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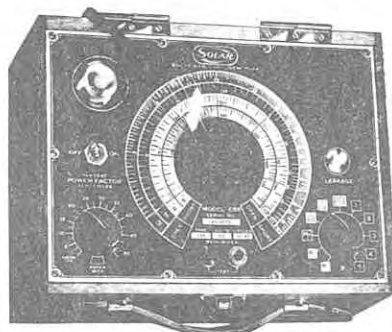


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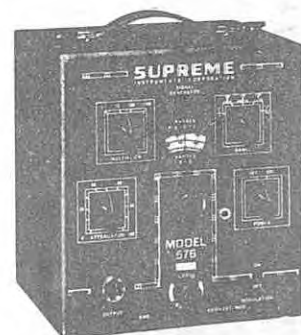


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THE CANADIAN RADIO AMATEURS' JOURNAL



January, 1951

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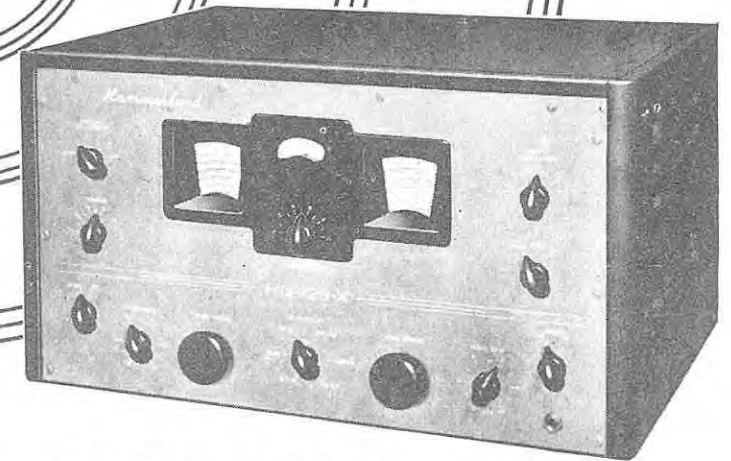


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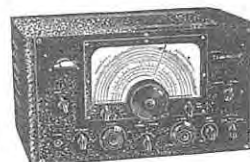
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SKYWIRE

Vol. 4

No. 1

Published monthly as
THE CANADIAN RADIO AMATEURS' JOURNAL
Editor - Fenwick Job, VE3WO

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January, 1951

SKYWIRE BUSINESS AND EDITORIAL ADDRESS

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SIDEBANDS

The following story is presented for your guidance, more than for entertainment. The moral is a simple one, and though there is a lighter side, don't discard the lesson it can teach.

It happened to a Canadian ham not long ago! The tale is both humorous and sad - humorous in the facts of its telling - and sad that it could quite as easily have been YOU - with bouquets of flowers arriving at the home in which you were resting in peace, while a sorrowing family stood nearby.

One of the boys was working on a power supply conveniently, but not safely, located under a desk which was used to support a portion of the transmitter. Connecting wires were very tastefully and colorfully haywired and draped around said supply, and the back of the desk shelf area. Something went wrong! The owner, in a hurry to get back on the air and continue his contact, crawled under the desk to locate and fix the trouble, and in so doing got a poke of roughly 500 volts which shook our hero to the core.

Matter of fact it shook him so badly that there was that involuntary reaction so often encountered in a high voltage shock. Instantly, he jerked back, trying to get clear. Well, our friend bonked his noggin against the under side of the desk, while a hearty echo resounded through the house - and he wound up in a slightly smaller clatter under the table, next to the junk pile, and fortunately not ON it!

His wife, hearing the uproar, rushed into the room to investigate, and seeing the now-dormant body of her spouse, feared the worst and broke into a loud cry of anguish. This touching demonstration of love and affection was wholly lost on our hero, since he was quite blotto on the floor, but shortly thereafter the couple were reunited, none the worse, except for the xyl's frazzled nerves, and a king-sized goose-egg on the hams head!

Moral??? To make that rig of yours both fool and damnfool proof so the story won't be repeated at some other point with perhaps another Silent Key to list. The Handbook is your best source of Safety Tips, and a buck or two spent in cleaning up danger points is certainly worthwhile. Don't take chances !!! And if you think that it can't happen to you, the news that several broadcast station operators have been electrocuted here in Canada within the past fifteen months should make you stop and think. Carelessness was the cause in each case, because the high voltage transformer vaults of such a station are heavily protected by interlocks.

These operators, like yourself, were all accustomed to working near and on high voltage circuits, but that one instant of forgetfulness was all that was needed to trip them. And it CAN happen to YOU, if care isn't used at all times when working on your rig. It isn't so much a matter of voltage being taken as the current flowing through your body that determines whether you live or die! Moisture, such as perspiration, is a fine conductor. Make sure that high voltage isn't given a chance to show how good it is at taking the path of least resistance to ground through you. Several hundred jolts between the ears is no way to grow hair. Be careful !

We must apologize on behalf of the Canadian Marconi Company, for including inadvertently in the Christmas Greetings, the calls VE2WR and VE2CK. These have now been assigned to R.D. Williamson and T.C. Cunningham respectively and we hope that this error has not inconvenienced the present licensees in any manner. Our sincere regrets, gentlemen!

While we're at it, Radio Electronic Supplies, 571 Yonge Street, Toronto asked us to offer their apologies also for the delay in answering the many inquiries from hams. No catalog is available, and answers are being mailed as quickly as possible. Please be patient.

Single-Sideband Suppressed Carrier

An Outline of the System, and Its Possible Amateur Application

By J. WOOD (G3VG)

The principle of Single-Sideband transmission is not new—it has in fact been in constant use on British commercial circuits since as long ago as 1925.

At that time it was in its simplest form and only operated at very low frequencies—the first application being Transatlantic S.S.B. telephony on a frequency of 60 kc. A great deal of development has taken place since then, and there are now several systems in use. The principal systems are classified below :

DOUBLE CHANNEL — SUPPRESSED CARRIER

SINGLE CHANNEL — SUPPRESSED CARRIER

SINGLE CHANNEL — CARRIER UNSUPPRESSED

The various frequency spectrums of the systems mentioned are shown and will help to clarify the definitions. (See Fig. 1).

In the Double-Channel systems separate intelligence is conveyed on each Sideband, *i.e.* two separate transmissions. This is achieved by the use of several balanced modulators and filters and is very complex.

In a normal Double-Sideband Transmission (ordinary amplitude-modulated 'phone transmission) the power distribution is as follows :

50 per cent. of total radiated power is Carrier.

25 per cent. of total radiated power is Upper Sideband.

25 per cent. of total radiated power is Lower Sideband.

Since the carrier does not contain the intelligence this is 50 per cent. of wasted power and since only one Sideband is necessary to convey intelligence this is a further 25 per cent. of wasted power. It therefore follows that a saving in power of 75 per cent. can be achieved by the use of S.S.S.C.

The essential components of such a system are :

(1) An S.S.S.C. drive unit, the purpose of which is to generate the system.

(2) A linear transmitter or RF amplifier to amplify the generated S.S.S.C. transmission.

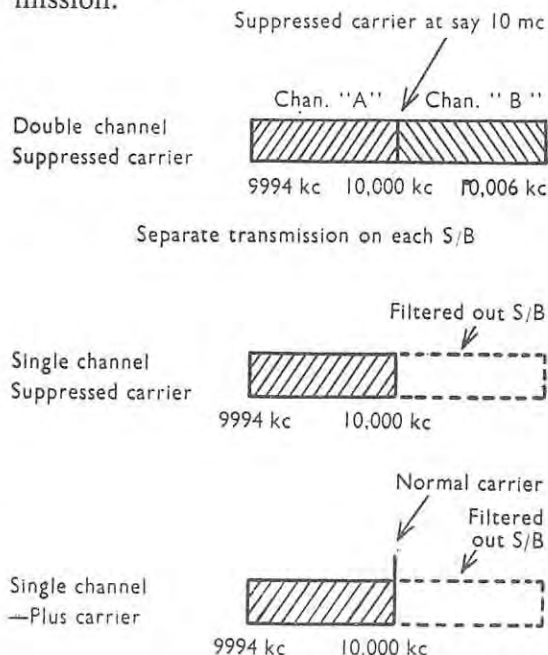


Fig. 1. Frequency spectrums of single-sideband suppressed carrier systems. In each case a band-width of 6000 cycles is desirable for high-fidelity transmissions. This can be reduced for acceptable quality speech transmission.

Drive Unit

There are in general two methods of producing an S.S.S.C. signal :

(a) By the use of Filters.

(b) Phase-shift method.

The balanced modulator is used in both methods and a circuit of a typical B/M is shown in Fig. 2. It will be seen that the modulation is applied in push-pull, whilst the carrier is applied in phase. The output is taken from the tank circuit L1 and will consist of several frequencies, being the various sums and differences of

Skywire

the injected component frequencies. If L1 is made resonant at the frequency of the carrier, the output will then consist of the modulation at carrier frequency $F_c + F_m$ and $F_c - F_m$, the carrier being suppressed. Even in a well designed B/M the carrier is not completely balanced out but is still present at a level of -50-60 dB to the Sideband. However, since -60 dB is a power ratio of one in 10^6 it is to practical purpose balanced out.

The output from the B/M then consists of an upper and lower S/B. This is fed

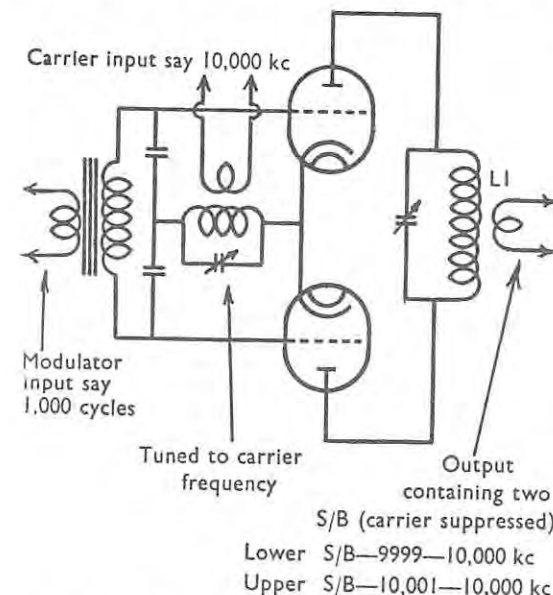


Fig. 2. Fundamental circuit of the balanced modulator, an essential unit in the system.

into a band-pass filter eliminating one of the Sidebands. The resultant is the Single-Sideband, carrier suppressed. In practice it is standard to use more than one stage of modulation. This helps to simplify the filtering out of the undesired inter-modulation products. The first carrier injected into the first B/M is preferably a low frequency carrier.

Balanced modulators have a low efficiency and so it is better to generate the S.S.S.C. system at a very low level and then amplify it by using a linear trans-

January, 1951

ABBREVIATIONS USED IN TEXT

S.S.S.C.	Single Sideband, Suppressed Carrier.
D.S.B.	Double Sideband.
A.M.	Amplitude Modulation.
Fc	Carrier Frequency.
Fm	Modulation Frequency.
B/M	Balanced Modulator.
S/B	Sideband.
O1	Oscillator No. 1.
O2	Oscillator No. 2.

mitter. The schematic of a typical S.S.S.C. transmitter is shown in Fig. 3.

Advantages of S.S.S.C.

The advantages of S.S.S.C. over a normal AM transmission are outlined below :

- (1) Band-width only half as great as with usual AM system.
- (2) Multi-path fading greatly reduced.
- (3) Power economy at transmitter.

Since Tx is Class-B linear there is reduced power consumption when modulation is off.

- (4) Signal-to-noise ratio improved by 9 dB; 6 dB is due to suppressed carrier, and 3 dB to reduction of band-width and consequent reduction of noise.

Nine dB is a power gain of 8, so a 150-watt S.S.S.C. transmitter will produce a field strength equal to a 1.2 kW transmitter using the normal amplitude-modulated system.

Disadvantages

Offsetting the advantages one must bear in mind the ever-constant disadvantages of :—

- (1) Complexity of design and construction.

- (2) Increased initial cost of equipment.

- (3) Greatly increased fault liability.

- (4) The re-insertion of the carrier at the receiving end must be of the correct frequency and phase with respect to the suppressed carrier. This presents difficulty although in some systems a "pilot" carrier is transmitted with the S.S.S.C. signal.

Page 7

Carrier Re-insertion

Undoubtedly the biggest difficulty that will arise in amateur S.S.S.C. transmission is the replacing of the carrier at the receiving end. It will be appreciated that the re-inserted carrier frequency must

speech—and must possess sharp cut-off characteristics. The successful design and construction of such filters is somewhat complicated and will prove an obstacle. A simpler scheme recommended by the writer is to dispense with the filters.

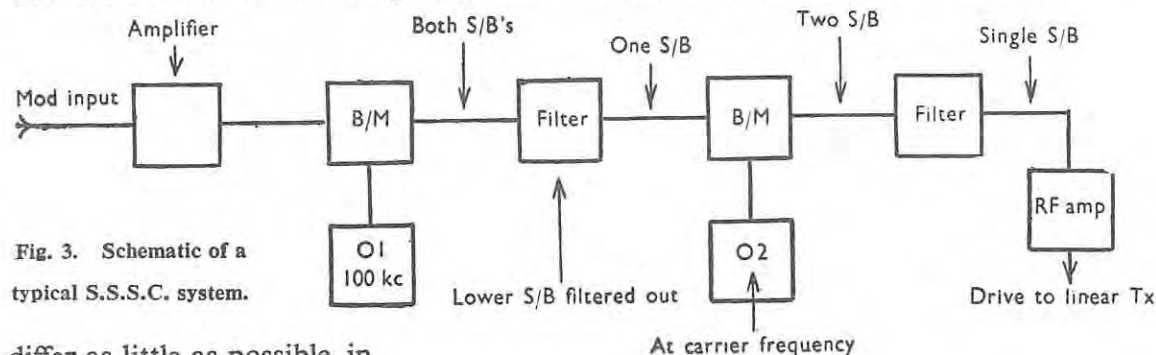


Fig. 3. Schematic of a typical S.S.S.C. system.

differ as little as possible in frequency from the original, because the difference in frequency will cause the demodulated intelligence to be that same amount different from the original modulation.

A tolerance of five cycles is usual. However, since correct frequency response is not so important in amateur DX working, a somewhat greater frequency difference is permissible and commercially ground close tolerance crystals could be used with satisfaction.

The phase of the re-inserted carrier with respect to that of the original will not be so important in amateur working and can be neglected completely.

In amateur systems, the re-inserted carrier can be injected into the RF or IF stages of a normal receiver.

Filters

The last important obstacle is the design and construction of the Band-Pass filters—following the B/M stages.

These filters should have a band-pass-width equal to the sideband transmitted—a width of 2,500 cycles is ample for good

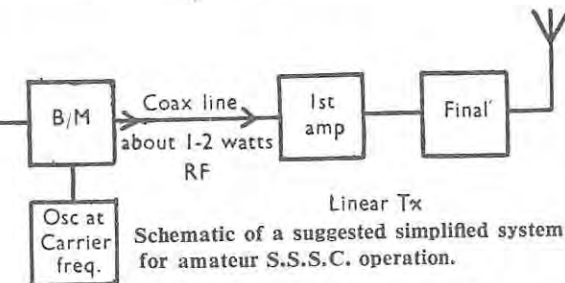


Fig. 4.

This would also mean that only one stage of B/M is now required. A schematic diagram and circuit of this arrangement appear in Fig. 4. The resultant signal would be D.S.B. carrier suppressed. However, this would still retain some of the advantages outlined earlier—notably the 6 dB improvement in signal-to-noise ratio as a result of the carrier being suppressed.

6 dB is a power gain of 3.9, so this simplified system would give performance equal to a normal 600-watt transmitter when using a 150-watt transmitter operated D.S.B.S.C.

Linear Transmitter

Finally, a few notes on the transmitter which is now to operate as a linear amplifier.

The push-pull stages are operated in Skywire

Class-B. Actually, best results are obtained with the valves biased to "projected cut off," i.e. slightly less than cut off. The output should be proportioned to input volts and the plate current flows in pulses that are half-sine waves possessing an amplitude proportional to the excitation

voltage. The linearity is best checked on an oscilloscope.

The theoretical maximum efficiency of a linear amplifier is 78.54 per cent. and the highest practical efficiency obtainable is 60 per cent. at crest of modulation.

Parasitic Oscillation

Some Notes on Prevention

By K. E. MARCUS

PARASITIC oscillations are a nuisance, to say the least, as it sometimes takes weeks of patient investigation to cure them. As with so many other ailments prevention is far better than cure, but so far we know much too little about oscillations altogether to take prophylactic measures. So here are a few hints where they originate and what can be done to stop them.

If the IF amplifier goes unstable, i.e., if there is positive feedback from a stage further on to a point nearer to the aerial, that is feedback-instability, not parasitic oscillation. Or, if our receiver working into a 465 kc IF merrily howls at 1,395 kc, we call that harmonic instability, as apparatus should not get ticklish at the 3rd harmonic of IF, but again there are no parasitics.

But if our apparatus starts oscillating at a frequency not used, and rather without provocation, then "we got it." Often it is an oscillation quite outside the spectrum of frequencies normally encountered, and therefore the best method is to find what oscillates and at what frequency. For this a wavemeter with probe is a very great help, but unfortunately sometimes the frequency of parasitics is very high indeed.

VHF Parasitics

For example, oscillations in the region of 300 mc can often be traced to wrong operating conditions in pentodes. One particular instance will show what is

meant. Certain HF pentodes are worked with screen voltages of about the same magnitude as the anode voltage. Round such a pentode something had gone wrong in such a way that electrons, after passing through the screen grid, were slowed down by the suppressor grid and found themselves opposite a low potential anode, became disgusted and turned back to the screen. This electronic odyssey showed itself in violent oscillation at about 300 mc, and closely corresponded with the time taken to pass the screen, roam about in the field between screen and anode and finally settle on the wrong twig.

An involuntary magnetron of this kind is a good example of what can be expected and it can be seen that decoupling, the mainstay against feedback and instability, will help precious little. On the contrary, decoupling elements very often are the source of parasitics. To show what can happen, here again is a case out of practice. In a transmitter-receiver there was an instability at one particular frequency and that frequency only. It was quite independent of the setting of the tuning, and showed only on the receive position. It was finally traced down to a resistor-condenser combination oscillating at its time-constant and driving the (theoretically) immobilised PA valve.

Fortunately, in commercial gear there is little likelihood of encountering parasitic oscillation as extensive laboratory tests prevent sets with faults like that to come into production. But in amateur built gear things are sometimes sticky. The first step, of course, is to make sure that we are dealing with parasitic oscillations, by applying additional de-coupling and screening. If that stops the trouble all the

better, if not we should try and find out, even roughly, at which frequency the parasitics swing.

Now, if it is a very high frequency (from 100 mc up) it will be valves, and the writer has encountered innocent looking HF diodes doing Indian war dances at about 400 mc. So do not take anything for granted in this field.

Grid Stoppers

By far the best approach is first to exchange valves. If that does not help, fit grid stoppers temporarily to each suspected valve in turn. Where the grid stopper does the trick it should be permanently fitted, but of course, there is no point in stopping all grids indiscriminately. Failing that, the anodes should be stopped, and if no special suspicion indicates another valve, the output pentode or tetrode should be carefully "screened" (in the Military Intelligence sense!). It is amazing to see what these valves can do. Failing again, try the screen grids.

About the value of stopper resistors: Considering the frequencies involved and their time-constants the maximum should be around 200 ohms, but in most cases 50 ohms will prove a useful value.

If parasitics are generated at a lower frequency than 100 mc, one can rely on it that some resistor-condenser combination is the cause of the trouble by making a valve—in addition to its proper function—work as a relaxation oscillator.

Calculating Time Constant

The safest approach then is by calculation. "5 megacycles per second" means 5 million oscillations per second, which, obviously, means that each oscillation lasts 0.2 microseconds. Each frequency has, besides its wavelength, its "time-constant." It might be as well to memorise:

(Frequency) (Wavelength) (Time-Constant)

5 mc = 60 metres = 0.2 μ sec/c

Now, any resistor-condenser combination giving the time-constant corresponding to the frequency of parasitic

oscillation should be suspected. It will generally be found that very few components satisfy the formula

$R \text{ (in ohms)} \times C \text{ (in microfarad)} =$

Time-constant (in microseconds)

When such a combination is found simply exchange the resistor. That will do the trick in most cases; if not, exchange the condenser. Many explanations have been put forward for this effect, but all we can say at the present juncture is that probably the crystalline structure of the resistor graphite behaves as a quartz crystal.

For a parasitic at 5 mc we should therefore suspect combinations like

•02 μ F and 100 ohms

•01 μ F and 200 ohms

•005 μ F and 400 ohms

and so on, which all have a time-constant of 0.2 μ sec.

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MD5ZC	L/Cpl. P. L. Bennett, Royal Signals, 8 Inf. Bde., MELF.
ST2CH	RAF Station, Khartoum, Anglo-Egyptian Sudan.
TG9BA	Al Broll, c/o PAA, Guatemala City.
VE8OG	Cambridge Bay, Victoria Island, N.W.T.
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There is, for example, the "bump test." The finished set is placed on a board which every second is automatically raised several inches and then allowed to drop with a bump which gives the innards of the set a thorough shaking. And the set stays on the board until it has had 4,000 such jolts.

Then there is the humidity test, in which the set is placed in a steam chamber with 95 per cent. humidity at 158deg. Fahrenheit for 12 hours. After a couple of hours to dry out it is expected to play. A third test gives the set a thorough roasting in conditions of dry heat.

The reason for these tests is that Eddystone sets are designed, not for suburban fireside listening, but for hard work under the most exacting conditions in all parts of the world.

International Reputation

Strattons are short-wave specialists with an international reputation. Their list of agents reads like a world cruise itinerary. Their sets have been taken on expeditions up Mount Everest, into the Antarctic, and are in daily use in ships sailing the seven seas.

Mr. H. N. Cox (technical director) told a reporter of "The Birmingham Mail": "Sets that work perfectly well in this country would be no use in the tropics or other parts of the world. Much of our equipment is for vital communications work, and nothing can be left to chance."

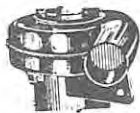
In face of keen American competition Eddystone sets are now selling well in Canada, and it is hoped will eventually enter the U.S. market.

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Ham Specials ORDER NOW!

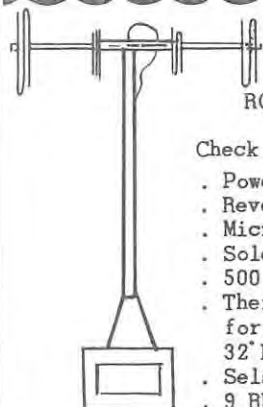
4 BETTER VALUES



Blowers

Brand New! Made by A.G. Redmond Co. U.S.
 Quiet, continuous duty
 1525 R.P.M. operation
 115v. A.C. 60 cycles
 Useful for: cooling tubes, transmitter
 dark room, ventilation etc.
 Complete with mounting bracket, A.C. line
 cord and plug.

LIMITED QUANTITIES AT \$12.00



ROTARY BEAM ANTENNA

Check these features!

- . Power needs - 110v 60cy.
- . Reversible motor
- . Micro Switch controls
- . Solenoid brake
- . 500 watt strip heaters
- . Thermostat controlled
for low temperatures of
32°F to -50°F.
- . Selsyn operated
- . 9 RPM, easily geared to
slower speeds.

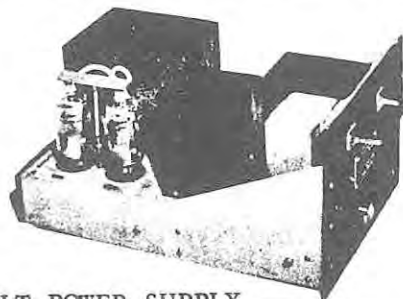
Here is a rotary beam mechanism which is built to Army specs and made to stand up to rugged outdoor Canadian winter condx. The unit is completely waterproof and is electrically heated, controlled by thermostat. Contains selsyn motors with direction indicators and is ideal for remote-control operation. Magnetic brake gives positive, immediate stops at required operating points. AN AMATEUR NATURAL!!!

YOUR cost, including packing - \$75.00



RF-24

10 METER CONVERTER I \$12.00
 Complete with instruction manual



600 VOLT POWER SUPPLY.

Brand New, with spare tube for each type.

INPUT - 115 volts - 60 cycles.

OUTPUT - 600 volts DC @ 350 ma.
 6.3 volts DC @ 12 amps

DIMENSIONS: 18" x 9" x 11 1/4"

Weight net - 62 lbs - Shipping
 weight - 120 lbs.

SPECIAL \$29.95

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

Supplies for Repairmen & Amateurs

HOW'S UR OBS IQ?

The American Radio Relay League

THERE IS AN OBS NEAR YOU!!

Listen for him regularly.

Official Bulletin Nr 269, Nov 28, 1950. The Department of the Army announces the acceptance of civilian members in its Military Amateur Radio System program. Civilian applicants must be 21 years of age or older, and must hold a valid FCC amateur radio station license. They must agree to operate their stations in accordance with rules and regulations prescribed for the MARS by the Army. Only amateurs who own stations, in operation at time of application for MARS membership, can be considered. MARS stations are assigned military call signs and operate on military frequencies allocated to the system. A MARS Bulletin, and manual of operating procedures are issued to all members. Civilians interested in joining the system are invited to seek further information from the Signal Officer of the nearest Army installation.

Official Bulletin Nr 270, Dec 5, 1950. The Voice of America is continuing its series of weekly fifteen minute programs devoted to amateur radio, and prepared in co-operation with A.R.R.L., but on a changed schedule. The programs are now beamed to Central and South America each Sunday at 0144 GCT on 6.08, 9.53 9.67, 9.70, 11.71, 11.79, 15.13, 15.21 15.27, 15.33, 15.35, 17.76, 17.78, 17.80 17.83, 21.46 21.51 megacycles. The broadcast to the Far East is at 1445 GCT on 6.06, 6.185, 9.515, 9.570, 9.6 and 11.73 megacycles, with relays in the Far East on 6.12, 11.79, 11.89, 15.25, and 15.33 megacycles. At 1915 GCT the program is beamed to Europe on 11.87, 15.27, 17.78 and 21.5 megacycles, and relayed on 7.2, 9.7 and 15.23 megacycles for additional coverage.

January, 1951

Official Bulletin Nr 271, Dec 13, 1950. The Fourth Annual A.R.R.L. VHF Sweepstakes will be held January 13 and 14. Similar to the annual November A.R.R.L. Sweepstakes, this contest will be open only to stations operating on the 50, 144, 220 megacycles-and-higher bands. All amateurs in the Leagues' Field organization are invited to take part, and a special certificate award will be given to the leading entrant in each A.R.R.L. section. Rules in full will appear in January QST. Convenient forms for reporting VHF SS contacts will be furnished operators on request.

Official Bulletin Nr 272, Dec 20, 1950. You are cordially invited to take part in the Seventeenth A.R.R.L. International DX competition. Contest periods for CW are February 9 to 11 and March 9 to 11. Phone competition is scheduled for February 16 to 18, and March 16 to 18. Complete details and rules may be found on page 32 of January QST. Though not required for entry, convenient reporting sheets for the CW, phone, or both sections of the competition will be supplied by A.R.R.L. upon request.



"... Quick job on the PA while QSO a VK..."

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!

CHANCE OF A LIFETIME! Here is my complete station, consisting of HT-9 transmitter, and new model Signal Shifter (Meissner) both with complete set of coils - and set of spare tubes, HQ-129X receiver and an HF-10-20 converter. Here is a total value of over \$1300.00 - all for \$675.00. It is guaranteed like new condition - not even a scratch on any unit. Will sell as separate units - write for prices. All units carefully crated and shipment will be made prepaid freight, or you pay the difference and will ship express. Write to VELKS, Ron Hesler, Sackville, N.B.

WANTED - E coil set for HRO (900-2050). Write VELUO, J.K. Creelman, Box 372, Sackville, New Brunswick

DEPENDABLE PERFORMANCE



AEROVOX FLUORESCENT LIGHTING CAPACITORS

As an important part of the ballast—and as arc-suppression units in the starting switch—Aerovox Fluorescent Lighting Capacitors enable you to get correct lighting at low cost. See Aerovox Catalogue No. 4 for technical information.



AEROVOX CANADA LIMITED, HAMILTON, CANADA.
Manufacturers of fixed capacitors for all radio and electrical uses

FOR SALE - 250 watt all band transmitter, 812's final, 805 modulators. Audio amplifier, modulator, exciter, final in five foot Hammond rack. Power supplies are separate unit. Separate supply for final and modulators. 9 amp Variac in final supply. Separate VFO using Clapp circuit. \$250.00 because need money. Spare set both final and modulator tubes. All enquiries answered. M. Wood, VE4MW, 130 24th Street, Brandon, Manitoba.

FOR SALE - Hammarlund Super-Pro, Series 200, rack model. 18 tubes, 5 ranges, 540-1160, 1160-2.5, 2.5-5, 5-10, 10-20 Mc with ten meter converter included. Complete with speaker and baffle, in perfect working order for only \$200.00. Northern Electric 5' rack - \$10.00. Microphone stand fully chromed, 35 to 65 inches for \$6.00. Rek-O-Kut 16 inch transcription motor brand new, \$100.00, Brush PL-20 crystal pickup, \$25.00. Tubes - never used, 2-813's at \$5.00 each, 2-807's at \$1.50 each. Frequency meter C2, excellent condition, \$35.00. Power supply, Hammond parts, 1500 volts @ 200 mils, completely mounted, \$50.00. For complete details; write - C. Gutman, 7000 Somerled Ave., Montreal, Quebec.

CLEARING HOUSE - Have 3-833A's, good condition at \$10.00 each, 2-810's, brand new at \$10.00 each, 2-872's brand new, at \$5.00 each. 1-BC459A transmitter, aluminum finish, filaments rewired for 12 volts, and brand new at \$30.00, complete with tubes and calibrating xtal. Also 6 relays, 4PST 30 amp contacts, 110 volt, 60 cycle coils, mounted two to a panel at \$12.00 a pair. Write, VE3WO, 86 Invermay Ave., Wilson Heights, Toronto, Ontario.

FOR SALE - Harvey-Wells TBS-50 transmitter, phone and CW on all bands from 80 to 2 meters. Condition is as new for \$130.00. W.H. Galpin, 168 Sherbrooke St. Winnipeg, Manitoba.

There's a simple but Undeniable Reason WHY ASTATIC MICROPHONES with CERAMIC ELEMENTS are GAINING WIDE, ENTHUSIASTIC PREFERENCE

MANY TECHNICAL advantages of Astatic Microphones with Piezoelectric Ceramic Elements have been pointed out. Frankly, that does not account for the rapid and wide-spread acceptance shown, at home and abroad, for these new instruments in which Astatic has pioneered. Overshadowing all these important technical features is one simple but undeniable fact—sound transmitted by Astatic Ceramic Microphones is the MOST NATURAL you've ever heard! Everyone has different words to describe the remarkable quality of voice reproduction... all agree

that it is more NATURAL than anything they've heard. Try it. Judge for yourself.

Of course you'll also be interested in the immunity of Astatic Ceramic Mikes to tropical heat or arctic cold, high humidity or dryness. Frequency response is unaffected through wide temperature range. They're amazingly rugged against accidental shocks and stresses, operational abuses which shorten or impair the service life of other types. Adaptable to existing hook-ups without requiring other changes in equipment.

Our plant in Canada is equipped for testing and repair of all models of Astatic microphones!

SPECIFICATIONS

Model	Cable Length	Output Level*	Range c.p.s.	Response Characteristics
D-104-C	7'	-58 db.	30 to 7,500	Rising 1,500 to 4,000 c.p.s.
JT-30-C	7'	-62 db.	30 to 10,000	Substantially flat
JT-40-C	7'	-62 db.	30 to 10,000	Rising 1,000 to 4,000 c.p.s.
T-3-C	7'	-62 db.	30 to 10,000	Substantially flat
VC	7'	-62 db.	30 to 10,000	Substantially flat
VC-1	7'	-62 db.	30 to 10,000	Rising 1,500 to 5,000 c.p.s.
CC	7'	-62 db.	30 to 10,000	Substantially flat
CC-1	7'	-62 db.	30 to 10,000	Rising 1,500 to 5,000 c.p.s.

*0 Reference Level = 1 volt per bar



D-104-C



T-3-C



JT SERIES



VC SERIES



CC SERIES



D-104-C



T-3-C



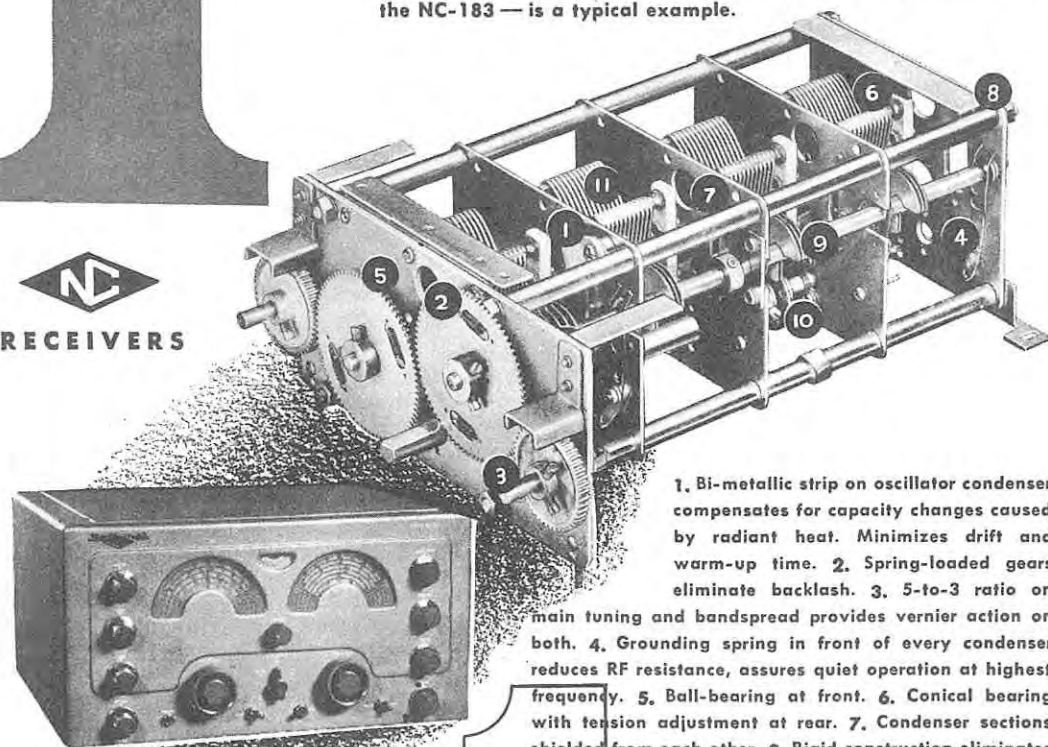
CC SERIES

CANADIAN **ASTATIC** LIMITED
2273 DANFORTH AVENUE TORONTO 13 CANADA

1

ST in service... in re-sale value

Why do National receivers still establish DX records after 10 or 15 years of service? Why — when you're ready to buy a new National — does your old one bring a higher re-sale price? Because National receivers are National-built (not just assembled), using National components specifically designed to out-perform and out-last commercially available substitutes. This tuning condenser — from the NC-183 — is a typical example.



1. Bi-metallic strip on oscillator condenser compensates for capacity changes caused by radiant heat. Minimizes drift and warm-up time.
2. Spring-loaded gears eliminate backlash.
3. 5-to-3 ratio on main tuning and bandspread provides vernier action on both.
4. Grounding spring in front of every condenser reduces RF resistance, assures quiet operation at highest frequency.
5. Ball-bearing at front.
6. Conical bearing with tension adjustment at rear.
7. Condenser sections shielded from each other.
8. Rigid construction eliminates instability.
9. Bandspread construction identical to large condensers.
10. Antenna trimmer condenser for line match.
11. Plate serration for individual capacitor adjustment.

NC-183 FEATURES

540 kc to 31 mc plus 48-56 mc coverage. Bandspread over entire range — calibrated on amateur bands. Two high gain RF stages. Image rejection 40 db at 30 mc. Variable threshold noise limiter. Crystal filter provides 6 steps of selectivity from 4 mc bandwidth to 250 cycles. S-meter with adjustable sensitivity. Temperature compensation and voltage regulation. Push-pull 10-watt audio stage with phono input and tone control. NFM adaptor socket.

Distributed in Canada by
CANADIAN MARCONI COMPANY
Established 1903
MARCONI BUILDING, - MONTREAL
VANCOUVER WINNIPEG TORONTO
HALIFAX ST. JOHN'S, Nfld.



NC-57

For Amateurs —
For SWLs — a
neat 7 tube super-
heterodyne with
BFO and ANL.

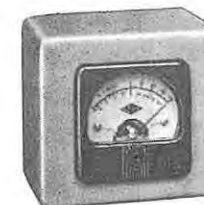


Details of the NC-57 found only in larger and more expensive communications receivers:

1. Ample power output for the average room (3 watts into a 5" P.M. type speaker) with three position control for tone adjustment.
2. A separate RF GAIN control for adjustment of receiver sensitivity.
3. PITCH control to adjust beat note on CW (code) signals.
4. Voltage stabilized oscillator circuit which makes it possible to hold a short wave signal without regard to line voltage changes.
5. Automatic threshold noise limiter to minimize interference due to ignition noise, lighting, static, etc.
6. Band switching made easy by means of simple 5 position switch.
7. Receiver includes all necessary wiring to the accessory socket for plugging in the SM-57 Signal Strength Meter.
8. R.F. TRIMMER control on front panel provides means of matching receiver to various types of antennas for most efficient operation.

The NC-57 is a compact superheterodyne receiver with self-contained speaker and power supply. This recent addition to the National line sets a new high for performance-per-dollar in the moderate price field. The frequency range is continuous from 540 kc. to 55 Mc. with bandspread tuning available throughout the entire range, a feature which is indispensable in the crowded high frequency bands. Front panel controls are held to a minimum consistent with ease of operation and full utilization of the circuit features of the NC-57.

SM-57 Signal
Strength Meter.

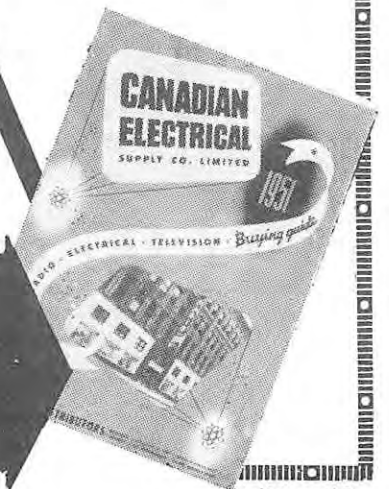
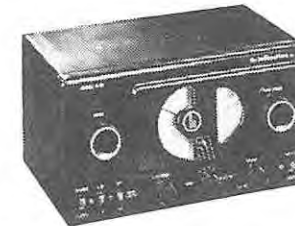


The SM-57 Signal Strength Meter has been designed as an accessory to be used in conjunction with the NC-57 in amateur stations or as a tuning indicator for short wave listeners.

Distributed in Canada by
CANADIAN MARCONI COMPANY
Established 1903
MARCONI BUILDING, - MONTREAL
VANCOUVER WINNIPEG TORONTO HALIFAX ST. JOHN'S, Nfld.

What makes a HAM SHACK?

A Ham Shack is a personal thing. It becomes what it is by virtue of a lot of different items. A receiver and transmitter, a battered old desk, that map stuck up on the wall, all those QSL cards you have received and so many other odds and ends that have just gathered in that one spot. It gradually assumes a personality of its own, becoming in part that of its owner. It is a place for spending many happy hours. It has a lived-in atmosphere familiar to a room constantly in use. No two Ham Shacks are alike even though they contain the identical equipment. And the equipment you use is important. On it depends the amount of pleasure you have and the satisfaction you receive from your long nights of DXing across five continents. That's why it pays to buy the best. And the best is always available from CES. Whatever you require from a tube socket to a transmitter, CES can show you the best and sell at the most reasonable price.



SPECIAL

Yes we have something special to offer you. Regular type 807 tubes — not War Surplus. These regular tubes are on sale for only \$1.99. There are only a limited quantity available so order today!

Pardon us for being repetitious—but we think our catalogue is something special. We've said it before and we say it again. There is only one CES catalogue and nothing else like it in Canada. That's why Hams from coast to coast use it for their Buying Guide. If you have not received your copy write for it today. IT'S FREE!

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DX PREDICTIONS

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

PREDICTIONS FOR JANUARY, 1951.

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!

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	14	28	28	28	28	14	14	7	7
S. America	7	7	7	14	28	28	28	28	14	14	7	7
Australia	-	-	-	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
Wattous	7	7	7	7	7	28	28	28	28	28	14	14
Toronto	7	7	7	7	7	14	14	14	14	7	7	7
Montreal	4	4	4	4	4	7	7	7	7	7	7	4

Wattous to: AST	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	14	14	7
S. America	14	7	7	7	14	28	28	28	28	28	14	14
Australia	-	-	-	7	7	7	14	-	-	28	28	-
U.S. - West	7	7	7	7	7	14	14	14	14	14	14	14
U.S. - Central	7	7	7	7	4	14	14	14	14	14	14	14
U.S. - South	14	14	14	7	7	7	14	28	28	28	14	14
Vancouver	7	7	7	7	7	7	14	28	28	28	14	14
Toronto	7	7	7	7	7	7	14	28	28	28	14	14
Montreal	7	7	7	7	7	7	14	28	28	28	14	14
Sackville	7	7	7	7	7	7	28	28	28	28	14	14

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

FREQUENCY PREDICTIONS

BY CLIVE B. McKEE, CBC INTERNATIONAL SERVICE ENGINEERING DEPT.

DURING OUR LAST TALK, we told you how the antennas assisted the transmitters in their difficult task of transmitting programs all over the world.

You will remember that we told you that these antennas consist of a specially designed system of wires, and that because of this careful design they can concentrate or beam the vibrating energy passed to them by the transmitter to any desired area of the world.

It should not be thought that one antenna can beam energy at will to areas in a variety of directions. Each antenna is so designed, however, that it radiates equally well in either a forward or backward direction. Say, for example, that two masts have been set up in an east and west direction. The antenna supported between these two masts lies also in an east to west direction, but radiates in a north and south direction. By an additional refinement in this design it can be so arranged that it radiates to the north or to the south but not in both directions at the same time. This change in direction can be accomplished when so desired by the engineers who operate the transmitters.

Now each of these antennas is designed to radiate efficiently in only one out of eight bands of radio frequencies used for short-wave broadcasting, and it can be adjusted to operate at a high percentage of efficiency on any particular radio frequency in this one band.

From the foregoing you will see that to operate a world wide broadcasting service efficiently it is necessary to have quite a number of these antennas. Owing to the international nature of the service it is essential to have antennas which will radiate to all the various points of the compass that it is desired to serve. Additionally, due to the variations of the ionosphere and the consequent necessity of using several different bands of radio frequencies during any one day it is necessary not only to have one antenna but several radiating in any given direction. In fact if it were economically possible, it would be desirable to have one antenna for each and every one of the eight radio frequency bands, and to duplicate this set of eight antennas for everyone of the directions it was desired to serve. But as we have said before, such

a number of antennas is economically impossible.

As we told you last month, these antennas are so designed and erected that the vast numbers of rays of energy transmitted proceed out into space and in the appointed direction at an angle of elevation from the surface of the earth predetermined by the construction of the antenna. Let us, for the sake of simplicity of explanation, consider just one ray among these vast numbers of rays of energy which are leaving the antenna aerial and shooting off into space. While listening to this description you must bear in mind that in actual practice on either side and above and below the ray we are describing, there are vast numbers of other rays radiated by the antenna and these rays travel side by side towards the ionosphere.

The ray we are considering travels onward and upward in a straight line and with the velocity of light. When it arrives at the F layer which, as we told you previously, is always ionized to a greater or lesser degree, its direction alters. It is deflected from the F layer and proceeds once again towards the earth. When it reaches the earth it is once again reflected like a light ray from a mirror and again travels up to the ionosphere. This process is repeated again and again so that the wave can travel completely around the world, if need be, in a series of "hops."

As we mentioned before, we considered only one ray in this explanation, but if we bear in mind that all the adjacent rays are being reflected by the ionosphere in a similar manner we can easily understand that a considerable portion of the earth's surface at the distant points will be covered by the down-coming rays.

As the ray of energy is alternately bent in the ionosphere and reflected from the earth's surface it loses a certain amount of energy. It must also be remembered that the ray on its journey to the F layer passes through the D and E layers, and under certain conditions it can suffer absorption during its passage through these layers—all of which causes it to lose energy. Whether the amount of energy lost is serious and whether the ray ever does return to the earth depend upon the communications engineer having chosen the correct transmission frequency

How well our radio wave travels from one point to another, depends upon the number of ions that may exist at a given level of the ionosphere at any particular time. By knowing the state of the ionization of the upper atmosphere we are in a better position to forecast what frequencies should be employed to give the best possible communication over any given distance under such conditions of the atmosphere as may be encountered at any given day or hour. If there is not sufficient ionization to turn back a radio wave of a given frequency, it is useless to use a frequency higher than this.

The ionization of the atmosphere is, as explained in previous talks, dependent both upon the intensity and duration of sunshine. This sunshine contains the ultra-violet light which is the principal cause of ionization. It is thought that the ultra-violet light radiations are more intense at the time when sunspots are most numerous than when sunspots are few and far between. The ionization, therefore, at a given time of day or season of the year is at a maximum during years when the greatest number of sunspots is in evidence. Fortunately, it has been found possible to make measurements of the density of ionization at any hour of the day or night, and from such measurements it is possible to learn much that is of assistance to us when predicting the right frequency to use for the best communication conditions at any given time.

The choice of the correct frequency to be used during daylight or dark, month to month, or year to year, is based upon a close study and analysis of scientific data correlated and issued by such bodies as the Central Radio Propagation Laboratory of the National Bureau of Standards, Washington, and the National Physical Laboratory, Teddington, England.

How do these laboratories obtain their information? There are about 60 observatories in various parts of the world which are making continuous records of sunspot numbers and continuous measurements of ionospheric density. These measurements of the density of the ionosphere are made at regular intervals during the 24 hours. Perhaps you would be interested in learning how these measurements are made. First of all, they entail the trans-

Skywire

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

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P.O. Box 648,
Sydney Mines, N.S.

Second Prize

Astatic D-104 mike
(Ceramic or crystal)

Harold Benson, VE3HB,
40 Edgemore Drive,
Toronto, Ontario.

Third Prize

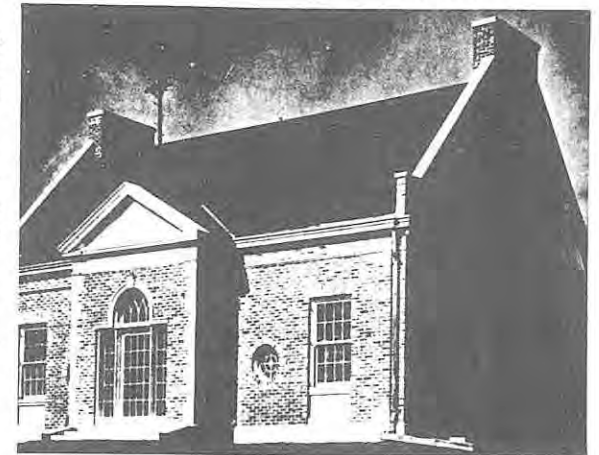
Hammond Antenna Direction
Indicator Kit (6vdc or 110AC)

R.S. Woodford, VE6MZ,
P.O. Box 370,
Calgary, Alta.

The names of the winners in the Skywire Ham History contest appear above beneath the prizes they have won. Our congratulations to these lucky hams.

The correct answer, and the one returned by amateurs from coast to coast, who knew the history of the American Radio Relay League was:

The Hiram Percy Maxim Memorial Building, which houses the famous Headquarters station - W1AW. It is located near Newington, Conn., U.S.A. and the voice of one of its operators can be heard on the amateur bands almost nightly.



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One only - BC-348 modified to 110v 60 cycle operation. This has been re-cased for excellent appearance, and knobs are National type HRS black and chrome. An S-Meter has been fitted to front panel, and paint job is perfect on entire set. Comes complete with Hammond speaker cabinet, 12 inch PM, noise limiter built in so it works, and with power supply. A fine receiver you'll be proud to own at \$135.00 net

One only Hallicrafters S-52 receiver, condition - very good - \$125.00.

One only R-1155 Marconi receiver. This has 110v 60 cycle supply, plus speaker, and is in excellent operating condition for this months low price of - \$69.00.

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This is the compact steel cased, black crackle finish model, without a mark on it. Calibration book accompanies this at the one only price of \$89.00. Order now! No more after this one is sold!

TRANSFORMER BARGAIN, 60 cycles, 110 volt primary, Z mtg., potted windings. Will deliver 280 VDC at 65 mls all day long and 6.3 at 2.1 amps, plus 5 at 2 amps for filaments. Compare prices, then get several for the shack at \$2.95 each.

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HAMMOND VARIABLE AIR CONDENSER, 350 mmf at 3000 volt rating with spacing good for more. Perfect for tank circuits, Pi networks and antenna tuning units. Our low bargain price - \$3.95 each.

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mission of separate pulses of vibrations varying in frequency from 1,000,000 vibrations a second to 25,000,000 times a second.

Now, let us consider the details of this operation. Let us assume that we have a transmitter that can radiate any one frequency from 1,000,000 to 25,000,000 times a second. Nearby we have a receiver to which is connected a cathode ray tube. This tube is similar to those used in television receivers, and in this test it is used to enable the operator to actually see the pulse as it leaves the transmitter and the pulse after it is picked up by the receiver upon its return from the ionosphere.

As an example let us transmit a pulse of say 1,000,000 vibrations a second. As this pulse leaves the antenna of the transmitter we see an indication on our cathode ray tube. This pulse owing to the original design of the antenna travels vertically away from the surface of the earth and proceeds at the speed of light—186,000 miles a second—towards the E layer of the ionosphere. Upon reaching the E layer the pulse finds that the density of ionization is so great at this frequency that the E layer will not allow it to pass through, so, the pulse travels a certain distance into the ionosphere and is then gradually bent around until it is travelling vertically back towards the earth. On arrival it is received by the antenna connected to the receiver and another indication is apparent on the screen of the cathode ray tube. The operator, by closely watching the interval of time between the first indication, when the pulse left on its journey, and the second indication, when it returned from its journey, can tell, since he knows the pulse was travelling at a speed of 186,000 miles a second, the distance that it has travelled. This distance is then assumed to be the height of the E layer above the earth for a frequency of 1,000,000 vibrations a second.

Now, if as these pulses of radio waves are sent upward we gradually increase their frequency by adjusting the transmitting apparatus, we shall eventually arrive at a frequency at which the pulses will pass completely through the lower reflecting E layer and travel upward to the F layer. This frequency, about three million cycles, at which the waves just fail to return from the E layer, is known to the communications engineer as the critical frequency of the E layer. If we know such a critical frequency, we can readily compute the density of the ionized layer. This is a very important factor in the general theory of the prediction of transmission of radio waves. While the lower or E layer changes very little in

height, the upper or F layer varies with the hour of the day, the time of the year, and also with the sunspot cycle.

Note however that while the frequencies greater than the critical frequency fail to return from the E layer they are still reflected by the F layer. As we continue to increase the number of vibrations transmitted, we shall arrive at a frequency—the critical frequency of the F layer—where the pulse penetrates the layer and does not return to the earth at all.

Now as we have just told you the observatories conduct their measurements by transmitting vertically upwards. This form of transmission is all very well for making measurements but would be by no means satisfactory for broadcasting purposes. Now if the ionosphere will reflect, say, 6,000,000 vibrations when they are transmitted vertically upwards, it will reflect a much higher frequency when transmitted at an oblique angle, as is done by the antenna of a broadcasting station. The scientists therefore, when making their analysis take this into account, and the data with which they provide the broadcasting organizations, have been suitably computed for ordinary short-wave transmitting purposes.

The question of the prediction of the necessary frequency or frequencies to transmit over a certain path therefore, involves the following two factors: the distance between the transmitting end and the receiving end, and the density of the ionosphere.

If day after day, month after month, we plot the observed critical frequencies at which the pulses fail to return to earth we shall find a very close correspondence between these critical frequencies and the number of sunspots counted. Therefore, if we are able to anticipate the number of sunspots that may appear, we can anticipate the critical frequencies to be expected that year, and therefore be in a position to forecast the frequencies that should be used for communication. The critical frequencies, since they are directly dependent upon the amount of ultra-violet light, are high at noon and low during the hours of darkness. Since usable communication frequencies are computed from these critical frequencies, it will be seen at once that the frequency to be used at noon will be higher than that used during the hours of darkness.

From the data supplied to him, the engineer can plot a graph for the middle of each month showing in effect the change in ionosphere density during the 24 hours along the path that the transmissions must take, and by use of this graph he is able to judge the maximum usable

frequency at any one time. For this discussion let us take the path from Sackville to Great Britain. For example let us say that it is desired to serve this area between the hours of 1700 and 2330 GMT. The engineer upon looking at the graph can immediately ascertain the frequency or frequencies it is necessary to use during this period.

Now while it is possible on certain paths to use just one frequency throughout all the hours of transmission, it is by no means a wise procedure, particularly if the primary frequency in use is the maximum frequency usable during that time. It is therefore usual to transmit upon another frequency also, this frequency being termed the assisting frequency and in the month of November, 1950, the International Service is assisting this 15 m/c frequency with a frequency of 17,820,000 vibrations from 1415 to 1845 and with a frequency of 11,720,000 vibrations from 1900 to 2330. The adoption of this safeguard is made necessary due to the possible effects of ionosphere storms. These storms cause the height and density of the ionosphere to alter very greatly, and where it would be possible for the primary frequency to provide an adequate service under normal conditions, the variations in the ionosphere caused by the storms completely destroy any possibility of this frequency providing a suitable service.

Having now chosen the frequency band which is required for transmission over the Sackville to Great Britain path during certain hours, the engineer must decide on the specific frequency in that chosen band which he is able to use. The International Service has only one allocated frequency in the 17 mc/s band.

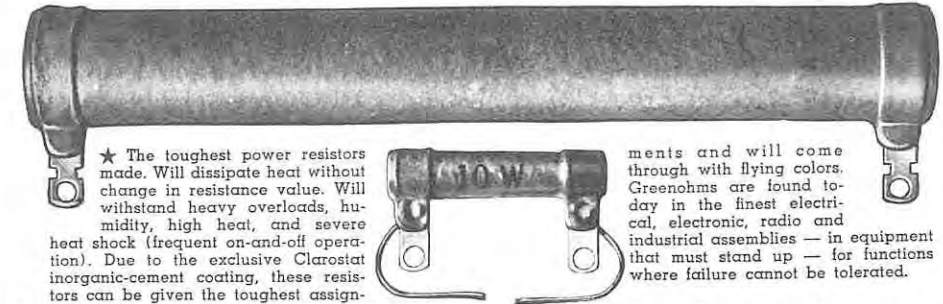
In the 15 mc/s band, however, the International Service has three allocated frequencies: 15,090,000; 15,190,000, and 15,320,000. It might appear a simple matter to choose one frequency from three but appearances are often deceptive and it is by no means an easy choice to make. The most important factor to be considered is interference.

At the present time when the number of nations desiring to air their views internationally is increasing rapidly, the allocated bands are proving too narrow to accommodate all the desired frequencies. This situation of course tends to make it inevitable that certain nations are pirating frequencies which are allocated to other countries. Some broadcasting organizations therefore suffer greatly from interference of this nature, and that is why reports from the listener informing us of the time, frequency and source of interference are so essential.

Skywire

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By the Wife of an Active One

- (1) The Household Broadcast Receiver is *MINE*—thou shalt not interfere with it in any way, neither shalt thou cause it to emit clicks, thumps, whistles nor the sound of thy voice. Neither shalt thou lay thy thieving fingers on the valves without my express permission. And if I *do* lend a valve, and later ask for its return, thou shalt replace it with good grace and a word of thanks, not hand it to me with a scowl.
- (2) Thou shalt not drop solder on the carpet.
- (3) Thou shalt not wake me at 3 a.m. to discourse on the night's activity in thy quest of DX.
- (4) If it be thy desire to erect an aerial mast, thou shalt not put it in the middle of the lawn, but shall endeavour to fit it into my plans for the garden. Neither shalt thou steal my clothes-line for a halyard, nor erect a counterpoise where I or the children can get hurt by it.
- (5) Thou shalt not have more than one radio periodical on the newsagent's bill each month, but shall take them on subscription (as an annual birthday present perchance).
- (6) Thou shalt not pull up the floorboards without prior arrangement. Especially shalt thou not do this just after I have finished cleaning a room, nor when I am expecting a visitor.
- (7) Not more than once in any month shalt thou come home hours late for a meal, bringing a friend without warning, else thou canst get thy food thyself—and wash up afterwards.
- (8) If a ham comes to tea, and I and the children are at the table, thou shalt encourage polite conversation, and not huddle at one end discussing that which I

wot not of until such time as I and the children have left you to it.

(9) If thou leavest valuable gear where the children can get it, the results be on thine own head, and thou shalt not try to dock the house-keeping or the children's pocket money to replace breakages.

(10) Should it so happen that a spiv steals the contact that thou didst desire, thou shalt not swear or curse at me, not abuse me, nor beat me, but thou shalt take the dog for a walk and return in better humour.

And in return for all this will I put up with thee and be a good and faithful spouse and lavish on thee my care and attention. And thou shalt be free to attend club nights and field days without hindrance, and thou canst stay up half the night chasing DX so long as thou dost not wake the family. And that part of our home which thou callest *shack* shall be sacred to thee and I will do my best to keep the children out and shall refrain from cleaning up in thy absence.

Thus shall we live happily ever after.



".... I have decided to give you some white mice, Henry...."

Skywire

Evening on the Air

What Often Happens !

By J. D. HEYS (G3BDQ)

PEACE at last ! The YL is safe and sound with mother at the pictures . . . the dog is asleep under the bench ; so here goes. Stand back OM's—now for some DX. On with the "joy" . . . pleasant chatters from all five power packs (*must pack those laminations one day—try a bit of shellac, p'raps*) and the little red lamps glow benevolently. That's funny, Ten seems dead. Old G6—reckoned ZS would be pouring in about this time. Could it be that temporary tap on the Windom? Impossible ! I bound it up with dead-loss tape only the other day. To heck with this, let's try Twenty ; the PA's a bit shaky on Ten anyway (*must neutralise some-time—even if it is an 807 !*).

Where's that exciter coil ? Here we are ; under the bench with the dog, as usual. Now for the PA grid coil. What a bind this coil changing is . . . will go all modern soon and rig up a bandswitched job. I wonder what ass invented butterfly nuts ? (*A plug-in tank circuit is really overdue at this station ; perhaps some time in the next holidays . . .*) Whooshburr . . . there we are—bang on 14050 kc. What an exciting violet tinge that 807 has ! A good sign they say . . . hope so ! Char-chip-char-chip char-char-chip-char . . . Queer ! She doesn't chirp on Forty. (*That neon stabiliser on the feeder must be put to a real job.*) Ah well, everything helps to push us through the QRM.

On at Last

Now for business. You can't beat a crafty CQ at the start ; it proves she's getting out. A round dozen—that's enough. Here go the switches . . . VFO off . . . aerial over (*I'll fix that relay up soon*) . . . RF gain up. MURDER ! . . . How does I1—always find my frequency for his endless CQ's ? Easy does it . . . at last

—a call. Let me see ; weak and watery, that means one of those KH6's or even AC4YN. (*What did I hear ? An OH ?*)

What strange QRM on the band tonight. Thought so—someone knocking at the door. There's only one person it can be ; Ivor Scanner again, moaning about TVI. Quietly does it (*rubber pad under the key always at this station !*). We'll pretend to be out . . . Sh, good dog. (*That reminds me ; the harmonic suppressor shall have to make its debut.*)

Now for that sig again . . . Burroomph—G3BDQ DE G3—FB OM UR SIGS 599 ACROSS TOWN TONITE BEST ON THE BAND HI HI HI 73 SK ! . . . I'll really fix that type one of these days.

Well, they can never say we don't try to raise DX. What did Old Timer say ? ("90 per cent. operating time should be spent listening.") Try anything once here, so let's have a look round the phone band for a change. Yes . . . a VK5 calling CQ Europe. Quick ! . . . VFO zero beat . . . lovely, can't miss . . . modulator on . . . mike in circuit . . . Phff, Phff ! Funny, no mod. Who could have pinched the mike battery ? Probably in the YL's cycle lamp ; shall have to rob the AVO. Ouch ! How come that the outsides of those 6L6's are live ? (*Now I remember ; I didn't take the shields to earth.*) Too late . . . VK5—is in QSO !

Try One-Sixty

I WILL have a QSO tonight ; must hurry though, the YL will be back soon. What about Top Band ? Can't miss up there. Aha ! the local net. G5—is really on form tonight. Change coils again . . . series tune the Windom (*I'll have to keep a condenser handy for this job.*) . . . half an amp up the spout . . . good !

"Hiya G5—and gang ; this is G3BDQ. Excuse me breaki . . ."

Curses ! What now ? Lights won't work either. Of course, that's it ; I forgot to put another shilling in the meter. Now let me see . . . sixpence . . . half a crown . . . a 50-ohm resistor . . . Too late ! The YL and Co. are back. QRT.



LEADS WON'T PULL OUT in SANGAMO TYPE 30 PLASTIC CAPACITORS...

LEADS are completely moulded in Plaskon case and held securely in contact with the extended foil electrodes. Leads on Type 30 Capacitors are made from a specially chosen alloy to provide extra strength when flexed.

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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.

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SAMPLES ON REQUEST

TELEVISION COMPLETE FIRST TV TRANSMITTER

Earmarked For C.B.C. Use, First Canadian-Made Model Built at CGE's Royce Works

When Canadian-produced television shows go "on the air" in Toronto, a CGE-Royce product will play an important part. The transmitter for the Toronto television station of the CBC has been built and tested here by members of Royce's Transmitter Division. This is the first commercial television transmitter to be built in Canada.

In the building of the transmitter, Fred Heath of Royce was in charge of engineering, assisted by Bill Paulin. Bill supervised the testing, and assistant foreman Al MacDonald was in charge of assembly. "Building a TV transmitter is somewhat more complicated than building any other broadcast transmitter," says Bill, "since there are many additional circuits. The mechanical construction, however, is fairly standard. There is a total of 211 tubes, of many different kinds, in the transmitter."

Three Cubicles

The television transmitter is really two in one, the sound transmitting part having a power of 2½ kilowatts, and the picture transmitter a peak power of 5 kilowatts. There are three cubicles, the aural (sound) cubicle, the control and video (picture) exciter cubicle, and the video power amplifier and modulator. Besides these, other pieces of equipment are an air blower and a water cooler, for cooling the tubes in the three cubicles, and a control console, where the operator sits.

So that the operator can keep a constant check on the quality of the picture coming from the transmitter, a picture tube, giving considerably better definition than the ordinary television receiver, is built into the control console. This tube reproduces the signal being sent out over the air, and the operator can keep his eye on it as he sits at the console.

Precision Tuning

Standard test procedures are being used on the television transmitter, except for the final testing of the antenna, which was also built at Royce. This must take place in a flat wide open space at least 150 by 400 feet in area, as the tuning is done with such precision that the pres-

January, 1951

ence of other objects might affect it.

This "bat-wing" antenna is a strange looking object, and derives its name from its six "bat-wing" elements, each composed of two metal structures like the wings of a bat at right angles to each other. When it is installed at the transmitter site, the antenna will be mounted on a 500-foot, self-supporting tower. The reason for this tall tower is the fact that dependable reception for television can only be had slightly beyond the line of sight from the antenna.

Present plans call for the transmitter to be installed at new CBC studios to be erected on Jarvis Street in Toronto. It is expected that it will be sending out Canadian television programs by September, 1951.

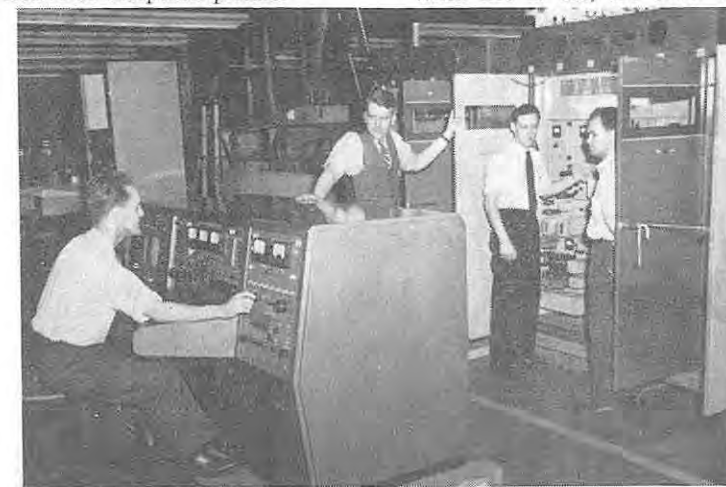
The coming of television has brought with it many new things. Service dealers in television areas have been required to make bigger and bigger investments in equipment to better handle the problems of television service. This is especially true in fringe areas where signal strength is low and additional accessories are required to receive an acceptable picture.

Typical of one type of sales and service accessory equipment required in some areas is the traveling antenna truck of George Rock of Cadyville, N. Y. This truck, on which an antenna is mounted, is used to determine the proper position for the best signal and can be used to demonstrate the performance of a set to a prospective customer in his own home.

The antenna tower used by Rock is of his own design. By using a ten foot mast, it can be raised to a height of 75 feet. The tower is strong enough to handle any size antenna in winds up to sixty-five miles an hour without the aid of guy wires or blocking on the truck.

It is also possible for the truck to be driven to various locations for use in probing while the tower is raised to a height of 45 feet. In constructing the tower on the truck Rock designed the tower to use a twenty foot length of two inch diameter magnesium pipe, to extend the height to 85 feet where necessary.

When not in use, the tower is



Four key men in the building of Royce Works' television transmitter. At left, Bill Paulin, who supervised testing, sits at the control console. Next, Fred Heath was in charge of engineering, and in front of one of the three transmitter cubicles are Al MacDonald, who supervised assembly, and Herb Snelgrove, who worked on testing.

owered and positioned on the roof of the truck. Raising the tower by means of a wrench allows handling by one man.

An investment in equipment such as that used by Rock represents one of the new problems facing television technicians. The days of the "screwdriver mechanic" are rapidly ending. The rise in television and associated installation and service requires the service dealer to invest greater amounts of money in equipment, if he is to give satisfactory service to the growing number of television set owners.

The question of commercial color television is still up in the air. First broadcasts were scheduled to begin on November 20, but the Federal Court in Chicago has temporarily restrained the Columbia Broadcasting System from beginning broadcasts on that date.

The restraining order will remain in effect until the court has reached a decision on an application filed by RCA for a temporary injunction. Both the FCC and CBS have filed motions asking for dismissal of the application.

No indication was given for the length of time required by the court to reach a decision. The panel of three judges hearing the case stated that, "No one can expect this court to render any kind of a decision today, tomorrow or next week. It is unthinkable that the court give a decision at once in view of the importance and complications of this issue. The court will decide as soon as it can—we've got a lot of studying to do—a lot of reading to do."

Meanwhile, CBS continues its closed circuit showing of its color television system in New York. Generally, reception to color television has been favorable, but disappointment has been expressed by many viewers at the small screen size.

The big storm which swept the eastern part of the country over the Thanksgiving weekend caused considerable damage to television antennas and forced some radio broadcasters off the air.

Television set owners in the Metropolitan New York area were hit when more than 50% of the nearly 3,000,000 antennas were blown down or damaged.

Set owners, according to the New York Better Business Bureau, were attempting to seek antenna adjustments under their service contracts. Most contracts, according to the BBB contain a clause exempting the service company from responsibility "due to damage or loss from fire, water, windstorm, lightning and any other so-called 'acts of God.'" In such cases, said the BBB customers cannot morally or legally expect service companies to repair or replace such antennas without incurring additional charges.

Large Screen Picture Tubes Most Used

Television picture tubes 16 inches and larger accounted for 87% of those sold to receiver manufacturers in September. During the month, set makers and distributors bought 813,688 picture tubes for use in new equipment and for replacement of worn-out tubes. Rectangular picture tubes accounted for approximately 54% of the number of picture tubes sold. Most popular size tube used by manufacturers was the 16 and 17 inch rectangulars which accounted for nearly 45% of all tubes sold.

Civilian production by the radio and television industry will be cut next year because of shortages of vital materials. Under orders issued by the National Production Administration supplies of aluminum, nickel, copper, zinc and cobalt for civilian use will be reduced.

Industry leaders have estimated that set and parts reductions of between 20% and 30% will be necessary because of the scarcity of these materials.

Most serious problem facing the manufacturers was the NPA order which removed cobalt from the list of materials available for civilian production. Cobalt is vital to the production of alnico magnets, essential in speaker production. Without cobalt the industry would have to use inferior permanent magnet speakers.

To relieve this condition, the NPA released a directive which said "It will be necessary to develop some long term method for conservation and allocation of this material. Some immediate needs for both defense and civilian uses are pressing, however, an interim measure must be adopted to provide minimum supplies for these needs."

The NPA said its directive provides that orders other than defense orders, shall be filled by delivering to each purchaser 30% of the average monthly quantity which he received during the first six months of 1950.

Restrictions of other critical materials for civilian use by the NPA have not been as heavy as those put on cobalt, but they will have some effect on receiver production next year.

The resourcefulness of the industry can, however, be counted on to develop new methods of manufacturing and conservation of vital materials for greatest production and efficiency without sacrificing quality in the products it produces.

Testing of television picture tubes without having to remove them from the television receiver is now possible, using a new cathode ray tube testing adapter in conjunction with any standard Sylvania Tube Tester.

The new Sylvania Cathode Ray Tube Testing Adapter Type 228 is designed to indicate shorts, leakage and open heaters in electro-magnetic cathode ray tubes and will also indicate relative emission of types having accelerating anodes.

"It is estimated that approximately 85% of the causes of failure or erratic operation of cathode ray tubes may be detected by this simple adapter," according to Rainier. He also stated that the adapter will save television servicing time since set troubles caused by the picture tube can be isolated more rapidly.

The adapter provides the radio and TV servicemen with an inexpensive tube tester accessory which permits quick, convenient checking of TV picture tube operation. The adapter is available from Authorized Sylvania Distributors.

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CLUB ACTIVITIES

THE SCARBORO AMATEUR RADIO CLUB will be holding its 5th Annual Banquet and Hamfest on Saturday evening, February 17th, 1951. The place - the Y.W.C.A. on Gerrard Street East, near Greenwood, in Toronto. The Committee has promised a good Turkey Dinner, with excellent prizes and entertainment. Tickets are \$3.00 each, and the quantity available is limited. Get your tickets as soon as possible and you won't be disappointed. These affairs have become famous, and you'll miss a good time if you don't reserve your tickets immediately.

THE NORTH BAY AMATEUR RADIO CLUB IS sponsoring the Northern Ontario Hamfest Picnic, scheduled for July 1st and 2nd, 1951, at North Bay. This is advance notice of the Hamfest so you can make plans to be there early enough to get your tickets before they're all gone. VE3EAW, VE3ACZ or VE3AHH will all see that tickets are reserved for you, if you write or send a message. Last year the top prize was an Eddystone 750, so you can have an interesting time at this years gathering. Plan NOW for it.

THE FRONTIER RADIO ASSOCIATION - WINDSOR Ontario will hold its Annual Banquet at the Hotel Norton Palmer in Windsor on Friday evening, February 16th at 7.00 p.m. Guest speaker will be ARRL Director John H. Brabb, W8SPF of the Great Lakes Division. There will be prizes and entertainment, following the banquet. Tickets at \$2.50 cover both

registration and dinner. For further information, write Walter Guillot, 3BUR at 86 London Street West, Windsor. Mark envelopes - Frontier Radio Assoc.

THE ONTARIO PHONE CLUB IS HOLDING A QSO Contest on Sunday, March 11th, 1951, from 10 a.m. to 10 p.m. The purpose - to enable CW and fone operators to become more familiar with both types of operating. Two suitable awards will be made. The Fone Trophy will be known as the Columbia Record Trophy and the CW award as the Sparton Radio Trophy. Both, donated by Sparton of Canada, will be engraved to show winner, and presentation year. A further engraving for each winner each year will be supplied by the donor!! You win permanent possession of either of these beauties, by winning three times! The rules are: 3500 to 3750 kc for CW operation. 3750 to 3800 for mobile fone stations of 100 and less watts. 3800 to 3850 is for fone of 101 and up watts. No multipliers. One point for fone to fone, fone to CW or vice versa, if contacts, at any time, are made in portions of band designated above. Any station may operate fone or CW in proper portions of band. Judges: VE3HP, Art Ferguson - VE3DU, Dave Hutchison of London, for CW. For fone, VE3YJ, George Foster, and VE3FQ, Earl Kimble. Contest logs are to be forwarded to E. Kimble, % Sparton of Canada Ltd., London, Ontario. You have until midnight, March 31st, 1951 to get your entry in!



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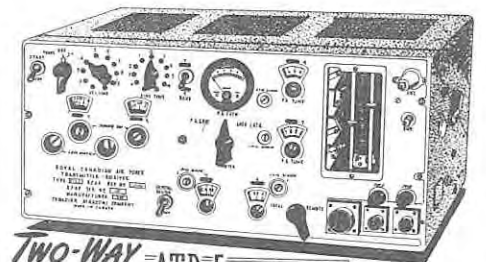
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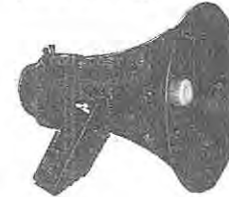


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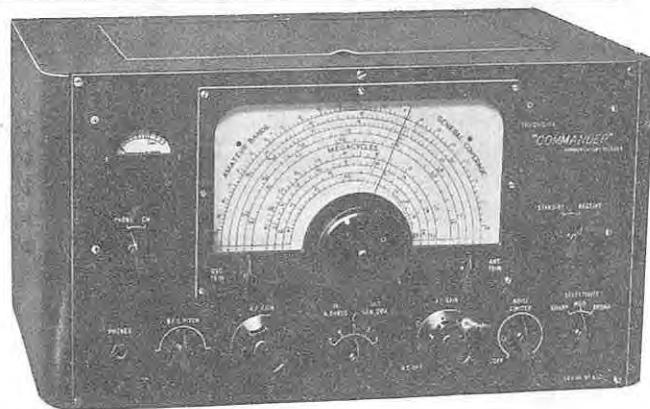
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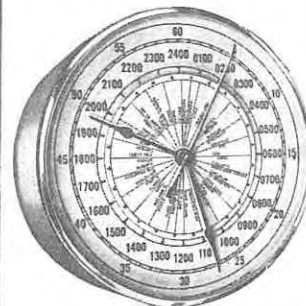


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