to happen that would make me decide, definitely, to try and become an Amateur operator.

It was my custom every Saturday morning to listen to the local radio station. How important this was going to be was revealed when later I discovered a whole hour about 'Ham Radio' complete with transmission noise and other interference. However, it was most enjoyable.

It was a long interview with a veteran 'Ham Operator', who related his experiences in a manner that caused me to make my decision. Though impressed with the account of his experiences and his interest in the hobby, I could not, however, relate to his own personal experiences, except to note that they were very interesting and unusual. Any Amateur would have listened to those experiences with a great deal of delight! My experiences, too, could be as much fun as his were. He had accomplished many things and, obviously, enjoyed every minute of it. It was on this programme that I first became aware of CARF and wrote immediately for more information and membership. In due time, the answer from CARF arrived, together with the first issue of "The Canadian Amateur" I was far more interested in belonging to a Canadian Club than a Canadian Division of an American one, as a beginner.

When one was about to receive two kits of information, he had to be very interested in Amateur radio as a hobby! I like people, enjoy talking and communicating with them; looking forward to the day when I would be able to do this with my own rig. What is an Artist doing taking Amateur Radio courses, anyway? About the only thing I could do would be to design my "QSL" card, which would not help me to learn ten words per minute or operate a transmitter!

Electronic Theory is not related to my artistic background. A lot had to be done. The hobby magazines told a great deal about those people who have had no Radio background and who did quite well as Amateur operators. This information encouraged me.

A couple of letters to operators I did not know, received no reply. This was discouraging because I was given those names with the impression that they would help ... I had to make a start all by myself. I had to 'dig in' and ask as many questions as possible. Help and en-

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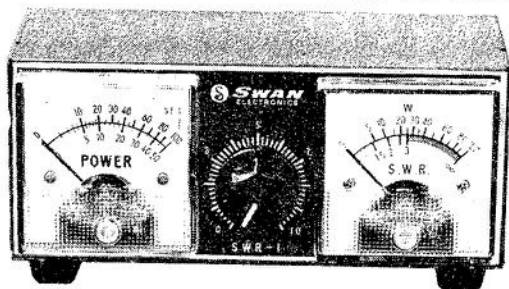
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couragement would have been nice to receive from those who 'had been there'. When I get a licence, my intentions will be to give help where possible.

Study material was on its way; Morse code tapes and booklets. Amateur magazines were not as plentiful as were C.B. books but were available. Both types were loaded with commercial padding. You had to choose carefully to get the better ones.

This new interest was going to take time. A lot of things needed to be done. Where could one set up his Station? What type of equipment? I left that for later,

first and most important was the Code. I thought again about the time element. (Time was needed for art assignments.) There were two 'Hams' employed with the same Company as I, who were still active. One was particularly good with CW. He suggested I might find a local Radio course that Fall, taking new students. Things were getting complicated, now that I had enrolled in a Night School course, but I did need help and direction. In the meantime, one was driving himself to distraction and excitement, reading 'Ham' magazines, planning, looking at Heathkit catalogues.

## *Equipment Review*

This month we are reviewing the Atlas 350-XL, manufactured by Atlas Radio Inc., Oceanside, California. This review was made possible by two Ottawa Hams; Mike MacKay (VE3JRF) who loaned me his 350 for a week, and Stu MacNeil (VE3CXY), who after seeing Mike's 350 went out and bought one too, providing further input. The comments are broken into three sections; the good news, the bad news, and my parting shot.

The good news is an impressive string of technical and operating features, presented here as a mammoth run-on sentence: CW/SSB coverage 160 to 10 m expandable with optional crystals by up to 10 auxiliary 500 KHz ranges between 2-5 and 6-23 MHz; all solid-state, SWR-protected finals; 14 VDC operation; full break-in CW; tunable AF notch; CW filter; VOX, PTT and RIT; digital dial option that doubles as a 100 Hz to 40 MHz counter; auxiliary receiver antenna jack; separate receiver antenna jack (i.e., it can have another receiver fed by the TX/RX antenna, or have the 350 RX and TX connected to separate antennas); TX/RX state indicator lights; split or transceiver operation using the main VFO and/or the optional auxiliary VFO plus the ability to receive on two frequencies simultaneously (i.e., main and auxiliary VFO), switched 14 volts at 5 amps for auxiliary equipment; linear amplifier relay control; PTT jack for footswitch, etc.; ANL and noise-blanker; '350 watts solid state power';

### THE ATLAS 350 XL

Dave Robinson VE3BTY

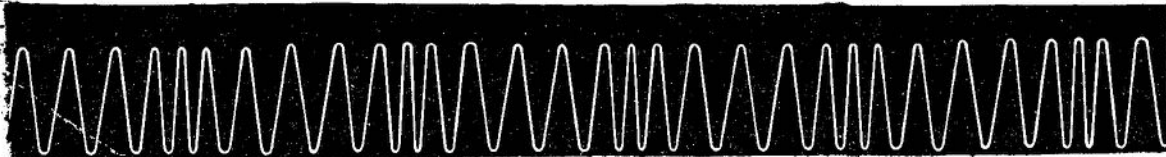
metering of 'reflected power'; 'power supply amps' and 'S-meter'.

Now for the bad news, presented in a similarly illiterate fashion: the 350-XL can draw over 30 amps at 14 VDC (420 watts) and give you 200 watts into 50 ohms resistive and less as the SWR goes up (40 watts for SWR - 3:1), which means you might as well plan on using a matching network if you want that 200 watts output; the analog dial scale is quite coarse, meaning that the digital dial option is almost necessary (which it certainly would be with the auxiliary VFO); the relationship between RF gain control is highly non-linear (for most of the RF gain control range the S meter rests on zero, and then seems to jump to 40 dB over S9 for the rest of the range); turning the AF gain fully counter-clockwise leaves an annoying amount of sounds still coming from the speaker (you also must turn down the RF gain to get it quiet enough so you can answer the phone); the only operator feedback to adjustments to mic or ALC gain (both front-panel controls) is 'PA AMPS'; the receive audio quality was not what one might expect; the noise-blanker seemed ineffective against all noises (line buzz, ignition, and atmospherics) and the ANL introduced severe audio distortion.

The Atlas 350-XL is not an appliance operator's delight yet. So far, there are three modifications for the lucky owner to make (one of these might tame the  
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# The DRAKE TR-33C

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Push Button  
Encoding Mike**

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- **Hand Held Convenience, 12 Channel Capability**
- **SCPC (Single Crystal Per Channel) Frequency Control**
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• 12 Channels—only one crystal per channel provides simplex OR repeater operation on ANY channel. 2 channels supplied. 5 transmit offset positions, 3 supplied. • All FET front-end crystal filter for superb receiver intermod rejection. • Small convenient microphone included. • New lower power drain circuit on squelched receive. • Nicad rechargeable batteries supplied. • Built-in battery charger. • Ac and dc power cords supplied. • Telescoping screw-on antenna supplied, rubber helix optional. • Channel indicator light when using external dc supply. • Carry strap supplied. • Meter Indicates receive strength, xmit output, or battery voltage. • External speaker jack on rear panel. • Auxiliary jack on rear panel—may be used for tone-pad connections, etc. • Traditional R.L. Drake service backup.

### DRAKE TR-33C SPECIFICATIONS

**GENERAL:** • **Frequency Coverage:** 146-148 MHz, 12 channels (2 supplied: 146.52 and 146.94). Crystal determines receive frequency. • Transmit frequency offset for repeater operation determined by 5-position switch: Simplex, +600 kHz, and -600 kHz supplied; any two additional offsets available with accessory crystals. • **Power requirements:** 13.0 volts dc  $\pm$  15% external supply OR internal battery supply. • **Current Drain (Batteries):** Squelched receive: 30 mA; transmit: 400 mA. External supply: above plus 45 mA for channel switch indicator lamp. • **Antenna:** 50 ohm external antenna through SO-239 connector OR screw-on telescoping whip antenna supplied, may be replaced with rubber helix antenna. • **Dimensions:** 5.5" x 2.8" x 8.5" (13.8 x 5.8 x 21.6 cm). • **Weight:** 4.4 lbs (2 kg).

**RECEIVER:** • **Sensitivity:** less than .5  $\mu$ V for 20 dB noise quieting. • **Selectivity:** + 30 kHz adjacent channel rejection greater than 75 dB. • **Modulation acceptance:** at least  $\pm$  7 kHz. • **Inter modulation Rejection:** 70 dB referenced to sensitivity level. • **First i-f:** 10.7 MHz with monolithic crystal filter. • **Second i-f:** 455 kHz with ceramic filter. • **Audio Output:** nominal 1 watt at less than 10% distortion into 8 ohm built-in speaker or external speaker.

**TRANSMITTER:** • **Rf Output Power:** 1.5 watts minimum with 13.0 volts dc supply. • **Frequency Deviation:** Direct frequency modulation adjustable to at least  $\pm$  7 kHz deviation, factory set at  $\pm$  5 kHz • Separate microphone gain and deviation adjustments • Drake 1525EM Push Button Encoding Mike can be used direct with no modification.



*DRAKE 1525EM @\$63.00 plus  
\$1.50 shipping*

*DRAKE TR-33C @ \$289.00 plus  
\$4.00 shipping*

receiver AGC and S meter foibles) and Owners' Manuals are yet to be seen. The auxiliary VFOs are back-ordered. Even my CW speed-freak friend (Neil Sipkes VE3EXA, who is occasionally found working less than 20 wpm) had trouble working full break-in and had to turn down the AF gain while sending. Equally distracting was the intermittent CW sidetone, the uncorrelated rasping noise from the speaker, the intermittent digit in the optional digital readout.

The 350-XL plus optional digital readout plus plug-in optional auxiliary

VFO plus 14 VDC power supply won't be found in Canada for less than \$2000, unless there's a sale.

In conclusion, the Atlas 350-XL looks like a rig with a lot of promise: it could cope with any new band segments that WARC 1979 might throw our way (useful also for Maritime Mobile, 14 VDC for field day and emergencies?) but, above all, I think the marketers at Atlas may have wrenched the 350-XL away from the designers a bit prematurely, and tippy-toed past quality control to the market place.

## "CQ Caracas"

(Bud Punchard, VE3UD, describes a recent unforgettable South American holiday ... all due to Amateur radio.)

It all started a year ago with a local phone message to the effect that YV5ABH, Claudio, in Caracas, Venezuela, had been looking for a phone patch in Ottawa.

An immediate "CQ Caracas" brought forth my friend YV1BJZ, Gaston, at the oil fields at Maracaibo, 500 kilometres from Caracas. He offered to call Claudio on a company phone line and fifteen minutes later, there he was, "five-nine plus" in Ottawa. He wanted a phone patch to two Venezuelan students, Rosa and Francisco, who had come from Caracas on scholarships to study English at the University of Ottawa. We soon had them on the line, speaking Spanish to their parents in Caracas via Claudio's patch, with perfect transmission both ways.

From then on, all winter, spring and summer, scheduled patches were put through lasting up to an hour or more. Many times the young people came to dinner and to chat with their parents in Caracas on Sunday evenings. A real friendship sprung up between all concerned, ending up with an invitation from their father, Manlio, YV5AQW, for us to visit Caracas. Manlio is a plastic surgeon and unfortunately his work does not allow him sufficient time for Amateur radio.

Last December my daughter Nancy and I decided to accept the invitation and to combine a Caribbean cruise with a visit to Venezuela. We left one day late in November before the snow came and were met at the Caracas airport by Manlio, his wife Rita and Claudio about

10:30 p.m., in a balmy 30 degree C. temperature. Although we couldn't see much at night we were quickly whisked twenty kilometres to their beautiful house on the mountainside overlooking the city.

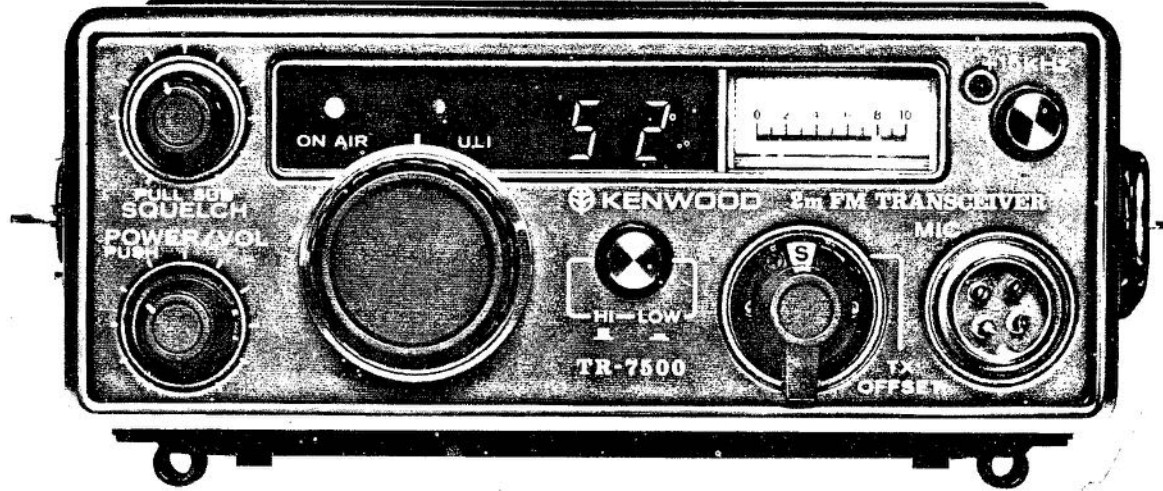
Next day we took a taxi to the port of La Guaria to board the cruise ship Angelina Laura of the Italian Costa line, only to find that it wasn't there. No one in the hot, stuffy terminal could speak English but after struggling with our instant Spanish tourist books we found out that the ship was anchored a couple of miles off shore because the port had no dock space left for her. After a four hour wait we were about ready to return home, but the ship finally came in and for \$27, we managed to get our four bags aboard and in our air-conditioned



What Amateur radio can do for you! The author relaxes on a Venezuelan beach -- the coconut shell contains fresh coconut milk and rum!

ORDER NOW

# TR-7500

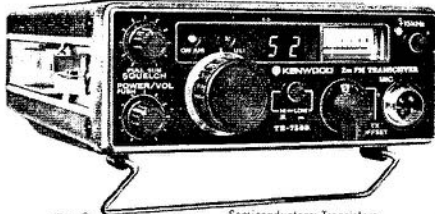


There are a number of good 2 meter FM transceivers on the market. You may already own one. But, even if you do, we suggest that you put your radio to this test. And, if you're thinking of buying one, this test should be a helpful guide.

**\$429.**

|  | NO                       | YES                      |
|--|--------------------------|--------------------------|
| Is it PLL synthesized?                             | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have 100 channels (88 pre-programmed)?     | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have 12 extra diode programmable channels? | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have single knob channel selection?        | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have a LED digital frequency display?      | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have a powered tone pad connection?        | <input type="checkbox"/> | <input type="checkbox"/> |
| Does the receiver have helical resonators?         | <input type="checkbox"/> | <input type="checkbox"/> |

If your answer is NO to any of these, the TR-7500 is the radio that you should own. And, in addition to these important features, you get proven Kenwood quality, value and service.



TR-7500  
Specifications

**NEW!**

|                             |                                     |
|-----------------------------|-------------------------------------|
| Semiconductors: Transistors | 41                                  |
| FETs                        | 8                                   |
| ICs                         | 7                                   |
| Diodes                      | 35                                  |
| Frequency Range:            | 146.01 to 147.99 MHz                |
| Mode:                       | FM                                  |
| No. of Channels:            | 100                                 |
| Operating Temperature:      | -20 to +50 degrees C                |
| Power Voltage:              | 11.5 to 16.0V DC (13.8V DC nominal) |

|                      |  |
|----------------------|--|
| Grounding Polarity:  | Negative ground  |
| Antenna Impedance:   | 50 Ohms  |
| Current drain:       | Less than 0.5A in receive with no input signal<br>Less than 3A in transmit (HI) Less than 1.5A in transmit (LOW) (at 13.8V DC) |
| Dimensions:          | 172 mm (6-3/4") wide<br>250 mm (9-7/8") deep<br>75 mm (2-15/16") high  |
| Weight:              | Approximately 2.2 kg (4.8 lbs.)  |
| TRANSMIT SECTION     |  |
| RF Output Power:     | High: 10 Watts<br>Low: 1 Watt (approximately)  |
| Modulation:          | Variable reactance frequency shift   |
| Frequency Deviation: | ±5 KHz   |
| Spurious Radiation:  | Better than -60dB  |

|                         |  |
|-------------------------|--|
| Tone Pad Input          |  |
| Impedance:              | 600 Ohms   |
| Microphone:             | Dynamic microphone with PTT switch, 500 Ohms                       |
| RECEIVE SECTION         |  |
| Receive System:         | Double conversion superheterodyne                                  |
| Intermediate Frequency: | 1st IF: 10.7 MHz<br>2nd IF: 455 kHz                                |
| Sensitivity:            | Better than 0.4 uV for 20dB quieting Better than 1 uV for 30dB S/N |
| Squelch Sensitivity:    | Better than 0.25 uV  |
| Selectivity:            | 12kHz at -60dB down<br>40 kHz at -70dB down                        |
| Image Rejection:        | Better than -70dB  |
| Spurious Interference:  | Better than -60dB  |
| Audio Output:           | More than 1.5 watts across 8 Ohms load 10% distortion              |
| Intermodulation:        | Better than 65dB   |

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cabins.

It was well worth it, because for a week we ate, danced, swam and sunbathed in luxurious splendor on shipboard, moving to a different island each night and touring them by day. We visited Granada, Guadeloupe, St. Thomas, San Juan, Puerto Rico, Curacao and returned to La Guaria.

Unfortunately, the ship's radio operators were not very co-operative and after a peek at their "shack" through a port-hole, we decided their gear was not quite as good as some of our ham stations!

Back at La Guaria, we took a taxi to the city over a magnificent 13-mile four lane highway, reputed to cost ten million dollars per mile. The city of Caracas is big and prosperous, approaching a population of 3 million and oozing with oil money.

Sandwiched in a long valley between 4,500 foot mountains, with cheap gas and limited space for highways, the result is a traffic madhouse that makes Toronto or Montreal look tame indeed. There didn't seem to be any right-of-way rules or any "yield" signs, so establishing an overlap over the other fellow is the only way to go when you have two lanes feeding into four lanes every few blocks. The result is more prangs per kilometre than you have ever seen and a continuous jam all day long downtown.

Caracas not only has some magnificent modern buildings but is in the throes of an extensive building boom. We saw one single multi-storied development housing nearly 40,000 people, including stores, schools and recreation facilities. There are many very modern high-rise apartment buildings.

Our hosts live in a very affluent section of exquisite Spanish style homes, high up on the mountainside. Every house is a fortress, however behind high walls, locked gates and barred windows, guarded by many noisy dogs. The government official's house next door sported an armed guard as well.

The first morning we were awakened at 6 am by two raucous parrots next door, trying to bark like the three watchdogs protecting the yard. They eventually called all the neighbours by name, then settled down to a conversation in Spanish which was unintelligible to us but the funniest comedy imaginable. After a week they seemed to become our friends and we missed them when we left.

During our many trips around the city we saw many beam antennas -- mostly yagis with some quads and numerous 40 metre rotatable dipoles and inverted V's. Unfortunately we never seemed to have the time to knock on doors and get acquainted.

Manlio arranged a weekend in the country for us at a little house which belonged to a doctor friend. In his English camper we left Caracas in the usual 5 to 10 mile traffic jam and fought our way out to the highway to the west, which looks a mountain version of Ontario's 401.

We arrived in darkness at the city of Maracay and turned north an unforgettable 40 kilometre drive over a 5,000 foot mountain and down to the seashore.

As we climbed through the night our ears began to pop and the paved road narrowed to the point where we prayed we would not meet another car. The headlights showed few protective curbs on the sharp turns but little did we realize we were thousands of feet above the valley floor!

Some of the 180 degree switchbacks were unbelievable as the road deteriorated and we forded boulder-strewn streams. The rain forest vegetation was beyond anything we had ever seen, with plenty of bamboo, wild bananas and huge 150 foot trees. After two hours on the mountain road we descended to the old coastal fishing village of Choroni, unchanged since colonial days. Soon we were having a drink in a delightful new country house, with open iron grill work for some of the walls in place of windows. The house was set in a tropical garden, shaded by towering trees (which my eyes automatically measured for use as antenna supports).

Next day we headed for the beach, five minutes away, with the temperature about 30 degrees C. It was worth the whole trip -- a curving, sunny tropical beach perhaps a kilometre long between mountain promontories and decorated by waving coconut palms, perfect sand, water and surf.

After establishing ourselves with a hammock, slung between palm trees, a bar, deck chairs and plenty of ice, we collected and cracked coconuts and used the milk as a mix and the coconut shells as cups. We tried not to think it was probably snowing in Ottawa (it was!)

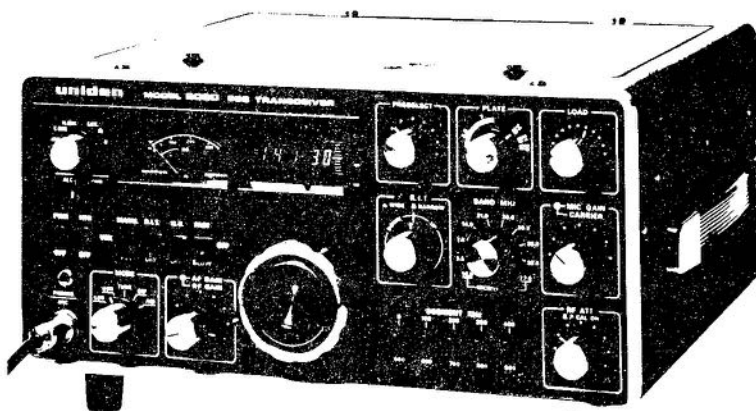
Our country host and his wife were  
february 1978 - page 33



# 2020

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YOU MAY NEVER HAVE OWNED A  
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- \*Phase lock-loop (PLL) oscillator circuit minimizes unwanted spurious responses.

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- \*Multi-mode USB, LSB, CW and AM operation.

- \*Extraordinary receiver sensitivity (.3u S/N 10 db) and oscillator stability (100 Hz 30 min. after warm-up)

- \*Fixed channel crystal control on two available positions.

- \*RF Attenuator.

- \*Adjustable ALC action.

- \*High performance noise-blanker is standard equipment ...not an accessory.

- \*Built-in VOX and semi-break in CW keying.

- \*Crystal Calibrator and WWV receiving capability.

- \*Phone patch in and out jacks.

- \*Separate PTT jack for foot switch.

- \*Built-in speaker.

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both medical doctors and went out of their way to introduce us to the native foods, which we had never heard of before but will never forget, either. They ordered a big fish which was caught and delivered the next day. It was prepared in a sort of fish soup with eight or nine vegetables of which we recognized only potatoes and pumpkin. The doctors said they enjoyed getting away on weekends from the madhouse that is Caracas. They believe the bad

mountain road isolates their retreat to their benefit.

Sunday night we arrived back in the city along with the usual thousands returning from the country, grinding it out bumper-to-bumper. Two days later we said goodbye to our good friends and winged our way back to Ottawa, arriving in the worst blizzard of the year and a foot of snow.

An unforgettable dream-like interlude ... thanks to Amateur radio.

## No Cooked Ham, Please

(RISKS TO HAMS FROM NONIONIZING RADIATION)

A. Peter Ruderman, VE1PZ

Many hams know from direct experience what happens when their finger touches a source of r.f. energy--it gets burned. As early as 1924, a Professor Schereschewsky at the Harvard Medical School found that massive doses of radiation at selected frequencies between 18 and 66 Mhz killed laboratory mice. Studies in Germany in the 1930's provided empirical data on the dielectric properties of fat, muscle, skin, lung and kidney tissue, and blood. In the 1960's British scientists concluded that the electrical intensity of an r.f. field was the simplest indicator of bodily risk because human tissue is a "lossy dielectric" and therefore more susceptible to the electrostatic than to the electromagnetic component of the field.

The electrostatic field causes the damage by causing a buildup of heat. A technician working in the focus of a v.h.f. parabolic antenna was killed because he was literally cooked when the power was accidentally turned on. A number of cataract cases developed among U.S. forces radar technicians, and this probably meant that the temperature of the eye was raised  $10^{\circ}\text{C}$  by the radiation. Lower power has produced temporary sterility, since the human testicles are normally  $2^{\circ}$  cooler than the body cavity.

Except for a small band of frequencies where the radiation just penetrates to the nerve endings in the skin, there is no early warning of thermal damage. Even when you can feel the heat, nerve impulses move 5 to 7 feet per second so the damage is done before the brain

registers the fact.

It has also been found that the heat generated depends on the frequency. Above 3,000 MHz the energy heats the skin but does not go deeper, and some is reflected. From 1,000 to 3,000 MHz there is almost complete absorption of energy in the body, which explains the frequencies used in microwave ovens. At 400 MHz perhaps half the energy is absorbed by the body while the rest passes through, and at lower frequencies less is absorbed and more passes through.

When we get to the HF part of the spectrum, the absorption of energy depends on the impedance match. The better the match, the more energy will just pass through. British Admiralty engineers compared the intrinsic impedance of a human body at communications frequencies (about 377 ohms) with the field impedance calculated in a plane 1 meter above the ground of a 10-meter monopole. It was found that the best match between field impedance and body impedance occurred about 8 MHz, where the impedance ratios were about 9:1 for muscle and 2:1 for fat. At this frequency, since the match was still not perfect, a strong field would raise body temperature. Incidentally, the farther the body was from the antenna, the better was the impedance match.

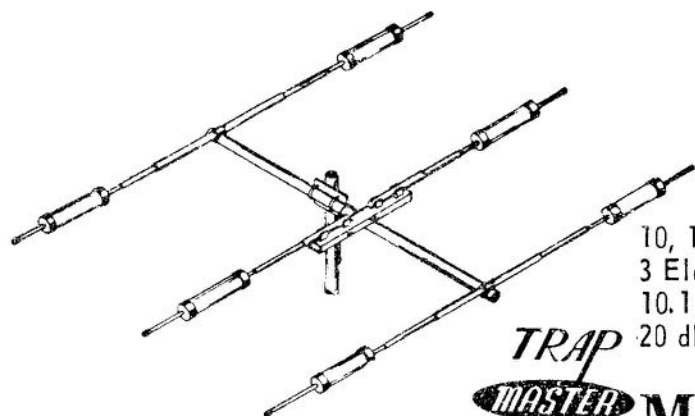
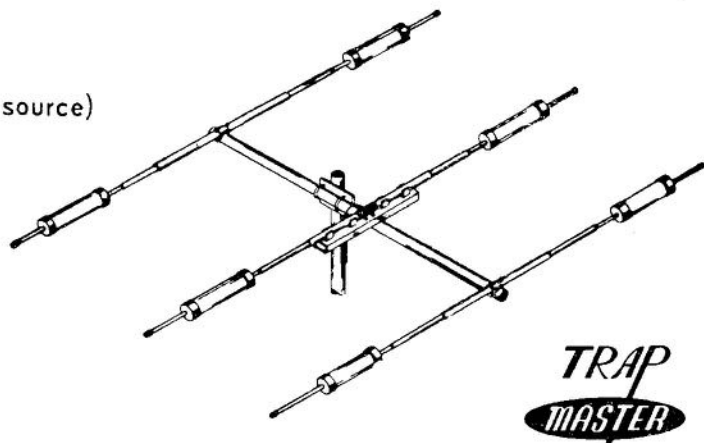
Luckily, the effects of heat damage are not necessarily cumulative unlike ionizing (atomic) radiation where the damage is irreversible and cumulative and in which case safety involves calculating the lifetime permitted dose. The human body has an efficient homeo-

**Mosley Electronics Inc.**

## Select Quality Multi-Band Beams

10, 15 & 20 Meter  
3 Element Beam  
10.1 db. Forward Gain (over isotropic source)  
20 db. Front-to-back Ratio

### Mosley CL-33



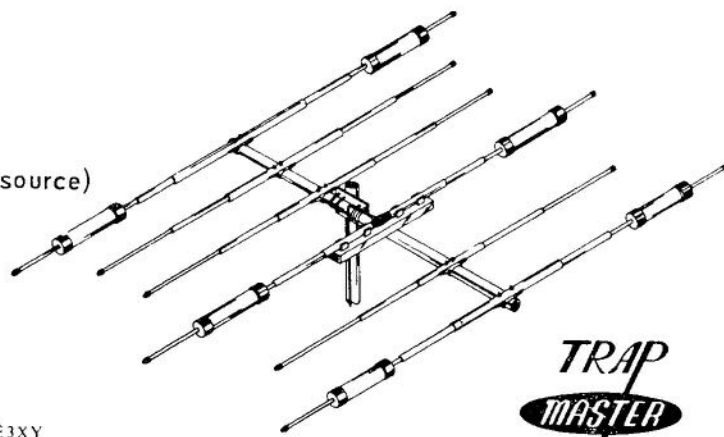
10, 15 & 20 Meter  
3 Element Beam  
10.1 db. Forward Gain (over isotropic source)  
20 db. Front-to-back Ratio

### Mosley TA-33

### Mosley TA-33Jr.

10, 15 & 20 Meter  
6 Element Beam  
10.1 db. Forward Gain (over isotropic source)  
20 db. Front-to-back Ratio

### Mosley CL-36



Write for Catalogue Sheets c/c J. H. Williams VE3XY

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static mechanism, which means it cools off after being heated up. So long as the damage from one exposure is not irreversible, a person can safely be exposed again and again.

As for what constitutes a safe dose, the old American standard was 100 mw per  $\text{cm}^2$  of body surface, but this was reduced to 10 mw (intermittent exposure) after the cataract experience. The Canadian Standards Association figure for microwave ovens is 1 mw/ $\text{cm}^2$  (continuous exposure). Bell Laboratories in the U.S. has suggested 0.1 mw. The Russian (USSR) safety standard in industry (presumably for continuous exposure) is .01 mw/ $\text{cm}^2$ . The American Standards Association is now talking about establishing separate standards for different frequencies.

The standards are based on the levels that were actually seen to harm people plus a margin of safety. The USSR standard is based on laboratory measurement of thermal effects and workers' reports of symptoms. British investigators have suggested that 1,000 volts per metre of body surface (about 50 mw/ $\text{cm}^2$ ) is safe for continuous daily exposure between 2 and 22 MHz. They based this on thermometer measurements in a plastic dummy head filled with potassium chloride solution, insulated in two polystyrene boxes, fastened at the base of a whip antenna and subjected to radiation at various communication frequencies with a power of 500 watts. The whip seems to have been the same monopole used in the impedance experiment.

The theoretical measurements are affected in practice by the position of the body, the amount of fat relative to muscle tissue, and the amount of hair and clothing. The power density is also affected by the complexity of the r.f. field. A wavelength or more from the antenna, the expression  $P_t/4\pi R^2$  is an acceptable measure of power density where  $P_t$  is transmitted power in watts and  $R$  is the distance in meters from the antenna. If you are closer to the antenna, the electrostatic component of the field (which causes heat damage) becomes greater than the electromagnetic component and the simple formula no longer holds. On the good side, the formula is based on an isotropic radiator but with a real-life vertical, dipole, quad, or Yagi, exposure below the feed

point would be lower than indicated by the formula.

For practical purposes, assume that an Amateur is using 1 kw d.c. input to a dipole with well-shielded or field-cancelling feed lines in the 10-meter band. If the shack is one wavelength from the feed point, the power density would not exceed 0.1 mw/ $\text{cm}^2$  for the operator, and would likely be even less. This would be safe by ASA, CSA, or British standards and might be safe by Russian standards if we knew to what frequencies they applied.

In VHF operation, the Amateur operator is closer to the antenna, and if the power is usually lower the frequency is higher. While the 2-metre band is not yet in the real danger zone for heat absorption, 1.25 meters is riskier and the Oscar up-link in Mode B riskier still. The common case of a 2-metre transmitter radiating 10 watts of power from a whip antenna on the car roof might involve enough radiation coming through the windows and windshield to hit the operator with as much as 8 mw/ $\text{cm}^2$ --this would be safe only for intermittent exposure by most standards.

With a hand-held instrument, the antenna is very close to the operator, and a 1-watt signal 30 cm away would expose him to as much radiation as a 10-watt signal a metre away. With the microphone built into the transmitter and the whole unit held against the face, the power density would be 3 or 4 times greater.

My conclusion is that casual Amateur use of the HF bands poses no real hazard for the operator except for contact burns, which are avoidable. Mobile operation on 2 metres is probably OK for intermittent exposure. Hams should avoid long rag-chews with hand-held v.h.f. instruments whenever the power is above the milliwatt range, and should not walk in front of multi-element UHF beams. Experimenters in the spectrum above 1,000 Mhz should take serious precautions.

The best bet is to be a fat, hairy-chested, bearded operator wearing a fur coverall and several pairs of longjohns!

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VE1PZ will follow this story with another look at 'Cooked Hams' in the next issue of The Canadian Amateur.

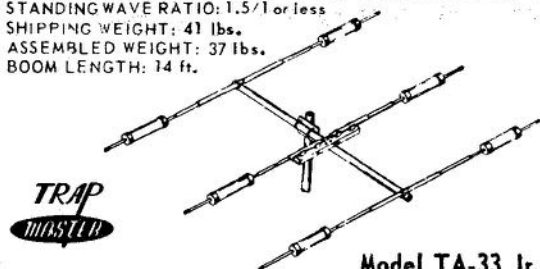


# MOSLEY ANTENNAS

## Model TA-33 for 10, 15, and 20 meters

The Mosley TA-33 three element beam provides outstanding 10, 15, and 20 meter performance. Exceptionally broadband — gives excellent results over full Ham bandwidth. Exclusive Mosley trap design offers resonant frequency stability under all weather conditions. Element center sections are of double thickness aluminum to reduce sag. Boom requires no bracing. Heavy duty universal mounting plate fits masts up to 1 1/2 inch O.D. Antenna handles full KW AM/CW or 2 KW P.E.P. SSB input. Feed with one coax line, RG-8/U recommended. The TA-33 may also be used on 40 meters with TA-40 KR conversion. Complete with Hdw.

FORWARD GAIN: Up to 8 db. TURNING RADIUS: 15.5 ft.  
FRONT-TO-BACK: 20 db. or better WIND LOAD: 114 pounds.  
MAX. ELEMENT LENGTH: 28 ft. WIND SURFACE: 5.7sq. ft.  
STANDING WAVE RATIO: 1.5/1 or less  
SHIPPING WEIGHT: 41 lbs.  
ASSEMBLED WEIGHT: 37 lbs.  
BOOM LENGTH: 14 ft.



## Model TA-33 Jr.

Mosley TA-33 Jr. has quality and performance found in the TA-33. Rated to 300 watts AM and CW, - 1000 watts P.E.P. on SSB. Complete with Hdw. The Junior may be converted to MP-33 with higher power rating with MPK-3 Kit. Shipping weight 28 lbs. Assembled weight 20 lbs.

## The Classic 33 10, 15, and 20 meters

Beam designed to provide the extra gain for working hard-to-reach DX. Incorporates exclusive Mosley 'Weather-Proved' traps with resonant frequency stability. Features new boom to element clamping and balanced radiation. Hardware is stainless steel. Feed with 52 ohm RG-8/U coax. Fits up to two inch mast. Use with most heavy-duty rotators. 1 KW AM/CW or 2 KW P.E.P. SSB input.

FORWARD GAIN: Full 8 db. compared to reference dipole or 10.1 db. over isotropic source.

FRONT-TO-BACK: 20 db. or better on 15 and 20; 15 db. on 10 meters.

STANDING WAVE RATIO: 1.5/1 or better.

MAXIMUM ELEMENT LENGTH: 27 ft.

ASSEMBLED WEIGHT: 42 lbs.

BOOM LENGTH: 18 ft.

SHIPPING WEIGHT: 47 lbs.

TURNING RADIUS: 16 ft.

WIND LOAD (80 MPH

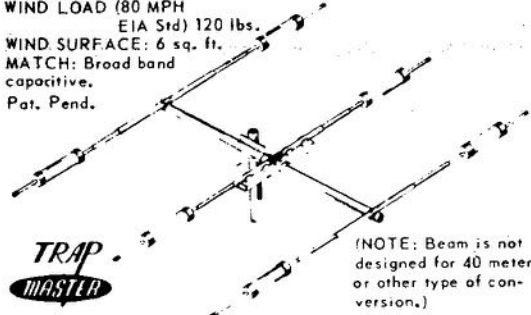
EIA Std) 120 lbs.

WIND SURFACE: 6 sq. ft.

MATCH: Broad band

capacitive.

Pat. Pend.



## MOSLEY ANTENNAS

|                       |        |
|-----------------------|--------|
| TA-33JR               | 195.00 |
| TA-33                 | 259.00 |
| CL-33                 | 295.00 |
| CL-36                 | 360.00 |
| MPK-3-TA-33JR         |        |
| Conversion            | 63.00  |
| D-12 ground plane 2 m | 35.50  |
| MY-144-9 el. Yagi     | 54.50  |
| MM-144 mobile         | 31.50  |
| Larson mobile         | 31.50  |
| Larson magnetic mount | 16.50  |

## HY-GAIN ANTENNAS

|                         |        |
|-------------------------|--------|
| 18ABT/WB-10-80 vertical | 138.95 |
| TH6DXX 6 el.            | 350.00 |
| 204BA 4 el. 20 m        | 269.00 |
| BN-86 balun             | 22.50  |

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|              |        |
|--------------|--------|
| AR-40        | 95.00  |
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| HAM III      | 205.00 |
| Tail Twister | 379.00 |
| Rotor Wire   | 21¢ ft |
| RG8U coax    | 25¢ ft |
| RG8U foam    | 28¢ ft |
| RG-213 coax  | 44¢ ft |

## KENWOOD RADIOS

|          |         |
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| TS-520S  | 899.00  |
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#### Sources:

Brodeur, P. - 'Microwaves I' and 'Microwaves II', The New Yorker Magazine, Dec. 13 and 20, 1976.

Oswald, K. - 'High-frequency conductivity and dielectric constant of biological tissues and fluids' *Hochfrequenztechnik und Elektroakustik*, vo. 49, 1937.

Rogers, S.J. and King, R.S. - 'Radio hazards in the m.f./h.f. band', *Non-ionizing Radiation*, December 1970.

Medvedyev, V.P., - safety tables, *Gigiena Truda (USSR)*, No. 1, 1973.

Unpublished memoranda from Maritime Telephone & Telegraph Co. and the Manitoba Telephone Co.

The author, who is Dean of the Faculty of Administrative Studies and Professor of the Department of Preventive University, Halifax, VE1PZ (exVE3BPR and HB9XKC) was in Geneva at a World Health Organization early last December and operated the International Telecommunication Union station 4UITU, but he reports that "they wouldn't let me use the Collins -- just the FT 101 and the Yaesu linear and that was it! My reputation must have preceded me -- last time I was there I burned out the finals in the Collins -- which was surely random chance but happened at the wrong moment!".

## RSGB Official retires

Garry V. Hammond, VE3GCO

After thirty-eight years of dedicated service, Arthur O. Milne, 70, has retired as the R.S.G.B. (Radio Society of Great Britain) QSL manager.

Amateurs in Canada, and around the world should appreciate the outstanding service G2MI and his XYL, Lucy, have rendered in making fellow hams happy with QSL's. Arthur and Lucy handled about 1,750,000 cards each year since they began looking after the bureau in September, 1939.

Arthur's home had its own postal code - BR 27 NH. Each day it received at least one mail truck delivery. When asked about the most cards he ever remembered from one day's mail, Arthur recalled a stack of cards which were in one-pound packets and when put on top of one another stood 10'6" tall! They came from none other than Box 88, Moscow and the Central Radio Club of the Soviet Union. In spite of this individual record, however more cards come from the West German DARC Bureau than any other country.

G2MI has held every office in the RSGB. These include council member, secretary-treasurer, honorary editor of the *Radio Communication* magazine, and president. He was secretary of the Region I, IARU (International Amateur Radio Union) from 1950-1958.

Arthur and his XYL Lucy are the proud parents of three, including Geoffrey who is G3UMI, ex-VP9MI. Since retiring from the Engineering Department of the U.K. Post Office, Arthur continues to try to be as active on the air as possible. He proudly displays

pre-war and post-war DXCC and WAS certificates. G2MI is holder of 5B DXCC No. 362 and presently has more than 260 countries confirmed, including AC4 RF of TIBET.

Think about it! 50,000,000 QSL's for YOU, for ME, and LOTS of OTHERS, too!! Thank you, Arthur, for a jolly good job on our behalf.

P.S. Effective immediately the new R.S.G.B. QSL manager is G3DRN, E.G. Allen, 30 Bodnant Gardens, London, England, SW 20 0UD.



Garry Hammond VE3GCO, left, happily received a bundle of cards direct from Mr. QSL Bureau Manager, Art Milne G2MI at his home in Bromley, Kent, England. Art was first licenced at age 15 in 1922.

# Lightning — Nature's Artillery

Mike Turik, VE3BJK  
(in the Windsor ARC Bulletin)

Last summer, during a severe electrical storm, one of my neighbour's buildings (about 1000' from me) was destroyed by a lightning strike; despite the efforts of 3 fire departments the building was burned right to its foundation.

This incident gave me some food for thought concerning my own situation. How well is my tower grounded? I happen to have 3 ground rods buried within 2 feet of my tower. Next question, just what the heck is lightning, sure sure, a simple question, what schoolboy doesn't know what lightning is, right? Well the fact remains that when one gets right down to the nitty-gritty of it, even the experts are arguing amongst themselves concerning the many facets of this complex "thing". In my research for this article very few sources came up with the same answers.

To this very day no-one seems to know what "ball" lightning really is. I once saw this phenomena just after a severe electrical storm. It darted above the ground at about 5 feet, did a couple of quick turns and fortunately for my chum and I took off in the other direction.

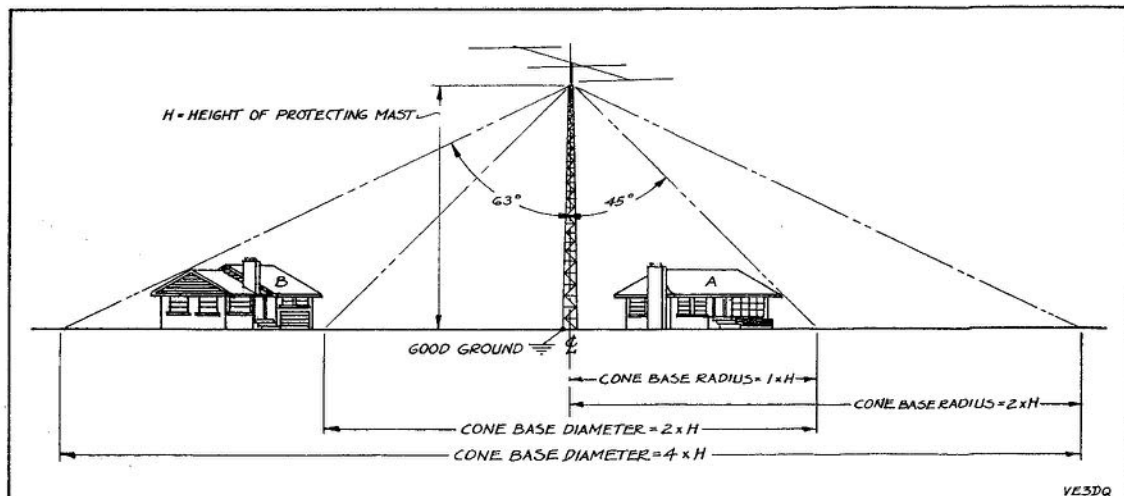
So how do you protect your property from nature's wrath? Is it really that dangerous? I'm sure my neighbour has a new-found respect for it.

As the drawing illustrates, your nice

new tower is a giant lightning rod that can be made to work for you! The drawing shows the "cone of protection" or "angle of shielding". Building "A" located within a 1 to 1 (radius to height) cone, or a 45 degree angle of shielding, will be protected against practically all strikes. Building "B" within the 2 to 1 cone, about a 63 degree angle, will be protected against the vast majority of strikes. (As an argument for getting that nice new tower installed, your neighbour's property will also be protected if it falls within the "cone"!)

Here are some facts that came to "light" during my research and which may be of interest. Did you know that each minute (60 secs) over 100 lightning bolts bombard the earth (6000 per hour), and by the way it does strike twice in the same place--don't be fooled by that bit of garbage. The bolt itself is a series of discharges, usually about 20, delivered at the target in the blink of an eye. The light we see is actually the path of burning air (ionized) through which the bolt has passed. This fiery flash is so intense that it literally explodes the air molecules with the detonation we know as a thunderclap.

Lightning can generally be compared to static electricity; but static is relatively harmless, right? So what causes the damage? Well it's the current which



can be tremendous - from about 1000 to 300,000 AMPERES, (depending on which expert you listen to). Regardless, that is certainly a lot of "Zap". For instance, compare those figures with what it takes to light a 100 watt lamp (less than an amp)...So how thick is it? The experts are still arguing on its dimensions, which are difficult to measure for obvious reasons. It is however, generally agreed that the actual "core of energy" in an

average bolt is about 1/2 to 3/4 of an inch thick. The ionized gas produced by its path appear to be 4 inches thick.

This short article on lightning is only the "tip of the iceberg" on the reams that can be written about the subject. If it has given you something to think about because your tower is NOT grounded then it will have served its purpose.

Do not under-estimate Nature's Artillery.

The



## Spacecraft

Extracts from an AMSAT Press Release by Perry Klein W3PK and Joe Kasser G3CZ

### Introduction

The AMSAT-OSCAR D, the next Amsat spacecraft in the Oscar Amateur satellite series, is due for launch in February 1978. It was built over the last two years by Amateurs in Canada, the United States, West Germany and Japan and is also the first spacecraft in which Amsat, Project Oscar and the ARRL have joined together in building flight hardware.

Amsat-Oscar D carries transponders for two modes of operation. There is a conventional 145.9 MHz/29.4 MHz Mode A transponder, and a new 145.9 MHz/435.1 MHz Mode J transponder, a similar frequency combination that was pioneered by the Oscar IV spacecraft in 1966. Six channels of telemetry are provided to monitor the onboard status of the spacecraft. The spacecraft makes extensive use of parts left over from the Amsat-Oscar 7 and Phase III programs.

### Mission Objectives

The principle objective of the Amsat-Oscar D is the educational use of a low orbiting satellite. It is to provide a means for the use of such a satellite as an educational tool in schools or other

educational institutions. Other objectives include the continuation of communications demonstrations by means of stations in the amateur-satellite service, of the feasibility of using satellites with small amateur terminals for communication in the 'bush', in emergencies, between medical centres and isolated areas, aeronautical, maritime and land mobile communications and direct satellite-to-home voice 'broadcasting' to simple amateur receivers. The craft can also be used to demonstrate special operating techniques adapted to low orbits, and to test the new Mode J frequency combination for small terminal users.

### Description

Amsat-Oscar D is in the Amsat Phase II (low-orbit) series, designed to operate with small non-commercial stations in the amateur satellite service. It contains two communications transponders and command and telemetry systems. It is solar powered, weighs 60 lbs., measures 13 x 15 inches and has an anticipated useful operating time of three years.

Normally, only one of the two transponders will be operated at a time because of battery constraints.

### Two-to-Ten M Transponder - Mode A

The Mode A transponder is a two-to-ten metre unit similar to the one on Amsat-Oscar 7 and with the same frequency passband (input frequency passband february 1978 - page 41



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band of 145.85-145.95 MHz, and output frequency passband between 29.40 and 29.50 MHz). A 250 mW telemetry beacon provides telemetry data in Morse code at 29.402 MHz. About -95 dBm is required at the transponder input terminals for an output of one watt. This corresponds to an effective radiated power from the ground of 80 watts for a distance to the satellite of 1,200 miles and a polarization mismatch of 3 dB. The transponder translation frequency (input frequency minus output frequency) is 116.458 MHz. Thus the relationship between the uplink (fu) and downlink (fd) is as follows:

$$fd = fu - 116.458 \pm \text{Doppler}$$

where both fd and fu are in MHz.

For example - an uplink signal at 145.900 MHz will produce a downlink signal from the transponder on 29.442 MHz  $\pm$  Doppler.

As in the functioning of the two-to-ten metre transponders in Amsat-Oscar 6 and 7, the passband is not inverted, and upper-sideband uplink signals become upper-sideband downlink signals. Output power is 1 to 2 watts.

Note that the downlink frequency will be slightly different (8 kHz) to that of the equivalent Amsat-Oscar 7 Mode A transponder that has an equivalent frequency relationship of

$$fd = fu - 116.450 \pm \text{Doppler}$$

## Two-Meter-to 70cm Transponder - "Mode J"

The second transponder, constructed by members of the Japan AMSAT Association in Tokyo, uses a two-meter input, 70 centimeter output combination which has not yet been flown in the AMSAT Phase II series. A similar combination was used in the short-lived OSCAR IV spacecraft in 1966.

This transponder, Mode J, operates with an input frequency passband of 145.90-146.00 MHz, and an output frequency passband of 435.10-435.20 MHz. Power output is about 1-2 watts PEP, and the output passband is inverted, i.e., upper-sideband uplink signals become lower-sideband downlink signals. The

transponder translation frequency (input frequency plus output frequency) is 581.1 MHz  $\pm$  Doppler. Uplink sensitivity for one watt output is -105 dBm, corresponding to an eirp from the ground of 8 watts for a distance to the satellite of 1200 miles. Note the greatly improved sensitivity of this mode, and keep your power down. A 100 milliwatt beacon carries telemetry at a frequency of 435.095 MHz.

The relationship between the uplink (fu) and downlink (fd) is:

$$fd = 581.1 \text{ MHz} - fu \pm \text{Doppler}$$

where both fd and fu are in MHz.

## Antenna System

Both the Mode A and Mode J transponders use the same receiving antenna, a canted turnstile comprised of four 19-inch lengths of 1/2-inch carpenter's rule fed by a hybrid and matching network so as to develop circular polarization.

The Mode A ten-meter downlink antenna is a linearly-polarized dipole, oriented perpendicular to the stabilization magnet in the spacecraft as in AMSAT-OSCAR 6 (but unlike AMSAT-OSCAR 7, which has the ten-meter antenna parallel to the axis of the magnets).

The Mode J 435 MHz downlink antenna is a simple monopole, linearly polarized, and located on the top of the spacecraft. Note that its location may result in some radiation shielding at high Southern Hemisphere latitudes.

## Power System

The spacecraft contains solar panels on its four sides which, combined with a 12-cell, six-ampere-hour rechargeable nickel-cadmium battery should power the spacecraft with a positive power budget in Mode A for several years even considering solar cell degradation in the radiation environment. The power drain in Mode J, however, is somewhat larger, and so the Mode J transponder probably cannot be operated continuously.

## Launch Interface and Orbit

The AMSAT-OSCAR D is being launched from the NASA Western Test february 1978 - page 43

# AMSAT-OSCAR D

Range as a secondary ("piggyback") payload with the NASA LANDSAT-C earth resources technology satellite and the NASA PIX (Plasma Interaction Experiment). Programmed orbital parameters are:

Apogee: 577 statute miles  
Perigee: 549 statute miles  
Period: 103 minutes  
Inclin.: 99.0 degrees  
Time of Descending Node: 9:30 AM  
(launch window from 9:30-10:00 AM)

The orbit is planned to be sun-synchronous, with passes repeating at the same time each day on a one-day cycle (as opposed to the two-day cycle of AMSAT-OSCAR 6 and 8).

## Operating Schedule

Since the prime mission of the spacecraft is to use the Mode A transponder for the ARRL OSCAR educations program in schools, the spacecraft may be left in Mode A during weekdays (Mondays through Fridays, U.S.A. time), and put in Mode J on weekends. Note that all communications should conform to the G3 ZCZ band plan.

If it is not an excessive burden on the telecommand stations, evening orbits in the Western Hemisphere (morning orbits in the Eastern Hemisphere) can be switched to Mode J, battery permitting.

In any case, all operation in Mode J will require careful monitoring of the battery charge level (as indicated from channel 3 telemetry, battery voltage). The power budget may not support the Mode J transponder for fulltime, continuous operation in this mode over an entire weekend.

Details of the operational modes of the spacecraft will be announced by AMSAT in the Newsletter, and late updates on the AMSAT Nets.

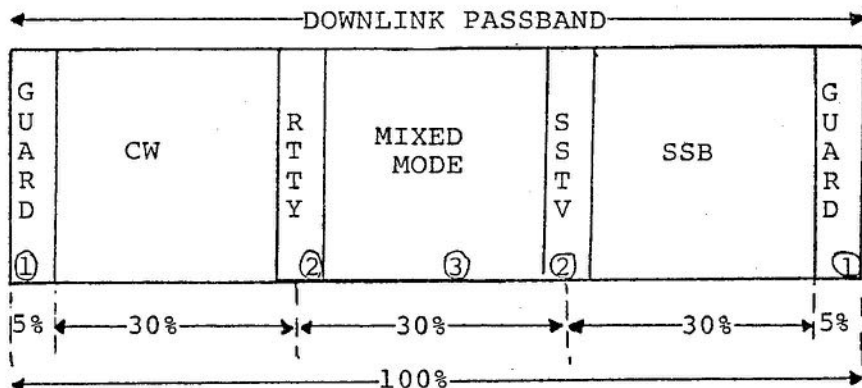
AMSAT-OSCAR D will operate in a 560 statute mile orbit, i.e., at just over half the altitude of the 910 statute mile orbit of AMSAT-OSCAR 7. Thus, communication ranges will be different. The usable time on an overhead pass will be about 18 minutes instead of 22 minutes and the horizon range will be 2000 miles instead of 2450. This means, for example, that trans-Atlantic communications will still be possible but not as often as with AMSAT-OSCAR 7.

Keeping track of this satellite, however, is going to be much simpler. It will come into range at the same time each day (more or less); the overhead descending node pass is planned for (9:30 AM local time).

(For the full text of this AMSAT press release, send 25¢ in coin or stamps to CARF Inc. Box 356, Kingston, Ont. K7L 4W2)

## The G3ZCZ Satellite Band Plan

This band plan has been adopted by AMSAT as the recommended operational usage of the AMSAT-OSCAR communication



# Publications:

- \* **Canadian Amateur Radio Regulations Handbook** - up-to-date interpretation of Canadian Amateur Radio Regulations written in language you can understand, plus more useful information concerning the operation of a station in the Canadian Amateur Experimental Service.
- \* **The Canadian Amateur Certificate Study Guide** - contains the technical and operating information necessary to successfully pass the latest DOC Amateur examinations.
- \* If your Club is running classes, the new **Instructors Package** is now available to go along with the Canadian Amateur Certificate Study Guide. Lesson plans, hints on teaching Morse, large diagrams suitable for making overhead transparencies or slides, typical exam questions, and more ... all compiled by professional electronics teachers. Only \$2.50!
- \* A 35 mm slide package with diagrams is also available for \$5.00!
- \* **Advanced Certificate Study Guide** available in August --- for details see the Canadian Amateur.

## Logo Stickers

New CARF Logo Adhesive Labels are now available from CARF, Box 356, Kingston, Ont. K7L 4W2. Two sizes are available: 6 x 2 1/2 and 3 x 1 1/4. Both sizes are 35¢ each or 4/\$1.00.

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# AMSAT-OSCAR D

tions transponders. This conforms to the normal downlink usage of the AMSAT-OSCAR 7 satellite over Europe.

This plan allocates a percentage of the available radio frequency spectrum as seen on the downlink to different modes of communication. The relative amount of spectrum for each mode is thus the same for any transponder in any satellite.

## NOTES:

(1) Guard area to avoid interference to beacons. These frequencies are available for Emergency and Bulletin Stations.

(2) RTTY and SSTV are placed at the

edge of the CW and SSB passbands, conforming to their usage at HF where RTTY is present within the CW space and SSTV is transmitted in the SSB subband.

(3) Mixed Mode Area. This is recommended for crystal controlled stations, or by Dx-pedition stations, or anyone wishing to work both CW and SSB stations.

This band plan is always based on percentages of the downlink passband. It applies to both inverting and non-inverting transponders. The allocations of frequency for AMSAT-OSCARs 7 and D are as follows.

| DOWNLINK PASSBAND |         |    |         |            |         |     |       |             |
|-------------------|---------|----|---------|------------|---------|-----|-------|-------------|
| LF                | GUARD   | CW | RTTY    | MIXED MODE | SSTV    | SSB | GUARD | HF          |
| MODE A            | 29.4    |    | 29.435  |            | 29.465  |     |       | 29.5 MHz    |
| MODE B            | 145.925 |    | 145.94  |            | 145.96  |     |       | 145.975 MHz |
| MODE J            | 435.1   |    | 435.135 |            | 435.165 |     |       | 435.2 MHz   |

Note: Mode A Guard Channels 5 kHz Non-Inverting Passband  
 Mode B Guard Channels 2.5 kHz Inverting Passband  
 Mode J Guard Channels 5 kHz Inverting Passband

## New deals for Clubs

The Canadian Amateur Radio Federation now has a special deal for clubs and students. This deal is designed to encourage club-sponsored courses on Amateur Radio and to gain support for your national society. For \$13.00 a student receives a copy of the Certificate Study Guide and the Regulations Handbook and a year's membership in CARF--a saving of \$3.00. In addition, the club sponsoring the course will obtain, as a bonus, a copy of the Instructor's Package when 5 orders for the Package Deal are received and a set of 35 mm slides for use with the Instructors Package when 10 Package Deals are received.

The CARF National QSL Bureau address is P.O. Box 66, Islington, Ont. M9A 4X1. For information on how to use the service, see page 45.

### BANNED COUNTRIES LIST

Iraq, Khmer Republic\*\*, Libya, Pakistan, Somalia, Turkey, Viet-Nam\*, Peoples Democratic Republic of Yemen.

\*-Stations XV5AA, XV5AB and XV5AC were authorized to exchange communications with Amateurs of other countries by the former Saigon regime.

\*\*-Station XU1AA has been authorized to exchange communications with Amateurs of other countries.

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Note: all Commonwealth countries are eligible for reciprocal operating privileges to Canadian Amateurs.

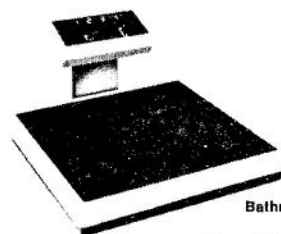
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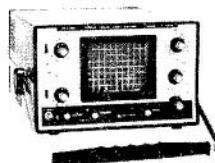


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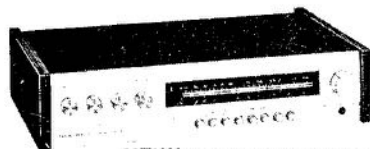
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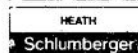
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