SKYWIRE

THE CANADIAN RADIO AMATEURS' JOURNAL

December, 1950

20 cents

Toronto, Ontario, Canada.

Give him a new voice this Christmas with a wonderful Turner microphone

With Best Wishes

for

A Merry Christmas

and

A Happy and Prosperous New Year

TURNER

THE TURNER COMPANY

Cedar Rapids, Iowa

Sole Distributors in Canada

CANADIAN MARCONI COMPANY

ESTABLISHED 1903

MARCONI BUILDING, - MONTREAL

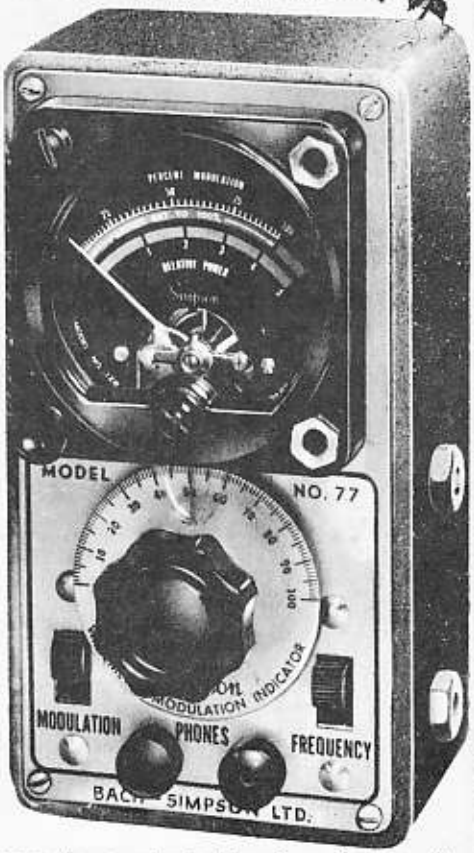
VANCOUVER WINNIPEG TORONTO HALIFAX ST. JOHN'S, NFLD.

Hints and Kinks for Xmas

from Simpson

(P.S. MARK YOUR CHOICE AND LEAVE WHERE THE XYL CAN SEE IT)

The Simpson line of panel instruments offers a complete range of D.C. and A.C. meters, in case styles and sizes to suit all purposes. Dress up your rig with an accurate and reliable meter; just fill in the Model and Range Our jobbers carry a complete stock.



The famous Simpson Model 240 "Hammeter" is a gift that will be appreciated. This multi-purpose instrument is built to give the best of service, a must in every ham shack. It is a rugged, self-contained, pocket-sized instrument built expressly to check high voltage and all component parts of transmitters and receivers. The full size 3 inch instrument with the celebrated Simpson movement, using the full bridge-type construction and soft iron pole pieces guarantees satisfaction. In stock at all jobbers, price $32.50. (Check here OM).

THE NEW MODEL 77

Here is a gift that will delight the heart of any ham. The new version of this famous Wavemaster, Modulation Indicator and Field Strength Meter is guaranteed to produce more than a grunt of appreciation. The Old Man can buy his own ties or socks, but here is a gift that will really say Merry Christmas in his own language.

He will tell you all about its versatility, full between band coverage, sensitivity, stability and many other features. You will have to listen to his transmitter and watch this accurate and compact instrument measure the modulation. The model 77 is in stock at all our jobbers, price $32.50. (Check here OM).

We wish you a Very Merry Christmas
and a
Happy New Year

Bach-Simpson Limited

71 Carling St., London, Canada

A VERY

Merry Christmas

to all VE's

Season's Greetings

We welcome the opportunity the Holiday Season offers to express our appreciation of the patronage and good will of our friends.

A Merry Christmas to you and yours and every good wish for a Happy and Prosperous New Year

THE **RADIO CENTRE** 62 CRAIG ST. WEST, MONTREAL, P.Q.

SKYWIRE

Vol. 3. No. 9

Published monthly as

THE CANADIAN RADIO AMATEURS' JOURNAL

Editor - Fenwick Job, VE3WO

Table Of Contents

COMING NEXT MONTH - Space limitations in this issue mean that Tony Lubiniecki's article for further Dynamotor Conversion will appear next month. Become a regular subscriber and get it for sure! It's written by VE2ACJ.....

December, 1950

SKYWIRE BUSINESS AND EDITORIAL ADDRESS

VE3WO — 435 PARKSIDE DRIVE, TORONTO, ONTARIO

Home Phone—LAkeside 8926

AUTHORIZED AS SECOND CLASS MAIL POST OFFICE DEPARTMENT, OTTAWA

HAMMOND

NEW TRANSFORMERS

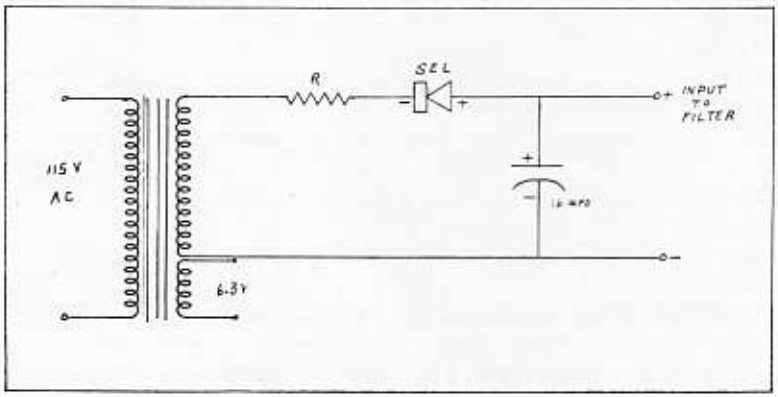
A series of compact and economical Power Transformers designed for half wave Selenium Rectifier applications. Ideal for TV Boosters, Converters, Frequency Meters and fixed bias for Amplifiers or Transmitters

262B25 — Pri. 115v, 25cy. 4 watts, Brkt, 1 lb., 2¾" mtg. cts.
Sec. 120v, 15 ma. 6.3v, 0.3A.
262B60 — Pri. 115v, 60cy. Same Sec. Brkt, 10 oz, 2⅜" mtg. cts.

262D25 — Pri. 115v, 25cy. 8 watts, Brkt, 1¾ lb., 2¾" mtg. cts.
Sec. 120v, 30 ma. 6.3v, 0.6A.
262D60 — Pri. 115v, 60 cy. Same Sec. Brkt, 1 lb., 2¾" mtg. cts.

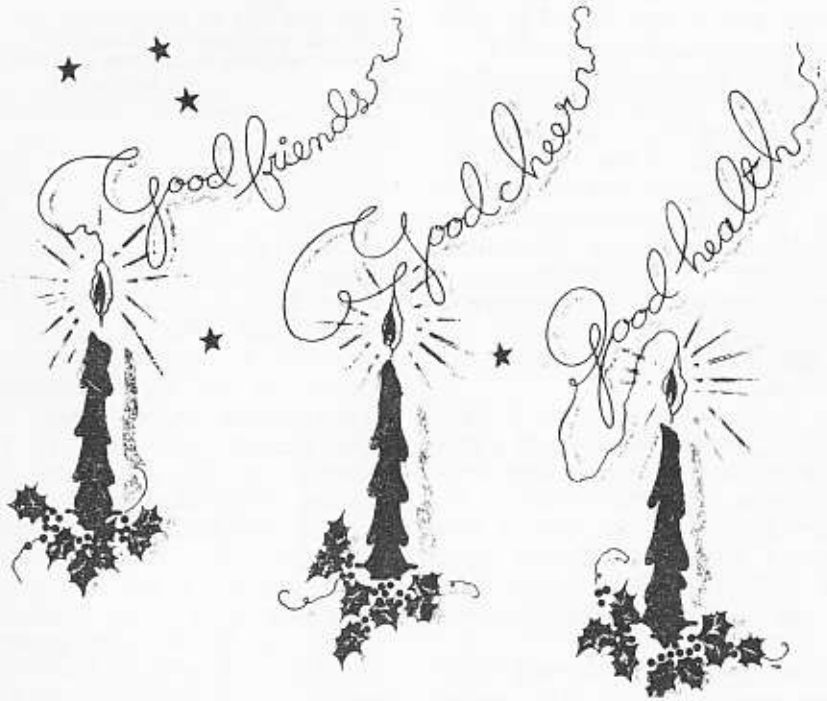
262F25 — Pri. 115v, 25 cy. 16 watts, "X", 2¼ lb., 1¾ x 2⅛.
Sec. 120v, 75ma. 6.3v, 1A.
262F60 — Pri. 115v, 60cy. Same Sec. Brkt, 1½ lb., 3⅛" mtg. cts.

RECOMMENDED CIRCUIT SUPPLIED WITH EACH TRANSFORMER



Distributed Through Leading Jobbers From Coast To Coast

HAMMOND MANUFACTURING COMPANY
Limited
GUELPH · ONTARIO · CANADA



Christmas Greetings to all VE's

Fenwick Job, VE3WO

December, 1950

Aerial Design and Installation

PART II

By **I. E. HILL (G6HL)**

The first part of this excellent article appeared last month, covering the design of a good multi-band system and the installation of a Lazy-H for the 28 mc band.—Ed.

DURING 1946/47 one Lazy-H array was erected and it was found to give excellent results compared against a 132-ft. Zepp erected 60-ft. at one end and 55-ft. high at the other. Even in directions favourable to the long wire and within the 60 deg. arc of coverage of the Lazy-H the latter gave 3 to 6 dB gain on both receive and transmit. With this encouragement a second Lazy-H was erected orientated 100 deg. to the first and this arrangement gave complete coverage. It was, however, found that contacts were sometimes difficult in the directions in which the aerials overlapped.

A move to the London area, mid-1947, delayed progress, but at the new site a fair amount of space was available and two Lazy-H arrays were suspended from 32-ft. poles. Results were excellent, but it was decided to go a stage further and have three arrays with switched change-over instead of the earlier plug-and-socket scheme.

In order to operate 14 mc as well as 28 mc a change was made to 8JK aerials (single section at 14 mc). Performance of the 8JK's was about equal to the Lazy-H on 28 mc, but on 14 mc they were on a par with the long wire. The major difficulty, however, was in arrangement of the feed system so that switching between the aerials did not affect the PA loading. This problem was not solved when a halyard broke and the whole contraption was spread over the flower beds and lawn. That was the end of the 8JK's ; with their bamboo spreaders they did give rather a Christmas tree appearance anyhow.

The next move was to erect three Lazy-H arrays in the form of a Y. Pole height was increased to 42-45 ft. to permit the experimental addition of more elements. 28 mc operation only was decided as the requirement and tuned feeders selected. RF was fed from the transmitter in coaxial cable to a matching box which effected feeder tuning and included a remotely-operated switching motor for the feeder change-over. This arrangement worked very satisfactorily and exactly according to plan until a contact on the switching motor failed. Rather than change it, the whole feed scheme was renovated and each aerial fed separately by coaxial cable through a switching unit at the operating position to matching units under each array.

Fig. 6 shows the present complete installation which gives satisfactory results on all bands 28 mc and below. It would, perhaps, be expected that the close proximity of aerials not in use would considerably upset the directional properties of the one being energised ; but in practice the only ill effect noticed is reduced directivity within ground-wave range.

Constructional Hints

Such an elaborate array required a fairly large number of spreaders, but these were all made from the scrap box. The Lazy-H spreaders were made from 5-in. lengths of bakelite and/or ebonite rod and sheet, holes being drilled in each end to take a short length of insulating material from

scrap coaxial cable. The spreaders were located in position at 3-ft. intervals along the feeders by means of short lengths of 20 SWG wire also threaded through the coaxial insulator as shown in Fig. 7.

The three-way spreaders for the omni-purpose aerial presented a little difficulty, but were eventually made from 1½-in. lengths sawn from a junk paxolin coil form. Short lengths of scrap ebonite rod were screwed round the circumference of the former and small pieces of coaxial insulating material used to insulate the feed lines at 6-in. spacing as in Fig. 8.

The quanitiy of wire required was fairly considerable, but the omni-purpose aerial and feeders were made by twisting together a number of strands of 22 to 18 SWG enamelled wire rescued from scrap transformers. No. 12 SWG copper wire from a scrap power transformer provided the Lazy-H elements and the insulators are all cheap egg or shell type.

Suggestions

Few amateurs make an exact copy of another's design and local conditions usually dictate a different approach. It might, however, be profitable to suggest a few possible developments which would be of interest.

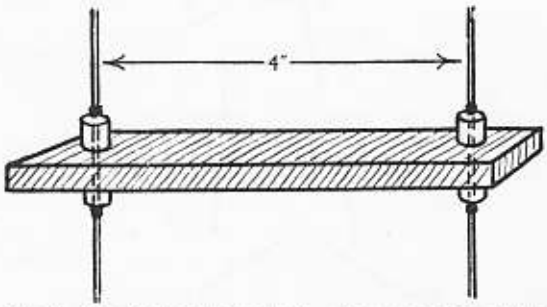


Fig. 7. Feeder spacing method, using coaxial insulating material carried on strip bakelite.

The Sterba curtain gives almost identical results to the Lazy-H and might be adaptable to giving greater gain in some

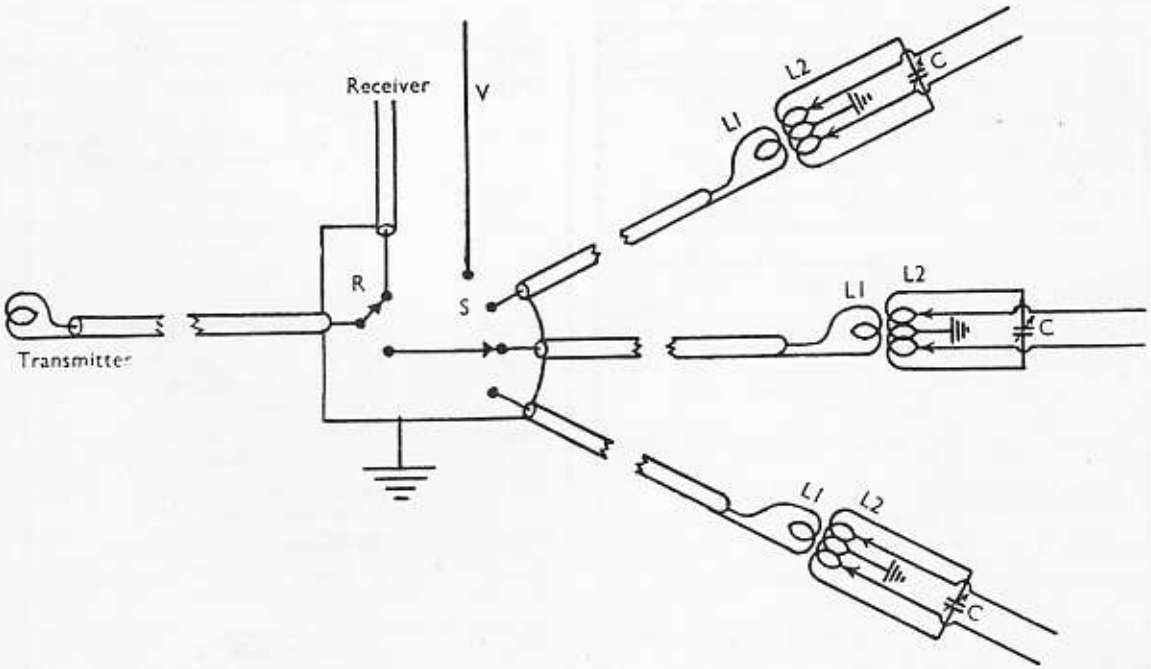


Fig. 6. (B) Aerial change-over switching and matching units at G6HL. *R*, aerial change-over relay ; *S*, selector switch ; L1, link coil, one turn, 2-in. diameter ; L2, aerial coil, 6 turns, 2-in. diameter ; *C*, 30 $\mu\mu$F double-spaced ; *V*, vertical check aerial for 28 mc, and reception.

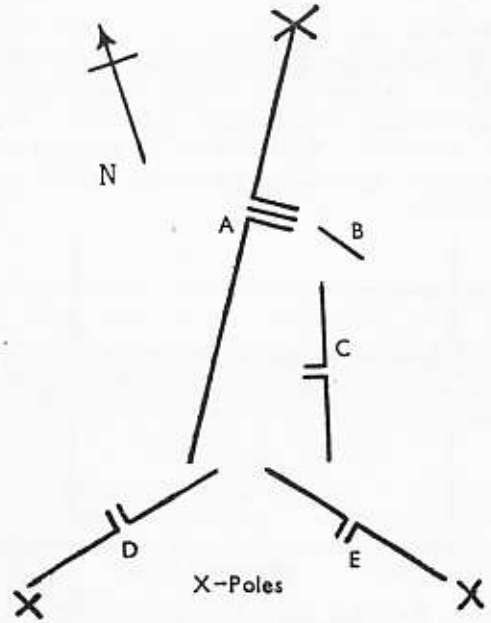


Fig. 6. (A) Aerial layout at the author's station. Key *A*, 66 ft/33 ft, Zepp fed ; *B*, Vertical Rx aerial ; *C*, *D*, *E*, Lazy-H arrays ; *X*, indicating positions of 45-ft poles.

directions. An assembly of three Sterba curtains could be fed with 300-ohm line at the focal point, thus simplifying the feeder change-over scheme. A further development might be to use a common vertical member at the focal point and arrange

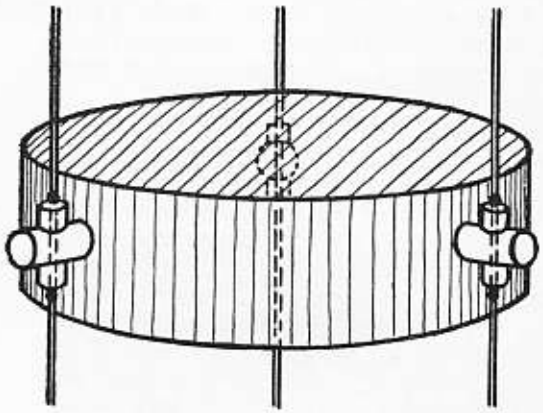


Fig. 8. Three-way feeder spacing, using sections of bakelite coil formers.

DX QTH's

CE5CU	Box 3971, Santiago de Chile.
CR9AM	Box 504, Macao.
EK1GW	c/o Mackay Radio, Tangier.
ET3AE	Box 145, Addis Ababa.
ET3AF	Box 858, Addis Ababa.
HI2S	Box 103, Port-au-Prince, Dominican Republic.
HL1AR	APO 901, c/o Postmaster, San Francisco, California.
J4AAK/G4LV	Cpl. B. M. Selby, c/o Well Hill, Hemingford Road, North Cheam, Surrey.
KP4EZ	APO 851, c/o Postmaster, Miama, Fla.
MI3BC	QSL via A.R.I. (*Station in Eritrea*).
OA4Q	Box 538, Lima, Peru.
OQ5AS	Box 9, Usumbura, Urundi, Belgian Congo.
OX3GF	APO 858, c/o Postmaster, New York.
VK9GW	c/o O.V.C., Port Moresby, New Guinea.
VP4TT	Waller Field, Trinidad, B.W.I.
VP5AL	Government Airport, Kingston, Jamaica.
VP7NG	Box 2003, Arlington, Virginia, U.S.A., (*Station in Bahamas*).
VQ4NSH	Box 571, Nairobi, Kenya.
VQ5ELD	L. H. Durham, Post Office, Kampala, Uganda.
VS7AC	P/O Clee, Naval HQ, Trincomalee, Ceylon.
VS7LA	c/o RAF, Koggala, Ceylon.
VS7WN	A. J. Benn, Admiralty W/T Station, Narahenpitiya, Colombo Ceylon.
W1DTS/CT2	Bill Gibbs, 24 Fletcher Avenue, Lexington, Mass.
ZB1AO	Capt. Gatehouse, HQ Royal Artillery, Tigne, Malta.
ZC6NO	c/o X Branch HQ, Palestine.
ZD8B	A. Boa, Cables and Wireless Ltd., Ascension Island.
ZS1GV	A. J. Marsh (*ex-G3BFV*), Port Radio Office, HM Dockyard, Simonstown, South Africa.
ZS3F	Box 297, Windhoek, S.W. Africa.

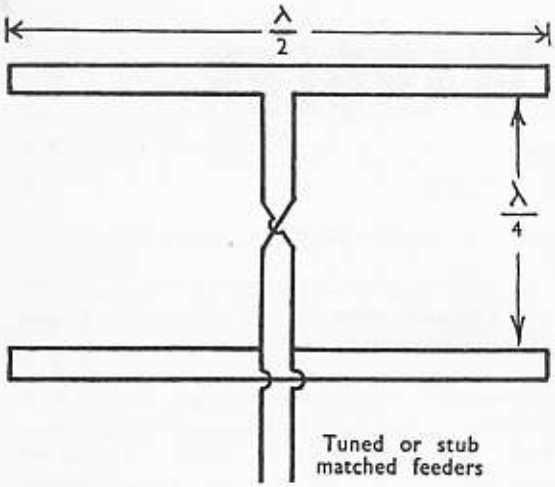


Fig. 10. Two dipoles stacked to these dimensions will lower the vertical angle of radiation.

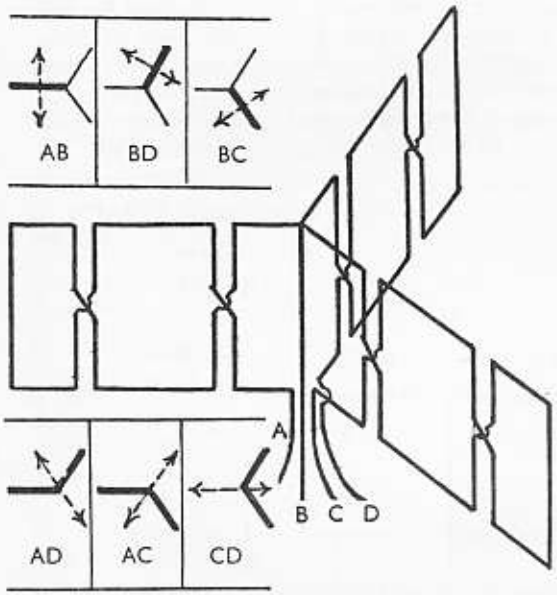


Fig. 9. Sterba array, showing horizontal radiation patterns and directivity for various feeder connections. Patterns AD, AC and CD are estimated.

switching so that each Sterba curtain could be used individually, or two combined in V-formation to give additional angles of increased directivity. Arrangement of these curtains and resultant radiation angles are shown in Fig. 9.

The bi-directional aerials, Lazy-H or Sterba, can be made uni-directional by erection of a similar array spaced one quarter-wave behind and fed in or out of phase *via* a DPDT change-over switch. This, however, becomes rather elaborate and the effective width of horizontal coverage would probably be reduced below 60° and the complete 360° coverage thus lost.

Investigation of vertical directivity laboured earlier might be interesting and could profitably proceed by stacking six elements, two over two over two, spaced quarter-wave and fed in phase by crossing over the feed line between each pair. The bottom elements could be removed at will by use of a DPDT switch and their effect on signal strengths noted. The position of the switch connecting the bottom elements would give the lower vertical angle of radiation.

Lack of space may in many cases preclude the erection of the full Lazy-H array, particularly for frequencies below 28 mc. An interesting improvement on the dipole and one which will also give lower vertical angle radiation comprises two folded dipoles spaced one-quarter wave vertically and fed in phase (Fig. 10). The horizontal radiation pattern will approximate to that for the single dipole, but power will be concentrated in a lower vertical angle dependent on height above effective earth.

Finally, it must be emphasised that there is *no* super aerial system. A dipole at a given height will give the same results, however it may be fed, provided the feed is correctly adjusted and is non-radiating. Increased directivity in vertical and horizontal plane can be achieved by varying the height above effective earth or stacking a number of dipoles. Design is a compromise between requirements and local conditions ; the best answer in one location does not always apply in another owing to local geographical conditions or obstructions. However, there are a few simple factors which must be considered and it is thought that vertical radiation angle is perhaps one often forgotten in the race for a narrow beam and high front-back ratio.

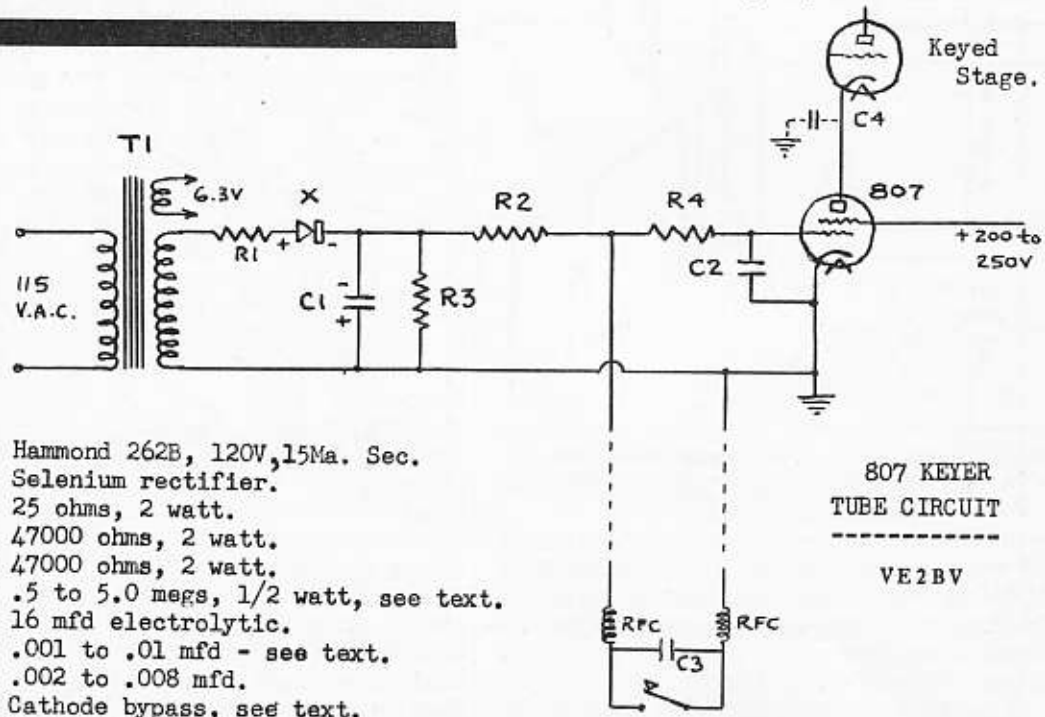
THE LAZY WARBLER

by
D.G. Murphy - VE2BV

A SIMPLE, INEXPENSIVE VACUUM TUBE KEYING UNIT!

Judging from some of the c.w. signals to be heard on the ham bands these days, a lot of the amateur fraternity have not digested the numerous fine articles on keying and key-click elimination which have appeared in the amateur radio journals within the past year or so. Vacuum tube keying is one system which offers a simple method of obtaining perfect keying. It is used very extensively in commercial transmitters, and has given excellent results at the author's station for the past three years. Yet, this system has never been very popular with the amateurs, possibly because its' simplicity and advantages have not been fully appreciated. It is with this last thought in mind that the following description of a vacuum tube keyer, using that trusty old veteran, the 807, is presented.

Vacuum tube keying offers you a neat method of varying the keying characteristics over wide ranges, without the fuss and mess of the bulky choke and condenser arrangements, and with no dangerous voltages on the key. Altering a very simple R-C combination is all that is necessary to change your keying when you are dissatisfied with your signal. The author's experience however, indicates that you will seldom, if ever, desire, or require alteration of the components, once they have been properly installed.



807 KEYER TUBE CIRCUIT

VE2BV

T-1 - Hammond 262B, 120V,15Ma. Sec.
X - Selenium rectifier.
R-1 - 25 ohms, 2 watt.
R-2 - 47000 ohms, 2 watt.
R-3 - 47000 ohms, 2 watt.
R-4 - .5 to 5.0 megs, 1/2 watt, see text.
C-1 - 16 mfd electrolytic.
C-2 - .001 to .01 mfd - see text.
C-3 - .002 to .008 mfd.
C-4 - Cathode bypass, see text.
RFC - 2½ mh R.F.Choke.

The keyer described can be built on a small chassis external to the transmitter, or as an integral part of your rig. The latter course is favored as a permanent installation, since little chassis space is required.

The circuit shown in the diagram on the opposite page is not new. On the contrary, the basic circuit has appeared in amateur handbooks for some years. Modernizing the circuit by replacing the old 45 with an 807 and simplifying the power supply by using a selenium rectifier should tend to make the vacuum tube keyer more popular.

Before going any farther, let it be said here that this system may not be the best for oscillator keying, nor is this model suitable for the keying of high-powered stages. Some success in vacuum tube keying, for an ocsillator, can be obtained, although compromise adjustments of the R-C network are necessary if a chirp is to be avoided. If it is essential that you key your high-powered final, we suggest you look elsewhere for a suitable keying system. The unit to be described is undoubtedly at its best when keying an 807 driver, or a similar tube or stage, running at from fifty to one hundred mils, and with the succeeding stages biased to cut off.

The 807 was selected because of its ability to pass more current with less voltage drop through the tube itself than with other commonly available tubes, and because of its' reasonable cost. Actually, the circuit can be further simplified by triode connecting the 807 (tie-ing together the plate and screen) but with some loss in efficiency. It is therefore recommended that screen voltage. in the neighborhood of 200 to 250 volts be applied. This voltage is not very critical, incidentally. Our experiments have indicated that when the keyer tube is passing fifty mils, a voltage drop of some thirty to thirty five volts can be expected with a correspondingly higher tube drop as the current through the tube is increased to one hundred mils. Since the usual driver cathode bias resistor is dispensed with when using a keyer tube, the net voltage loss should not be very serious, normally.

Construction of the keyer is very straightforward. The 110v isolating transformer can be eliminated, if you must economize, but in this case, watch your AC polarity when the power is turned on. The transformer is a safety guarantee, and as such its' use is highly desirable. If you have B batteries available, or if for any reason you don't want to use an AC power supply, the batteries will be quite acceptable. Approximately eighty to eighty-five volts will be required for complete cut-off of the keyer tube, when you have 225 volts on the screen, and when you have about 650 volts on the plate of the tube in the keyed stage.

This cut-off voltage will vary with the screen and plate voltages used, but normally two 45 volt batteries should do the job. As the current drain is extremely small, life of the batteries will be practically unlimited. It is recommended that R-4 and C-2 be temporarily connected at first, so you can vary the values until the desired results are obtained. Final permanent soldering into place can be done later. C-2 must appear directly across the control grid and cathode of the keyer tube, and it is recommended that it be connected directly to the tube socket pins. Cathode by-pass C-4 may or may not be required, depending on circumstances, and your particular circuit and layout. Key leads may be of any length! In some commercial installations they run for miles. But do not under any condition omit the RF chokes and the condenser at the key. These are essential to the elimination of induction ckicks which would be generated in the key leads themselves. To be effective they must be right at the key itself.

The action of the vacuum tube keyer revolves around R-4 and C-2. If you are not too familiar with RC time constants, it might be a good idea to read the few paragraphs in the handbooks, which deal completely with this subject. Briefly, here's how it works. When you press the key, you ground the keyer tube grid, and incidentally also, the power

supply through resistor R-2 so that this is a must. This permits the tube to conduct. But the grid cannot reach ground potential instantaneously, since C-2 must first discharge, and this action is being retarded by resistor R-4. The larger that C-2 becomes or the larger R-4, or both, the slower the tube will be to commence conducting. Thus the " make " will be softened. When you open the key, the tendency is for the grid of the keyer to go negative, and the tube then stops conducting. But this action also is not completely instantaneous, since C-2 must first charge, and this action is being impeded by resistors R-2 and R-4, both of which are in series with the power source. Larger values for R-2 and R-4 and C-2 will increase the amount of softening of the " break " and vice versa. Actually R-2 has a slightly undesirable effect, since it is only in the charging leg of the circuit and thus unbalances the make and break time. Its' effect is kept at a minimum by making its value small in relation to the value for R-4

With an understanding of these principles, you can now start with a median value for C-2 of say .005 or .006 mfd, and try various resistors with values ranging between those specified for R-4. If you're not satisfied, repeat the process with smaller and larger values of C-2 until you get exactly the keying characteristics you like. If you have access to an oscilloscope, you'll find it is an invaluable aid, and you'll be quite amazed at the variety of wave shapes which can be obtained. However, the assistance of a patient neighboring ham with over the air tests will serve almost as well. If this little Warbler doesn't eliminate your key clicks, and at the same time produce the kind of keying you want to have, then my friend, there's something wrong with that rig of yours!

WANTED!

Articles by Radio Amateurs

2000 to 2500 words

Covering any material of genuine interest to radio amateurs, such as:

- **Transmitters**
- **Receivers**
- **Antennas**
- **Test Equipment**

Articles should be typewritten (double spaced) and accompanied by suitable diagrams, photos, and parts lists. Liberal payment will be made upon acceptance.

Address all communications to

SKYWIRE

THE CANADIAN RADIO AMATEURS' JOURNAL

435 PARKSIDE DRIVE, TORONTO, ONTARIO

VE3IY - Art Dunstall, of York, passed away recently. His wife had pre-deceased him, leaving his two small children in the care of their seventy five year old grandmother. As death came after a prolonged illness, the family is now in dire financial circumstances. The Ontario Phone Club is trying to aid as much as is possible, in memory of member 3IY, and many other Canadian clubs are sending a donation to help these orphans. The Phone Club has sponsored a draw - tickets, a dollar each, for this most worthy cause. Pass the hat at your next meeting - and send the contributions to VE3AOP, who will get them to the grandmother. It is a real chance to help a brother ham who is now a Silent Key. Make it a very Merry Christmas for these youngsters - and help to give them a chance in life!

Record those Good QSO's on Wire

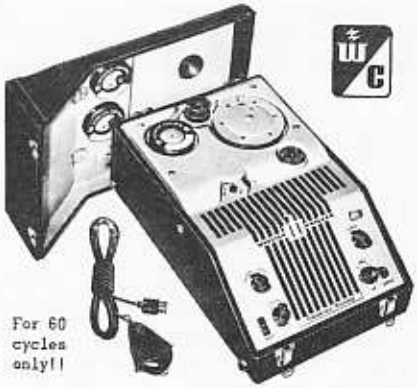
Many other valuable uses too, for a Webster-Chicago *Electronic Memory* Wire Recorder in your Ham Shack

Recorder is a real asset in ham radio operation. It takes input from microphone, phono pickup or direct from your receiver. Outputs for external amplifier or speaker. Push button control makes Model 180 easy to operate while you are on the air, and provides all desirable recording, playback, and erasing combinations.

Record your QSO's. Take down those Dx's for some well-earned gloating when the gang is in. Test your modulation levels and the quality of your rig.

Model 180 Wire Recorder is ideal for handling traffic—no chance of error in relaying important messages.

Model 180 makes a *Complete* ham shack. Try it and you won't be satisfied without one.



For 60 cycles only!!

The Webster-Chicago *Electronic Memory* Wire Recorder is easy to operate. Wire recordings of lifelike quality may be played over and over again or erased simply by recording over the same wire. Model 180, lightweight and portable, comes complete with microphone and 3 spools of Webster-Chicago *Pre-tested* Recording Wire—ready to use. Plug into any AC outlet.

The Webster-Chicago Wire Recorder comes to you completely equipped with a sensitive hand-type crystal microphone and three spools of recording wire (two 15-minute spools and one 30-minute spool).

Stop in tomorrow and see the Webster-Chicago Model 180 Wire Recorder at your favorite ham supply house. If you use a wire recorder now check on Webster-Chicago Pre-tested Recording Wire. It pays to use the best... pre-tested for your protection.

Distributed in Canada by

CANADIAN MARCONI COMPANY

Established 1903

MARCONI BUILDING, - MONTREAL

VANCOUVER WINNIPEG TORONTO HALIFAX ST. JOHN'S, NFLD.

ESICO

Electric Soldering Irons

IN STOCK AT YOUR JOBBER

• No. 61 Pencil Iron

Amateur Net $4.50

This pencil iron is only seven inches in length and weighs just 2½ ounces exclusive of cord. The handle temperature at the point where it is held in the fingers, is actually no higher than body temperature. Diameter of handle is ¾" and may be used as a pencil for the most delicate soldering operations. The element construction is of the same type as used in ESICO industrial irons and will give long service. The tip is the so-called plug type, held in place with a set screw. Three shapes of tips are available, Type B—⅛" dia. pyramid point, Type A—⅛" dia. straight pencil point and Type C—⅛" dia. bent 90 degrees with a pencil point.

• RED LABEL LINE

For Production Line Continuous Operation. These irons are of most rugged construction.

No. 38 - Net $6.30 - ⅜" Tip—100 Watts

No. 58 - Net $8.10 - ⅜" Tip—200 Watts

No. 78 - Net $9.90 - ⅝" Tip—300 Watts

No. 98 - Net $11.70 - 1⅛" Tip—550 Watts

• GREEN LABEL LINE

For intermittent duty. Meets all requirements of the home craftsman.

No. 415 - Net $1.80 - ⅜" Tip—55 Watts

No. 416 - Net $2.70 - ½" Tip—60 Watts

No. 417 - Net $3.60 - ⅝" Tip—100 Watts

No. 418 - Net $4.50 - ½" Tip—130 Watts

• ORANGE LABEL LINE

For Professional Mechanics—light or heavy soldering where iron must withstand operation for eight hour periods or more on frequent occasions.

No. 62 - Net $4.50 - ⅛" Tip—60 Watts

No. 63 - Net $5.40 - ¼" Tip—100 Watts

No. 64 - Net $6.30 - ⅜" Tip—130 Watts

No. 65 - Net $7.20 - ½" Tip—200 Watts

No. 67 - Net $8.10 - ⅝" Tip—300 Watts

No. 69 - Net $9.90 - 1⅛" Tip—500 Watts

Distributed in Canada by

CANADIAN MARCONI CO.

MONTREAL

VANCOUVER WINNIPEG TORONTO

HALIFAX ST. JOHN'S, NFLD.

RF Balance

Neutralising Circuitry

By **W. VINICOMBE (GM8RV)**

FOR the purpose of this short note, it is assumed that the reader has had some experience of neutralising an RF stage. It is hoped that the more knowledgeable will excuse the simple manner in which it is portrayed.

A circuit built by many amateurs is shown in Fig. 1(A). It is neutralised with plate voltage off. When the HT is switched on, symptoms of instability are noticed. The grid current will invariably go up instead of down. The valve may run hotter than the load warrants. There may be inexplicable jumps in the metered currents and unwanted RF may be observed.

The circuit redrawn, as Fig. 1(B), may help to make this apparent. The sketch, captioned "Why" is not truly balanced. The capacity between grid and plate (dotted condenser PG) is normally neutralised, but how about the plate to filament or earth (dotted condenser PE)?

By adding a small variable condenser (N/P) as shown in Fig. 2(A), it is possible to effect almost perfect neutralisation. Again redrawn as at Fig. 2(B) and captioned "Why not," there is shown a bridge, with two fixed and two variable values. By carefully manipulating these variables a balance is assured and the valve and circuit under consideration will be perfectly stable.

This condenser (N/P) is connected between the plate coil and earth and therefore subject to all the electrical stresses in the anode circuit; the insulation resistance and spacing should be equal to dealing with four times the anode voltage at least. The capacity depends upon the valve being stabilised, and should be about twice the anode-to-filament capacity of the valve, as shown in the manufacturer's data sheet.

To help those in difficulty, a small tuning condenser with ceramic insulation was used at GM8RV. The spacing was quadrupled, using two fixed and one moving vane. In place of the terminals, small stand-off insulators were screwed on, the whole being mounted on the chassis with the rotor plate earthed—the other connection being obvious. Where a split-stator condenser is employed for anode tuning, N/P may take the form of a metal plate (with rounded edges—to resist corona) mounted on a suitable bracket, and placed near the correct stator section. Adjust as may be required.

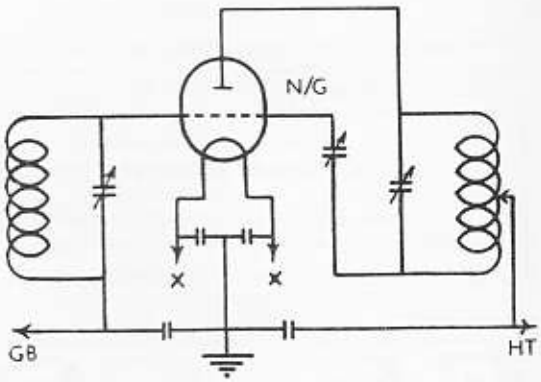
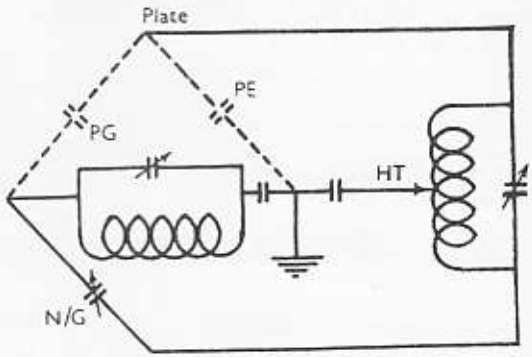


Fig. 1A.



WHY ?

Fig. 1B.

Procedure and—

Neutralisation is accomplished as follows: With condensers N/G and N/P at minimum, HT off and drive on, search is made for RF in the tank coil, using an absorption meter or

neon lamp. RF will be at maximum when the coil is tuned to resonance. Increase capacity of N/G until this indication disappears. Check by swinging tuning condenser. When RF is no longer apparent, attention should be given to the grid meter. Kicks in grid current will be

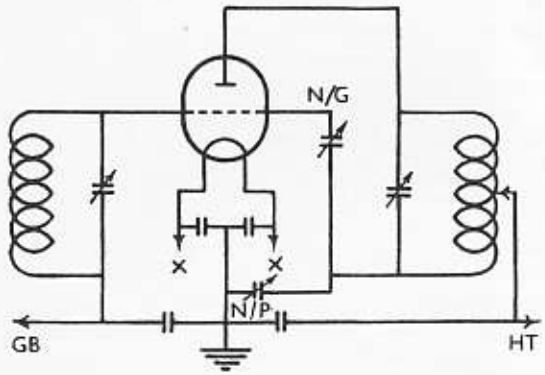
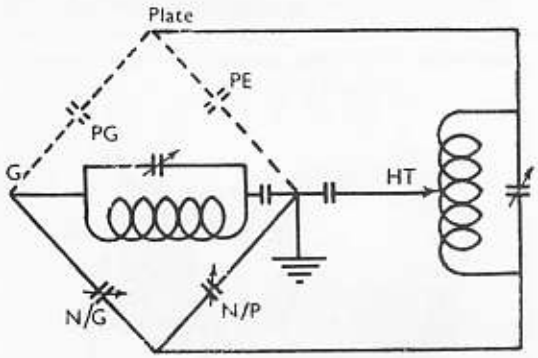


Fig. 2A.

observed as the plate tank condenser is swung through the point of resonance. Continue the adjustment of N/G until these kicks cease.



WHY NOT ?

Fig. 2B.

—Precautions

It is at this point that the transmitting amateur ceases his efforts and is satisfied—but tune the signal in on the station Rx ; swing the anode condenser as before, and the note in the receiver will be heard to vary considerably. Once more condenser N/G should be adjusted. Now condenser N/P should be brought into service. By careful manipulation of this capacity, a setting will be arrived at where the note in the receiver is perfectly stable, no matter what the position of the tank condenser.

Switch on the HT. It will be found that no further adjustments are necessary. The valve will appear harder to drive, but in fact this is not so. All the power into the grid is being used to the best advantage, as evinced by a cooler valve and no RF in places from which it should be absent.

The foregoing remarks apply to the triode which is so popular and also to the cheaper type of tetrode, many of which should be neutralised as a matter of course.

". . . Shocking transmission, OM, but as it's Christmas, can give you S9 plus FB. . . ."

HOW'S UR OBS IQ?

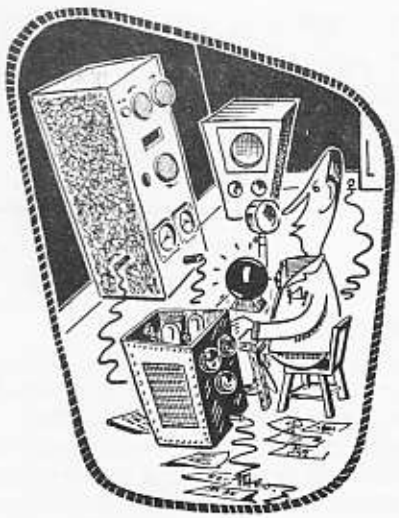
The American Radio Relay League

Official Bulletin Nr 264, Oct. 26, 1950 S.S.A., the Swedish amateur radio society invites participation in the Fourth All-European DX Contest. The CW section of the contest will be held from 0001 GCT November 25th to 2400 GCT November 26th, and the phone competition from 0001 GCT December 2 to 2400 GCT December 3. Certificate awards will be given to the highest scoring participants in each country and each U.S. and Canadian licensing area from which entries are received. All entries should be sent to SM6ID, Contest Committee, Post Office Box 609, Gothenburg 6, Sweden. The complete contest rules appear on page 43 of November QST!

Official Bulletin Nr 265, Nov 3, 1950. A.R.R.L. announces a ten meter W.A.S. contest to be held December 8, 9, 10 and 15, 16, and 17. All amateurs in the Leagues' field organization are invited to take part. Phone, CW, or both may be used. A certificate award will be given to the leading entrant in each A.R.R.L. section. Complete rules will appear in December QST. Send a post card or radiogram to Headquarters, giving the call of the station from which you copied this message and you will receive gratis, convenient reporting forms for the W.A.S. Contest.

Official Bulletin Nr 266, Nov 9, 1950. Co-operation is again requested of operators of fixed station amateur equipment who use the 28 Mc band, in keeping clear of 29.6 to 29.7 Mc to facilitate use of that sector by mobile stations. The A.R.R.L. Board of Directors urges that these frequencies be voluntarily set aside for mobile operations. By staying clear of 29.6 to 29.7 Mc, fixed stations will help to encourage mobile operation and make possible the fuller utilization of mobile stations in A.R.R.L. Emergency Corps and Civil Defense tests. All amateurs, especially those possessing operative mobile equipment, are urged to register in the Emergency Corps. Registration blanks and further information may be obtained by contacting the nearest A.R.R.L. Emergency Co-ordinator.

Official Bulletin Nr 267, Nov 16, 1950. Amateurs in military service unable to comply with activity requirements for license requirements for license renewal are relieved of this requirement during 1951, by an F.C.C. order adopted November 13th. To assist amateurs encountering difficulty getting photocopies of their licenses for use in mobile installations, F.C.C. on the same date clarified amateur regulations by pointing out that there is no prohibition, against photocopying amateur operator licenses. However, photocopies are valid only as concerns stations authorization, as the operator authorization must be the original.



". . . . Trying out a new crystal tonight, OM. . . ."

Amateur Radio

WRITERS WANTED

To write articles on transmitters, receivers, antennas, test equipment, and any material of general interest to amateurs. Articles should be typewritten, between 2000 and 2500 words in length, accompanied by suitable diagrams, photos, and parts lists. Liberal payment made upon acceptance.

Address all communications to

SKYWIRE

THE CANADIAN RADIO AMATEURS' JOURNAL

435 PARKSIDE DRIVE TORONTO, ONTARIO

amateur WANTED

REQUIREMENTS:

- **Good Character**
- **Give Full Details of Practical Experience**

Qualified Candidates Will Be Interviewed Promptly

We need a livewire salesman for the Toronto area, to specialize in Electronic Parts and Instruments. Prefer a licensed Amateur with all-round amateur knowledge. For further information, write, wire, phone or come in person

RADIO TRADE SUPPLY CO. LTD.
595 YONGE STREET
TORONTO, ONTARIO

Perfect For Christmas

FOR FIXED OR MOBILE OPERATION

H-W BANDMASTER XMTRS
have* EVERYTHING *required
from 2 to 80 Meters

Over 3000 BANDMASTERS now in use around the world—it's the most popular and versatile small transmitter of the age.

YOUR BANDMASTER REMAINS MODERN BECAUSE—

It is PROTECTED by a continuous Technical Bulletin Service mailed regularly to all registered owners:

AN INSURANCE POLICY

Which provides methods of adding new features to your present BANDMASTER as they are developed. In this way no BANDMASTER becomes obsolete or outmoded.

3 BANDMASTER MODELS

JUNIOR	SENIOR	DELUXE
$142.65	$182.00	$224.00

Simple inexpensive accessory kit converts Junior to Senior. Built-in antenna changeover and push-to-talk relay now available at small extra cost.

SEE THEM AT YOUR SUPPLY HOUSE

Send Now for Latest CATALOG

Distributed in Canada by

CANADIAN MARCONI CO.

MONTREAL

VANCOUVER WINNIPEG TORONTO

HALIFAX ST. JOHN'S, NFLD.

HAMADS

Skywire Hamads must pertain to amateur radio. Rates are 20 cents per word, per insertion for commercial advertisements for profit, and 4 cents per word for all non commercial, non-profit advertisements by experimenters or licensed radio amateurs! Full remittance MUST accompany copy! Print plainly and count address in the total. Do NOT send personal checks unless exchange is included. Mail to Skywire, Toronto!

Sell: New Hammond 767 plate transformer, 10V300, 10S300 chokes, 2-4x1500 oil condensers. First reasonable offer accepted for lot. $5.00 discount if picked up from 11239-72 Ave., Edmonton (VE6BH)

BC-457A transmitter, converted for 80 meter operation, SCR-522 receiver part only, for sale. VE3ANT, 257 Finch Ave., East, Northmount(Toronto), Ontario.

19 Set in perfect condition, used about six hours. Spare set of tubes and miscellaneous cables. Best offer takes it! Write Lloyd Cavanagh,%CKCL, Truro, N.S.

INCLUDE FULL REMITTANCE WHEN SENDING AD.

For his Christmas stocking

QSL CARDS

- ATTRACTIVE
- QUALITY
- SERVICE

VE3BCB Print 204 Ranleigh Ave., Toronto

SAMPLES ON REQUEST

For his Christmas stocking

PE-103 Dynamotor brand new, factory cartoned. Best offer. Phone or write Sid Prior, 11 Cedar Ave., Toronto, or HOward 3428.

SCR-522 Two Meter rig. Receiver and transmitter partly converted for manual operation. Complete with schematics for $35.00, 115VAC power supply $30.00 and 28VDC Dynamotor at $10.00. Write to A.L. Campbell, Innisfail, Alberta.

Hallicrafters HT-9 transmitter, CW and phone. Condition like new. Band-switching, 160 watts input to 814. All coils for operation 80 through 10 meters and complete set of tubes. Key and brand new Vibroplex type BUG included. Willing to give 30 days guarantee for immediate sale - best offer over $350.00. F.O.B. Ottawa. Also famous AR-88D Communication receiver with calibrated S-Meter, like new condition, not war surplus, includes broadcast band, and down to 32 megs. Best offer over $325.00. Reason for sale QRT. Contact Lt/Col L.G. Eon, VE3LM, 98 Harmer Ave., Ottawa, Ontario.

Use Skywire Hamads for disposing of your extra equipment. Some other ham needs it and will buy for cash!

PHONOGRAPH PICKUPS — MICROPHONES

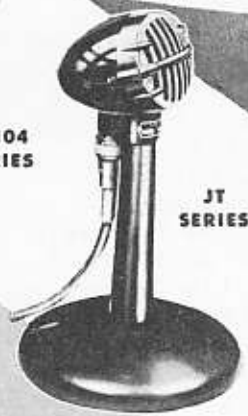
CUTTING HEADS — VIBRATION PICKUPS

THESE ASTATIC MICROPHONES *Now Enjoy a* DOUBLE POPULARITY

All models Astatic microphones tested and repaired - quickly, inexpensively, in our Canadian plant. Write for prices today!

THE ALL-TIME, leading popularity of Astatic Microphones now goes DOUBLE. All models shown are available with ceramic as well as crystal elements. The growing acceptance for the ceramic types has placed them almost shoulder to shoulder—in point of preference—with the tried-and-true favorites, the crystal units. Here, to aid you in your personal choice, is the technical data on each:

D-104 SERIES



JT SERIES

T-3 SERIES

VELVET VOICE SERIES

SPECIFICATIONS

Model	Output Level	Range	Response Characteristics
D-104	—48 db.	30-7,500	Rising
T-3	—52 db.	30-10,000	Substantially flat
JT-30	—52 db.	30-10,000	Substantially flat
JT-40	—52 db.	30-10,000	Rising
200	—52 db.	30-10,000	Rising
241	—58 db.	30-7,500	Substantially flat
D-104-C	—62 db.	30-10,000	Substantially flat
T-3-C	—62 db.	30-10,000	Rising
JT-30-C	—62 db.	30-10,000	Substantially flat
JT-40-C	—62 db.	30-10,000	Rising
VC	—62 db.	30-10,000	Substantially flat
VC-1	—62 db.	30-10,000	Rising

Letter "C" in model number designates ceramic unit.

CANADIAN ASTATIC LIMITED

TRADE MARK REGISTERED

2273 DANFORTH AVENUE TORONTO 13 CANADA

New Year Greetings

THE NATIONAL COMPANY,

George Magrath, SWL

C.L. Gagnebin	W1ATD	Victor Penney	W1MTS
Herman Bradley	W1BAQ	Donald Poulin	W1MXC
Lawrence Amann	W1BG	Dexter Atkinson	W1MYH
James Ciarlone	W1BHW	Martin Oxman	W1NYU
Calvin Hadlock	W1CTW	Ralph Hawkins	W1OEX
Harvey Poore	W1DKM	John Prusak	W1OPT
Seth Card	W1DRO	Austin Banks	W1ORK
Albert Porter	W1ESI	William McNamara	W1OTK
J. Francis Bartlett	W1EU	William Bartell	W1PIJ
William Osborne	W1EXR	Charles Coyle	W1PME
George R. Ringland	W1EYZ	Harry Paul	W1PMS
Don Hinds	W1FRZ	Richard Brayley	W1PRZ
Robert Murray	W1FSN	Hyman Kana	W1PSJ
Dave Smith	W1HOH	George Servente	W1PWG
John Baxter	W1HRK	Raymond Jordan	W1QIU
Vincent Messina	W1HRW	Harry Mayo	W1QFQ
Jack Ivers	W1HSV	S.W. Bateman	W1RX
Joe Rossi	W1HXY	Clark Rodiman	W1SZ
Edmund Harrington	W1JEL	William S. Doyle	W1TV
Alfred Zerega	W1JMK	Edward Braddock	W3BAY
Robert Williams	W1JOX	Arthur H. Lynch	W4DKJ
Frank Lopez	W1KPB	Raymond Lewis	W4JUU
William Martin	W1KUB	M.B. Patterson	W5CI
Richard Gentry	W1LEN	Ralph Hemeom	W6CYJ
John Stanley	W1LFF	Herb Becker	W6QD
Leo Green	W1LML	W. Clif McLoud	WØAZT
Francis Waden	W1LNV	Clyde Schryver	WØRPE
Richard Thurston	W1MFZ		

Xmas Greetings

FROM THE BOYS AT *Marconi*

Rupert K. Grant, 2QQ

2ET	JACK	Kingan
2ACU	RALPH	Letts
2RS	BOB	Foreman
2AEF	FRED	Hasell
2GK	BILL	Stygall
2OG	BOB	De Clercq
2EQ	TOM	MacGregor
2LR	BILL	Kokoskin
2AR	AL	Marshall
2RJ	JOE	Bowman
2CK	HAL	Houghton
2TY	FRED	Looker
2UK	JIM	Hastie
2AHF	JERRY	Locke
2WD	BILL	Duncan
2BQ	ERNIE	Stevens
2HT	JOHN	Nadon
2CR	HARRY	MacLellan
2AFF	HARRY	Liteplo
2KT	JOHNNIE	Brisbois
2WR	KEN	Wilmot
2XO	DICK	Bird
2LO	JOHN	Holland
2AGG	JOHN	Book
2RX	MICK	Morden
4CK	CHUCK	Tremblay
3ARF	BOB	Parsons
3US	JIM	Darbyshire
1AF	SAM	Sellars
1AC	ALF	Eavis
2HJ	ART	Wilkins
2GJ	FRED	Williams
2MN	HAROLD	Turner
2ED	CHARLES	Baker
2AEG	SID	Allen
7PF	GERRY	Nelson
7ACH	ALEC	Young

Get what YOU want for Christmas

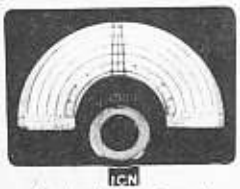
Check (√) your preferences below and leave this list where your yl or xyl can see it.

R9'er with coil for either 20,10, or 6 meters, less tube (6AK5)..... $37.00

HAMMOND 3-ELEMENT 10 METER BEAM

Elements made of telescopic aluminum alloy with adjustable spacing between elements. Can be fed directly by 50 to 100 ohm twin conductor co-ax (RA4M). Adjusting instructions furnished. Boom designed for extra strength to withstand wind and ice coating of ice. Mounting plate 8" x 8½". Total weight 26 lbs. Supplied complete with hardware.

No. 1321 NET PRICE $34.50



National Illuminated Dial, Smooth Vernier Action $8.80

VELVET VOICE SERIES

Astatic 200-S Crystal Mike, with ON-OFF sw, and stand - $11.25

MODEL 750

EDDYSTONE
25 or 60 cycles
$250.00

D-104 SERIES

Popular amateur microphone!

$18.45

TYPE CC01A OSCILLATOR WITH AK2 OR AK3 CRYSTAL. Amateurs depend upon Bliley for high activity, precision calibrated, plated crystals. Supplied for 20-40-80-160 meters. Complete oscillators specifically designed for crystal control on 2-6-10-11 meters.

Unit less crystal - $15.65

ELDICO PRODUCTS

ANTENNASCOPE

Wired, tested,

$43.45

NEW IMPROVED GRID DIP OSCILLATOR KIT IN KIT FORM
CORRECT PRICE!
$35.45

DB 22A

Preselector by RME
25 or 60cy
$105.00

B & W LOW PASS FILTER: attenuates all frequencies above 50 mc by 75db or more throughout the entire television band. Four models to choose from - 52, 75, 300 and 600 ohms $32.60

TRS-50 TRANSMITTER

The most versatile small transmitter. 50 Watts—8 bands Phone or CW. The TRS-50 is crystal controlled on all bands, yet requires no oscillator or multiplier tuning. Eight bands cover 80 to 2 meters with band switch and no plug in coils. It serves for fixed or mobile station, and will operate from an AC power pack or to 450 volts.

Deluxe bandswitching $224.00

COMMANDER
25 or 60 cycles
$285.00

SELECT-O-JECT
★Boosts 38 db — Rejects 38 db. Any Selected Frequency.
SOJ-1 for all receivers..... $41.15
SOJ-2 wired for HRO-50, NC-183, NC-173..... 41.15

Dow bug in beautiful Chrome, with red lucite paddle and trim

$18.75

$32.50

MODEL 77 WAVEMETER
complete with coils
$32.50

Buy Christmas Seals

VOLT-OHM-MILLIAMMETER MODEL 666-HH

$27.50

MB-150

150 watt type

$30.50

MODEL 630 VOLT-OHM-MIL-AMMETER

$52.50

MB-40L

40 watt type

$14.70

Merry Christmas *From*

The Crawford Radio

VE3YR GEORGE

VE3JU BILL

KING WILLIAM AND HUGHSON STS.
HAMILTON, ONTARIO

DX PREDICTIONS

Prepared by C.B. McKee, Engineering Division, CBC International Service

PREDICTIONS FOR DECEMBER, 1950

Skywire frequency predictions are for amateur communications on various circuits to almost any part of the world. These tables are for five major areas in Canada, and amateurs who are operating reasonably close to the cities indicated will find these predictions quite adequate.

Figures shown are in megacycles and indicate the band to be used. They are for normal F layer transmission and don't consider Sporadic E which may provide unusual DX openings!

Toronto to: EST	00	02	04	06	08	10	12	14	16	18	20	22
Europe	7	7	7	7	28	28	28	28	14	7	7	7
Africa	7	-	-	14	28	28	28	28	28	14	7	14
Caribbean	7	7	7	7	14	28	28	28	14	14	7	7
S. America	7	7	7	14	28	28	28	28	28	14	14	7
Australia	-	-	14	7	14	14	-	-	-	-	-	-
U.S. - West	14	7	7	7	7	28	28	28	28	28	14	14
U.S. - Central	7	7	7	7	7	14	14	14	14	14	14	7
U.S. - South	7	7	7	7	14	28	28	28	28	28	14	7
Vancouver	7	7	7	7	7	14	28	28	28	28	14	14
Watrous	7	7	7	7	7	14	28	28	28	14	14	7
Montreal	4	4	4	4	7	7	14	14	7	7	7	4
Sackville	7	4	4	4	7	14	14	14	14	7	7	7

Sackville to: AST	01	03	05	07	09	11	13	15	17	19	21	23
Europe	7	7	7	14	28	28	28	14	14	7	7	7
Africa	7	-	-	28	28	28	28	28	14	14	7	7
Caribbean	7	7	7	7	14	28	28	28	14	14	7	7
S. America	7	7	7	14	28	28	28	28	28	14	14	7
Australia	-	-	7	7	14	14	-	-	-	-	-	-
U.S. - West	7	7	7	14	7	14	28	28	28	28	14	14
U.S. - Central	7	7	7	7	14	28	28	28	28	28	14	14
U.S. - South	7	7	7	7	14	28	28	28	28	28	14	14
Vancouver	7	7	7	7	7	14	28	28	28	28	14	14
Watrous	7	7	7	7	7	28	28	28	28	28	14	14
Toronto	7	4	4	4	7	14	14	14	14	7	7	7
Montreal	4	4	4	4	7	7	7	7	7	7	7	4

Watrous to: MST	22	00	02	04	06	08	10	12	14	16	18	20
Europe	7	7	7	7	14	14	28	14	7	7	7	7
Africa	7	-	-	7	14	28	28	28	28	14	14	7
Caribbean	7	7	7	7	14	28	28	28	28	28	14	14
S. America	14	7	7	7	14	28	28	28	28	28	14	14
Australia	-	-	7	7	7	7	14	-	-	28	28	-
U.S. - West	7	7	7	7	7	7	14	14	14	14	14	14
U.S. - Central	7	7	7	4	4	14	14	14	14	14	14	7
U.S. - South	14	14	14	7	7	28	28	28	28	28	14	14
Vancouver	7	7	7	7	7	7	14	28	28	28	14	14
Toronto	7	7	7	7	7	14	28	28	28	14	14	7
Montreal	7	7	7	7	7	14	28	28	28	14	14	7
Sackville	7	7	7	7	7	28	28	28	28	28	14	14

Montreal to: EST	00	02	04	06	08	10	12	14	16	18	20	22
Europe	7	7	7	14	28	28	28	28	14	7	7	7
Africa	7	-	-	14	28	28	28	28	28	14	-	14
Caribbean	7	7	7	7	14	28	28	28	28	14	17	7
S. America	7	7	7	14	28	28	28	28	28	14	14	7
Australia	-	-	14	7	14	14	-	-	-	-	-	-
U.S. - West	14	14	14	7	7	28	28	28	28	28	14	14
U.S. - Central	7	7	7	7	7	14	28	28	28	14	14	7
U.S. - South	7	7	7	7	14	28	28	28	28	28	14	7
Vancouver	7	7	7	7	7	14	28	28	28	28	14	14
Watrous	7	7	7	7	7	14	28	28	28	14	14	7
Toronto	4	4	4	4	7	7	14	14	7	7	7	4
Sackville	4	4	4	4	7	7	7	7	7	7	7	4

Vancouver to: PST	21	23	01	03	05	07	09	11	13	15	17	19
Europe	7	7	7	7	7	7	14	14	7	7	7	7
Africa	7	7	7	7	7	14	28	28	28	28	14	14
Caribbean	7	7	7	7	7	14	28	28	28	14	14	7
S. America	7	7	7	7	7	28	28	28	28	28	28	14
Australia	-	-	7	7	7	7	14	14	-	28	28	-
U.S. - West	7	4	4	4	4	4	14	14	14	14	14	7
U.S. - Central	7	7	7	7	7	14	28	28	28	28	14	14
U.S. - South	14	14	14	7	7	28	28	28	28	28	28	14
Watrous	7	7	7	7	7	7	14	28	28	28	14	14
Toronto	7	7	7	7	7	14	28	28	28	28	14	14
Montreal	7	7	7	7	7	14	28	28	28	14	14	7
Sackville	7	7	7	7	7	14	28	28	28	28	14	14

VIBRATIONS in Broadcasting

BY CLIVE B. MCKEE CBC INTERNATIONAL SERVICE ENGINEERING DEPARTMENT

IN OUR FIRST TALK you may recall we introduced you to the world of vibrations.

We told you that the human voice, for instance, causes vibrations varying between 100 and 8,000 times a second. Of course no individual voice covers this entire range. You have only to listen to the people talking around you every day, to realize that some people have low-pitched voices—a low speed of vibration—and others have high-pitched voices—a high speed of vibration. The figure that we have given of 100 to 8,000 vibrations a second does, however, indicate the range over which the human vocal cords may vibrate. Actually a very narrow range of frequencies from 200 to 3,500 can be used to convey intelligence. Advantage of this fact is taken in the construction of the telephone.

The telephone is simply an instrument which is connected by two wires—lines as they are usually called—to your local telephone exchange. When you dial or ask for the desired number, the wires attached to your instrument are connected temporarily to the wires which are attached to the instrument of the person you are calling. When you speak into the mouth-piece of the telephone, the vibrations set up by your voice cause—by varying the air pressure—a thin disc of material in the mouthpiece (known as the diaphragm) to vibrate at the same frequency.

Now this piece of material by its action causes electrical vibrations to move along the wires, and they in turn, cause a similar piece of material in the earpiece of the telephone, at the other end of the line, to vibrate in sympathy with your voice. The vibration of the diaphragm in the earpiece, by varying the difference in air pressure, causes the eardrum of the person listening to your voice to vibrate, and thereby intelligence is conveyed.

The wires or lines which we need in this process are expensive to design and build, and to cover the full voice vibration range of 100 to 8,000 a second would be prohibitive in cost if installed for every subscriber. The telephone engineers found however that these lines could be designed at a reasonable cost to carry vibrations from 200 to 3,500 only and yet the voice was perfectly understandable to the listener.

By now you are probably asking yourself, "What has this to do with broadcasting?" Well, if you keep in mind the story of the telephone you will find it very much easier to understand the actual mechanics of broadcasting.

Everyone knows that the microphone is the instrument to which announcers, singers, bands, and all and everything you hear on your radio programs, direct their talents. This microphone, although different in construction, is very similar in action to the mouthpiece of your telephone at home. And like the one in the telephone mouthpiece, this microphone sets up electrical vibrations in sympathy with the speech, music, and other sounds which it hears. These electrical vibrations are amplified and carried by wires or lines through the various control rooms and then out and away from the studio centre, along wires or lines, sometimes hundreds of miles, to the transmitter.

These lines while serving the same purpose as those connected to your telephone, are much better, and of course more expensive to construct. They are better because they have been specially designed to carry a much wider frequency range of vibrations than those connected to your telephone. If by some chance you could listen to music via your telephone you would find that it sounded thin and flat. The big bass drum would sound lifeless, and those beautiful high notes of the strings would have disappeared. Now in broadcasting we play music for your enjoyment, so of course it is necessary for us to have between our studio and transmitter these specially constructed lines capable of carrying a much wider range of frequencies than that necessary for full telephone communication.

The lines in use by the International Service of the CBC carry the program from the studio centre in Montreal, a distance of 600 miles (1,000 kilometres) to the transmitters at Sackville, New Brunswick. These transmitters were erected, owing to the suitability of the location on our Atlantic Seaboard.

All transmitters are not necessarily erected near the sea, but wherever they are situated they serve the same purpose, and that is to span with links invisible to the human eye, the waters of the oceans, and the great land masses of the world, and by means of this invisible link to join your receiver to those lines which have carried the program all the way from the distant studio centre. Now once again referring to the first talk in our series, you will recall that we said everything about us vibrates, and apart from voice vibrations, we told you about the vibrations of ultra-violet and infra-red rays.

Now this invisible link between your receiver and the transmitter is composed of vibrations. As with everything else which vibrates they vibrate at a predetermined number of times a second. The frequencies used for local or medium-wave broadcasting are situated in a band between 540,000 and 1,600,000 vibrations a second. You will recognize these figures on your medium-wave dial which may be calibrated in kilocycles, in which case the figures will range from 540 to 1,600, or it may be simply marked from 54 to 160. In short-wave broadcasting the vibrations used are in eight relatively narrow bands, situated at intervals between 6,000,000 and 26,000,000 vibrations a second, or 6 megacycles to 26 megacycles.

Any vibrations falling within these ranges are known as radio frequencies. The vibrations caused by the voice, music, etc., are known as audio or audible frequencies. Now our transmitters at Sackville can operate on certain predetermined frequencies of vibration in any of these eight bands of vibrations.

These radio-frequency vibrations, remember, are the connecting link or carrier between our transmitter and your receiver. It is the transmitters' function to generate these required frequencies of vibrations; and also to add to them, the audio frequencies. In other words the transmitter generates invisible lines which in effect act just as the lines joining the telephones mentioned previously, and over these invisible lines the speaker's voice is carried to your receiver.

The transmitter's chief assistant in its effort to transmit programs over thousands of miles is the antenna.

Do not let this technical word antenna

LIKE MAGIC!

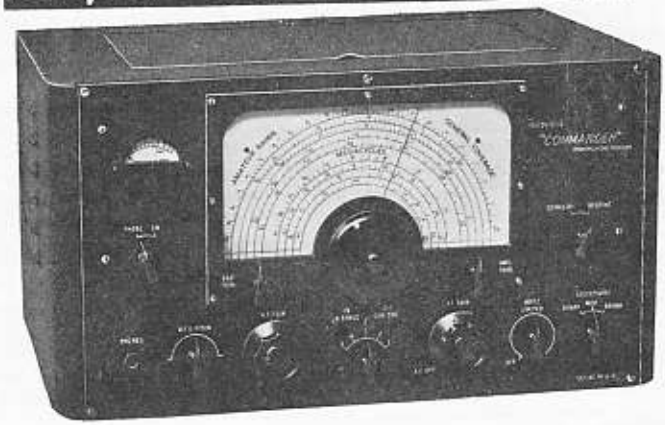
ZOOMING AHEAD IN DEMAND!

Feature For Feature
Compare it...You can't beat a

Quality

Beauty

Economy



"COMMANDER"

With Real Communications Features:

- 1600 kc 1st IF, 100 kc 2nd IF — 3 position selectivity
- Signal remains constant with selectivity change
- Over 12" semi-circular bandspread on 10 M.
- Separate electrical bandspread on 3.5, 7, 14, 21, 28 mc bands
- Between 1-2 microvolts input for 50 milliwatts output
- Complete coverage 1.7 to 31 mc in 5 bands
- Full-vision illuminated direct-reading dial calibrated in frequency
- Precision 50/1 ratio slow motion drive
- Series noise limited with adjustable clipping level
- Panel bandspread cal. adjustment against external frequency standard
- Input balanced or unbalanced, impedance 70-400 ohms

Fully CSA approved

PRICE $285.00

(Less Speaker)

WRITE US TODAY FOR FREE DESCRIPTIVE LITERATURE

SOLE CANADIAN REPRESENTATIVES

ELECTRONIC MATERIELS INTERNATIONAL LTD.

502 BANK STREET – OTTAWA, CANADA

perplex you. The majority of our listeners will no doubt have an antenna of some description, whether it be outside in the garden, on the roof, or merely a piece of wire running around the picture rail. Now this piece of wire joined to your receiver is the antenna and its function is to receive from the air the vibrations caused by the transmitter, very much as it is the eardrum's duty to receive from the air the vibrations which we recognize as sound.

The transmitter uses an antenna to radiate these vibrations, but this antenna connected to the transmitter is by no means just a piece of wire of haphazard length. The antenna used by the broadcasting station is a specially designed wire or system of wires suspended between two steel masts. Many local broadcasting stations use only a specially constructed type of steel tower as the antenna and do not use a wire or system of wires suspended between masts.

Mention has just been made regarding a haphazard length of wire, and the antennas used by the majority of our listeners will no doubt be of varying lengths and height above ground, and therefore fall into this category.

Just as the transmitting antenna is of a specified length and construction, so also should the receiving antenna merit like care in its design. It is just as important for good reception, particularly on the short waves, that your receiving antenna be of a correct length and that it be erected in a suitable position so that it receives signals from any one direction at maximum strength. Your local dealer or service-man will no doubt willingly supply you with the necessary information, to enable you to improve your own antenna system.

So much for the general idea of broad casting. Let us now examine the main differences between a local broadcasting service and a world-wide short-wave service.

Let us consider the local service first. This service as its name implies is designed primarily for broadcasting to a strictly local audience. The transmitters used in this service are required by international agreement to operate upon a certain radio frequency in the band of 540,000 and 1,600,000 vibrations a second. Each broadcasting station is allocated a radio frequency which does not cause interference to other broadcasting stations, and programs are radiated upon this one frequency during all the hours that the station is on the air. The radiations from the local broadcast antenna in most cases spread out in all directions around the antenna in a circular formation.

All of you at some time or other will no doubt have dropped a stone into a pond or pool of water. You will have noticed that when the stone touched the water it caused little wavelets to travel outwards in circles. As they travel outwards these wavelets, due to the inertia of the surrounding mass of water, gradually decrease and finally die away. In this same way the energy radiated by a local broadcasting station spreads out around its antenna to all points of the compass until it gradually dies away due to absorption.

The distance covered by this form of broadcasting is not great, normally being of the order of 300 miles, depending upon the power of the transmitter and the ease with which the waves of vibrations carrying the program travel along the surface of the earth. It is due to this close following of the earth's surface that the term ground-wave broadcasting has been given to local broadcasting systems. This ground wave covers only short distances of a few hundred miles at most and is therefore useless for broadcasting programs over long distances, as is necessary in short-wave broadcasting.

In short-wave broadcasting the radiations from the broadcasting station do not travel along the ground. Due to the high frequencies of vibrations, and the special type of antennas used in this system of broadcasting it is possible to direct the radiations away at a predetermined angle from the earth's surface and into outer space. When the radiations leave the short-wave broadcasting antenna they shoot off into space and start their upward journey—at the speed of light (186,000 miles per second)—until they reach either the E or F layer of the ionosphere where they are reflected downwards again towards the earth. From the earth they are reflected again to the ionosphere and continuing in this fashion the signal covers the surface of the earth in great strides, very much like the giant in his seven-league boots.

The antenna used at a short-wave transmitting station is unidirectional; that is, it transmits the radiations in one direction only, and not to all points of the compass as with the local broadcasting antenna. These antenna systems are specially designed for use with certain frequencies and for directing the programs to certain areas of the world. There may be several antennas aimed in the same direction but designed to radiate different frequencies. Once these antennas are installed they remain permanently in their position and radiate vast numbers of rays of energy with the desired angle of elevation, in the appointed direction.

As you will no doubt have noticed, it is not strictly true to talk of short-wave broadcasting, because the word broadcasting means to scatter widely, and as we have just told you the short-wave antenna does not permit this, but concentrates the radiations in a beam, very much as a searchlight concentrates the light it produces.

This beaming of the radiations is done because of the very many great distances that have to be bridged when transmitting to the world and the necessity, due to these great distances, of concentrating all the available power in the desired direction. As opposed to local broadcasting, shortwave broadcasting has to carry its news and entertainment in many different languages, to a wide variety of countries. It is therefore an unnecessary waste of time and power, to provide the people of Australia and New Zealand for example, with programs specially written and produced to be of interest to European listeners.

Another important reason for the need of directional programming is of course the difference in local times between countries in various parts of the world. For example when people in the British Isles listen to the Voice of Canada at say, 8 o'clock in the evening, it is 3 o'clock in the afternoon in Montreal and 6 o'clock the next morning in Australia. We see therefore that in short-wave broadcasting careful planning has to be undertaken to see that the right programs are broadcast from our short-wave transmitters in the right direction and at the right time.

As you all know, the local station of your choice can always be found at the same position on the tuning dial of your receiver. And you can hear your programs every day all the year round at this one position.

Those of you however who listen to programs via the short wave will have noticed that at different times of the day and at different seasons of the year it is necessary for you to change your tuning position. This changing about will have puzzled many of you and no doubt, annoyed others. These changes are dictated by the ionosphere. The ionosphere, because of its variation in density, causes short-wave broadcasters to use one frequency at one time of the day and another frequency at another time of the day. It is also necessary to change frequencies from season to season and year to year.

Skywire

The shocking news of the death of one of Canada's most widely known amateurs, reached us in early November. John Dalton Woodlock, familiarly known around the world to countless amateurs as VE2HE is now a Silent Key.

Johnny was just 34 years of age, but succumbed to a heart attack. Surviving him are his wife and three children.

Perhaps this country's most widely known 75 meter phone man, pre and post war, he was an ardent supporter of the Montreal Amateur Radio Club. In the past year of his life, Johnny attained considerable fame by being the first experimenter to receive television in the Montreal area from Schenectady, more than 200 miles away. Starting in radio at the age of 7, this remarkable achievement was one of his proudest accomplishments.

A warm personal friend of your Editor, and of "Pop" Payette, as well as countless U.S. and Canadian hams who came to visit him at Iberville, it is difficult to realize his personable voice has now been stilled. Canada has lost a great amateur who will be sorely missed!

PAYETTE & COMPANY

WHOLESALE RADIO DISTRIBUTORS

910 BLEURY STREET MONTREAL, I CANADA

"THEY DON'T CATCH ME"

The Multi-way Menace

By **NONET**

HAVING been invited by a large number of amateur spiders to enter their parlours, and having, in unguarded moments, succumbed to their entreaties, I have now decided to give up being a fly.

It may be that I am in a minority, but *I do not like nets*, and in future I will have none of them. And, furthermore, I am not making my escape from these extremely sticky traps for the unwary in discreet silence, but am taking this opportunity of telling some of the spiders in whose parlours I have wasted so much time just *why* I am not their future meal.

To start with, the net is a time-waster. The time wasted increases roughly as the square of the number of people in the net. This tendency manifests itself right at the start, when a duet is transformed into a trio. Two chaps having a contact will each say what they want to say and then cut loose ; but if a third comes in, the chances are that each of the original two will repeat practically everything that he has already said—whether interesting or not—for the benefit of the third party. All the usual "I'll be brief about the rig" stuff, and so on, together with some theory (possibly sensible but maybe half-baked) about aerial systems, 807's, microphones or what-have-you.

By the time eight or nine members have joined the assembly, everyone talks *at* the others instead of *to* someone else ; everyone has to remember, or note down, innumerable comments on divers subjects made by all the others ; and one such comment is sure to touch someone off on his pet subject, on which he is a well-known bore. It is a mitigating circumstance, I admit, that the said bore will only have his turn about once in every forty minutes ; but perhaps most of the others have, by then, been touched off on their particular bore too.

I am convinced that when a net has become really large there will be two or three members who will talk just for the sake of talking—even if they have to think quite hard to find something on which they can talk for a long time.

Reducing the QRM ?

Now about the only argument ever put forward in favour of netting is that it reduces the QRM by keeping, on one channel, eight or nine stations who might otherwise be spread over the band. This carries a dangerous grain of truth but is, nevertheless, a complete fallacy. Nine stations transmitting for five minutes each will cause precisely the same amount of QRM, whether they occupy the same frequency for nine consecutive periods of five minutes or whether they spread over the band for sporadic periods.

In fact, to my mind, it is slightly more annoying to find one channel apparently occupied for ever than to hear various short and snappy conversations being spread out over 200 kc or so.

Even the multi-way QSO in which the participants are on different frequencies is rather less devastating than the tight net which goes on for hours and constantly admits more and more who are foolish enough to yield to the urge to break in.

Glad I'm getting out to-night, OM. . . . . .

"Say, 'MERRY CHRISTMAS' to Your Favorite Ham with One of These Items"

SELSYN UNITS

Will operate from 110 volts, 60 cycle by using a resistor or a condenser in series. Size is 2¼" in diameter x 4¾" long. Ideal for beam antenna position indicator.

$2.75 a pair

We have R-1155 receivers, complete with external power supply, speaker in fine operating condition. These will make any shack complete. Only $69.00 complete, ready to plug in, 60 cycle

One Marconi SMR-3 all wave receiver covering 100kc to 32 mcs, less b/c. band. Lots of bandspread on amateur bands. With 25/60 cycle supply, and xtal filter unit, speaker - $129.50

Compact Edison type wet cells, 2vdc with 14 ampere hour capacity. These are shipped dry, uncharged, at just $2.25 each. Perfect for portable or emergency powered rigs.

MARION "4 FOR 1" FEATURE

3" METERS 3"

0-1 ma - $7.95 each
0-10ma - $6.75 each

ELECTROSTATIC VOLTMETERS
0-2000 volt scale, draws no current. $5.00 each!!

FREE FALL '49 CALLBOOK SHIPPED WITH EACH ORDER FOR $5.00 OR MORE OF THESE FINE SPECIALS !!!!!

—ATTENTION— MOBILE HAMS

Complete mobile package - just the antenna to buy! Transmitter Marconi built with 6L6 osc., 6L6 final. Modulator 6N7 cl B with 6N7 driver stage. Carbon mike! Operates any band by plug in coils. Supplied with coils for ten--- hot receiver covers 2.5 mc police band now and is easy to change to 75 or HF with converter. In package is 350v/150ma 6 volt dynamotor, fine condition, remote head for dash mounting, and a good looking mike. These were removed from police cars during modernization and are very good condition. Only a few available for FB mobile operation at just

$69.00 complete!!!

TELEVISION - F.M.

COMPLETE WITH NEW TUBES, PARTS LIST & SCHEMATIC CIRCUIT

Frequency Range is 158 TO 210 MC/S

Easy to Convert for Operation on Other Bands

2 METERS

14 TUBES

2 R.F. STAGES Slug Tuned

5 I.F. STAGES Iron Core I.F.'s

14-Tube UHF Superhet Receiver—

TELEVISION FOUNDATION

This beautifully constructed receiver was designed especially for Signal Corps communication service, and is one of the finest and most sensitive sets ever manufactured. Operating from 110V 60 cycles, this set has two tuned RF stages, tuned converter and oscillator, five I.F. stages, using iron-core IF's, a diode detector, tuning eye, and a two stage amplifier that will drive a speaker or phones. The frequency range is 158-210 Mcs. It is a simple matter to operate on other bands by making a slight alteration in the tuning coils. A complete set of tubes is included with each receiver, along with a circuit diagram and parts list. The high-voltage power supply delivers 150 milliamperes, and is well filtered by a heavy-duty choke and three 5 Mfd. oil-filled condensers. This line of a line-one cost the government about $500. Amateurs and experimenters will never again be able to purchase fine equipment at such a tremendous saving!

BRAND NEW

CONVERSION DATA FOR TELEVISION CONVERSION FREE TO PURCHASERS OF THIS FINE RECEIVER

$39.50

TUBULAR CONDENSER KIT

KIT CONTAINS THE FOLLOWING VALUES

.002 MFD - 600 WV
.004 MFD - 600 WV
.005 MFD - 600 WV
.02 MFD - 600 WV
.03 MFD - 600 WV
.05 MFD - 600 WV
.2 MFD - 600 WV
.01 MFD - 400 WV
.1 MFD - 400 WV
.2 MFD - 400 WV

KIT OF 20 Condensers

Standard Make

Brand New

$1.00

10 Kits - $9.25

We Insist on Keeping PRICES DOWN!

• Our policy has been value for high-quality merchandise . . . and despite high prices, we adhere to our principles.

RADIO ELECTRONIC SUPPLIES CO.

571 YONGE STREET TORONTO

TELETRONICS

BEST of SURPLUS

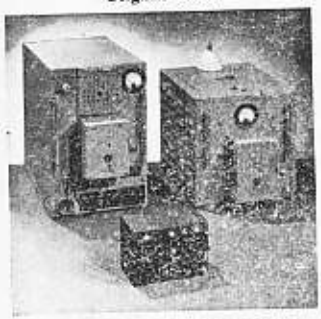
Wish You A Merry Christmas and A Happy, Prosperous New Year

BENDIX

Communication Equipment

WAR SURPLUS—NEW!

Equipment at a fraction of the Original Cost!



PRICE $200.00

The Famous TA-2J Transmitter is the answer to your communication problems. Offering stable operation plus excellent range on R/T or C/W. Easily converted to A.C. operation.

- FREQUENCY COVERAGE—2.9 Mcs. to 15 Mcs.
- TUNING IS PRE-SET—Utilizing 8 Crystal Controlled Channels.
- OUTPUT POWER—Approx. 125 Watts.
- CAN BE OPERATED LOCALLY OR BY REMOTE CONTROL.
- COMPACT — STURDY — DEPENDABLE.

The above quoted price includes power supply—(not shown). Operates on 28 volts, D.C.

TRANSMITTER -	$100.00
POWER SUPPLY -	$50.00
ANTENNA LOADER -	$50.00
REMOTE CONTROL -	$8.00

Specials

TRANSFORMERS
(ALL PRIMARIES 117 V. 60 CYCLES)

FILAMENT TRANSFORMERS

#12433 - 2.5v at 10 amps - $1.35 each

#12795 - 6.3v at 1.2 amp - .75c ea.

#12789 - 5v CT @ 3 amps - $2.50 each
6.3 at 10 amps

#11968 - 2.5v at 3.5a - 10kv insulation
2.5 at 5 amps
2.5 at 1½ amps - $3.50 each

OIL FILLED CONDENSERS

WE HAVE LARGEST CANADIAN STOCK OF OIL FILLED HIGH VOLTAGE CONDENSER FILTER UNITS. THEY RANGE FROM .004 AT 200 VOLTS TO 15MFD AT 25,000VDC, AND ALL ARE OUTSTANDING VALUES. HERE ARE A FEW EXAMPLES!

10mfd	- 600vdc	- $2.50 each
8mfd	- 600vdc	- $2.50 each
4mfd	-1000vdc	- $1.75 each
4mfd	-1500vdc	- $2.75 each
4mfd	-2000vdc	- $4.50 each
2mfd	-4000vdc	- $6.00 each

WRITE ABOUT OTHER CAPACITIES AND VOLTAGES. WHAT DO YOU NEED?

FILTER CHOKES
LARGE STOCK - BIG SELECTION
MANY MORE NOT LISTED
WRITE FOR PRICES!!

CHOKE

30 hy at 25 mils - .50c
10 hy at 150 ma. $1.75
.025hy at 3 amps $5.25
30hy at 450ma. - $7.00
20hy at 100ma. - $1.00
10hy at 200ma. - $2.00
60hy at 75 ma - $1.00
30hy at 65 ma - $1.00

THIS GRAVY TRAIN Stops ONLY ONCE!

Below Wholesale Cost ! ! !

CALLING ALL MOBILERS!
We Have 6 Volt Dynamotors (CARTER Magnetors)

- List Price $51.50
- NOT War Surplus

MA-251 Carter Magnetor is the finest inverting type preferred for mobile eircuits, police mobile, etc. PM field design, low drain, ball-bearing equipped. Input 6 VDC at 8 amps, output 250 VDC at 100 mils. 4800 rpm continuous duty. Only 3½ x 3½ x 2¾". Brand-new only $5.00. Used, good condition $2.50! your mail order today. No more when these are gone!

$5.00

BUY TWO FOR TRANSMITTER, USING THEM IN SERIES FOR 500 VOLTS !

LARGEST STOCK OF JONES PLUGS AND A/N CONNECTORS IN CANADA. WRITE YOUR REQUIREMENTS AND WE'LL GIVE YOU A BETTER BUY ON THESE ITEMS.

COMPLETE TELEVISION MANUAL

THE VIDEO HANDBOOK

The vast amount of information contained in this book can only be briefly outlined here. The VIDEO HANDBOOK contains 768 pages—over 800 illustrations—thousands of vital facts.

Sec. 1 Television Past, Present, Future
Sec. 2 Fundamentals of Television
Sec. 3 The Television Station
Sec. 4 The Television Receiver
Sec. 5 The Television Antenna System
Sec. 6 Building a Television Receiver
Sec. 7 Descriptions of Modern Television Receivers
Sec. 8 Installing Television Antennas
Sec. 9 Servicing Television Receivers
Sec. 10 Television Test Equipment
Sec. 11 Obtaining a Television Broadcast License
Sec. 12 Miscellaneous

A COMPLETE MANUAL ON SERVICING TELEVISION RECEIVERS INCLUDED IN THE VIDEO HANDBOOK

Here you will find the most complete account yet published on every step in repair or maintenance. There are detailed block diagrams illustrating every test equipment set-up. There are circuit diagrams illustrating every stage discussed, every component. You will find a complete description of alignment procedure, signal tracing for troubleshooting and over 100 photographs of oscillograms showing wave forms encountered. There are 35 pages of troubleshooting charts, short-cuts that are money-saving and time-saving. All common faults (and scores of less-common troubles) are enumerated and their symptoms listed and illustrated. This section is the most valuable service guide money can buy.

ADVANCE SALE—ONLY $5.50! MAKE SURE YOU GET YOUR COPY—ORDER NOW!

TELETRONICS
CORPORATION LIMITED

590 YONGE STREET TEL. PRincess 3127 TORONTO 5, ONT.

Head Office:- 1171 St. James West
Montreal

LADIES PRESENT

The next time you look into the sky at night and see a finger of light sweeping out from the local airport, take a long look. It may be the last you'll see of an airway beacon, because today they are fast becoming as obsolete as a three dollar bill.

Science, in developing invisible electronic aids has changed the way of thinking among airline officials. Now, with devices available for installation in planes and at the airports, there is no longer any need for the visual type of beacon. High frequency radio signals have taken their place. A pilot can fly through night or fog with complete accuracy with no recourse to lights or other visual aids. The Civil Aeronautics' Authority in the United States recently announced that it has authorized the complete dismantling of visual beacons, in favor of what are called Omirange airways. Already, there are two hundred and seventy one Omnirange stations across the line which are radiating all direction radio signals, and making flyer safer each day.

In all the talk about what to do if an atomic war gets started, many people have asked a good question. It's fine, they say to have Geiger counters to measure the amount of atomic radiation in a neighborhood and to have plans worked out for the evacuation of populations to a suburb and the like, but isn't every person going to worry about the amount of radiation he has absorbed personally? How is every one going to find out his chances for survival? Well, science has an answer to this question in the form of a portable gadget called a Dosemeter. No larger than a quarter, it can tell you exactly how heavy is the dose of radiation you're worrying about. Doctors explain that the gadget can be used by the relief and disaster workers to pick out the most seriously exposed people and thus get medical aid to them first.

This gadget consists of a small water which turns blue on exposure to atomic rays. If the exposure has been slight, the color is a very light shade of blue. The heavier the radiation dose, the deeper the color becomes and the sooner medical aid must be given. Nothing has been decided as yet on how or when these Dosemeters will be distributed to the public. Eventually, if a war came along, all of us might want them strapped to our wrists like a watch, or hung around our necks like the dog tags of the last war, so that we'll know the instant there's any trouble. Dosemeters might almost become an Atomic Age costume jewellery item, but this isn't likely for some time to come.

Two Canadian surgeons have recently reported on work with a new electric shock machine which can start again a heart which has stopped beating. So far it has been used only on animals, but there seems to be no reason why it wouldn't be just as successful on human beings. As a matter of record it may furnish a new way of saving lives of people whose hearts suddenly stop during operations. Up to now, surgeons have had to massage failing hearts or inject drugs as a stimulant, but apparently the electric shock machine is quite an improvement on both techniques.

The device is a sort of pacemaker. As you may or may not know, the heart has its own pacemaker, a little lump which is the source of natural electrical impulses controlling and co-ordinating the heartbeat. This new device has been designed to take over when the natural pacemaker fails for any reason.

What the surgeon using this electrical unit does, is insert the metal-tipped electrode through the veins - to reach the heart with its electricity. The speed of the artificially produced heartbeat can be controlled without trouble!

During the war years, a radar crew aimed at a flight of ducks migrating south. The ducks flared up and changed direction just as if they had been shot at. When the scientists who were operating the radar tried it again, the same thing happened. The experiment was tried several times again, with movies being taken of the ducks as they scattered. As a result of these early experiments, radar was installed at Delta, Manitoba, to continue them during the annual Spring migration.

Over a period of five days, enough tests were made to prove quite positively that the ducks were allergic to radar bombardment. The original experiments at Johns Hopkins were confirmed in every detail. The birds all reacted in the same way. When the beam was thrown on them, they flared up and changed direction. One flight was given the treatment three times in a row and finally became so confused that they scattered in all directions. Surprisingly, though, this radar bombarding effected only flights in migration, and not local birds at all.

An electronic brain machine developed by the United States can store grand amounts of scientific information in its system, then automatically pore over it, select what is being looked for by the operator, and then hand him copies of what is wanted.

Known as the Rapid Selector, the device has a large library of thirty five millimeter film on which the records and information can be stored. This film can handle as much data, as a half a million conventional file cards as the material is microfilmed with a predetermined code pattern, consisting of a series of black and white squares, printed simultaneously on the film.

The operator of the machine, wishing to obtain information, places a master card in the machine and a photo-electric cell scans it at a rate of more than sixty thousand subjects a minute, selects the desired frame and then copies it on a separate film by a high speed photoflash technique. The film then can be viewed at the operators leisand needed information abstracted from it.

Westinghouse

RADIO TUBES

For better reception!

CANADIAN WESTINGHOUSE COMPANY LIMITED

HAMILTON, CANADA

You can now add the word Electret to your ever-growing vocabulary. It represents something in wax that is not supposed to exist but which does. It is described as an electrical counterpart of the permanent magnet.

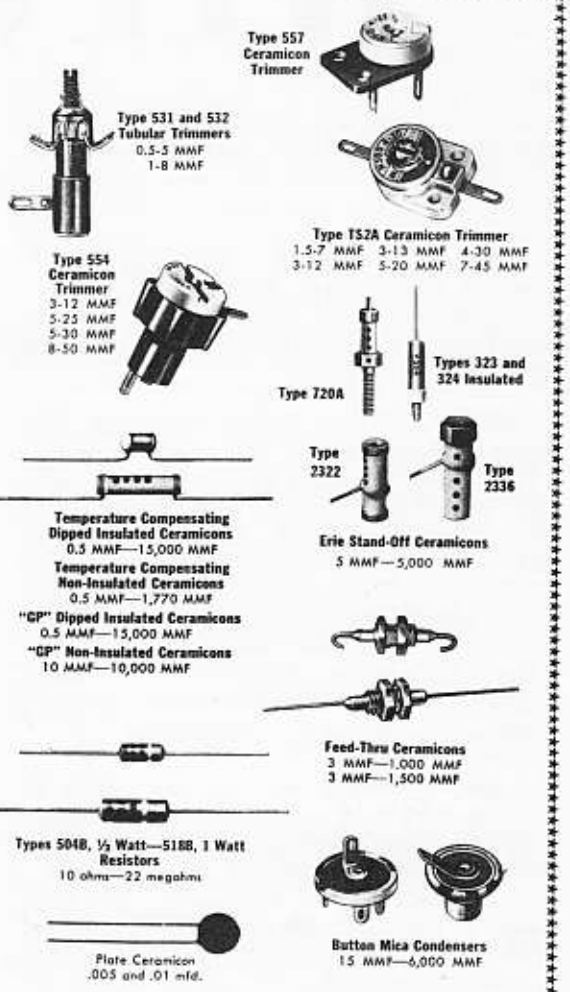
An electret is still going after twelve years of experiment. This one is made of a special kind of wax in which negative and positive charges can migrate while it is still soft, but are frozen into place when it hardens. The wax is allowed to harden while it is in a strong electric field, and it is capable of retaining its charge, if properly handled, for a very long time. The treated wax carries a permanent positive charge at one surface, and a permanent negative charge at the opposite surface. It is believed that the wax molecules have electrical poles which line up in the same direction. Basic material most commonly in use in the making of the electrets is plain carnauba wax, sometimes mixed with rosin. Incidentally, the electret is not a battery, but a device to produce an electrostatic field only.

A one pound Geiger counter for uranium prospecting was developed by the Canadian National Research Council. There are other types, weighing up to eleven pounds, which will make easier, the task of looking for this invaluable mineral.

Radium and uranium prospecting before the war was largely hit and miss and based on what the prospector was able to see. Now, the Geiger counter eliminates error because it will indicate minute amounts of radioactivity. Heart of the device is the now famous Geiger Muller tube which has been made in miniature, with low power consumption needs that made possible the smaller portable units now in use.

For some time it was believed that migrating birds find their way by means of a natural kind of radar, but it wasn't until fairly recently that the theory looked like it had been proven. The story of what happened is stranger than fiction. But then of course, the truth frequently is.

December, 1950



High quality is joined with simplicity in design to assure long-life economy and ease of installation in ERIE RESISTOR products. A complete line of Ceramic Condensers for receiver and transmitter applications; Button Mica Condensers for high frequency applications; Carbon Resistors and Suppressors; Custom Injection Molded Plastic Knobs, Dials, Bezels, Nameplates and Coil Forms. Complete technical information on request.

ERIE RESISTOR OF CANADA
LIMITED
Factories: Toronto, Ontario; London, England; Erie, Pa.

TELEVISION

The Royal Canadian Institute was host to the celebrated Dr. C.B. Jolliffe of the RCA Princeton Labs on Saturday evening, November 18th. With the Hall packed to the rafters, his talk that evening was on Color Television, its principles, problems and performance, and Torontonians hung on every word. The entire talk was well interspersed with lantern slides, sound movies and various demonstrations and experiments.

Anyone who might, before hearing this address, have doubted that the RCA compatible system of color really worked would have gone home convinced that it should be commercially acceptable immediately, without the resultant disruption that must follow if the outmoded mechanical system now proposed as the standard for the country. He would also have been convinced that color television was the ultimate in home entertainment, with black and white TV appearing drab and lifeless by comparison.

The entire evening was most worthwhile as the RCA method of color telecasting was so completely and simply explained that there was no misunderstanding of its principles, among non-technical listeners. The high point of the demonstration was in the actual showing of Kodachrome movies made of the Washington hearings. The subject we saw was a shapely girl in native Hula costume, in full rich color. The F.C.C. may have been able to find some defects, as will appear farther on in this column, but the result shown to the audience was sufficiently good to warrant at least making the acceptance of color by the public and manufacturers, a competitive field, allowing RCA and CBS to win or lose on what the public wants most and buys. One of the original troubles RCA had encountered in production of the famous Tri-Color Tube was that the red phosphors didn't transmit either the proper shade of red for true color, or enough light for easy home viewing, according to the F.C.C. This trouble has now been overcome through further developments in red phosphors for the tubes, and the light output is now four or five times as great as it was originally. Certainly the colored sample shown in test-tubes produced brilliant and wonderful reds. As a matter of fact, RCA was scheduled to have a showing at Princeton of their new tube and receiver (which has been further simplified) to illustrate the better red color - and all around improvement in the picture generally, on Thursday, November the 23rd, with the later crucial test before the F.C.C. scheduled for about December 5th. What will come of this, no one will hazard a guess. A court injunction of an indefinite nature now stands against CBS, and until the Supreme Court of the U.S. gets the case, there will be no commercial color television shown. The industry is solidly behind a compatible system, and against the whirling filters required for CBS-color.

On this point, Dr. Allen Dumont, a very bitter antagonist of the CBS system, went to great pains - and expense - to show how silly the whole thing could be. New Yorkers were treated to the sight of an eight foot wheel, being driven by a seven and one half horsepower electric motor, also of rather imposing size - both of which would be required for CBS color on a thirty inch tube. As one bitter manufacturer put it - Who can afford an extra room to house the rhubarb?

Material shortages, particularly of cobalt, and secondarily of nickel have cut production of TV receivers enormously. Both metals are required in quantity for manufacturing of PM speakers and focus magnets, and right now, of the four magnet producers (who make 94% of all magnets used by the industry, one has already completely shut down, and the others are almost ready to do so, unless more cobalt is forthcoming. There is no substitute for this metal in making Alnico, as

greater quantities of nickel must be used, to give the same strength, and nickel is on the critical list as well. Most of the U.S. cobalt is brought in from the Congo, and is used for hardening of steel too. Thus, one shortage developing like this, could conceivably slow a tremendous industry down to a trickle of sets within another couple of months. One manufacturer who produced three and one half million sets in 1950 as of this date, is hoping he'll be able to hit a production figure just one quarter of this staggering total, in 1951.

There are more than ten million television sets in use in the United States as you read this issue! More than a million of them were purchased in the month of September! Sales in October fell below this point, due to the edict on color, which made many probable buyers, decide to sit tight for a time, hoping to get a color adaptable set. Inventories at dealers are not too high in spite of this temporary buyer resistance, and the worsening war news in Korea seemed to start the stampede for sets once more. For a time, during the early Fall, it was almost impossible to get delivery of a large screen set in any major city. When you stop to realize that New York City alone has installed more than a million sets in the past year, this becomes understandable. We here in Canada can't begin to realize the enormity of the television business in the U.S., without seeing some of the fantastic figures involved in production and installation. It has been estimated that there will be twelve million and more sets in use by year-end, and that production will begin to crawl about this time. The question now, in Canada, is whether the C.B.C. has delayed too long and whether it is going to be possible to develop a large television industry in this country now that it is virtually impossible to get components in any quantity!

Some of the things found by the F.C.C. in its hearings on the color issue were grouped under the heading of flicker, motion continuity and allied effects. The C.T.I. system suffered most from large area flicker in the demonstrations, when the illumination exceeded a minimal value. There is also a problem of small area flicker in this system in a very noticeable line crawl or jitter which seriously marred the quality of the picture. C.T.I. developed various color shifts in an attempt to overcome the trouble, but was unable to do so at the hearings. Last reports, a couple of weeks ago, had it that the C.T.I. system had been much improved. There is no confirmation of this, for as we go to press on December 6th, no report has yet arrived about the additional hearings which were to be held about this time!

The CBS color system had noticeable flicker at 24 foot lamberts of brightness for a 7 to 1 viewing distance. This however, did not become objectionable until higher light intensities were used, and the use of long persistence phosphors is expected to mini-

LOOK **RADAR TECHNICIANS WANTED**

69TH OBSERVATION REGIMENT RADAR BATTERY needs immediately a number of officers, 29 sergeants, and 150 recruits of other ranks. Openings exist for qualified people, well versed in Electronics field. Fast promotions and trades pay, above excellent base pay for YOU. Further information about this interesting Reserve activity is to be had by calling the Meeting Barracks in Toronto, EL6981 any Monday evening, and asking for one of the Radar Officers. Summer camp, good pay, interesting work. Meetings - Monday nights at 8.00, Falaise Bldg., Fleet and Bathurst.

mize this trouble. No trouble was encountered with continuity of motion.

RCA, with its sixty fields per second, has no large area flicker in black and white reproduction of color, and none was found in the color counterpart, although a low level of illumination was used. In a small area, twinkling was seen due to dot structure of the picture. With an increase in picture brightness this difficulty would tend to be more apparent, although again the use of long persistence phosphors now being developed, probably would minimize this. No probelm was observed at any of the demonstrations, with continuity of motion.

In the brightness and contrast testing, the C.T.I. system didn't show enough picture brightness. Four foot lamberts was the highest measured brightness, so that all tests had to be conducted in what was virtually a completely darkened room. The CBS display gave a measured brightness of 22 foot lamberts, and this was considered to be enough for ordinary home viewing, even with lamps on in the room. RCA was able to produce a picture part way between these two limits, in terms of foot lamberts, but were handicapped by having to use a corrective filter over the face of the tube, to bring color rendition to something approaching normal. This filter cut down the light output by half that available without it. Today, the red phosphor, the big stumbling block, has been improved to give more light than that given by CBS, and the end is not yet in sight. It is felt by researchers that in a short time, light intensities of nearly fifty foot lamberts will be possible!

Superimposition of the three color images is a problem, in registration, color breakup and fringing. Since three separate pictures are telecast in each of the primary colors, which, we repeat again, are red, green and blue very definitely, in spite of what we were taught in early life, it is necessary to superimpose each of these images in its own color, to reproduce the final picture. C.T.I. had trouble with faulty registration at each showing, although color breakup and fringing were not apparent. CBS, had of course, nothing more than minor trouble in this division, because a single tube is used both in transmitting and reproduction. Some trouble arose with hum and vibration, and stray magnetic fields, but these can be cured without undue difficulty. The RCA system at times seemed beyond the understanding of several of the Commissioners, and they were unable to express themselves lucidly enough. Their report says that there was evidence of misregistration, but what this evidence actually was never was very clearly expounded. RCA did testify that a color camera tube could be built that would have correct registration built into it. Color breakup and fringing should not be apparent in the RCA system, for objects in motion.

In color fidelity, C.T.I. had trouble because of faulty registration. CBS, with the whirling disc produced good quality pictures in each case, while RCA was able to achieve good color pictures, in spite of the limitations imposed by the unsatisfactory red phosphors. F.C.C. was quite worried about a a time constant used in sampling of colors, feeling that should an error occur that the color rendition would not be satisfactory and acceptable.

Resolution of the C.T.I. system should be much the same as in present monochrome, but the theory didn't work out, and they fell down on this phase of the tests. CBS produces an inferior quality picture in both horizontal and vertical resolution. The actual loss vertically is twenty three percent, and forty-six percent horizontally. Similarly, transmission down present co-ax links would reduce the dfeinition of this color picture, if being received in black and white, to about thirty four percent of present pictures. RCA definition varied, on tests, with resolution of from 67 to 100 per cent of present black and white standards. Misregistration in the RCA pictures seemed to reduce apparent resolution, but this is a problem which is likely to be solved. A further improvement can be expected in this registration problem as the original tests used a quarter million hole color screens - as against 600,000 hole types at this date

YOUR Christmas Present—FREE!

AN EXTRA DIVIDEND FOR SKYWIRE READERS!

This new Skywire contest is designed to acquaint the Canadian ham with part of amateur radios' great history.

The rules are simple: To enter, you only need to correctly identify the building shown — and fill out the entry coupon at the bottom of the page, and mail it to:

Ham History
℅ Skywire Magazine,
435 Parkside Drive,
Toronto, Ontario

You may enter as many answers as you wish but not more than one answer may appear on each coupon. The contest is entirely free—costs you nothing—and is open to everyone in Canada with the exception of staff and families of Skywire Magazine.

If more than one correct answer is received, these will be grouped together and an impartial judge will select the winners.

All eligible entries for this easy contest must be received by Skywire *not later than midnight, December 25th, 1950.* The winners names will appear in the January issue of Skywire.

HAM HISTORY

YOU CAN WIN

First Prize - choice of
National Select-O-Ject!
Millen R9'er, complete!

Second Prize
Astatic D-104 mike
(Ceramic or crystal)

Third Prize
Hammond Antenna Direction Indicator Kit (6vdc or 110AC)

AN EASY CONTEST YOU CAN ENTER

NOTHING TO BUY - IT'S FREE!!!

To make Canadian hams better acquainted with famous amateur historical fact, Skywire takes pleasure in introducing this new informative contest that *costs you nothing to enter!* And *you* could be the winner!

Here are some clues to help you:

Built as a memorial.
Located in Eastern U.S.A.
Houses world famous ham rig.
Heard nightly on most ham bands.

Fill out the coupon below *right now*—and mail it to us. Remember —midnight December 25th, 1950 is the deadline for acceptable entries. Don't miss out on these prizes.

---TEAR OUT—MAIL TODAY---

HAM HISTORY
SKYWIRE
THE CANADIAN RADIO AMATEURS' JOURNAL
435 PARKSIDE DRIVE, TORONTO, ONTARIO

My answer is .....
Picture identity

Contestants' name (print clearly) ..... Call .....

Address ..... City .....

Don't Miss Any Issue of Skywire

Mail in your subscription today

Canadian Amateur News While It's Still News! Keep up-to-date on the VE-Events. Ham Clubs get a special reduced rate. Write for the details.

Contributions of Club news, Amateur Activities wanted from all parts of Canada for Skywire. Technical material by contributors is paid for at regular page rates.

Be sure of receiving every copy by subscribing Now!

1 Year $2.00

More than 400 pages of good reading each year, written for you by many Canadian Hams. To interest everyone, regular columns on these subjects:

- **Sidebands**
- **Technical Technique**
- **DX Predictions**
- **DX News and QTH's**
- **Club Activities**
- **How's Ur OBS IQ?**
- **Skywire Hamads**
- **Ladies Present**
- **Television News**

----------TEAR OUT—MAIL TODAY----------

SKYWIRE

THE CANADIAN RADIO AMATEURS' JOURNAL

435 PARKSIDE DRIVE, TORONTO, ONTARIO

Send me twelve issues of Skywire

Call .....

Subscriber's Name (print clearly) .....

Address ..... City .....

Here is Postal Note Money Order Check (Exchange included) for $2.00

Christmas Greetings around the world

In this season of the year, when you will be DX-ing the Seasons Greetings to your friends in many countries around the world, CES wishes to say MERRY CHRISTMAS to all our friends in Canada.

For the finest in equipment for your Ham Shack, in any season you can rely on Canadian Electrical. We have the latest in amateur requirements at the lowest prices. When choosing that special Xmas Gift for the "Shack" glance through the pages of the CES 1951 Buying Guide before deciding. Better still, why not visit our store and see for yourself? Heard about our Xmas Special—Regular 807 tubes, Only $1.99.

CANADIAN ELECTRICAL SUPPLY CO. LTD

MONTREAL — 275 Craig Street West *Plateau 3421

TORONTO — 543 YONGE STREET *MI. 2481

Have you received your copy of our 1951 Buying Guide? It's filled with all the latest in Ham equipment. Write for your FREE copy today!

for a Merry Xmas

HQ-129-X

choice of THOUSANDS

Full range .54 to 31 mc in six accurately calibrated bands • Band spread with four calibrated ham bands and all-purpose scale • Variable selectivity crystal filter for phone or cw. • Antenna compensator for maximum image rejection and high sensitivity • Voltage regulation. Noise limiter that really kills noise • Adjustable S meter • *Three* IF stages . . . The HQ-129-X has every up-to-the-minute improvement that radio science has so far developed for amateur radio receivers.

Hams are pretty shrewd individuals when it comes to selecting the gear they use. Many thousands knew what they wanted — they're using HQ-129-X receivers on the air every day. That, we believe, is one of the finest endorsements any product can achieve.

VE-made for VE's . . .

SEE THE HQ-129-X AT YOUR DEALER'S

Ask the VE nearest you, who has one, to let you hear it.

STROMBERG-CARLSON COMPANY, LIMITED

211 GEARY AVENUE • TORONTO

Here's to a JOYOUS CHRISTMAS

From all the gang at A and A

HAM HEADQUARTERS FOR TWENTY YEARS!

ALPHA ARACON

Radio Company Limited

29 Adelaide St. W. Toronto 1, Ontario

Telephone ELgin 3186*

We want to do our share in making this holiday season enjoyable . . . . . and so it will be with one of these fine Christmas specials in the shack. We have reduced previously asked prices by one third, to clear our complete stock of used receivers. Merry Christmas

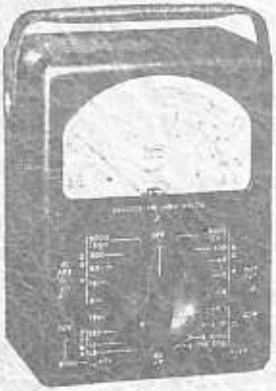
BC-348 was $125.00
now $83.50

RME-45 was $222.75
First Come now $148.50
First Served

HRO Jr. with coils was $168.00
now $112.00

S-36 VHF receiver was $300.00
now $200.00

ADVANCED VOLT OHM-MIL-AMMETER



Model 630

YL'S, XYL'S

A dependable Triplett Test Instrument, like this Model 630 is the way to make the OM be a stay-at-home nights. One of the finest of all the FB Christmas-Boxes you could give! Just $52.25, carrying case of leather is included!!

STILL A FEW OF OUR SPECIAL CRYSTALS left at 79 cents each. Will supply nearest possible, to your specified frequencies!

3.5 & 7 Mc. Crystals

Radio Trade Supply Co. Ltd.

Address all inquiries to Dept. AH

CANADA'S GREATEST RADIO SUPPLY HOUSE

RADIO - TELEVISION - SOUND

595 YONGE STREET. Telephone RAndolph 1146 TORONTO 5, ONTARIO