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# the canadian amateur

September 1978

No. 8

## CARF requests phone extension

One of the items discussed at the National Amateur Symposium last year was an extension of phone privileges on 40 metres for Canadian operators.

Your Federation has written to DOC asking that this recommendation be implemented.

In the 40 metre band, only 7000 kHz to 7100 kHz is available to Amateurs on a world-wide basis and all countries with an Amateur Service except Canada and the U.S.A. permit their Amateurs to operate phone between 7050 and 7100 kHz.

Canadians are permitted phone operation.  
Continued on Page 2

## Canadian co-inventor of new mode

Tom Lott VE2AGF is the co-inventor along with two U.S. citizens, Professor Richard Harris of the University of the Pacific in California and a graduate student, WB6CZX, of a new mode of audio transmission called 'folded audio' or 'narrow band audio'.

Although its commercial potential is vast indeed, the first product using this system will hit the Amateur market. The Amateur gear will be an add-on with unity gain to go between the mic and the mic jack.

The main feature is more economical use of the radio spectrum ... for example, a SSB signal will be only 1.7 kHz wide, although 3 kHz of audio is actually being transmitted.

For the story of how this new and interesting development works, we reprint part of an article by Norm Brooks K6FO which appeared in 'Worldradio' of July 1978:

Tom played a recording at a dinner meeting of the Society of Amateur Radio Operators at Berkeley, California recently. He used it to demonstrate the effectiveness of the Harris "narrow band compression system".

Members and guests who were present agreed that the narrow band signal, using the new system, came through the noise better than a standard FM signal of equal peak transmitter power.

Continued on Page 33

## Folded audio to hit Amateur market

# **CARF** the canadian amateur

ISSN 0318-0867

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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VO1NP Nate Penney, Box 10, Shoal Harbor, Nfld. A0C 2L0.

## Slow speed net

A slow speed CW net, sponsored by the London, Ont. ARC will start on Monday, Sept. 18, 1978. The net is open to all and will operate on 3675 kHz at 7:30 p.m. (Eastern Time) Monday to Friday. Central station speed will be 10 wpm.

For further information please contact: Dick Reiber VE3IBV, 417 Regal Dr. London, Ont. N5Y 1J8.

september 1978 - page 2

## 40 M

Continued from Page 1

ation from 7150 to 7300 but not only is this part of the band swamped by Region 1 and Region 3 broadcasting stations, but we cannot conduct phone QSOs with the foreign stations in those Regions. CARF has therefore asked DOC to authorize Canadians to use phone (A3 and F3) from 7050 to 7100 kHz.

## VE3VCA draw winners

Amateurs who worked VE3VCA, the official CARF 'Voice of the Canadian Amateur' station in Kingston, were automatically entered in a draw for prizes.

Winners of a CARF publication of their choice are VE6ANF, 3DUK, 3HMT, 2HY and 7AAE.

VE3VCA schedule for September and October is:

Wednesdays 2330-0130 Z

Saturdays 1800-2000 Z

Sunday 1400-1600 Z Third

Sunday of each month only.

Primary frequencies:

CW: 14060 first hour of each operating period.

SSB: 14160 second hour of each operating period.

Secondary frequencies:

CW: 21060 and 7060

SSB: 21160 and 3760

Since the primary interest is in VE/VO/VY contacts, VE3VCA will use the 20 M frequencies when that band is open to other regions of Canada; the others will be used when Canadian QSOs are not to be found on the primary frequencies.

Beginning the first of November, with the return to EST, add one hour to the Zulu times shown, as the Kingston operators will maintain the same hours on local time as during the summer.

## Yukon QSLs

The Yukon Amateur Radio Association, PO Box 4597, Whitehorse, Yukon Y1A 2R8, handles all QSL cards for Yukon and guarantees delivery.

# WARC 1979 Report

## GOOD NEWS AND BAD NEWS

Early in August, the Canadian Inter-departmental Committee on WARC '79 released a supplement to the second draft of the Canadian position on post-1979 frequency allocations issued last April.

Good news is that the proposal to change the International Telecommunication Union Article 41 which would have permitted 'no-code' Amateur licences, has been deleted. Bad news is that the proposal to remove 420-430 MHz and 3.8 to 4.0 MHz (75 metres) from the Amateur Service still stands. Amateur comments on an international proposal to reserve 10 kHz in each Amateur band for world-wide communications during natural disasters have been invited. Last chance comments will close on August 31, after which the CIC will prepare the Canadian position for WARC '79.

CARF will study the supplement and will be making a final comment to the CIC.

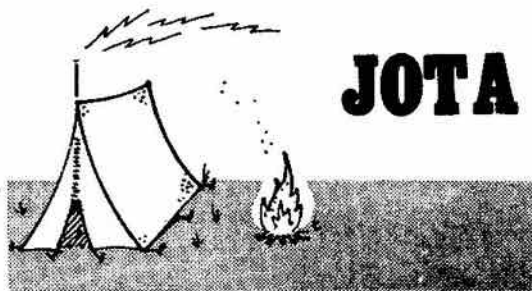
## VY1 Remembered

## Special calls

In addition to the special commemorative prefix 'CF' for VE and 'CY' for VO noted in our last issue, the prefix CF-8 has now been authorized by DOC Canada for VY-1 (Yukon Territory), despite the slight possibility of duplication of calls by VE8 operators who may also be qualified to use 'CF-8'. These special prefixes may be used by active, reserve and former personnel of the Armed Forces to commemorate 75 years of Canadian Armed Forces communications.

## Meteor showers . . .

- The Perseid meteor showers in the middle of August should have resulted in some interesting UHF and VHF propagation phenomena ... We would be interested in hearing about unusual DX related to the meteors.



# JOTA

## WORLD SCOUT JAMBOREE

Jamboree-on-the-air (JOTA) to be held Oct. 21 and 22, is an international Scouting program sponsored by the World Bureau in Geneva. It will take place from 00.01 local time Saturday on that weekend to 23.59 local time Sunday. JOTA acquaints Scouts with Amateur radio and lets them talk with other Scouts around the world.

The following frequencies will be used by Jamboree stations: CW - 3.590, 7.030, 14.070, 21.140, 21.140 and 28.190 MHz. SSB - 3.740, 3.940, 7.240, 14.290, 21.360 and 28.990 MHz.

The general call for JOTA will be 'CQ JOTA' on CW and 'CQ Jamboree' on SSB. All participants will receive certificates.

Scout leaders will be getting in touch with their local Amateur radio clubs to locate Amateurs who will participate.

The Canadian Scout national headquarters station, VE3SHQ, will be on all bands from 80 to 10 metres and Scout headquarters in other countries, including World Bureau station HB9S in Geneva, will also participate.

For details on how to get in on the action, write to: JOTA Co-ordinator, Canadian National Scout Headquarters, 1345 Baseline Road, Ottawa, Ont. K2C 3G7.

## Exams to continue

Last month we carried a statement from DOC HQ that no further exams would be held until the new ones were ready in October of this year. This has been modified, after several protests, to permit those who had made previous arrangements to write the existing exams until the end of September.



Canadian  
Repeater  
Advisory Group

### VE3DWL Hugh Lines

Thanks to Gordon VE6CCM and the Calgary ARA, we have received an update for the Calgary area repeaters. VE6FON is now on the air on 146.16/146.76. VE6VHF is located on Base Line Mt. near Rocky Mt. House and is linked via UHF with VE6RPT in Calgary.

The Pioneer ARC in Toronto advises that VE3PRT (448.3/443.3) now has a 23 cm input on 1297.12. They believe that this is the first installation of this type in Canada and one of only a few in North America. Future plans include further mobile testing and eventually a 'stand-alone' 23 cm repeater. A 1296 MHz solid-state mobile FM transceiver has been built and is being used in these tests. A new repeater in Ottawa is VE3ROB with an input of 145.32 using CW and an output of 3540 kHz.

From Gord VE3EYW we have some changes from Northern Ontario. The

Montreal River repeater VE3LSP is no longer at that location but is now in Elliot Lake. It is not on the air yet as the previous frequency of 16/76 is unusable. They have not yet chosen a definite pair yet. There is a repeater on the air from Chelmsford, VE3JIQ on 146.16/146.76, and a new repeater in Sault Ste. Marie is VE3SAP on 147.75/147.15 with an autopatch.

VE3DTP in Toronto is really VE3TDO and is on 146.43/147.03 vice 146.235/146.835, VE3TFM on 222.38/222.98 is not in operation and VE3UKW 449.0/444.0 is not on the air.

New repeaters in the Toronto area are VE3RAG (146.07/146.67) in Barrie, VE3IL (146.07/146.67) in Pickering, VE3YRC (147.225/147.825) in Aurora and VE3TWR (449.4/444.4) in Toronto. In Ottawa, the Canadian Police College ARC has a new repeater VE3CPC operating on 147.75/147.15.

In Quebec, Bruno VE2FDT advises that VE2RDV was originally on 146.25/146.85 but is now on 147.69/147.09. It has an operational range of about 25 miles and is autopatch equipped.

Gerry VO1GR advises that the Corner Brook Nfld. machine is VO1MO, not VO1KI. The reason for the call change is to perpetuate the memory of William Lyall, a club member and ardent 2 metre' operator who died accidentally two years ago.

From SONRA we hear of two new machines in St. John's, Nfld. VO1EN is on 146.46/147.06 and VO1PG, with autopatch facilities, is on 146.19/146.79.

Don VE1RI sends along lots of news from Nova Scotia. VE1JD has been replaced by VE1SYD in Sydney on the same frequency (34/94). It is autopatch equipped and operates from the CBC Tower in Sydney. VE1HAM is a new repeater operated by the Cape Breton Repeater Group and is located in Rear Boisdale on 146.28/146.88. This new machine is by far the best repeater to cover the Trans Canada Highway between the Canso Causeway and the Sydney area. VE1BVH is a new repeater in Big Harbour, near Baddeck, on 147.72/147.12. Two repeaters are also proposed, one in North Sydney and an RTTY repeater somewhere in industrial Cape Breton.

That's it for September ... keep the information coming.

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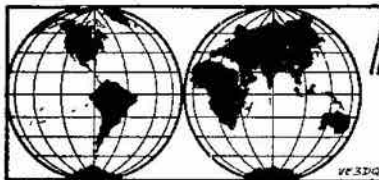
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Rothesay, E0G 2W0, New Brunswick.



# INTERNATIONAL NEWS

-- The FCC in the USA have ruled that CB rules violators and 'HF' outlaws have lost their right to upgrade (legitimately) to an Amateur licence.

-- HR Report notes that the Venezuelan government has prohibited phone patching as of June 20 this year.

-- Teletype fans will be interested to know that the FCC is probably going to okay ASCII, Amateurs as a whole will be interested to hear that the FCC is also considering a proposal that signal bandwidth be used to set up subbands in the Amateur frequencies.

-- ARRL directors have decided to ask FCC to permit novices to have full privileges on 220 MHz. Novices (5 wpm code) now have five year licences ...

renewable ... which makes them a permanent fixture on the US scene.

-- Strong objections from overseas operators was a contributing factor in the FCC rejecting requests for expansion of US Amateur fone bands.

-- Although YI1BGD Bagdad, Iraq, is working US stations, according to US sources, to date the DOC has had no reply to its official query through ITU as to whether or not the Iraqi government has lifted its ban on Amateur operation.

-- A usually reliable source reports that the USA and the USSR conferred on WARC '79 matters during August; also that the USSR is interested in expanding the Fixed Service into the 20 metre Amateur band.

## The 25 second Tower

Winner of the \$25 prize for the best Field Day story is Doug Cormier VE1 BCN, president of the Charlottetown, P.E.I. club who submitted the following account of this year's event in the 'Garden of the Gulf'.

Field Day '78 on Prince Edward Island was a super event. We used a large field at the beautiful Brudenell Provincial Park on a site overlooking the warm sandy beaches. Main event was the World's Championship Tower Climbing Contest. Entrants had to climb a 30 foot tower, attach a two-metre antenna to the mast, attach coax to the antenna and descend. Contestants had to touch all rungs on the tower on the way up and on the way down. The World's Champion is now VE1AIC, Ron Mackay. Ron's record of 25.6 seconds timed by two judges was nothing short of fantastic. We issue a friendly challenge to any club at next year's field day to try to break our record. Ron received a trophy and is the reigning king of tower power. Our tower next year will be 40 feet high.

Another event was the combined road rally and transmitter hunt. The road rally had several courses and all ended at the junction of five different roads. From this point the hidden Xmitter

could be heard. With five roads to choose from, the reflective power of salt water and the transmitter hidden on a secluded beach, a real challenge was assured.

The super-sleuth who won this event was Jim Ewing VE1ABU with his eagle-eyed team-mate Eddie Leblanc VE1EJ. The second team to find the transmitter was led by veteran Gord Beaman VE1 EO who only discovered the transmitter when he actually touched the antenna with his D.F. loop.

Very special thanks go to the four lovely girls in bathing suits who concealed the check-point Amateur from view in the nicest and most unusual way. Wow!

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# Radiation hazards

-- fact or fancy?

What happens to the body of an Amateur radio operator when he uses a hand-held VHF or UHF rig?

Much has been written recently about the biological effects of radio waves, some of it fact and some of it fancy.

To hear the latest word on this question, the CARF forum this year will feature VE1PZ, Dr. Peter Ruderman, Dean of Administrative Studies at Dalhousie University, Halifax.

Peter, who is a world-traveller in the course of his assignments for the World Health Organization, will both entertain and inform those attending the convention with his style of address.

In the belief that information on the usual topic of regulations and other facets of the hobby can be gleaned from The Canadian Amateur and other forums, CARF was pleased indeed to have Peter accept our invitation and sponsorship to provide something different for convention goers. He will speak on "Fact and fancy in the Radio Spectrum -- Real and

Imagined Hazards of Non-Ionizing Radiation".

## Experimenter details

As reported in our last issue, DOC had planned to make public at the Montreal club hamfest on August 6 the details of a new proposal for the no-code Experimenter certificate but it was not available in time. Business matters also prevented Dr. John deMercado, the Director General of DOC's Telecommunications Regulatory Service from attending.

Two working groups within DOC have been ironing out the new proposal and by the time this issue reaches readers, the details should have been made public and also released through the CARF News Service.

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# "DOC Nazis" Bootlegger claims

The following story, taken from the Lakehead ARC bulletin "Hi-Q" apparently appeared in a local newspaper. It will not wring many tears from the eyes of Amateurs and is printed here for its amusement value if nothing else.

"A Schreiber Ontario man may face charges for the operation of an unlicensed radio station. The equipment was seized in mid-May. (The man) said that representatives from the federal department and an RCMP and OPP officer came to his home on May 12 and confiscated his gear, valued at more than \$2000.

"(The man) who admitted to operating the station and being warned a year ago to stay off the air was disturbed at what he termed "Gestapo Tactics" of the officials. The officials when they came to his house to seize his receiver, transmitter, telephone patch and power supply unit, threatened his wife, he said. "They told her if she did not open the door they would break it down and subdue her. They did the same thing a year ago and I don't like the way they acted ... just like Nazis," he said. "I feel this is a denial of my rights," he added.

"(He) went on to say his wife had asked the men to wait until he came home but they would not. "I would have been home in another half hour and I could have talked to them, but no ... they just went ahead and ripped everything out with wire cutters."

"Turall says he has contacted MP Keith Penner and his lawyer in the matter.

"The seizure was made following complaints from other radio operators in the area, Mike Nawrocki, acting district manager for the DOC said. A report has been filed to the federal minister responsible and it is up to her whether charges will be laid in the matter, said Mr. Nawrocki. (The bootlegger) faces a \$2,500 fine or a year in jail if charged and convicted; As well, all of the equipment may be seized by the Crown.

"Nawrocki stated that (the man) had been warned on a previous occasion. He had not obtained a licence.

"Also seized were a number of QSL cards which have call letters from Amateurs around the world and (the Man's)

log book. He was believed to have used a VE6/portable as well as VE3 call in his operations. In an interview later on radio, the man stated the code requirement was ridiculous and too hard."

## New policy for affiliation

A new policy for club affiliation with CARF has scrapped the requirement of its having at least five CARF members and now all that is required is a letter from the club executive requesting affiliation with your national society.

Affiliate clubs receive copies of the CARF News Service bulletins and News Releases and free use of the CARF out-going QSL Service for the club station. In addition, Affiliate members will now receive a rebate of \$1.00 for all new CARF members whose application comes through the club. This rebate is available only from September 1 to November 30, 1978.

Note that CARF is the Canadian Amateur radio operator's own organization. It is controlled, managed and fully financed by Canadians. CARF is fully dedicated to the Canadian Amateur and to the belief that Canadian Amateurs are best able to determine their own needs, free of any foreign influence, control or support.

## Notice--

A number of owners of Heathkit HW and SB series rigs have reported problems with final circuits when they have replaced the original 6146 tubes with 6146 B tubes. Tipped off by Glen McMichael VE3CGU about his problems and those of others when trying to get rid of a parasitic in the final tank circuit of HW-100 and SB-101 equipment, and by advice from Heathkit, CARF passes on the information that 6146 type and not 6146 B type tubes should be used as a replacement in these rigs.

# National Symposium

The National Amateur Radio Symposium, convened by CARF, and sponsored this year by the Calgary Amateur Radio Association under the auspices of the Amateur Radio League of Alberta, is scheduled for the end of this month.

Theme of the September 30 meeting will be "Modernizing the Amateur Radio Regulations". Four workshops will consider separately regulations, frequency allocations and plans, certificates and examinations and digital computer communications.

The symposium is a working meeting and those who accept an invitation to attend are prepared to contribute to the deliberations from their knowledge and expertise in their particular field.

The symposium offers an unique opportunity to have your ideas and suggestions presented to the people who make the regulations ... in person. DOC headquarters personnel, including Dr. John deMercado, Director-General of the Regulatory Service, Senior officials of the Service, Messrs. W.W. (Scotty) Scott, Vic Decloux, and John da Silva are planning to attend, along with officials from DOC Regional Offices.

Calgary club officials have arranged for one of the new DOC vans with its

sophisticated equipment for frequency surveillance to be on display at the symposium. The vans are an essential part of the frequency management program of the Department.

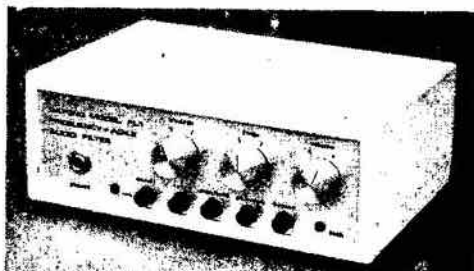
Those organizations or individual Amateurs who wish to make some viewpoint known but who will not be directly represented have been asked through a circular letter and in the last issue of this publication to submit a brief or letter to the Symposium. These written submissions will be considered in the deliberations of the working groups. The cut-off date was September 1. Late submissions may be accepted and will be forwarded to DOC if they miss the closing date for the agenda distribution.

Enquiries concerning details of the meeting can be had from the National Amateur Radio Symposium Committee, c/o Committee chairman R.H. (Bob) Eccleston, VE6EX, 5359 Dalhurst Cres., N.W. Calgary, Alta., T3A 1P6.

## 'Hi-Q' for blind

- The Lakehead ARC publication, 'Hi-Q', is put on tape by John VE3HTM, Arnold VE3JAA and Denny VE3EUI and sent to seven blind Amateurs in the area.

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# LETTERS TO THE EDITOR



## Tape Drive

The South Pickering ARC has recently launched a project to collect \$730,000 in Dominion Stores cashier's tapes in order to obtain an electric wheelchair for one of its members, Don Green, VE3HDV.

As we are a small Club this would require a prolonged period of time so we are endeavouring to solicit the assistance of as many Amateurs as possible.

Tapes should be forwarded to: South Pickering Amateur Radio Club, P.O. Box 353, Pickering, Ontario, L1V2R6.

Lynn Weber VE3GXP  
Secretary

## Friendly Amateurs

Back in 1946, the writer had the desire to become an Amateur radio operator. But, unfortunately, incidental things like 'earning a living', 'studying for a degree' and 'starting and raising a family' somehow got in the way. Funny how a man can get his priorities mixed up!

How to break into the Amateur radio fraternity was totally unknown to me, further complicated by business world travel resulting in long periods away from home. Judicious detective work ran down a gentleman by the name of Ray Hunter VE3UR, known affectionately as 'Uncle Ray', who had a weekly class in Etobicoke, Mississauga.

I had a problem keeping up with the class due to business absences. I was totally ignorant of the fact that Canada had its own publication in the form of CARF's The Canadian Amateur and so published an advertisement in 'CQ' asking for help.

Several people responded to this plea, among them Dr. Roland Suran. Rolly is a keen and distinguished DXer and I am still amazed that he devoted every Saturday afternoon (and I was in town many evenings also) to make sure that I understood the theory and did not just

learn everything parrot fashion.

I must make it clear that none of what I call my professional tutors would take any kind of reward for their services even though in each case I tried initially to keep it on a business basis. Fortunately, in each case I was able to find some method of assisting them in other ways that eased my conscience.

During my many months of involvement, I must say that I have met many fine people who made initial introductions at club meetings, flea markets, etc. I thought I was in a desert, alone, without assistance, and then found I was surrounded by Amateurs who were considerate, informative, and always willing to give help.

Steve Roberts  
Mississauga, Ont.

## New calls?

Seems to me, since the United States has just restructured their Amateur call signs and since the DOC has just changed the Yukon prefix to VY1, that it would be an excellent time to change all Canadian Amateur calls.

There is no reason, considering the prefixes assigned to Canada, that all Canadian Amateur stations could not have a five character call. With a two letter prefix (and using the digits one through zero), assigned to each province, territory, vessel and experimental service. The three major provinces could be assigned two consecutive prefixes, and in this way there would be no foreseeable limit to the number of five character combinations.

At least some constructive criticism on the subject might help in diverting the powers that be, to something other than removing the CN requirement for Amateur licencing.

Spurgeon G. Roscoe VE1BC  
1st Class Cert. 6-89

---

The address of the CARF QSL Bureau is Box 66, Islington, Ont. M9A 4X1.

---

# Marine CB on 220 MHz?

In the introduction to the recently issued supplement to the Canadian government proposals for post 1979 frequency allocations, there were a couple of comments that should interest Amateurs, although no specific proposals were made.

The paper noted that there existed a requirement for a 'maritime mobile small craft personal communication' which might be satisfied either in the requirement for a "maritime mobile small craft personal communication that might be satisfied either in the 216-225 MHz band or in the UHF spectrum" and for a "duplex maritime mobile ship-to-shore service" which could be allocated a place in the "400 MHz band or in another portion of the UHF spectrum".

The statement closed with the remark "... the requirements will be satisfied".

Of interest to satellite operators is the note that "as a result of bilateral meetings with other countries, we have been made aware that Amateur satellite allocations are unacceptable to many unless the allocation is made on a world-wide basis. It is therefore anticipated that Canada will have difficulty in negotiating the proposed Amateur satellite allocation 222-223 MHz band."

A footnote (318) to the ITU allocation table permits the operation of radio

altimeters in the shared Radiolocation/Amateur band 420-450 MHz but the Canadian Interdepartmental Committee for WARC '79 proposes to seek its removal.

## Sins of Omission

"To err is human..." We left off the credits for 'Etching made easy' on page 27 of our July/August issue ... apologies to author Gord Woroshelo VE3EYW.

Apologies also to our equipment reviewer, Dave Robinson VE3BTY, for the same omission on page 35.

Having dealt with the sins of omission let's pass on to one of commission ... although our report on the Quebec government's largesse to a VE2 Amateur organization, noted in earlier issues, was printed as received, it turns out that the \$55,000 grant went to the St. Lawrence ARC (not to RAQI) and was in the form of repeater equipment to cover the Gaspé area. RAQI did, however, receive a grant to cover the salary of a full-time employee and various meeting expenses.

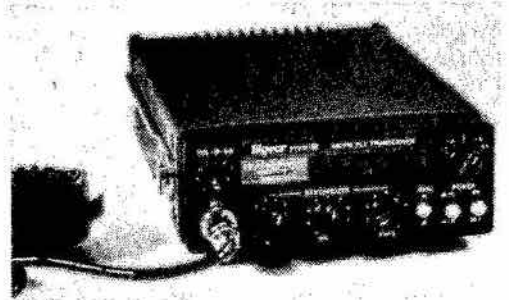
(RAQI also informed us at press time that its annual convention would be on 25-26-27 August, at Sorel.)

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# CQ Oldtimers

Having spent several years and more money than I should have, on collecting the history of marine communications in the Halifax area and having exhausted all possible sources I can think of, I would like help in locating the following:

1) Copies of the original Marconi two letter call codes, as they were known. These were issued from the beginning and changed around 1906 to three letters with the prefix being the letter M.

These M prefix calls remained in effect until the London Radiotelegraph Convention of 1912 at which time these calls were changed so that the prefix indicated the country of origin.

2) A vessel's flag signal call code and her wireless call did not become one and the same until sometime around the ITU convention held at Berne in 1933. One of the more dramatic distress calls answered in this area, was on April 21st, 1925, when the Japanese vessel 'Raifuku Maru' sank with all hands. 'Arleux' was the Canadian vessel involved with this distress, using call code CFL. I believe the Raifuku Maru's wireless call was JRF and her flag call KLRP and 'King Alexander'. I have been unable to locate the wireless call for either 'Homeric' or 'King Alexander'. They would have been three letters and the prefix should have been M. If anyone could provide these calls and might know where I could locate the operators names involved, it would be most appreciated. Masao Hiwateri was the 29 year old operator with less than a years experience, that went down with JRF. VE1BY took charge of 600 meters with VCS, Camperdown Radio, at that time.

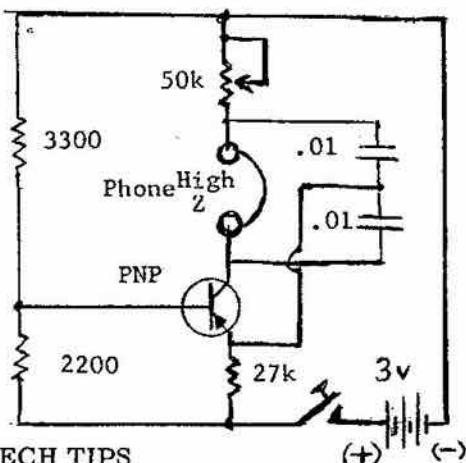
3) The Canadian Marconi Company has not given me any information and because the British Marconi Company has been most helpful, my history will be rather lop-sided in describing British equipment and stating ours was more or less the same for that period. We have had an excellent record and this is the one I want to record. If anyone could provide me with some detail on the equipment which has been manufactured in this country, it would me most appreciated. I would also like a photo of any of the radio rooms on our warships, especially the war time ones and of our

famous "Park" Vessels, with brief descriptions of same.

4) Other organizations have been most helpful. Although the R.C.M.P. Historian too, has been most helpful. no one seems to have a record of the radio detail on six of the pre-World War II RCMP vessels: 'French', 'MacDonald', 'Arresteur', 'Laurier', 'Detector' and the 'Acadian'.

From a photograph of 'French' I have broken it down to CGSR. If this was her wireless call, it is rather unusual because all the others I have located with a CGP prefix (except 'St. Roche' with VGSR). Apparently the stations installed on 'Arresteur' and 'Detector' were constructed from some sort of kit by the first operators assigned to these two vessels. The detail on this would be most interesting.

Anything pertaining to the history of marine communications would be most appreciated. I am more than willing to pay any reasonable fee for photos, photo copies, postage, etc. Contact Spurgeon G. Roscoe VE1BC, Box 1, Site 5, Armadale, N.S. B3L 4J5.



## TECH TIPS

Here is a very simple code practice oscillator that requires only a handful of parts and produces a good clean sine wave.

Another bonus is that it only draws a couple of mils of current from a 3 volt battery. The PNP transistor is any garden variety of audio or similar types, it is not at all critical.

Mike Turik VE3BJK in the Windsor 'Groundwaves'

# news briefs

- Although there was no Atlantic convention this year, old-timers in the Maritimes organized a picnic at Fort Beau-sejour on the NB-NS border.

- The Canadian Amateur Radio Tele-type Group (CARTG) is sponsoring the 18th annual Canadian-U.S. 'Dominion Sweepstakes' on the weekend of October 21-23. Operation runs through 0200 GMT 21 October to 0200 GMT 23 October. Info can be had from CARTG, 85 Fife-shire Road, Willowdale, Ont. M3L 2G9 ... send SASE.

- According to 'Hi-Q', DOC is seeking information as to the location of a station signing as 'VE3FEC' which is reported as having listed Thunder Bay as its location.

- A brigade of 90 Boy Scouts and adults in 45 canoes followed 150 miles of the North West Fur Trading Company route from Dog River, Dog Lake, Kaministiquia River to Old Fort William on the Kaministiquia River arriving July 2, 1978.

Safety communications were provided by VE3HFS, VE3AJ, VE3AYZ, VE3EDW, VE3JAB, VE3JAJ, VE3JAR, VE3JAY,

VE3KRK and Scout Commissioner VE3 KRO.

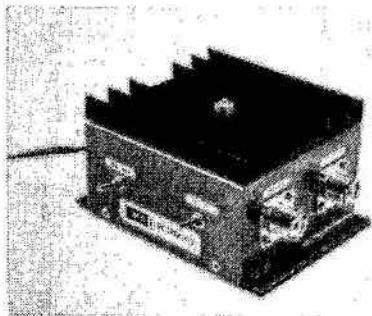
The scouts, dressed in voyageur's costume, arrived at Old Fort William to the salute of cannons and the skirl of the bagpipes and were welcomed by the Minister of Industry and Tourism for Ontario, Fort officials and the public.

- Amateurs in Eastern Canada who are working for awards sponsored by 'CQ' Magazine may be interested to note that Stan L. Parsons, 144 Sussex Ave., Riverview, N.B. E1B 3A7, whose call is VE1RY, has been appointed as a check-point for Eastern Canada to assist Jack Reed VE3GMT. Applications for 'CQ' awards and information may be had from Stan if you send a SASE (self-addressed stamped envelope).

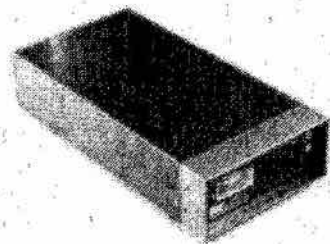
## Logo Stickers

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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# Consultative process reaffirmed

DOC's policy of consultation with radio spectrum users when regulations changes are contemplated, which has been demonstrated recently to Amateurs by its participation in the national Amateur symposium and in the case of the Experimenter certificate proposal, was recently reaffirmed by DOC's new deputy minister, Mr. Bernard Ostry.

In an interview with him published in a DOC house publication, the interviewer said, "Some people ... believe that there is not sufficient consultation on our part ... Do you agree with that?"

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## Best card contest

Glenn McMichael, VE3CCU, believes that there are lots of Amateurs in Canada who have a QSL card they have designed and are very proud of but of course you have to work them to get a look at their artistry (or sense of humor). To stir up a bit of activity in this area, Glenn is offering a series of prizes for the best three cards submitted in this contest.

The rules are; the QSL card contest is open to all Canadian stations; mail two cards to Glenn McMichael VE3CGU, Box 231, Goderich, Ont. N7A 3Z2 -- cards must be blank ... no writing on them. Entries must be postmarked before January 1, 1979, the closing date. Entries will be judged by five Amateurs in the Goderich area, Glenn, Jim Cooper, VE3CR; Bruce McCreath, VE3EAR; Bill Smith, VE3JFJ and Fred Looker, VE3ZL.

The cards will be judged on originality completeness of information and good design. Cards cannot be returned but the winners' cards will, it is hoped will be reproduced in these columns.

The prizes? Glenn will donate a Nye Viking heavy duty hand key to the first prizewinner, a Bill Orr W6SAI Wire Antenna Book to number 2 and the Callbook Radio Amateur World Atlas to the third winner.

CARF will sweeten the pot with a free copy of its Regulations Handbook to each of the three winners.

The deputy minister replied, "...I have seen every official of every lobby or industry that's asked to see me since I have been here. I have attended any reception or dinner they (user organizations) were holding that touched upon our work. Some of them have said that they have always had a close working relationship with this place and that they hoped it would continue and they have been reassured on that score. And they have said the same to the Minister and they've had her assurance as well."

"In one or two cases, reference has been made that in the past they have not been sufficiently close to the Department or the Department has not sufficiently consulted them. I have told them that if that is in fact the case, then it is something to be rectified."

---

## Rare DX: Sable Island?

DX chasers and country collectors were led up the garden path recently when a station signing "VGW-211" came up on 20 metres, and giving its location as Sable Island, off the Nova Scotia coast.

At press time the information we had was that there is a station on Sable Island alright, but it is not an Amateur station and an operator who didn't read the fine print in the regulations claimed that he just discovered that his certificate permitted him to operate on the Amateur bands and in his enthusiasm and ignorance made improper use of a government call sign on an Amateur frequency.

His activities didn't last long but he will no doubt be receiving a bundle of QSL cards!

(All's well that ends well, however. There is a group of government employees on Sable Island and when the hue and cry died down and the dust settled the commercial operators in the group appeared with a legitimate Amateur call, VE1MTA. Not only that but word was that the eight or so souls there are forming the Sable Island Amateur Radio Club ... who needs Clipperton Island?)

# Interference Regs

Call it Electromagnetic Compatibility (EMCAB), Radio Frequency Interference (RFI) or Electromagnetic Interference (EMI), this 20th century nuisance has, over the years, reached the point where more and more government regulation is required to control the problem.

A recent paper by G.H. Stewart of DOC outlines the history of such legislation in Canada and what lies in the immediate future in the way of control measures.

"The first regulation concerning radio matters was promulgated in 1913 under the authority of the Wireless Telegraphy Act. The objective of this document was to prescribe licensing requirements for certain radio services; however, there was no provision for the control of radio interference.

"A search of early records reveals that the earliest government publication concerning EMI was issued in May 1925. This document outlined some of the major sources of radio noise known at that time and suggested corrective action which could be taken to reduce the level of interference. However, no legislative action concerning EMI was initiated until 1936. At that time, a provision contained in Section 23 of the Canadian Broadcasting Act gave the federal government authority to issue regulations for the control of interference...

"In 1938, the Radio Telegraph Act was repealed and replaced by the Radio Act. This Act vested the Department of Marine & Fisheries with the authority to control and regulate radio matters

in Canada. It is interesting to note, however, that in the 1936 version of the Act there was no provision made to regulate interference; that came later in a 1953 amendment. One of the important aspects of the amendment was the inclusion of the word "sale". This meant the Department could now prohibit the sale, as well as the use, of equipment causing or liable to cause interference.

"In April 1959, the first specific, detailed EMI regulation, designated as the Radio Noise Limits Order, was promulgated as part of the General Radio Regulation Part I. This order limited the amount of radio noise that may be emitted by industrial, scientific and medical (ISM) equipment. The next step, in September 1964, was to broaden the scope of the Order to provide limits on the level of radio noise that may be conducted along household power lines from the horizontal sweep oscillators of television receivers.

"In October 1975, a regulation limiting the amount of radio noise that may be emitted from the ignition systems of internal combustion engines was introduced. At the same time, the old Radio Noise Limits Order was replaced by revised regulations limiting the level of radio noise from ISM equipment, TV sweep oscillators and ignition systems.

"This new document, known as the Radio Interference Regulations, constitutes the current legal control that the government exercises over EMI in Canada. It is important to recognize that these regulations give the Department complete authority to eliminate interference and not merely to establish reasonable limits. What we are doing by establishing limits is simply a relaxation of existing law and it is expected that this will result in a general lowering of ambient noise levels, especially in heavily populated areas.

"Looking to the future, the Department is planning to introduce, by Jan. 1979, a regulation that would limit the amount of radio noise to be radiated from high voltage power lines, one of the largest sources of EMI in Canada...

"Another regulation, which is antici-

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pated in the next few years, is one concerning radio noise generated by low voltage household appliances such as sewing machines, light dimmer switches, fluorescent lights, electrical blankets, etc. With an increasing number of new electrical and electronic devices being marketed each year, this type of EMI has become a significant source of EMI complaints.

"During the past few years, a number of complaints from owners of home entertainment equipment has risen dramatically and the Department has taken a number of steps which it hopes will ameliorate the problem. First, it has issued a document called EMCAB 1 which delineates the radio environment that may be encountered in typical urban and suburban communities. The intent of this document is to provide information that will assist manufacturers of electronic home entertainment equipment to design equipment that will have sufficient immunity to offset the effects of the strong signals found in many large cities. Also being planned for release in the near future is a document similar to the FCC's publication How to Identify and Resolve Radio-TV Interference Problems. The purpose of this document is to help the public identify those interference problems that can be resolved in a relatively straightforward manner, and to describe the corrective action that the reader can take to reduce or eliminate EMI problems.

"At this point in time, it is not the Department's intention to take legislative action which would force design changes on the manufacturers and suppliers of home entertainment equipment in order to insure improvements in the immunity capabilities of their equipment. Rather, the Department plans to en-

courage manufacturers to develop voluntary standards which would dissuade them from the further development and manufacture of equipment that is lacking in immunity capability."

## RSO Convention



The Radio Society of Ontario Convention, sponsored by the London ARC, will be held October 13-15 in London. Contact VE3LON/3, the LARC station, and get a special QSL card and \$1.00 off your registration. If you register before Sept. 15 with the committee you can also book a room at the Holiday Inn, the convention location, and save money. The \$42 single room rate will be offered for \$30 with double occupancy for \$3.50 extra.

Registration for RSO members is \$8.00, for non-members \$9.00. Ladies' Program is \$4.00 plus an optional \$2.00 for the bus tour. The Friday night bash is free to registrants. The Ladies' Luncheon on Saturday is \$5.00. Banquet and dance rates on Saturday are \$15.00 for singles and \$25.00 per couple. (Registrants only.)

Along with the Saturday technical and organizational forums there will be a flea market on the Sunday. For registration and other information send to: London Amateur Radio Club Inc., Attention: Convention Tickets, Box 82, Station B, London, Ont. N6A 4V3.

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ANNOUNCES

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WANTED: Collins 30S-1, C. Gutman, 7526 Mountbatten Rd., Montreal, Que. H4W 1J9.

FOR SALE: Heathkit HW-8 CW Xcvr, 80/40/20/15 M, power supply, manuals - \$135.00. J. Benson, VE3JJH, 628 Second St. S., Kenora, Ont. P9N 1H1. (Ph. 807-468-5629).

FOR SALE: Hammarlund HQ170 Receiver, Heathkit DX60B with HG10 VFO, manuals, excellent, \$300.00, M. McNaughton VE3EQQ, Box 507, Mitchell, Ont. N0K 1N0.

WANTED: Heathkit IT-12 signal tracer. Must have manual and be in good condition. Glenn McMichael, VE3CGU, Box 231, Goderich, Ont. N7A 3Z2.

FOR SALE: Ancomm S225 transceiver with Hamtronics pre-amp. \$300. Contact VE3EYW, Gord Woroshelo, 15 Grandmont Cres., Sault Ste. Marie, Ontario P6B 3W1.

FOR SALE: Signal Relay. Small (3/8x3/8x1 1/2"), 8-volt mercury wetted contact relay for keyer, RTTY etc. - NEW- with application note @ \$8.00 (plus Prov. tax BC residents) plus 50¢ handling and postage - Regular price \$18.00. Merritt Communications Ltd., 400 Prideaux St., Nanaimo, B.C. V9R 2N5.

## Standards for TV games

The Department of Communications is moving to set technical standards for home TV games.

The devices, reported to have a market of about 500,000 units a year in Canada alone, generate mini-TV signals of their own, which are fed to the antenna terminals of TV receivers through a transfer switch that allows users to

select either TV programming or the game.

Improper design or connection of these switches, however, can cause interference to other TV sets or radio services.

Game signals can leak into cable systems or home-receiving antennas, be carried on power lines or be radiated from the games themselves.

The government standards will set:

--limits for normal output signal levels from games;

--isolation requirements for transfer switches;

--maximum permissible radiated signal strength from the devices themselves;

--maximum radio voltages to be allowed on game power cords.

As an interim measure, the department has published a circular setting out recommended standards and urge suppliers with technically acceptable units to affix labels to their games indicating conformity with the standards.

-- HC Custom Mono Beams --  
64 Dunkeld Ave., St. Catherines, Ont.

band el boom \$	band el boom \$
HC20-3-20 \$175	HC10-3-12 \$ 85
HC20-3-26 \$195	HC10-4-18 \$105
HC20-4-30 \$235	HC10-5-24 \$150
HC20-4-36 \$280	HC10-6-30 \$185
HC20-5-40 \$390	HC6 -4-10 \$ 50
HC20-6-60 \$490	HC6 -6-20 \$105
HC15-3-16 \$115	HC2 -4- 5 \$ 25
HC15-4-24 \$155	HC2 -8-10 \$ 45
HC15-5-30 \$220	Gamma matched
HC15-6-36 \$280	

Write for spec sheets VE3WT



# How to tap AC

One of the first things that the newcomer (and old-timers) to Ham radio will run short of in the shack, are AC outlet boxes. Hammond Manufacturing (and others) are now marketing excellent AC strips with 8 and more outlets with circuit breaker protection for about \$28.00.

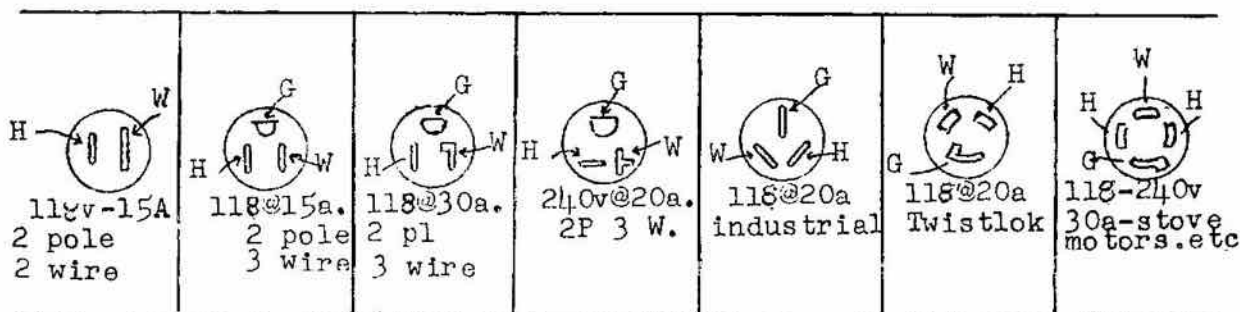
However, if one is handy with tools (and inclined to be frugal), it would be much cheaper to roll your own. I happen to use 4 surface duplex receptacles connected together with couplers. This arrangement gives me a total of 8 outlets. Try to avoid those nightmarish octopii made up of "cube taps" stacked one on top the other, these are dangerous and not too reliable. This arrangement is common at Christmas-time when we are tempted to plug all-too-many lights into one outlet.

So much for the commercial, now let's get to some basic standards used here in Canada and the US. The following primer won't make an electrician out of you but it might help keep you out of trouble. It's amazing the number of Amateurs who are not aware of the difference between the "silver or nickel

plated screw" and the "brass (or copper coloured)" screw on a duplex receptacle.

The nominal design center in the US and Canada is 117 volts @ 60 Hz, which means voltages between 110 and 125 are common and can be expected. In the UK and many parts of Europe it happens to be 220-240 @ 50 Hz. Wierd combos like 137 @ 42 Hz or 110 @ 16 2/3 Hz can also be found. Equipment operating on 1 phase of a 3 phase 240 Volt system calls for 208 volts.

Another area of confusion appears to be the difference between "system ground" and "equipment ground". So what you say? Well system ground, sometimes referred to as the grounded conductor normally carries line current at ground potential. Terminals are marked W and are colour coded WHITE (remember the white screw on that receptacle). Terminals for equipment grounds are marked G and are coded GREEN. In our system the equipment ground carries current ONLY DURING SHORT CIRCUIT CONDITIONS. This is the GREEN wire that connects right to the CHASSIS or FRAME.



Please note that 118 v. circuits have one wire (neutral) at above ground potential and the other (HOT) above ground. The neutral wire (WHITE), W, with silver coloured terminal is NOT fused while the HOT wire (H, black, red, blue with brass coloured screw terminal IS fused). Always switch the HOT line (H). Note that the neutral is grounded only at the distribution transformer and should NOT be grounded anywhere else. Remember neutral we refer to as "system ground" and is coded WHITE. Equipment ground (G) is coded GREEN and is grounded

separately at your transmitter, receiver, or other gear.

Finally, if you have any doubts as to whether the outlets in the shack can supply the TX and other equipment here is a very simple check to make. Turn on all your gear, put the TX on "transmit" under load the line voltage should not fall more than 5-6 volts @ 118. If you plan to operate a 1 KW linear, a 220 volt line should be run directly into the shack, and is highly recommended.

Mike Turik, VE3BJK  
in the Windsor ARC bulletin  
september 1978 - page 17



- 100% solid state SSB/CW Transceiver
- Full coverage of 10 – 160 meter bands
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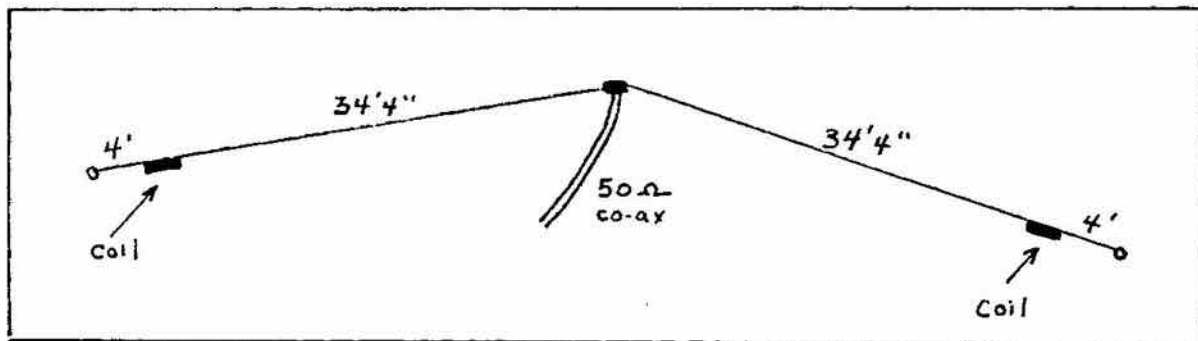
# 3 Band H.F. Aerial

Glenn McMichael VE3CGU

Two years ago I bought a house and finally had room for more aerials than when I lived in an apartment, but not enough for a full length 80 metre one. Various types of antennas were considered including the popular five band trapped models which at 102 feet overall still exceeded the available space. Combining ideas from articles by W6INI and VE3GSP with a few of my own I finally settled on the following three band design which without expensive L/C traps loads well on 80, 40 and 15 metres. It costs about \$5.00 more than a standard 40 metre dipole and takes up just eight more feet of space. It requires only an SWR bridge for initial adjustment and feeds with readily available coaxial cable

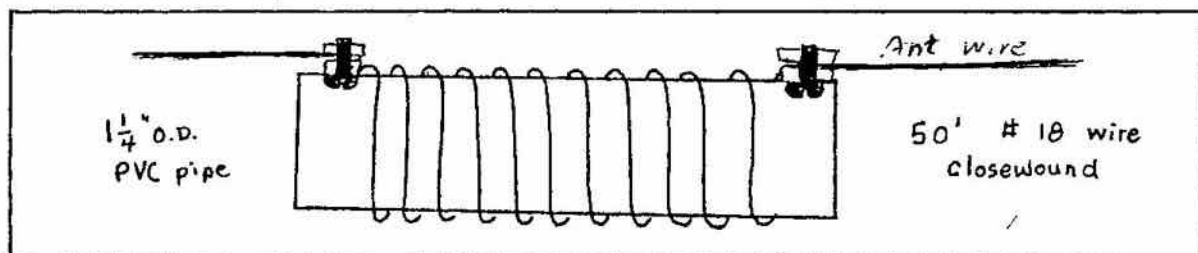
without the need of any type of matchbox or tuner.

The center section loads well on 40 metres and its third harmonic, 15 metres and gives wide bandwidth - the loading coils serving to isolate the end sections. On 80 metres these same coils act as loading inductors and give about 50 kHz bandwidth. When tuning on 80 metres remember that tip lengths for this band are fairly critical so adjust them small amounts at a time until it resonates at the desired portion of the band. Take SWR readings at its operating height, not with aerial near the ground because trees, ground and buildings will change its characteristic resonant point.



The coils each consist of 50 feet of #18 enamel or Formvar copper wire closewound on 1 1/4 inch outside diameter PVC plastic pipe. Use glue or varnish to hold the windings firmly in place. 4 x 40 hardware (use brass to avoid

rusting) and crimp-on solder lugs are employed for connection to the lengths of wire. I used G.E. silicone sealant to waterproof connections and prevent corrosion.



SWR measured at transmitter was 1.5:1 at 3.700 and 7.100 MHz and 1.6:1 at 21.200 MHz. I used RG58C co-ax and a low pass filter to feed the antenna.

With this aerial I have had excellent results working North America on all three bands and get good DX results on 15 metres. It is lightweight, inexpensive

and compact. If erected in inverted V configuration it takes even less than its 77 foot overall length.

If you have questions about this aerial that this brief article doesn't answer feel free to write - SASE please.

Glenn McMichael, VE3CGU, Box 231, Goderich, Ont., N7A 3Z2.

## D.C.B. ELECTRONICS

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# Radio Ramblings

Eyeball to Eyeball with some  
Unforgettable Hams

A. Peter Ruderman, VE1PZ

CO1PP in his shack in  
Varadero, Cuba, Feb/78 



(Peter is a medical doctor whose work with the World Health Organization gets him around the globe.)

I have had to travel far and wide to earn my bread during the past three decades -- so much so that my usual reply to the question "wotcha been doing?" is "just going up and down in the earth and walking to and fro on it." Your Editor asked me to write about Amateur radio as observed on a recent trip to Cuba, but it struck me that some general memories of eyeball QSO's might be in order.

--Harry, 9G1AR. Harry Kaklikian was 9G1AR in Accra, though he has since left Embassy communications to return to his native California. I met him on the air when I was VE3BPR in Toronto, and had an eyeball QSO when I was in Ghana to look at the government's rural health plan in 1975.

Harry had a very professional station, all Collins equipment, and a TH6DXX beam on a high tower, so there was no trouble working VE3ENA and other friends in Toronto despite the spotty condition of 20 meters that spring. I must have ingratiated myself with Harry by using the few words of Armenian that I had learned from a classmate in high school in the 1930's (a good memory helps on many occasions) for the evening ended with a fine dinner. As I was leaving Harry pressed two microphones into my hands, explaining that he was leaving Ghana soon so I might as well have them. When people say that my voice sounds bassy on 2-meter FM these days, that is because I am using Harry's mystery mike--the one with a GE label on the case, a Shure cartridge inside, and an obscure African heritage. I am

sure he is around and active somewhere in the States, but have never run into him on the air -- another typical Amateur experience.

What makes Harry hard to forget is the story of his ulcer. He wasn't getting anywhere with the U.S. embassy doctor and then discovered that the Soviet embassy doctor was an Armenian. When he went to see the man, he discovered that neither of them knew any medical words in Armenian. I was of no help because I only know "public health Russian" (names of tropical diseases and things like that) and couldn't describe ulcer symptoms. They eventually settled on English as a working language! Wherever he is, I hope that his ulcer is quiet and the DX is good.

--Indra, VU2BX. Indra Dar, VU2BX, came down from the hills of Kashmir and worked as a refrigeration engineer in India for many years. Ordinary people in India cannot exchange rupees for dollars, but Indra once did a big job for a hotel in Indonesia and was paid in dollars so he took a world tour. When he got to Toronto he settled down for 6 months and became an honorary member of the Nortown Amateur Radio Club where I met him. When the dollars ran out he went home to India.

In the summer of 1974 I was doing an assignment at the World Health Organization office in New Delhi, and weekends I would go to visit Indra at his house in the Kamla Market in Old Delhi. The Kamla Market is an unbelievable place-- a large hollow square covering several city blocks with truck company yards and offices, open arcades where artisans repair mopeds, compressors, and truck

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bodies, and inside the square a big field ankle-deep in mud and bullockdung, with rusted car bodies and tools scattered about.

Indra was retired by then, but ran a little refrigerator repair business in one of the arcades. To get to his house you went under the archway, turned right up a dark staircase that ran inside the thick perimeter wall, and emerged on top of the wall where you could look down into the street or the market. Indra had a two-level house there, where he lived with his daughter and son-in-law (a customs officer) and a ten-year-old grandson. The shack was a relatively cool cement cubicle on the lower level, with RG8 feedline running up to an old quad with curved, gnarly bamboo arms, and a long wire for the lower frequencies. He ran a Yaesu FT101B into a home-brew G2DAF linear (the one with the gated tetrode). We used to spend Sunday afternoons squatting on the floor of the shack, repairing equipment for less technical Amateurs, while the grandson would bring us tea and stay to watch us work.

I was living in a sublet flat in Defence Colony several miles away, and once as a sign of esteem he gave me a lift home in his 1949 Chevy which was still chugging away serviceably after 25 years. It bothered me that I could not repay his hospitality. Finally I was able to help him in a small way. He needed a double-gated FET and in those days only bipolar transistors were available on the market in India. I had made a little FET preamplifier for my portable radio to bring in the BBC news, so I unsoldered the 40763 and gave it to him. It was a small thing, but I felt somehow that I was dispensing a royal gift.

I have worked VU2BX occasionally from 4U1ITU in Geneva, but have never made it from any QTH in Canada. Indra had what can best be described as a quietly radiant personality, and I think of him often.

--Jose, CO5PP. Just this past February I was in Cuba with the XYL for a short winter break. Our holiday cottage was on Varadero Beach in Matanzas Province, which is CO5-land. One morning I went to the central telephone office to place a long-distance call. The rooftop antennas of the microwave link to Havana had caught my eye as I walked in, and

I got into conversation about them with the district engineer. He mentioned that there was an Amateur right down the street. I phoned, and his mother explained that he was working out of town but came home on weekends. We made a tentative sked for the following Saturday morning, and that is how I met CO5PP.

Despite his name being Jose Villafana, the call letters are appropriate because the diminutive of Jose in Spanish is "Pepe" and the letters "PP" are pronounced "pepe." He is an engineer specializing in electronic control systems for production machinery, and has been an Amateur since his teens.

The shack contained a 1950-ish National receiver, to which he had added a product detector, and a home-brew transmitter with 35 to 40 watts d.c. input on CW and AM. He had collected all the parts for a sideband adapter, but had not had time to put it together. The antennas -- all on the roof of the house -- were ground planes for 15 and 20 meters and a 40-meter dipole. Pepe is an ardent DXer on CW. When the QSL Bureau in Havana recently forwarded a card from Papua, New Guinea, they added a note of congratulations to the first Cuban Amateur to work the new country. He is on the air most weekends, usually on the low end of 15 or 20, depending on band conditions, so listen for CO5PP and if you work him say hello on behalf of VE1PZ.

--On gifts, royal and otherwise. 9G1AR gave me two mysterious microphones. I gave VUxBX one dual-gate FET and had a friend take down some cassette tape to CO5PP. I have had two experiences that illustrate the value of gifts. In November 1968 I was in the port of Bandar Pahlavi on the Caspian Sea in Iran and was taken through the royal caviar factory. At the end of the tour, my host invited me to the tasting room for a snack of the famous "golden caviar" that is reserved for the table of the Shah. He produced a little jar from the refrigerator, and with a flourish served me about 1/32 of an ounce on a plastic mini-spoon. It was yellow in colour, alright but to this day I remember my disappointment that it had absolutely no taste! I wonder what royalty felt about this priceless stuff, or was it another case of the Emperor having no clothes?

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## HAMTRADERS INC.



At the other end of the scale, I was staying in Kingston, Jamaica, in the summer of 1960, living for economy's sake in a sleazy but colourful boarding house that has since burned down. An elderly Austrian couple were there at the same time. They had just left Havana, where they had run a jewelry store for 30 years, and were waiting for U.S. entry visas. They did not speak English, and I got in the habit of translating the menu for them (brown stew fish with rice every day!) and helped them fill in the U.S. visa application form. They decided to reward me with a royal gift. One night they pranced (that is the only word that describes it) into the dining-room and offered me on a plate an object wrapped in shiny foil. I unwrapped the foil, and there was a small wrinkled apple, going soft in spots. They had probably spent half a day searching for that apple in a market-place full of ackee and mangos, and I have treasured the memory ever since.

--On martyrs and other things in Cuba

In the Museum of the Revolution (the old Presidential Palace) in Havana, one of the exhibits is a heavily-varnished wood cabinet surmounted by a plate with the call sign CO5MM. The cabinet contains an old command transmitter, a World War II surplus antenna coupling unit, a receiver, and a very neat home-brew linear. CO5MM apparently used it to run military traffic for the revolutionaries, and whether he did or not he was arrested and shot for it thus becoming a martyr of the revolution. The rest of his radio gear was eventually distributed to local Amateurs around Varadero.

The CO5s were more involved in the revolution than the CO2s around Havana, because the fighting began up-country (and ended there) and the final march on Havana (which is at the extreme west of Cuba) was more like a victory parade than a war. Varadero was the sort of popular summer place where a lot of university students with well-to-do parents were likely to spend their weekends; one of the saddest things to me was to see in the museum the photographs of all those bright young men and to realize that, raised on romantic Spanish legends of heroics, so many of them rushed, half-trained or untrained, into madcap raids on barracks and police stations only to be killed. Thanks to a high birth rate they

left behind a lot of younger brothers and sisters to build up the country afterwards. In Pepe's living room there is a big enlarged photo of his cousin who died in the raid on the Moncada Barracks at the age of 20.

The contrast with today bears dramatic witness to the healing effect of time. When I was in Cienfuegos not long after the revolution, the real soldiers and the phonies who came later were wearing fatigues, sporting beards and cigars, and carrying sub-machine guns in the street. In 1978 I did not see a gun anywhere -- no soldiers patrolling airports and bridges, no heavily-armed squads of police in the towns, such as you will find in most Latin American countries; or maybe all the gunslingers were in Africa. This would be in line with an old Spanish tradition. When the Moors were finally expelled from Spain in 1492, the government of the day must have wondered what to do with all the hot-tempered young fellows who had swords and armour but didn't know how to keep books or milk a cow. I am sure the King breathed a sigh of relief when they went off to conquer the New World and settled safely on the other side of the Atlantic.

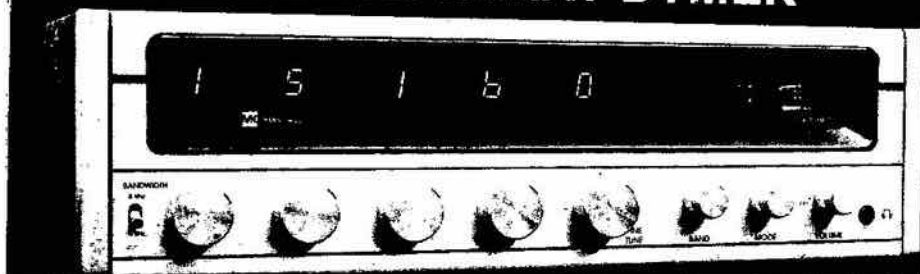
Some people to whom I talk here in Canada seem surprised that Cuba has a unique personality and is not just a pale imitation of Russia. I think there are two main reasons for this. For one thing, Cuba is definitely Latin in culture and lifestyle, and this exerts a mellowing effect. For another, the government seems self-confident and sure of popular support -- not running scared like some other countries of similar political persuasion.

There were some minor surprises in the electronic line. In one showroom I saw several brands of table-top TV receivers made in the USSR. For some reason, except for the brand label, all the controls were neatly marked in English rather than Spanish. Some of the TV antennas use conventional molded twin-lead, but others have transmitter-grade 300 ohm line with one-inch plastic spacers. House current is 110 volt, 60 cycle, as in Canada, and electric plugs and receptacles are in North American style.

Radio broadcasting is AM only, but many people make a hobby of taping FM broadcasts from Miami. As usual, the only Canadian broadcasts I could pickup

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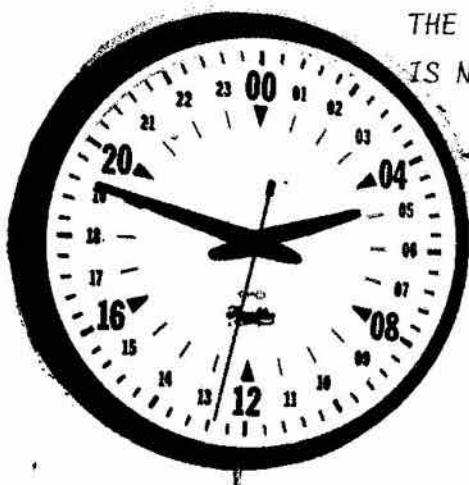


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were the morning news in English and Inuitak from the CBC northern service on 10 MHz. I suppose I was receiving this on the long path from Sackville, N.B. In any event I have noticed the same phenomenon as far south as Colombia. I once sent an SWL report to the CBC engineering department and asked about it, but nobody replied to my letter. Perhaps if some CBC engineer reads this Bulletin he will take it up.

There is a Canadian presence in Cuba. I passed a bar one day, and instead of floor mats at the entrance there were burlap flour sacks stamped "Maple Leaf Mills". On Revolution Square in Havana I saw a cluster of khaki tents with a tall flagpole in the middle and a huge Canadian flag on the pole. When I asked the

bus driver if he knew what it was he replied "I could tell you, but it would be a lie." In many Latin countries people tell fantastic stories because they know you want an answer and they have to tell you something, so this incident must count as an example of signal honesty!

I did my bit for CARF. Nobody in Cuba had heard about CARF before. Now they know.

A last look at Cuba. Leaving Jose Marti Airport, our plane halted at the far end of the runway. After 15 minutes the pilot invited us in a resigned voice to look out the starboard portholes and see why. Sure enough, there was a railroad track right across the middle of the airfield with a slow freight going by.

Adios, muchachos!

## ON BECOMING an AMATEUR

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PART  
5

From a shaky 5 wpm to a shaky 11 wpm

Before moving into 5 wpm, I decided to review. This was a waste of time and a bad habit. Even though I knew all the sounds, the move was into speed practice and the new problems one encountered. I was discouraged at once because I seemed to lose the ability to recognize letters. This was a common fault and was soon corrected with rest prior to the session and intense concentration.

This attitude put me into a responsive 5 wpm which helped when I moved in with a small group. It was better to be with others and important during practice in sending. Unfortunately the group was not together as many times as I would have liked. This tended to disorganize my efforts. Having had much to learn and too many loose ends was a real problem.

Most of the time I was on my own and found that this was to be a fact of life with my efforts for my Amateur radio ticket. Things were made more difficult in order to accomplish a proper cause and effect pattern for success. I had to be aware of my mistakes early in order to make any corrections by way of bad habits, etc. It was important for me to know why. If this was going to make the road rough, so it was to be. You had to do things the way it seemed best. This was later proven correct in

my case.

I felt I had done well in most classes, and there were indeed nights that I was able to write a high percentage of copy, even though I missed different letters each time. This was confusing until the instructor was able to put it into perspective by pushing me into 11 wpm because I was copying too close and thinking too much. A faster speed would mercifully not give me time to think, but only to listen and copy. That was my big hang-up. I worked hard trying to break the habit and only succeeded with much practice. I never felt that I had spent enough time during practice sessions with the code.

I went from a shaky 5 wpm to a shaky 11 wpm and, to my surprise, it was not difficult at all. I wasn't copying any better but more practice again put things right. I had increased my speed. At that same time, I was practising sending code and always felt confident doing it.

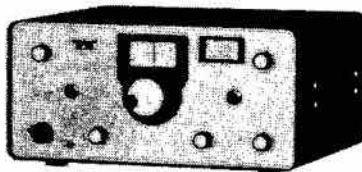
Listening to a faster speed, even though I didn't intend to copy, was a good thing. It made the speed I was working with seem slow and I got a better response. I always fought the desire to go ahead before I was really confident. Speed comparison is like driving at 50 km and then increasing to 100 km, then going back to 50 km. The second time

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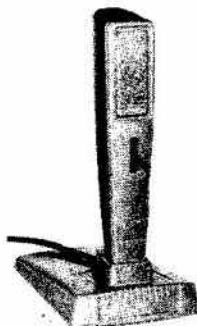
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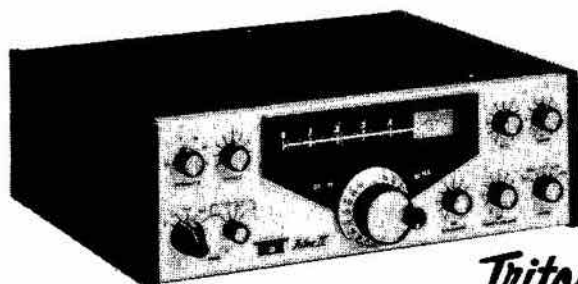
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you go at 50 km, it seems very slow. This really worked with code practice. I simply remembered not to bore myself or I missed letters or gave a lazy response. I was plagued with different moods, a hot and cold response with my efforts on theory and code practice. It was hard to believe that it was a normal enough situation. Your physical well-being is important as well. A thought ahead of upcoming DOC examinations prompted a plan of working a good strong 14 wpm for the test at 10 wpm.

All advice and material turned me in that general direction with my planned 14 wpm. Then, there was theory or new data for my brain to digest. I wasn't sure if I could develop a sense of the subject needed to understand diagrams and radio theory.

I started at page one and went on hoping for a light to shine or someone to help me. I asked myself if I could learn new things quickly. I really battled with the code. I practised steadily until I was properly programmed. It came to me when my brain was ready to accept it and no sooner.

With code, this was when I could instantly recognize letters at a particular speed; with theory, it was a knowledge of what was happening in relation

to diagrams and antennae applications, circuits, etc. Always alert for information, I discovered an article that stated I should write code, rather than print it.

I had to use a thin ballpoint, rather than a slow lead pencil or ink pen. I could do well up to 25 wpm with a ballpoint moving quickly along the paper. I had learned that young people did well with code and decided that some help might be at hand if I involved my 16-year-old daughter Carol. It was not without envy that I saw her respond just as predicted. She quickly acquired some sending ability and response to letter sounds so I was able to test myself on my response to her signals.

She quickly summed it all up one day after a test I thought I could easily handle when she said, "You don't know it well enough Dad, your answers were too slow". How right she was! I was at first surprised until I realized that this was not my comfortable, controlled situation. Not all was due to the difference in Carol's sending ability and a professional tape. The difference was really with my ability to respond, and that needed correction. The proper way was in much more practice.

(Number five in a series).

---

## Can you justify your hobby?

by Ted King VE1BPW

It seems to me that the worldwide Amateur Radio fraternity faces very difficult times ahead and therefore it is urgent that all Amateurs keep abreast of current developments through organizations such as CARF.

From the current tone of events -- especially in Canada and the United States -- it strikes me that the fundamental *raison d'être* of Amateur Radio is being questioned, and that the main force that buffers the Amateur bands from being closed out in favour of political/economic exploits is the fact that (formerly...Ed.) many radio inspectors on this continent started out as Amateurs. Recent articles that I've read have attempted to justify the continuation of the Amateur Radio status by using a rationale which is more or less as follows:

a. It was Amateur Radio operators who were the pioneers of modern communications, whose individual initiative and inventiveness made it all possible;

b. A lot of successful personnel in the commercial world (broadcasting, commercial electronics, etc.) got their start as Amateur Radio operators. (Out of a local group of six teenagers who earned their ticket in Saskatchewan some 21 years ago, five of us pursued careers either directly or indirectly related to electronics and communications -- the sixth became a doctor.);

c. Amateur Radio operators have made valuable contributions to public service during disasters and by providing vital communications from remote outposts;

d. Therefore, based upon this his-

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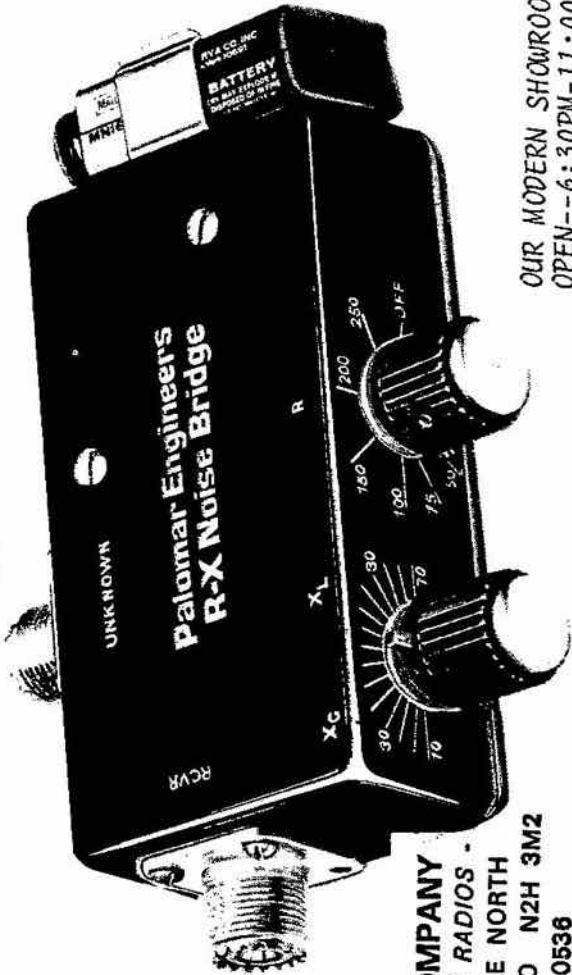
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torical performance, the existence of Amateur Radio should continue in the future.

Personally, I'm not convinced that this type of rationale is adequate. It certainly provides a source of pride to the fraternity to look back upon this track record. However, outside interest pressure groups who want our spectrum allocations do not share this pride or even sympathize with the positive benefits of Amateur Radio --- and they can come up with very strong arguments against it.

For example, Amateurs discovered the 'ducting' effect in propagation over coastal areas in the 420 MHz band. As a reward, pressure is on to make it available to commercial interests for coastal-based navigation systems for surveys/offshore drilling -- with (as I understand from a 'Canadian Aeronautical and Space Institute' symposium held this fall in Ottawa) demands which have a total disregard for Oscar satellite frequency allocations and fastscan TV repeater applications.

Arguments which are anti-Amateur can be summarized as follows:

a. Modern experimentation and technology is beyond the capabilities of the radio Amateur and should be now left to scientists and engineers in industry;

b. Communications/electronics is now a major career field into which youth can be enticed without first becoming Amateur Radio operators. The education of these young people should be properly left to provincial and corporate educational processes;

c. Response to disasters should be the responsibility of local governments, and CB operators being stronger in number and geographical dispersion can provide better support to EMO etc. than Amateur Radio operators. Remote locations are often served by satellite/commercial service these days;

d. Therefore, although the track record of Amateur Radio has been excellent, it is today an anachronism that can no longer be supported in the future.

I firmly believe that, if we are to justify our existence, we must be able to prophesize what the Amateur Radio Experimental Service will be able to do tomorrow that will benefit society.

Technology has changed quite a bit since I wrote my ticket. I remember

my first attempt at two metres over 20 years ago -- acorn triodes, other funny looking tubes, plumbing skills needed to build a rig, etc. Then I look at my FT-221 in comparison of size and flexibility and cost, and wonder why anyone should be foolish enough to try to reinvent the wheel. The answer is that no one should have to. This perspective makes it possible to 'prophesize' about Amateur Radio's future.

Perhaps an illustration will help clarify the above point. How many good inventions have gone by the wayside because large corporations bought up the copyrights/patents in order to prevent competition that could affect the stability or monopoly in a particular field? (Methane/propane convertors for automobile propulsion is a big one that sticks out in my mind.) Electronics, communication and data processing are becoming more and more an integral part of our daily lives. Will things like this happen in these fields if the door is closed to personal ingenuity by disbanding the Amateur Experimental Service? Being a non-profit motivated group, ideas and technical innovations developed by Amateurs become available through publication in various Amateur radio magazines -- and thus openly available to anyone who wishes to make use of them.

In the future, I expect that micro-processor technology -- hard-wired applications as well as software applications -- is the area where society will reap the benefits of Amateur Radio experimentation. Anti-Amateur lobbyists might argue that spectrum allocation is unnecessary. Not so. If I wish to remote access a computer, or to remote control monitor a device by computer, I need that allocation, and in doing so might be lucky enough to discover/develop a technique that will be beneficial to society. If left to industry, such a discovery might be stamped secret and buried in corporate files until year 2000 or whenever 'industry felt that consumer demand warranted production. Even simpler, how many auto manufacturers have anti-theft options available to consumers? Many good circuits are available in Amateur magazines -- and were developed only because they had equipment to protect. If there were no Amateurs, this data (backed by widespread exper-

september 1978 - page 31

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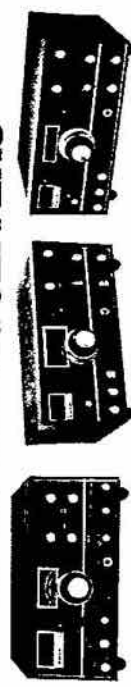
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 • CW station monitor with adjustable pitch and volume control  
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**350D** —  
 • Same basic features as 350A except:  
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 Both the 350A and the 350D are compatible with the Swan accessories that has built a reputation for reliability and performance that's second to none, including linear power supply to boost your power to the limit. So they're perfect for novices or anyone else because you can build capability as you need it.

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ience) might not be available.

Similarly, microprocessors will play an ever increasing role in daily lives of our citizens. Is software and programming to become the monopoly of the ultimate few survivors left over from the current computer marketing mania? Amateurs had a lot to do in getting this off the ground, and will continue, in my estimation, to make positive contributions in the forthcoming decade. In the United States, this is an area where over-regulation of the Amateur Service has inhibited development (e.g. they can't transmit using ASCII). Once this barrier is removed, things will improve. I can't afford a Northern Telecom/Ma Bell modem, but I'm certain that Amateurs will discover cheap, effective alternatives the same way they built phone patches, slow scan TV, etc. However, in order to contribute to society, Amateurs need the freedom to experiment, protected frequency allocations (especially from GRS) within which to experiment or communicate -- but must also be responsible for their actions (hence standards must be applied and examinations used to confirm that min-

imum standards are attained).

I heard an Amateur in Ontario on the air one day talking about the problem of retaining good mechanics in his automobile firm in a small rural area. He was fed up. The government forced him, under apprenticeship requirements, to maintain expensive training aids and materials in addition to dedicating man-hours to training. Then, when a new mechanic reached a certain level, he was sent to the factory for further training. If the kid was any good, he never came back. Thus, as a small businessman, he was forced to bear the financial burden of training -- but not reaping the benefits. If Amateur Radio disappeared, would the same thing happen to electronics technicians -- with the government and industry dictating how many, who, and how much and when its citizens would receive training in electronics?

I feel that young people should be enticed into electronics at an early age and be encouraged to learn and experiment outside structured education.

Amateur Radio is the best way of doing it.

---

## Folded Audio

Continued from Page 1

When Tom first heard the tapes of Harris' and Cleveland's work he became excited. He jumped into the developmental work enthusiastically.

Tom set up his home electronics laboratory to work on the Harris system. Tom said, "While I was testing a new idea to improve the system, I accidentally came upon a different idea that greatly improved the system." When he showed his improvement to Harris and Cleveland, they decided his discovery was a substantial contribution and they made him a co-inventor.

How it works

Human speech consists of vowel sounds, which are low in frequency, and consonant sounds, which are high in frequency. The Harris system basically folds the consonant sounds down into spaces between the vowels. The consonants carry most of the intelligence -- what is being said. The vowels carry the tone of the voice, or how it is being said.

"As early as 1931 the Bell Telephone

Laboratories was granted a patent on a similar system that used elaborate equipment, worth over \$100,000, but they missed a crucial point," Lott said. Many others have been working on methods to make speech take up less spectrum space. Some of the systems were analog, some digital. But none of them were good enough to use for a telephone circuit.

"The point they all missed," added Tom, "is that the human larynx doesn't sound the consonants and the vowels at the same time.

"The Harris system takes the set of vowels down here and the set of consonants up there, and, with an oscillator and balanced mixer, taking time into account, folds them all in."

The trick, of course, is to get a faithful reproduction at the other end. Tests have shown that if the two oscillators (sending and receiving) are 100 or more Hertz apart, the sound seems "Donald Ducky." But if the oscillators are 50 Hertz or less apart, the ear

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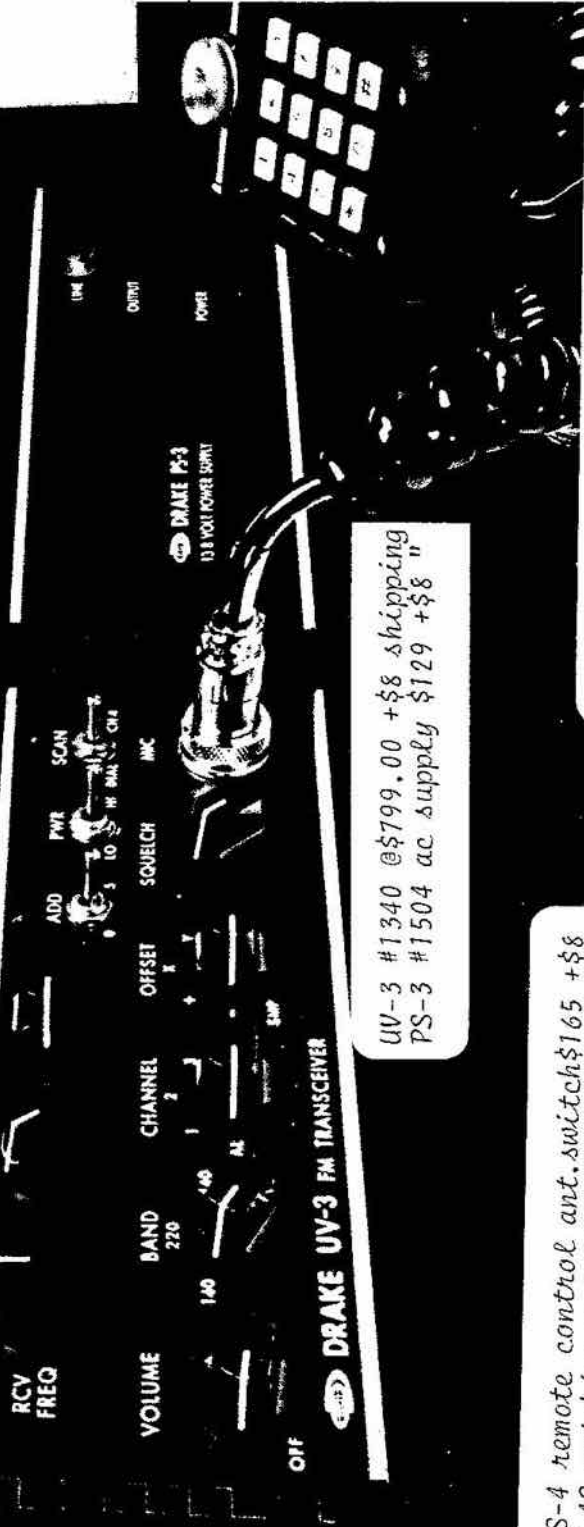
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can't detect any difference. And with today's technology, it is easy to build audio oscillators more accurate than that. On transmission an SSB signal will be only 1.7 kHz wide, even though 3 kHz of audio is being transmitted.

On reception, the same filters and oscillator are used to change the narrow audio back to normal width.

Without changing any existing equipment or channel spacings, additional Harris system channels could be put between existing FM channels without anyone on FM knowing they were there.

Tom said tests have shown that using Harris' speech compression on standard FM equipment without changing it in any way would result in an improvement of

from 5.7 to 6.4 dB in signal to noise ratio.

#### The future

Experienced engineers see the Harris system as being as big a change in voice transmission as other major inventions such as the superheterodyne or SSB.

Mobile channels could be 2.5 kHz apart, using the Harris' system and volume compression with an SSB signal. That's one-tenth the spacing of today's 25 kHz FM mobile channels!

It will be interesting to watch this new system develop. It will also be interesting to listen to SSB (which already sounds "Donald Ducky") with the new 1.7 kHz wide signals!

---

## Digital Data COMMUNICATIONS

The purpose of the proposed 'Experimenter' certificate is to promote Amateur experimentation in the fairly new field of digital data communications. The purpose of this article is to present an overview of digital communication techniques, especially digital modulation, and clarify some misconceptions of what digital communications is.

Digital data is a 'stream' of ones and zeros called binary digits (or bits); that is, a signal with two states in contrast to analogue or continuous signals such as speech or video. Digital data is transmitted over the airwaves by a carrier, but unlike conventional analogue modulation such as SSB and FM, this carrier has 'discrete' states. Two digital modulation methods are well known to Amateurs: CW and RTTY ( radioteletype). A CW signal has two states, carrier on and off. This type of signal is called 'amplitude-shift keying' or ASK. In general, ASK does not require the transmitter to be totally off, but rather the output power shifts between high and low power.

An RTTY signal also has two states. The carrier is continuously on, but it 'shifts' or is keyed between two frequencies, mark and space. Hence this signal is known as 'frequency-shift keying' or FSK.

Beyond ASK and FSK lies a multitude of digital modulation methods. Probably

Ken Smith VE3HWB in 'The Hamilton  
'The Hamilton Amateur'

the most important one is 'phase-shift keying' or PSK. Instead of shifting the frequency of the signal, the phase of the carrier is shifted between 0 to 180 degrees. This has superior noise immunity over FSK but requires more complex equipment. PSK, widely used in satellite communications, will probably become the 'workhorse' of Amateur digital communications.

How much bandwidth is required? This is directly dependent on the data rate, i.e., bits per second. A typical bandwidth varies from about 0.6 to 1.0 times the data rate, depending on the modulation used.

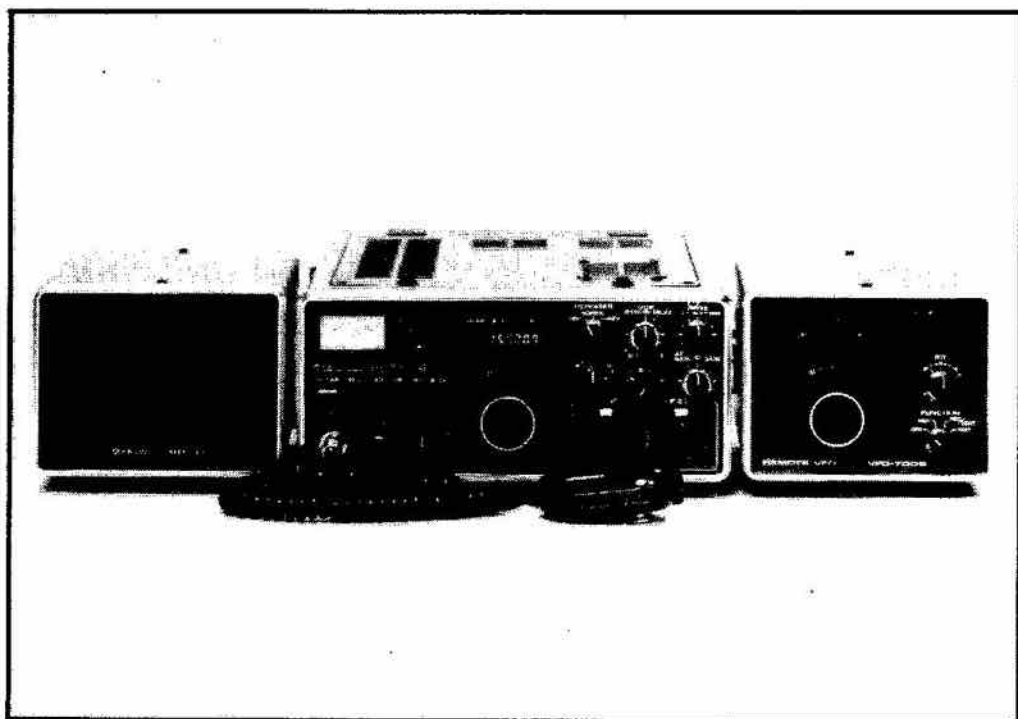
For example, 45.5 band RTTY (at 60 words per minute) can take 27 Hz of bandwidth without extremely complex equipment (170 Hz shift is not efficient). Since digital modulation, in theory, generates infinite bandwidth (as does FM), the signal bandwidth must be restricted by filtering to avoid interference to other stations on other channels. The filter can only be made so narrow before it 'distorts' the data being sent.

Although CW and RTTY, for example, transmit characters, digital modulation can also be used to transmit speech and video. Typically, speech signals are sampled at 8,000 samples/sec. and each sample voltage is approximated by one of 256 possible discrete voltage levels. It takes a group of 8 bits, called a 'bi-

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nary code', to represent 256 discrete levels. Hence, for speech, it is necessary to transmit 8 x 8,000 or 64,000 bits/sec. on an RF carrier. This digital representation of analogue signals is called 'pulse-code modulation' or PCM. In the Intelsat IV satellite system, such a PCM voice channel occupies 38 kHz of spectrum space. The channels are spaced 45 kHz apart (you can fit 88 channels into the two-metre band).

By comparison, PCM takes about 10 times the bandwidth that its SSB analogue counterpart does. Although digital communications sacrifices bandwidth, it does so to achieve better quality signals (in terms of noise rejection) than analogue ones, for the same transmitter power.

In order to achieve a specified maximum frequency response in a sampled signal, it is necessary to sample at least twice the frequency. Sampling at 8 kHz in a speech signal limits the maximum speech frequency to 4 kHz.

One way of increasing the data rate without much increase in bandwidth is using multi-level modulation e.g. shift between four frequencies or amplitudes rather than just two. However, multi-level modulation requires more power for the 'error rate'. One interesting type of modulation is the 'hybrid' type. For example, amplitude-phase keying (APK)

can send 2 bits at a time by both amplitude and phase keying the transmitter simultaneously.

How much can one squeeze into a given bandwidth? The highest in use today over a telephone line (4 kHz) is 9600 bits/sec. There is a limit because of noise; the less noise, the faster you can go, in the same bandwidth.

Noise has a large effect in digital communications. An error in binary is when you think a '1' was transmitted while in fact a '0' was transmitted and vice versa. The number of errors caused by noise is strongly dependent on the signal to noise ratio (S/N). Once the S/N increases above 10 dB, the error rate is drastically reduced. For example, at 12 dB S/N the error rate can be 1 bit in 20,000 bits sent. But a 1 dB improvement (1/6 of an S unit) will reduce the error rate by a factor of almost 10!

A term that appears now and then is 'pulse modulation', in which the transmitter sends out short, high power pulses of RF creating a wide bandwidth. This type of transmission is never used in modern digital communications; the only significant application is in radar.

The choice of digital modulation used depends on the application, available bandwidth, types of propagation, allowable cost and equipment complexity.

CARF MAKES

## Strong Plea for 75 M

To supplement its brief to the Canadian Interdepartmental Committee for WARC '79 (the international conference which will allocate post-1979 frequencies) that commented on the CIC second draft proposals for the Canadian position at Geneva, CARF has written to the CIC, discussing in some detail the alternatives to taking 3800 kHz to 4000 kHz from the Amateur Service and re-allocating that portion of the 75 metre 'phone' band to the Fixed and Broadcasting Services.

The letter, which has been edited to meet space requirements, reads:

In the CIC second draft proposals, it would appear that the CIC is proposing to take spectrum from the Amateurs for services that can be accommodated quite satisfactorily in existing bands as far as the Fixed Service is concerned, and

in existing bands with some minor modifications as far as the Broadcasting Service is concerned.

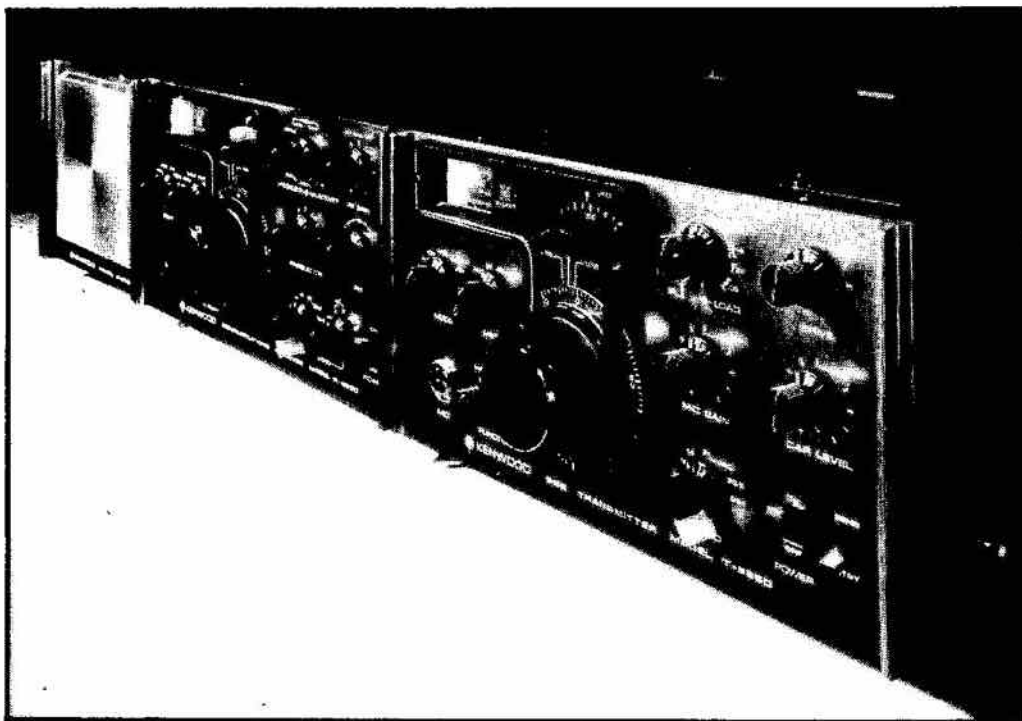
Monitoring of the bands below 3.5 MHz used by the Broadcasting and Fixed Services will show that they are relatively little used when compared with the 3.5-4.0 MHz Amateur Service band...

The question is raised as to why the Broadcasters to whom the CIC propose to give spectrum at 3.9-4.0 MHz cannot use the broadcasting bands at 2300-2495 and 3200-3400 kHz. We know that these two bands are allocated to tropical broadcasting but certainly broadcasting in the tropical countries has changed greatly since 1947 when these bands were first established and this should be taken into account. Tropical broadcasting stations in these bands can hardly be heard in Canada. If Canadian broad-

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casters use directional antennae, sharing with tropical countries should be quite easy. The use of these two bands would give broadcasters four times the spectrum in the CIC proposal. Further, they would have two bands with relatively good separation to adapt to varying propagation conditions.

The countries that were interested in containing broadcasting in these two bands to tropical areas in the world are no longer making such heavy use of these two bands for fixed services (which they can do on a shared basis). Surely they could be persuaded to agree to the use of these two bands already allocated to the Broadcasting Service for broadcasting in non-tropical areas, at least in Region 2.

The countries that were such strong supporters of tropical broadcast bands when they were first established now have FM (88-108 MHz band) to give a much better sound broadcasting service in the tropics where summertime noise is so severe on conventional AM sound broadcasting...

If it is a question of Canadian broadcasters serving the Northwest Territories, more effective results would be obtained by using the 535-1605 kHz and 88-108 MHz bands since receivers for these bands are now commonplace and the channels are available.

If it is a question of serving the United States, it would appear that we are giving up a long-standing policy of not exporting broadcasting to the United States... It would be much cheaper to advertise our (AM broadcast stations on) clear channels than to build new short-wave broadcasting stations.

We turn now to the Fixed and Mobile Services to which the CIC proposes to reallocate the 3.8-3.9 MHz band now allocated to the Amateur Radio Service.

The stations which made use of the

fixed and mobile bands between 1.605 and 5.0 MHz a decade or so ago are gradually being replaced with improved communications based on VHF, UHF and microwave radio relay as well as scatter and satellite systems...

The new UHF satellite now being planned will accommodate some of the new and some of the old requirements ... The result is that the Fixed and Mobile Service stations are not growing significantly in number in the 1.605-5.0 MHz band and will probably reduce in number in the future.

On the other hand, the Amateur Service in Canada is growing very significantly. Over the last ten years, the average growth rate was 4.5%, over the last five years - 6.5%, and last year 8.7%. There is every likelihood that Amateur station growth will continue.

Under the circumstances and for such a small requirement, i.e. 5%, it would be preferable to pursue one or all of the several DOC methods customarily used for rearranging existing Canadian frequency usage as needs for fixed and mobile frequencies make necessary. The frequencies for the new fixed and mobile stations that CIC are proposing to find in the 3.8-3.9 MHz band, were it approved by WARC '79, could be obtained in the existing Fixed and Mobile Service bands, thus avoiding the proposed serious loss of frequencies to the Amateur Radio Service.

This would not be the first time a rearrangement of frequencies was used to resolve a difficult problem. When it is planned and carried out carefully, costs can be kept quite low...

Your early reconsideration and withdrawal of the CIC's proposal to take away 200 kHz, i.e. 40%, of the 3.5-4.0 MHz Amateur Radio Service band would be greatly appreciated by all Amateurs in Canada.

## Salvaged Parts:

A Wavemeter

by W.J.Karle, VE2ECW

One of the first circuits to rise Phoenix-like from my junk box was an absorption wavemeter. This measuring device should be in every shack since it provides a ready means of verifying frequency both during routine operations and also when trouble shooting.

An absorption wavemeter is a simple  
september 1978 - page 39

# HEAVY DUTY HAM TOWERS

DMXHD Heavy Duty Ham Towers can support a large amateur beam of up to 9 sq. ft. wind area. Guy wires must be used if larger loads are required or cross bar mounted antennas or if greater height using straight sections is needed.

DELHI DMXMD and DMXHD towers use the larger and stronger sections of our standard eight section, 68 foot TV tower, Model DMX-68. DMXMD towers have a DMX2T top section, DMXHD towers have a DMX3T top section. Both top sections have a No. 244A cast aluminum mast clamp installed on the top plate.

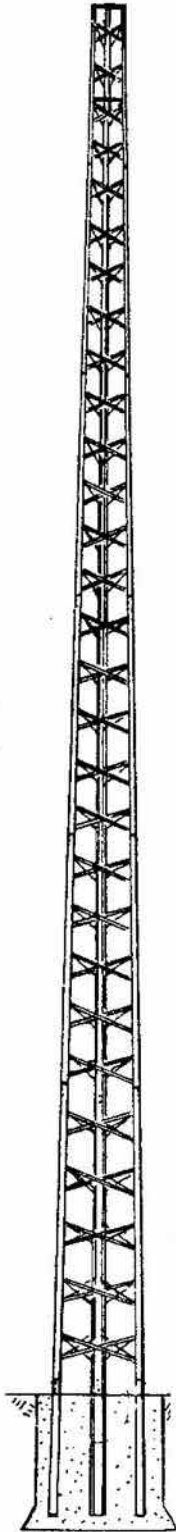
Each section is 8 ft. long and has beaded channel legs riveted together with "X" braces. Legs and braces are high tensile steel, heavily galvanized before fabrication. Rivets are solid heat treated aluminum. Sections fit accurately together and are joined by heat treated nuts and bolts. The uniform tapered leg design together with evenly spaced "X" braces give the tower greater strength and reliability.

**NOTE:** All DMXHD Series Ham towers are shipped complete with the following:  
8 ft. tower sections, top plate with cast aluminum mast clamp, rotor plate, three 4 ft. concrete base stubs, special nuts, bolts and washers. (No mast is included in package).

Model No.	Height of Tower	Tower Section Supplied	Wt. in lbs.
DMXHD-32	32	DMX3T, DMX4, DMX5, DMX6	170
DMXHD-40	40	DMX3T, DMX4, DMX5, DMX6, DMX7	241
DMXHD-48	48	DMX3T, DMX4, DMX5, DMX6, DMX7, DMX8	314

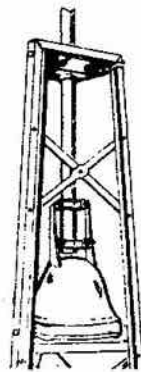
DMX-HD-40	225.00
DMX-HD-48	269.00
DMX-MD-48	245.00
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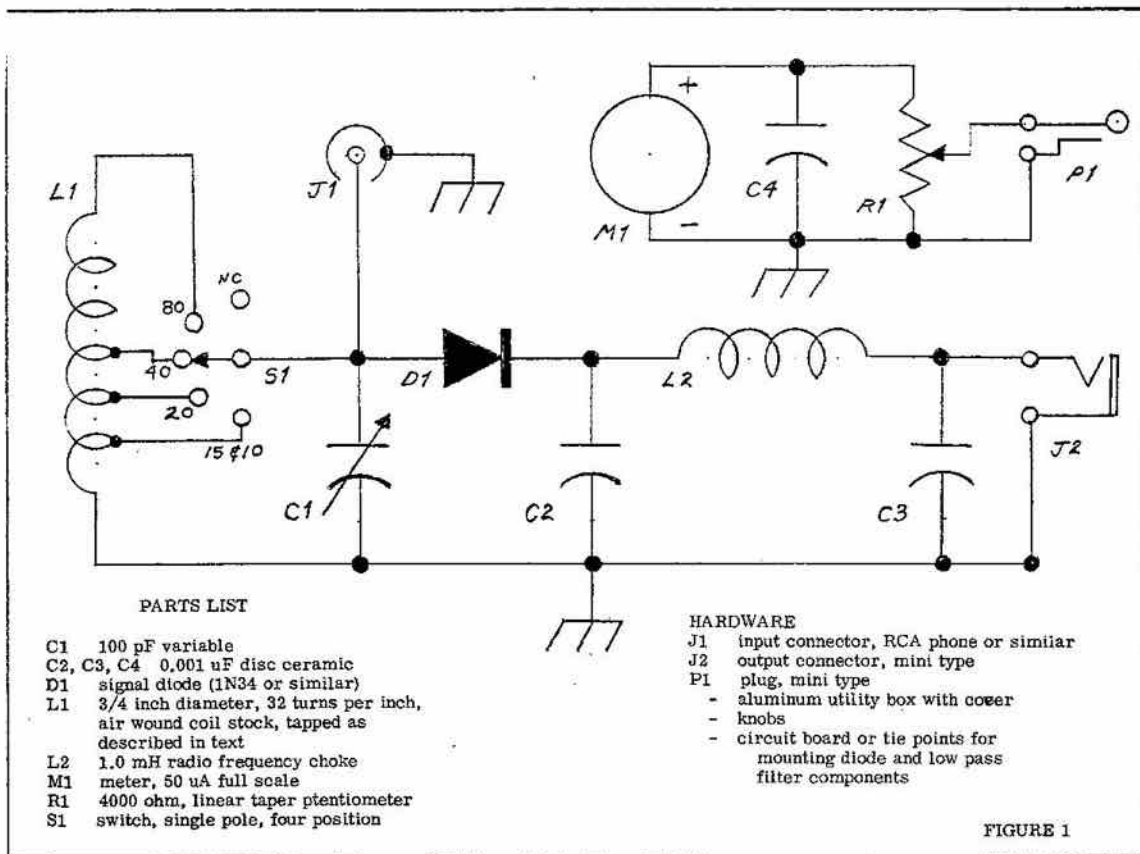
PACKAGE	
TA-33 Jr antenna	195.00
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100 ft rotor wire	25.00
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detector of radio frequency energy. Its level of sophistication is about equal to that of a crystal set. In fact, mine was used as an emergency radio once but more about that later.

The circuit is shown in Figure 1. An antenna and ground provide a means of impressing RF energy across a parallel resonant tuned circuit. The tuned circuit consists of the variable capacitor C1 and the inductor L1. At resonance, the tuned circuit offers a high impedance to the energy to which it is tuned. A relatively large voltage is developed across this circuit and is rectified by diode D 1. On the cathode side of D 1, there are half cycles of RF. This signal varies at a too rapid rate to appear on any meter, so it is filtered by the pi-network low pass filter composed of capacitors C 2 and C 3 and the radio frequency choke, RFC 1. At the junction of C 3 and RFC 1 there now exists a voltage which follows the more gradual changes in the applied RF signal. Those variations with a frequency of a few thousand Hertz or less, such as from amplitude modulation or keying, can be displayed on the

meter, M 1. The sensitivity of the meter is adjusted using R 1 which is a potentiometer.

Let's see how this circuit was built using junk box components. The heart of the wavemeter is the tuned circuit, so that's where I started. What range of frequencies should it cover? Since I operate on the high frequency bands, I opted for coverage from 3.5 to 30.0 MHz. I needed a combination of capacitance and inductance which would resonate between these frequencies. I calculated the LC constant for the lowest frequency which would lead me to the maximum values for the capacitance and the inductance. The LC constant is calculated using the formula shown below.

$$LC = \frac{25330}{f^2}$$

The frequency, f, is expressed in megahertz. The LC constant is a number expressing the product of an inductance in microhenries and a capacitance in picofarads. For a particular frequency, the product of L and C will be



# DRAKE TR-7

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- Model 7022** Drake SL-500 Cw Filter, 500 Hz
- Model 7023** Drake SL-1800 Ssb/RTTY Filter, 1.8 kHz
- Model 7024** Drake SL-6000 A-m Filter, 6.0 kHz
- Model 1335** Drake MMK-7 Mobile Mounting Kit
- Model 1538** Drake MN-7 250 Watt 160-10 Meter Antenna Tuner with Rf Wattmeter and complete switching functions
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**True Passband Tuning**—The TR-7 employs the famous Drake Full Passband Tuning instead of the limited range "i-f shift" found in some other units. The Drake System tunes from the top edge of one sideband, through center, to the bottom edge of the other sideband. In fact, the range is even wider to accommodate RTTY. Full passband tuning greatly improves receiving performance in heavy QRM.



**Unique Independent Receive Selectivity**—Optional receiving selectivity filters can be installed internally and pushbutton-selected from the front panel. These may be selected independently of transmit mode and provide optimum response for various conditions of ssb, cw, RTTY, and a-m. You may also transmit cw while receiving ssb, or vice versa, or even transmit one sideband while receiving the other. The standard filter is 2.3 kHz for ssb. You may choose from optional 300 Hz, 500 Hz, a special 1.8 kHz for crowded ssb, or 6 kHz filter for a-m.

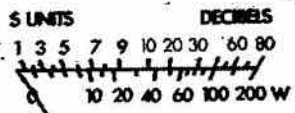
**State of the Art Receiver Design**—The Drake TR-7 introduces another industry first for amateur transceivers: "Up-Conversion," in combination with a special uhf high level double balanced mixer for superior strong signal handling, spurious and image response performance. The first i-f of 48.05 MHz places images well outside the receiver passband, and provides for true general coverage operation without i-f gaps.

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**Synthesized/PTO Frequency Control**—A Drake exclusive: Special high performance synthesizer, combined with the famous Drake PTO, provides smooth, linear tuning with 1 kHz dial and 100 Hz digital readout. 500 kHz up/down range switching is pushbutton controlled.

**Continuous, Wide Range Frequency Coverage**—The TR-7/DR-7 provides reception from 1.5 thru 30 MHz—continuously, and zero thru 30 MHz continuously with the optional Aux-7 Range Program Board. The highly advanced Drake Synthesizer makes this possible, and is an industry first. The TR-7/DR-7 provides transmit coverage for all Amateur Bands 160 thru 10 meters.

**TR-7 Internal Test Facilities**—As well as the standard "S" meter function, the TR-7 metering includes a built-in rf Wattmeter/VSWR Bridge. Also, the DR-7 digital counter reads frequencies to 150 MHz for test purposes. Access to the counter is from the rear panel.



**Receiver Incremental Tuning (RIT)**—Complete RIT flexibility is provided for both the TR-7 and RV-7 remote VFO for maximum convenience. The RV-7 also includes a special "spot" function for easy zero beating.

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a constant number. You can have a large value of inductance and a small value of capacitance or vice versa. As long as their product equals 25330 divided by the frequency squared, they will resonate at the given frequency.

In this case, the LC constant is about 2068:

$$LC = \frac{25330}{f^2} = \frac{25330}{3.5 \text{ MHz}^2} = 2068$$

So, I needed a combination of L and C which would equal 2068. I had a 100 picofarad (maximum) variable capacitor. By dividing the LC constant by 100 pF, I determined that I needed an inductance of about 20.7 microhenries.

I had some coil stock which I had picked up at a ham flea market. The coil stock was about two inches long, three-quarters of an inch in diameter, and had 32 turns per inch. I looked up the value of the inductance in a chart in one of the popular handbooks but I could have calculated the value by using this formula:

$$L_{\mu H} = \frac{a^2 n^2}{9a + 10b}$$

where: a is the coil radius in inches  
n is the total number of turns  
b is the coil length in inches

The maximum value of inductance offered by the coil turned out to be 24 microhenries ( $\mu H$ ). Knowing that I would unwind a few turns at each end in order to make the necessary connections, I wondered if I would still have enough inductance to resonate with the capacitor at 3.5 MHz. Subtracting two turn from each end left 60 active turns and a length of 1.875 inches. The formula showed that the inductance would be about 22.9  $\mu H$ . Dividing the LC constant by this number showed that about 90 pF of capacitance would resonate the circuit at 3.5 MHz. So, my variable capacitor was suitable. The tuned circuit design for 80 meters was ready.

The next frequency of interest was 7.0 MHz. I calculated the LC constant for this band and found it to be about 517. By dividing the inductance of the full coil into the LC constant, I found that 22.6 pF of capacitance would provide resonance at 7.0 MHz. One thing that you learn when experimenting, however, is

that variable capacitors have minimum values when their plates are fully unmeshed. In addition, there are stray values of capacitance arising from the wiring and other circuit components. Most of these capacitances are in parallel and add together. I suspected that my variable capacitor plus all of the stray capacitance would provide a value which would be too great for resonance at 7.0 MHz. Obviously, I needed less inductance.

I arbitrarily decided to use one half of the coil's turns. With half the turns, the length used for this band of frequencies is one half the length of the whole coil or about 0.94 inches (1.875 / 2 = 0.9375 in.) Plugging these values into the formula for inductance yields an inductance of 9.9  $\mu H$ .

$$L_{\mu H} = \frac{0.375^2 \times 30^2}{(9 \times 0.375) + (10 \times 0.94)} = 9.93 \mu H$$

Dividing this figure into the LC constant of 517 showed that a capacitance of 52 pF would resonate the circuit at 7.0 MHz.

For the 14 MHz band it was found that given the suspected minimal capacitance, there would be too much inductance when using one half of the coil. The same was true when using one-quarter of the coil or about 15 turns. At seven turns, the inductance was calculated to be about 1.24  $\mu H$  which, with an LC constant of 129, showed that the capacitor would be set near its maximum value when tuned to 14 MHz.

Repeating the above procedure for the 21 MHz band, revealed that the same seven turn tap and a different setting of the capacitor would work. Finally, a tap at four turns worked for the 28 MHz band.

The foregoing steps provide approximate values of inductance, capacitance, and coil length. The coil radius, the number of turns per inch, and the maximum and minimum values of the capacitor might be different when you search through your junk box. If you are willing to apply the above principles and if you are prepared to improvise, then you will be able to design a functioning circuit.

Let's look at the remainder of the circuit. The diode, D 1, was one of hundreds in a drawer. Just about any

small signal diode will work while a power diode probably would not perform well.

The low pass filter consisting of C 2, RFC 1, and C 3 is a little elaborate for the job. It was "borrowed" from another circuit diagram. The idea is to provide a low impedance to ground for RF. A low impedance can be roughly defined as one which is one tenth of the impedance of the driving source. The source in this circuit is the tuned circuit which would have a high impedance, on the order of thousands of ohms, when at resonance. The fixed capacitors, C 2 and C 3, are disc ceramic units with a value of 0.001  $\mu$ F. Using the formula for capacitive reactance, shows that at the lowest frequency of 3.5 MHz, the capacitors will offer an impedance of only 45 ohms to ground thus effectively shorting out the RF component of the detected signal. On the other hand, a modulating or keying frequency of 100 Hz will see an approximate impedance of 1.6 mega-ohm to ground and will not be attenuated. Reversed logic applies to the reactance offered by the RF choke: it will impede the flow of radio frequency energy and pass low frequency energy.

Any VOM, VTVM, or FETVM could be used as an indicating device to show the relative field strength by connecting the meter across C 3 which is the output of the low pass filter. I opted to use the 50  $\mu$ A ammeter and 4000 ohm potentiometer which formed part of my SWR bridge. At my QTH, a multiposition switch connects the meter and the pot to either the absorption wavemeter or the bridge.

After collecting all of the components, I tacked the parts together and proceeded to test the circuit. I injected RF at the frequencies of interest and observed the meter. It worked!

Packaging of the circuit was the next step. Here, my junk box failed me. No equipment housing could be found so I bought an aluminum utility box which measured 4 X 4 X 1 1/2 inches. The hardware, such as knobs, connectors, and a piece of Vectorboard, came from my collection of parts. The Vectorboard supports the diode and the low pass filter and is, in turn, fastened to the back of the bandswitch, S 1. The finished unit appears in the photos with cover removed you can see the piece of circuit board at the top with C 2, C 3, and RFC 1

on the left. The lower portion of L 1 is partially visible below C 2. The tuning capacitor is at the lower right. Note that the paint has been scraped away at the corners of the box. This affords better electrical contact between the box and its cover.

Some variations on this circuit can be suggested. Separate coils for each band, either plug-in or switched, will offer some improvement in selectivity. After making the individual coils connect the tuning capacitor across each in turn and inject RF. Now, temporarily connect the diode one, two, or a few more turns up from the grounded end. At some point, the output meter will peak. What you have done is to provide an impedance match between the tuned circuit and the diode. You will also find that the circuit is more selective because the diode and the rest of the circuit are not loading down the resonant circuit. If you use the tapped coil design, as I did, try to find a band-switch which will short out the unused turns of the coil. This reduces the possibility that stray inductances and capacitances will set up unwanted resonant conditions.

The wavemeter can be used in the shack with a short antenna connected to the input. Alternatively, a remote antenna can be employed. In both cases, orient the pick-up antenna for maximum meter deflection. You can make up a one turn coil and connect it via a short piece of shielded wire to the wavemeter. The coil can then be used as a probe when looking for parasitics, spurious radiations and so on.

Finally, you can replace the meter with a high impedance headset and be able to hear an amplitude modulated signal. Which brings us to a bonus feature. Once when we had a power failure, I connected my 40 meter doublet to the input of the wavemeter and plugged in the headset. Just before adding some more capacitance in order to get the meter down to the standard AM broadcast band, I heard a very British announcer. At first I thought I had the CBC. But no, it was the BBC in the 40 meter band! Further tuning netted Radio Moscow and Radio Tirana, both high powered short wave broadcast stations. I finally did detect the local broadcasters but I was already thinking of the need for an emergency transmitter and receiver ... using salvaged parts, of course!

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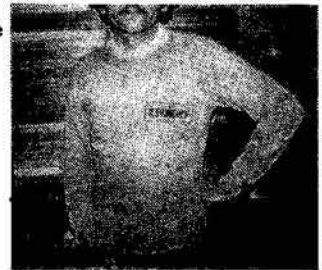
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