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and the *Podunk DX News:*

Tidbits:

Good news for even the hardest-boiled DXer is word confirming VQ7AA as legit. Here's hoping he will be able to make the DX Contest this year—we'll guarantee him a lot of attention.———The latest word from I1SN is that the QSL cards that were intended for the Ws after the recent San Marino expediti

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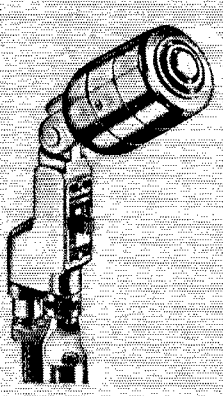
The CARDAX

World's favorite premium crystal microphone—the only high level crystal cardioid with dual frequency response. Lists at $39.50



The "630" DYNAMIC

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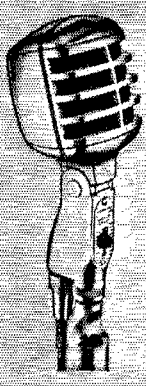

The MERCURY

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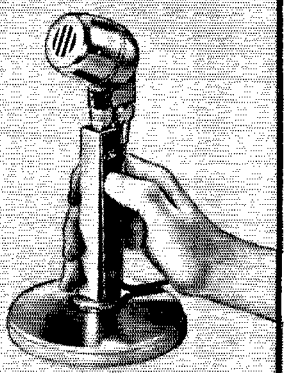

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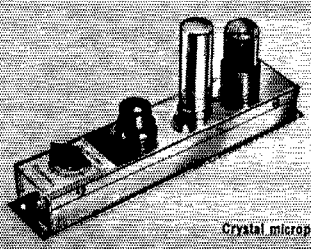
With an E-V microphone, you assure *accurate reproduction of your own speaking voice.* The shading and warmth of your speech arrive at the other end of the QSO undistorted and undiminished. *Your carrier is modulated with your exact speech*...the individuality of your voice is clearly retained...*your personality is on your carrier.* You get quick recognition and more QSO's.

Choose from today's most complete line. In addition to those shown, it includes E-V Cardyne, Century, Spherex, Mobil-Mikes and others.

Ask your E-V Distributor or write for full details.



SPEECH CLIPPER

Clips the peaks from speech frequencies which exceed a pre-set amplitude. Adds greatly to articulation and intelligibility in speech transmission, especially in the presence of high QRM or QRN. Holds modulation at 100%. With tubes. Lists at $24.50.

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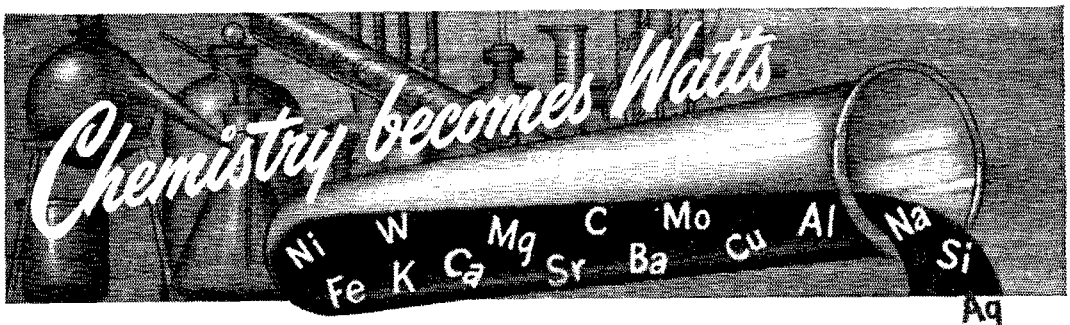

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NO object of like price makes greater demands on expert chemistry than a Ken-Rad miniature tube. Engineered into the 6AQ5 beam power amplifier—and other Ken-Rad miniatures—are at least 20 different elements, such as barium, beryllium, calcium, copper, iron, molybdenum, nickel, silicon, strontium, tungsten, etc.

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In operating results—*your* yardstick as a ham—a miniature like the Ken-Rad 6AQ5 shows the value of its builders' painstaking choice of the right materials. The tube packs a real punch. A pair in Class AB_1 audio has a rated output of 10 w, enough to drive practically any modulator tubes you are apt to choose.

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Study this great little amplifier, and other miniatures, at your nearby Ken-Rad distributor or dealer. See for yourself how Ken-Rad tubes are built, what they will do. Learn their low prices! *No better values are offered the amateur.*

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6AQ5 Miniature

Typical Operation, Push-pull, Class AB_1 Amplifier

Plate voltage	250 v
Screen voltage	250 v
Grid bias voltage	—15 v
Zero-signal plate current	70 ma
Effective load resistance, plate-to-plate	10,000 ohms
Max signal power output	10 w

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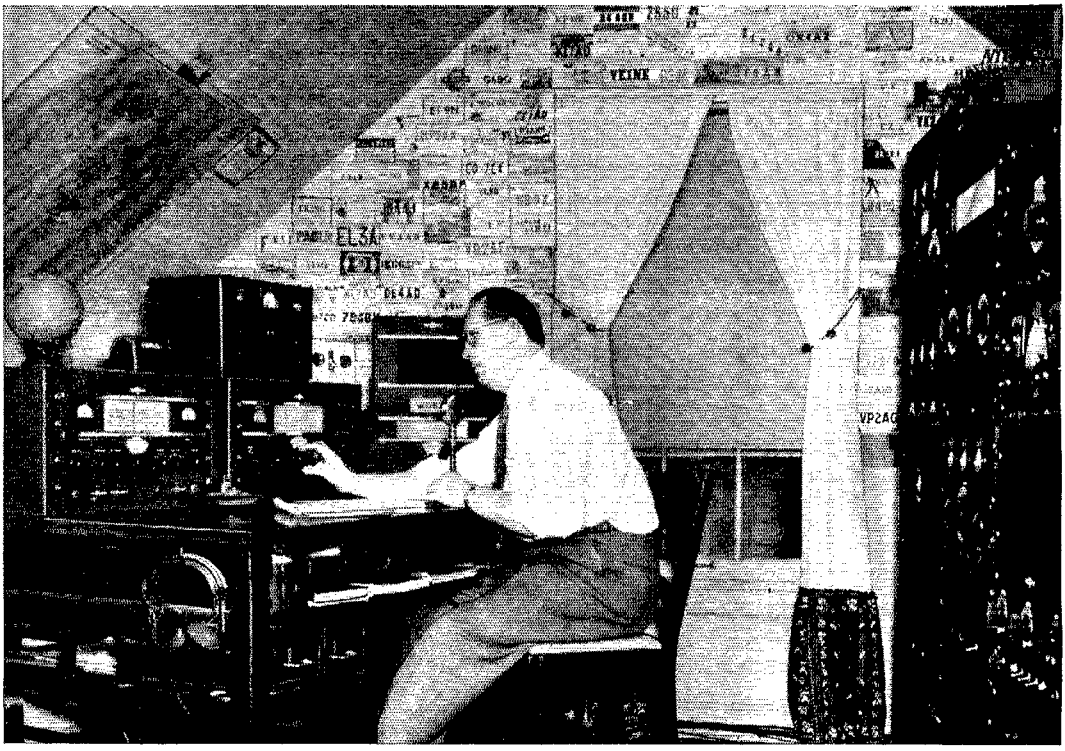

What you work when you work WØFYF

MANY hams are audibly if not visually acquainted with Harold A. Moss, WØFYF. Here he is, operating his outfit.

From left, on the desk: the 32V transmitter, with 150 watts input c-w, 120 watts phone, feeds a 3-element rotary beam on 20, and half wave dipoles on 80 and 10.

He's tuning his 75A, the receiver Collins makes for amateurs exclusively. Atop the 75A is the station's master power control box. At rear, the speaker sits on a 310C frequency control for the 10 and 20 meter kilowatt phone transmitter of WØFYF's own design and construction at right of picture. Also at right are his kilowatt 75 meter phone transmitter, and his frequency measuring equipment.

Harold remarks that the frequency measuring equipment has been used very rarely since he installed the 75A receiver—says he goes on through the months and seasons tuning the 75A to the frequency he wants, confident without checking that he'll be smack on. Actually the 75A's great stability, and the fine accuracy of its dial calibration, are tremendously helpful and satisfying. See or write your Collins dealer about the Collins 75A-1. It's a grand rig to own and operate.

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COLLINS RADIO COMPANY, Cedar Rapids, Iowa

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QST

FEBRUARY 1950

VOLUME XXXIV • NUMBER 2

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OFFICES

38 La Salle Road
West Hartford 7, Connecticut

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INDUSTRIAL ARTS INDEX

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HAM PERFORMANCE

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in *QST*. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

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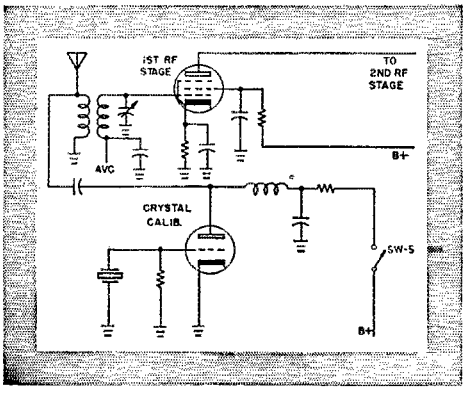

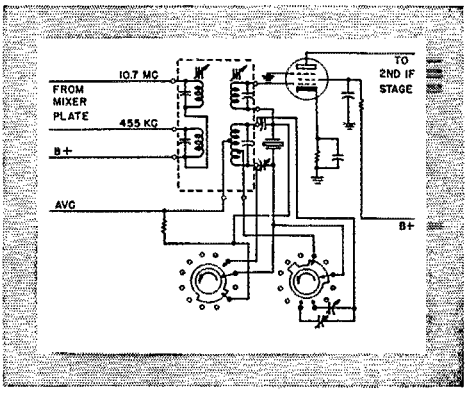

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.

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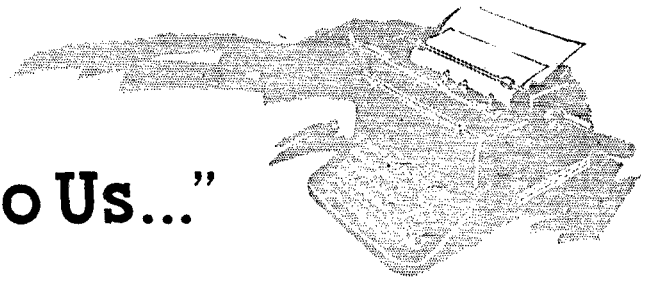


"It Seems to Us..."

DOCKET 9295

Once again the American Radio Relay League regretfully finds itself obliged to take issue with certain aspects of changes in the amateur rules proposed by the Federal Communications Commission.

Acting upon instructions of the ARRL Board of Directors, the League's Secretary and its General Counsel have prepared and, as of January 16th, filed a statement which, primarily, registers objection to a "Basis and Purpose" preamble now proposed as a new regulation, and objection to the Commission's insistence on establishing an Amateur Extra Class license (with a 20-w.p.m. requirement) as the sole future means of obtaining the right to use the 75- and 20-meter amateur 'phone bands.

At the informal engineering conference last October, League representatives drafted language which they said ARRL could accept as a new § 12.0 — Basis and Purpose.[1] That draft received unanimous endorsement by everyone present at the conference as a recommendation to the Commission. The amended proposal in Docket 9295, however, carries language differing in numerous respects from that conference recommendation. The result has been found unacceptable to the amateur service by the League's Board, which decided, unanimously, that it must be vigorously opposed.

The ARRL Board found similarly unacceptable the Commission's proposal to establish an Amateur Extra Class license, which FCC has retained, again despite a unanimous conference recommendation to the contrary. While the original provisions of last April have been modified so as to permit present Class A operators to continue renewals indefinitely, the effect of the language now proposed by the Commission is to require future applicants (after January 1, 1952) for 75- and 20-meter 'phone privileges to pass a 20-w.p.m. code test and a technical examination on a wide variety of subjects, some completely unrelated to 'phone operation and techniques, and to have been an amateur two years instead of the present one year. The League opposes such a philosophy. As purely an "incentive" type license — i.e., a super-class ticket simply for the pride of accomplishment and display on the shack wall — the League offers no objection if the Commission feels it a sufficiently desirable step to take on the additional field examination burden and the administrative paper work which would be necessary. But "additional privileges" for such a license are indeed contemplated by the Commission, even though unspecified. The League cannot perceive the wisdom of setting up license requirements now for certain unknown and somewhat nebulous privileges; if some day additional privileges become available, and if at that time it is thought desirable to limit them to specially-qualified amateurs, *then*, not now, is the time to determine what the license requirements should be. At present, just as last October, the ARRL Board feels strongly that "Class A" privileges should continue precisely as at present. For all these reasons, it opposes the Amateur Extra Class license as proposed by FCC.

The text of the League's document, filed on January 16th, will appear in March *QST* so that all members may see in what additional, though comparatively minor, respects the ARRL has commented on the FCC amended proposals.

We sincerely hope that Docket 9295 will be completely settled by its first birthday — in April. No one will work harder than the League to that end, nor coöperate more fully. At the same time, ever aware of its responsibility to the amateur service, the ARRL Board of Directors will continue to register its vigorous opposition to the enactment of any rules which it believes are not in the best interests of the future welfare of amateur radio.

THE DX CONTEST

As if you didn't know, the cover this month is a reminder that February and March are the big months for the DX men, rabid and casual. We hope you will forgive us for a little daydreaming of the type so dear to the heart of all

[1] *QST*, December, 1949, p. 27.

DXers — to be the only station on in a rare country. You will recall that VP7NG, the "Gon-Waki Expedition" during the '48 Contest, and more recently FP8AA, were culminations of just such ambitions.

Even if you don't go in for DX as a rule, the ARRL DX Contest (this will be the 16th) is worth your while. For one thing, it brings out activity in many countries that aren't too well represented on the air, so it is an ideal time to fill in on that WAC or DXCC, and you might help some foreign station get his WAS or WAVE. Further — and this is important to amateurs who like to enjoy their hobby — you are less likely to run into the selfish and ill-mannered tactics that too often mark present-day DX operating. In the Contest you won't find fellows "busting up" QSOs in their eagerness to work the DX, or repeating contacts to show how well they get out. Not that you won't run into some occasional stupid operating — that's too much to hope for — but in a Contest the crude ones really get their ears pinned back in a hurry. There will be a lot of QRM, but there will be a lot of DX, too. Good luck!

WWV-WWVH SCHEDULES REVISED

A NEW SERIES of technical radio broadcast services over WWV, Beltsville, Md., and WWVH, Maui, T. of H., was inaugurated on January 1, 1950. Except in certain details, these services of the National Bureau of Standards will not differ greatly from those given in the past.

The revised services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, indicating warning, unstable conditions, or normal, respectively.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier frequency is modulated by a seconds pulse which is heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

Station WWVH, recently established in Hawaii by the National Bureau of Standards, broadcasts on an experimental basis on 5, 10 and 15 Mc. The program of broadcasts on the three frequencies is essentially the same as that of WWV. Reception reports indicate that WWVH is received at many locations not served by WWV, thus extending the area served by standard frequencies and time signals. Time announcements in GCT are given from WWVH every five minutes by International Morse code only.

[EDITOR'S NOTE: Since the above announcement was received from the Bureau of Standards at press time, we have had no opportunity to investigate the future status of broadcasts of the 4000-cycle standard tone which have proved so valuable to amateurs in the past.]

Strays

During Christmas week the 500 members of Canada's Air Force Amateur Radio System received greetings through their own coast-to-coast nets from Air Marshal W. A. Curtis, chief of the Air Staff. The message was sent from VE3BFX, the Air Force Headquarters station of the System, shown above. "Bashing" the key is Group Captain E. A. D. Hutton, director of signals (Air) for the RCAF, and chief controller of the AFARS. Assisting in transmission of the message is Flight Lieut. J. W. Murphy, Headquarters staff officer engaged in AFARS work. Checking on the operation are Air Marshal Curtis (*right*) and Air Commodore W. A. Orr, chief of telecommunications for the RCAF. G/C Hutton and F/L Murphy are VE3AX and VE2OK, respectively.

HAMFEST CALENDAR

CONNECTICUT — Saturday, February 11th, at Poquonnock Bridge Fire House, Poquonnock Bridge. Fifth Annual DX Round-Up. Food, refreshments, speakers; FCC exams in afternoon. Tickets $1.25. Make reservations through Chairman R. Y. Chapman, W1QV.

MICHIGAN — Saturday, February 25th, at the Rowe Hotel, Grand Rapids. Annual Midwinter Hamfest sponsored by the Grand Rapids Amateur Radio Association. Formal program starts at 8:00 P.M. but doors open at 3:33 P.M. for swapping gear and gab. Eating facilities for out-of-towners. Special program for YFs and YLs. Admission by ticket, 50¢ in advance, 75¢ at the door. Write GRARA, P.O. Box 333, Grand Rapids, Mich., for tickets or further information.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1BHV, Ira C. Williams, Waterbury, Conn.
W1FA, Harry Upton, Bar Mills, Me.
ex-W1GKE, Sherburne A. Hall, Goffstown, N. H.
W2RYZ, George E. Reiser, Buffalo, N. Y.
W3EEY, Dr. Harry A. D. Baer, Allentown, Penna.
W3LPR, ex-W8EIS, Clyde W. Donner, Berlin, Penna.
W3ROP, Mrs. Ruth E. Raub, Erie, Penna.
W6LDM, Harold J. Bovee, Ventura, Calif.
W7GV, Meade W. Powell, Tucson, Ariz.
W8UKA, Harry O. McIntosh, East Liverpool, Ohio
W9ZCS, Richard H. Fritschler, Superior, Wis.
WØDBE, Herbert N. Koenig, Mitchell, S. D.

A Solution to the Keyed-VFO Problem

Full Break-In with Amplifier Keying

BY RICHARD M. SMITH,* W1FTX

• It is generally agreed that the cleanest c.w. signals are obtained through amplifier keying, yet because we need break-in operation, most of us key oscillators. Described here is a new system that provides the advantages of both methods without complexity or high cost.

BREAK-IN has been the only excuse for oscillator keying. Agreed, that amplifier keying is the easiest way to have a clean signal, but because it is impossible to copy a signal through the backwave that usually results, we have taken the easy way out and have keyed the oscillator in our transmitters. We have done this with the full realization that we are compromising the quality of our signals for the operating convenience of break-in.

The system described here eliminates the need for this compromise. It permits use of a continuously-running oscillator that can't be heard in the receiver, even with the r.f. gain turned up full. In other words, it provides the acknowledged advantages of both amplifier keying and full break-in at the same time, without the disadvantages of either.

First, a word of explanation lest some argue that "there are good keyed oscillators on the air today." True, but they are quite rare, and not easy to obtain. Oscillator keying just cannot be shaped to the extent that amplifier keying can. This is generally acknowledged by all who have investigated the subject, and needs no particular discussion here.[1] The difficulty, of course, is that all self-excited oscillators are frequency-sensitive to voltage change. This is true in varying degree from one oscillator type to another, but all, including the Clapp, are subject to the same faults. They all generate clicks under keying, and to soften the clicks we must use filters that introduce lag in the keyed circuit. If much lag is used, the frequency change it causes makes the signal sound chirpy. We compromise, therefore, by using only as much lag as we can before the chirp becomes noticeable. In other words, we let *chirp* determine how much lag we use, instead of using as much as is really required to kill the clicks. This, of course, is the undesirable compromise we mentioned before.

With amplifier keying, on the other hand, there is no limit to the amount of shaping that can be done. The clicks can be softened as much as needed without causing chirp. In addition, the shaping can often be done in simpler ways than with oscillator keying. The most desirable situation, then, is amplifier keying, provided that at the same time we make it impossible to hear an interfering backwave in our own receiver.

Some Possible Methods

Assuming that our oscillator is going to run all the time, what methods can be used so that no signal will be heard until the key is closed? For purposes of this discussion let's assume that we want to operate in the 80-meter band. Everything we say will apply to operation in the higher-frequency bands. We could, as one method, have an oscillator running at 3500 kc. and then shield it to the hilt, in signal-generator fashion, so that it

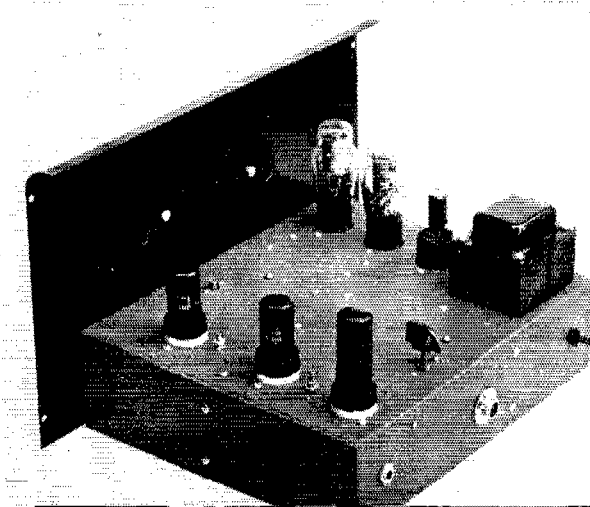
* Technical Assistant, *QST*.

[1] Goodman, "Some Thoughts on Keying," *QST*, April, 1941; "Keying the Crystal Oscillator," *QST*, May, 1941.

♦

Rear view of the VFO unit. Simple construction is used, with the front of the cabinet serving as panel. The oscillator tube and its padder condenser are near the panel, with the Class A amplifier and the 6AG7 output stage in line behind it. The slug-adjusting screws of the plate coils are visible between the tubes. The output padding condenser is mounted so that its shaft comes through the chassis near the 6AG7. The key jack and the coaxial connector used for a shielded output terminal are mounted on the rear of the chassis. All power-supply components are grouped along one side of the chassis.

♦



couldn't be heard until we keyed an amplifier. This is hardly a practical solution, as it requires mechanical construction beyond the scope of most ham workshops. In addition, there would still be a minute amount of leakage from the oscillator through the interelectrode capacities of the output tube. It might be possible to neutralize this effect, but it still sounds impractical. Heterodyne exciters have been used,[2] but they, like some of the trick delayed-action keying systems [3] that have been used successfully, are complicated and costly.

In some instances, break-in operation in the 20- and 10-meter bands with the oscillator running full time in the 80-meter band has been possible, but when operation closer to the fundamental oscillator frequency is desired, the backwave is audible, becoming an intolerable nuisance. We felt that of all of the various methods, this one, if it could be made to work on all bands, showed promise of being the simplest and therefore best system. As it worked out, this was valid reasoning, and the system described below was evolved.

The "New" System

There is nothing startlingly new or different about the *circuits* used in this system, as will be evident from the block diagram, Fig. 1, and the

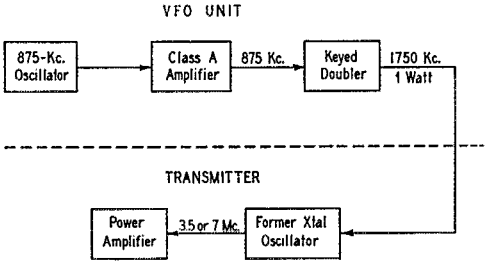


Fig. 1 — **Block diagram of the system. The circuits so closely resemble those of the usual VFO unit that modification of an existing unit to use the new system should be simple. The underlying principles that make the new system better than the old are discussed in the text.**

schematic diagram of the unit described later in this article. It does, however, use these circuits in slightly different fashion. The principles can probably be applied successfully to many existing VFO units with a minimum of effort.

The oscillator, as shown in our block diagram, runs at 875 kc. This was an arbitrary choice, and it might even be possible to move it one harmonic closer to the desired output frequency and still have the system work. Having it run at one-fourth of the operating frequency merely makes it a little easier. With this set-up, the fourth harmonic of the oscillator falls at 3500 kc. We want output from the transmitter at this frequency, but we don't want to have it until we close the key. The problem, then, is how to keep from hearing the *harmonic* with the key open.

In most VFO units, the oscillator is followed by a "Class A" isolation stage. Right here is where most of them fall down. The second stage is not operated in true Class A conditions, and it therefore *generates* harmonics, including the one at 3500 kc. that we don't want to hear. The success of the present system depends, then, upon two things:

1) keeping the amplitude of the harmonic generated in the oscillator itself at such low level that it can be eliminated from the receiver by simple means, and

2) preventing the generation of any additional harmonic energy *until the key is closed.*

Fortunately, both of these requirements are easily met. Because Class A amplification is used following the oscillator, the output of the oscillator can (*and must*) be kept small. This simplifies the shielding problem. It can be accomplished without any special tools, and is described more completely in later paragraphs. Preventing generation of any additional harmonic before the key is closed is a bit more difficult, but with the aid of Class A amplification, it becomes quite workable.

In the system described here, the second stage of the VFO unit is used to isolate the oscillator from the changing load conditions that occur during keying, and to amplify the fundamental signal. With well-shielded tubes such as the 6SK7 and others at our disposal, excellent isolation becomes possible. The 6AG7, in addition to good shielding, has the power sensitivity needed to build the signal up from a very low level to a watt or so output in a single stage. For the oscillator and the Class A amplifier stages we selected the 6SK7 because its extremely low grid-to-plate capacitance made it a good bet for isolation purposes. For the output stage, a 6AG7 was selected because it could be made to serve as a doubler with very little excitation.

To return to the Class A amplifier stage, its excitation requirements are slim. No *power* is required, as in Class C amplifiers, because no grid current is drawn. It merely wants a few volts. This is obtained by reducing the oscillator plate and screen voltages as far as practicable without impairing stability, and then loading the grid circuit of the Class A stage. We found that with the high-*C* circuit used in the oscillator, we could set the plate voltage at 15 or 20 volts without instability. This, however, still gave over seven volts output. By loading the plate circuit of the oscillator with resistance, and using a small grid resistor in the Class A stage, we cut this to a mere 2.5 volts. Loaded in this manner, the plate

[2] Bliss and Bailey, "A Heterodyne Exciter," *QST*, July, 1940.

[3] Goodman, "A 1950 VFO Exciter," *QST*, September, 1949.

circuit of the oscillator is quite broad-tuning, and once resonated in the middle of the desired band, does not need readjustment as the oscillator is tuned across its full range. Excitation to the 6SK7 grid does not rise above 2.5 volts or fall below 2 volts across the range, well within the 3-volt grid-bias requirement for Class A operation of the tube.

The tuned circuit in the plate of the oscillator, incidentally, helps to keep the harmonic output of the oscillator low when compared with the desired output at the fundamental. It is doubtful that an untuned circuit would be capable of delivering the fundamental output needed without requiring greater input to the oscillator. This, in turn, would increase the harmonic output.

To build the small signal developed at the grid of the second stage to the voltage required to swing the grid of a 6AG7 doubler, a tuned plate circuit is required in the Class A stage. The plate circuit is made broad-tuning so that it, too, can be adjusted for resonance in the center of the band and then left alone as the oscillator is tuned. Remembering, too, that even Class A amplifiers can produce some distortion (harmonics), inverse feed-back is applied by making the cathode circuit slightly degenerative. This merely requires the omission of the usual cathode by-pass condenser. It serves to broaden the response curve of the stage, and to lessen the chances for harmonic generation, both desirable results. With this arrangement, adequate excitation for the 6AG7 is obtained. Admittedly, the excitation is not equal across the band, but this is smoothed out considerably by the 6AG7 stage, so that ultimate output is fairly flat across the band.

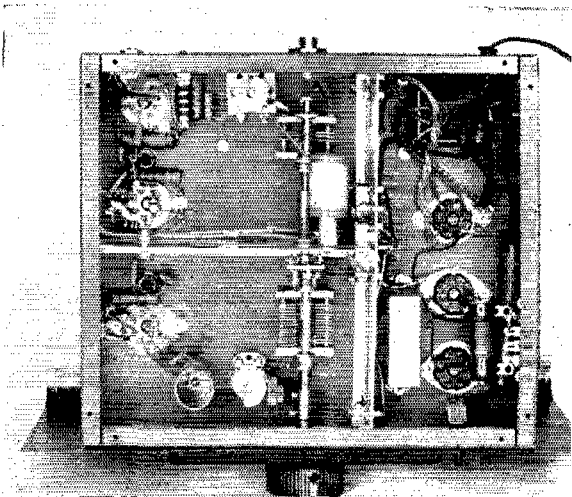
The output stage is a conventional doubler, with the tuning condenser ganged to that of the oscillator. An important consideration in this stage is the way in which it is keyed. With the first two stages running full time, excitation is always present at the grid of the output tube. Therefore, unless the grid circuit is opened by the key, the undesired harmonics will be generated here, will be coupled to the output circuit through the interelectrode capacity of the tube, and will be heard in the receiver. Two keying methods are open to us, then. We can key in the cathode circuit, thus opening both grid and plate circuits, or we can use blocked-grid keying, effectively opening only the grid circuit.

Actually there is little to choose between the two keying methods, although it seems easier to shape the keying with the blocked-grid system than with cathode keying. The latter is easier to install, but really complete shaping, desired by the more critical, is easier to get with the former.

The system is not yet complete, because we still have to couple the output of the VFO unit to the transmitter in such fashion that whatever minute harmonic *does* succeed in leaking beyond the Class A stage, and around the wiring through stray coupling, is eliminated. Two practical coupling circuits are shown in Fig. 3. Note that provision for applying fixed bias to the first stage in the transmitter is included. This will not be needed in all transmitters, but in about half of those tried with the VFO unit described, it was possible to hear a weak backwave in the receiver when plate voltage was applied to following stages in the transmitter. If you already have fixed bias applied to your transmitter for break-in purposes, this is no hardship. If you don't, it is simple enough to install, and a small battery will usually last a long time in a low-power stage. If you have to install it, you can use the same bias source for blocked-grid keying of the output stage of the VFO. Thus the cost is well spent.

In the coupling circuits shown, A indicates the modification necessary to convert a former crystal-oscillator stage to a doubler or quadrupler. At B, a switching circuit providing for operation of the first stage of the transmitter as either a coupling stage or a crystal oscillator is shown. The fixed bias is applied only when the switch is in the VFO position, with normal grid-leak bias applied for crystal-controlled oscillator operation. In both A and B, the stage is operated as a frequency multiplier to avoid the possibility of self-oscillation when operating in the 80-meter band.

That's all there is to the system. It is simple, but it works!



Bottom view of the VFO unit. In this view, the arrangement into three compartments is shown. The oscillator occupies the lower left-hand compartment, with the Class A amplifier and the 6AG7 output stage in the compartment above it. The power supply is in the compartment at the right.

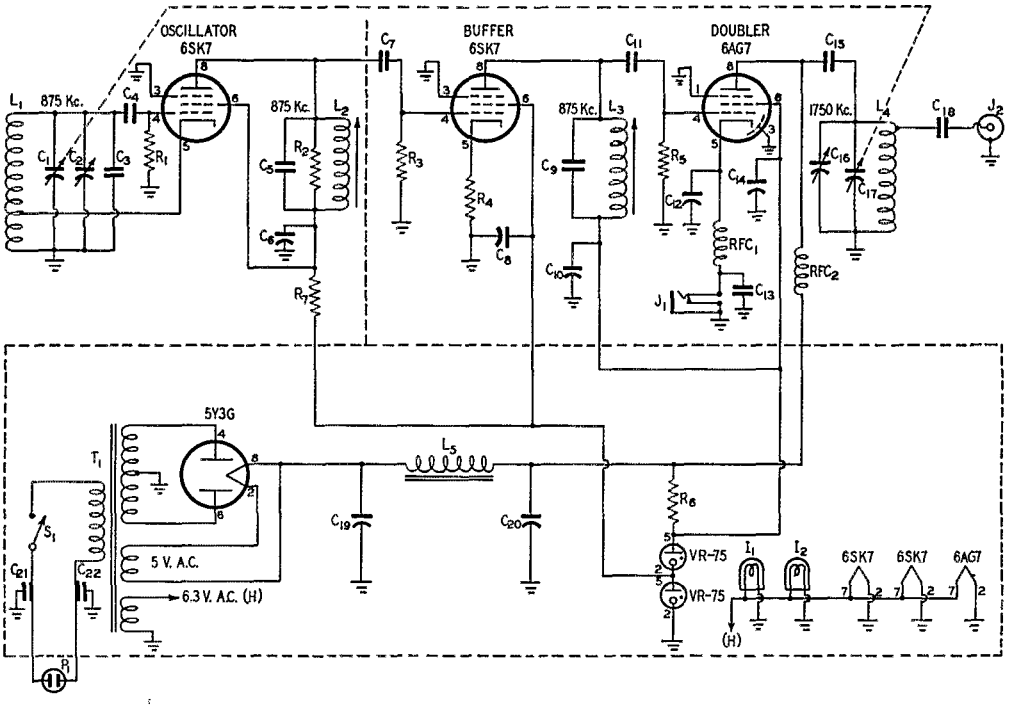


Fig. 2 — Schematic diagram of the VFO.

C_1 — 200-$\mu\mu$fd. max. variable (Millen 19200).
C_2, C_{16} — 140-$\mu\mu$fd. trimmer (Millen 22140).
C_3 — 680-$\mu\mu$fd. silver mica.
C_4, C_7, C_{11}, C_{15} — 100-$\mu\mu$fd. mica.
C_5, C_9 — 68-$\mu\mu$fd. mica.
C_6, C_8, C_{10}, C_{12}, C_{14} — 0.01-μfd. 600-volt paper.
C_{13}, C_{18} — 220-$\mu\mu$fd. mica.
C_{17} — 50-$\mu\mu$fd. variable (Hammarlund MC-50-S).
C_{19}, C_{20} — 8-μfd. 450-volt electrolytic.
C_{21}, C_{22} — 0.1-μfd. 250-volt a.c. (Sprague Hypass).
R_1, R_7 — 47,000 ohms, ½ watt.
R_2, R_3 — 10,000 ohms, ½ watt.
R_4 — 330 ohms, ½ watt.
R_5 — 0.1 megohm, ½ watt.
R_6 — 5000 ohms, 20 watts.
L_1 — 47 turns No. 24 d.s.c. close-wound on 1-in. diam. form. Tap at 14 turns from ground.
L_2, L_3 — Slug-tuned coil (CTC LS-3, 1 Mc.).
L_4 — 53 turns No. 26 d.s.c. close-wound on 1-in. diam.
L_5 — 10-hy. 75-ma. filter choke.
I_1, I_2 — 6.3-volt dial lamps (part of dial assembly).
J_1 — Closed-circuit 'phone jack.
J_2 — Coaxial connector, female.
P_1 — Male a.c. plug.
RFC_1, RFC_2 — 2.5-mh. r.f. choke (National R-100-S).
S_1 — S.p.s.t. toggle switch.
T_1 — 700 volts c.t., 70 ma.; 5 v., 3 amp.; 6.3 v., 2.5 amp. (Stancor P-6011).

A Practical VFO Using the System

The photographs and Fig. 2 show one way of putting the principles discussed here to work in a unit that is both effective and simple to build. The layout is not critical, and may be changed to meet individual needs provided that certain considerations are kept in mind. It is desirable to have as much isolation between stages as possible to eliminate stray coupling of the oscillator harmonic to the output circuit. For this reason all heater and d.c. supply leads are made with shielded wire, with the shield braid grounded at several points. The bottom of the 12 × 10 × 3-inch chassis is divided into three compartments by simple aluminum shield partitions. One, which runs the full depth of the chassis along one side, contains all the power-supply components. Another, in the front part of the chassis, contains the oscillator circuit. The third compartment contains the Class A amplifier and the output stage. The coils in these stages (L_3 and L_4) should be kept as far apart as possible, and mounted at right angles to one another. If a more compact layout is used, it is suggested that a shield be installed between them.

The wiring was purposely arranged so that there would be only one lead passing from one r.f. compartment to the other. This requires that the d.c. and heater leads to each stage be brought out separately to the power-supply compartment, as indicated in the circuit diagram. The coupling lead between the plate of the oscillator and the grid of the Class A stage is the only lead passing through the partition between the two stages.

In connection with the wiring in the Class A stage, the components in the grid circuit should be spaced from the plate circuit to reduce the possibility of regeneration. Other constructional details are evident from the photographs.

Adjustment and Operation

Some slight adjustment of the amount of fixed capacity used in the grid circuit of the oscillator may be required to permit tuning the range 875 kc. to 1000 kc. If only c.w. operation is wanted, greater bandspread of the low-frequency end of the bands may be obtained by removing rotor plates from C_1, and then making up the difference in fixed capacity with C_2. A wide frequency range is possible with the constants shown, including coverage of the 11-meter band, by readjustment of C_2.

The most important adjustment is to make sure that the Class A stage is operating in true Class A. To do this, resonate the plate circuit of the oscillator in the center of the desired tuning range. Then do the same for the plate circuit of the Class A stage. If you have no wavemeter capable of tuning the required range, you can listen to the oscillator in the broadcast band. Connect a low-range voltmeter, through an r.f. choke, across the cathode resistor, R_4, of the Class A amplifier. About 3 volts bias should be indicated. Now pull the oscillator tube out of its socket. The voltage read across R_4 will remain the same if Class A conditions are being met. If they are not, reducing oscillator output by increasing the size of R_7, or decreasing the size of either R_2 or R_3, should correct the trouble. Another way to check for Class A conditions is with a sensitive wavemeter coupled to the plate coil, L_3. Tune the wavemeter through the range around 1750 kc., the second harmonic of the oscillator. If any harmonic is detected here, it is certain that it is being generated in the Class A stage (assuming that your wavemeter is not at the same time coupled to the oscillator coil, and that the key is open), and the corrective remedies mentioned above should be used.

Now connect the output of the VFO to the input of the transmitter through a shielded lead. Coaxial cable, with the outer shield grounded, can be used here to good advantage, because it is low-loss and well shielded. Any length up to 8 or 10 feet can be used. The cable should be terminated at the transmitter end close to the grid of the first stage, so that radiation will not take place from any exposed wiring in the transmitter. Press the key, and adjust trimmer C_{16} for maximum grid current in the first stage of the transmitter. If too much drive is available, as well may be the case if a 6AG7 is used as the first stage in the transmitter, use a 6SJ7 output stage in the VFO unit. This will reduce the output considerably. The substitution can be made without wiring changes, but the tuning of both the Class A stage and the output stage may have to be readjusted slightly. If an 807 is used as the first stage of the transmitter, a 6AG7 will probably be needed as the output tube in the VFO, but for smaller tubes, the 6SJ7 should be adequate.

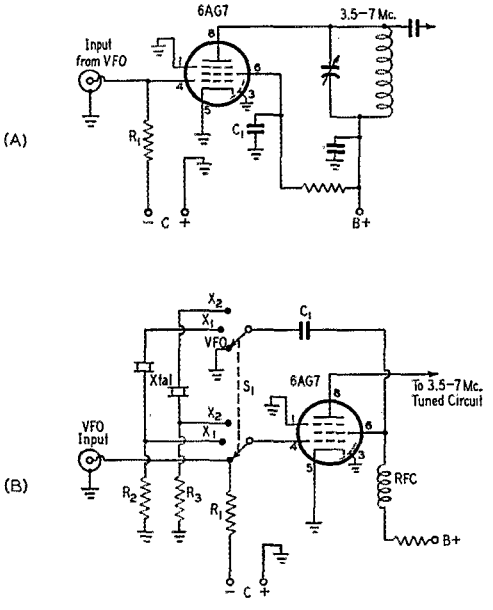


Fig. 3 — Two suggested methods of coupling the VFO unit to the transmitter. In both cases the 6AG7 is used as either a doubler or quadrupler from the output of the VFO. In A, a former crystal-oscillator stage has been revised to operate with fixed bias. In B, a switching system providing for either VFO or crystal control is shown.

C_1 — 0.001-μfd. (or larger) mica.
R_1 — 10,000 ohms, ½ watt.
R_2, R_3 — 47,000 ohms, ½ watt.
S_1 — Double-pole 3-or-more-position ceramic.

Shaping the Keying

This article can't go into the entire keying problem, but a few suggestions that apply to this particular unit are desirable. Don't expect to get perfect keying out of this unit alone. The rest of your transmitter has a lot to do with it, as shown by Carter [4] and others.[1] You can, however, shape the output of the VFO as you like it without worrying about compromise between clicks and chirps. As mentioned above, cathode keying is the simplest to install, but blocked-grid keying is recommended for those who really want to be able to go all-out.

If cathode keying is used, keep the amount of capacity used across the key to soften the break

(*Continued on page 86*)

[4] Carter, "Reducing Key Clicks," *QST*, March, 1949.

A Simple Nondirectional Antenna for Ten Meters

Vertical End-Fed Half-Wave Radiator for Restricted Space

BY STEWART BECKER,* W7AYB

THERE are several reasons why a ham whose chief interest lies in the ten-meter band may not want to or cannot put up a rotatable beam. Such an antenna is expensive, it requires a sturdy support, many consider it an eyesore, it is difficult to adjust for maximum performance, it must be rotated to cover all directions and it makes a relatively poor antenna for ground-wave work when the band is "dead." On the other hand, a vertical antenna may not have the gain in a favored direction, but it is simple and inexpensive. It can be mounted on a light structure and does not have to be rotated to cover all directions. It is easy to adjust and furthermore it is a good antenna for ground-wave work.

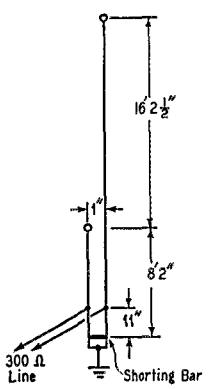


Fig. 1 — Dimensions for the 10-meter "J" antenna. The connecting point shown for the transmission line is suitable for a 300-ohm line.

The one complication that arises in the construction of a vertical dipole for 28 Mc. is that the transmission line from the center should be horizontal for at least one quarter wavelength in order not to interfere seriously with the radiation pattern. A quarter wavelength at 28 Mc. is about 8 feet, and a horizontal bar of this length on a vertical antenna is somewhat of a problem. After the one at W7AYB came down once too often, a substitute for the vertical folded dipole was sought.

A vertical "J" seemed like the answer except for the apparent requirement that it be made of aluminum tubing and be self-supporting. In my case, this was out of the question for several reasons. However, I had a lot of antenna wire around the shack as well as some odds and ends of $\frac{3}{16}$-inch polystyrene sheet stock. With these as a starter, the antenna shown in the sketch of Fig. 1 was built. Its performance has equaled that of the folded dipole. It has thoroughly demonstrated its worth as an all-around antenna for the ten-meter band, and it has the advantage that it can be connected directly to ground for static and lightning protection. The horizontal boom or lead-in is eliminated and it is one of the neatest-looking antenna structures that I have seen for some time. The antenna itself is practically invisible on the pole and a coat of white paint makes the whole outfit win the approval of the most fastidious XYL (well — almost, anyway!).

* 3645 Cactus Blvd., Tucson, Ariz.

The "J" Antenna

The "J" antenna has been so named because it resembles the letter J in shape. In this instance, it consists of a half-wave single-wire vertical element which is fed at the lower end by means of a quarter-wave matching section of two-wire open line. The quarter-wave matching section is short-circuited at the lower end and, since this point is at zero potential with respect to ground, a wire can be run from this point directly to ground. It need not be disconnected when the antenna is being used. Then the transmission line from the transmitter is fed into this quarter-wave section at the proper point for correct impedance matching.

The dimensions given here are suitable for general coverage of the ten-meter band. The single-wire antenna and the two-wire matching section both are made of ordinary stranded antenna wire, although solid No. 12 or 14 would do as well. The system is fed with a 300-ohm ribbon-type transmission line. The antenna is 16 feet 2½ inches long, the two-wire matching section is 8 feet 2 inches long and the 300-ohm line is tapped in 11 inches above the shorting bar at the bottom of the matching section. The spacing between the two wires in the quarter-wave matching section is one inch.

The Mast

Now comes the problem of supporting the antenna in a vertical position. The antenna with its matching stub has a total length of 24 feet 4½ inches and, allowing 4 inches at each end for in-

sulators and mounting, this gives an over-all length of approximately 25 feet. This is a little long for a single 2 by 4 and the extremely light weight of the antenna does not justify such a heavy support. All that is required is something that will stand up by itself because the antenna adds practically no burden to the support and the transmission line can be brought down along the support so as not to increase the suspended weight. This is one of the big advantages of this type of vertical antenna. If a vertical folded dipole is used, the antenna mast must be strong enough to support the 8-foot horizontal bar for the transmission line which, in turn, must be strong enough to support the strain (with wind!) of the transmission line hanging from there to the roof of the shack.

After consideration, the best combination seemed to be a 14-foot 2 by 2 at the top, supported by a 20-foot 2 by 4 guyed at the point where the matching stub joins the antenna. Guys at this point or lower have little effect upon the performance, although guys above this point may affect both loading and the radiation pattern. The 2 by 2 should be set in a 2-foot notch in the 2 by 4, as pictured in Fig. 2G. Care should be taken to make a snug fit and then three 4½-inch carriage bolts should be used through the two members to hold them securely together.

This gives a mast 32 feet long and a very simple socket on the roof of the shack is all that is necessary to hold the bottom, because the guy wires do the real work of holding it up. At W7AYB, the 2 by 4 is bolted to the side of a cement-block garage at a corner where the garage joins the house. It has been up for almost a year without giving trouble, but bolting it to a brick or cement-block wall should be avoided, unless it can be done near a corner. A couple of coats of white paint after joining the two uprights will finish the mast.

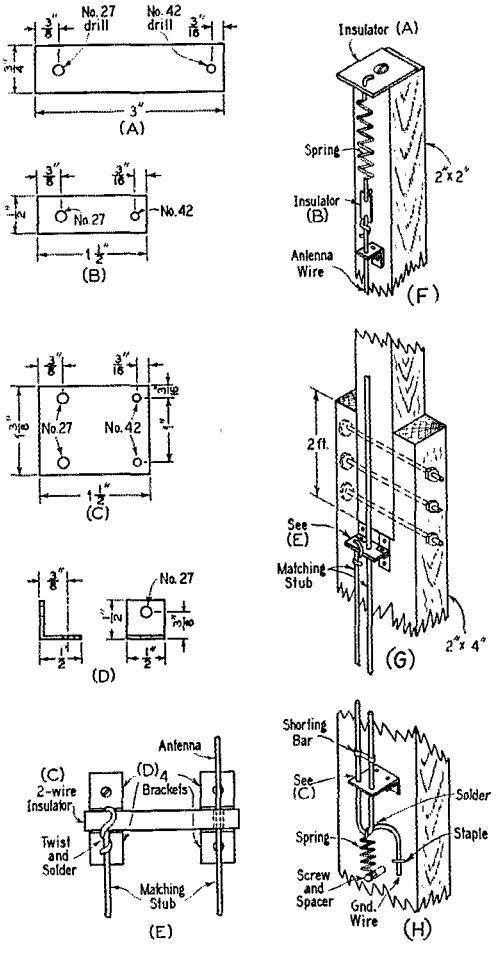


Fig. 2 — Detailed sketches of parts and assembly of the simple "J" antenna. A — Top antenna anchorage, 1 required. B — Single-wire insulator, 6 required. C — Two-wire insulator for matching section, 5 required. D — Metal angle pieces for fastening insulators to mast, 17 required. E — Method of mounting two-wire insulator at top of matching section. Four angles are used here. F — Antenna insulator and spring assembly at top of mast. G and H — Details of mast and antenna assembly.

Antenna Construction

The rest is easy. From the polystyrene sheet or other insulating material, cut up six single-wire insulators, as shown at B in Fig. 2, and five two-wire insulators as shown at C. Seventeen ½-inch metal brackets (Fig. 2D) will be needed for fastening the insulators to the mast. These can be made or purchased for a few cents. One angle will be used on each of five of the single-wire insulators and two angles will be used on each of four of the two-wire insulators. The remaining four will be used on the uppermost double insulator to which the free wire of the matching section is anchored. A pair of small coil springs, shown in Fig. 2F and H, is also required to keep the wire taut over a long period of time. The top supporting strip, A, is screwed to the top of the mast. This may be a piece of polystyrene strip, but it is safer to make it of metal, or at least bakelite, which will take the strain without danger of snapping off.

Now measure off a piece of antenna wire 34 feet long and fasten one end to the top insulator fitted with the spring. Then string the polystyrene-strip insulators along the wire, placing the single-wire insulators toward the anchored end of the wire. At 24 feet 7 inches from the top end of the wire, loop the wire through the eye of the bottom spring and double the wire back on itself. Holding the two strands together, pull the wire until both springs are under reasonable tension and then anchor the bottom spring. While

(Continued on page 88)

Your BC-221 as an Audio Signal Generator

BY CLIFFORD E. VOGT,* W8NCO

I HAVE always wished for a dependable source of known audio frequencies around the shack, without realizing that it has been at my disposal for the last couple of years in my BC-221.

Until recently I had never thought of using this excellent frequency meter for anything except spotting frequencies, calibrating my receiver, and qualifying for a Class I Official Observer's certificate. Quite by accident, while checking the calibration of the meter with some b.c. stations, I found the answer to my need for a supply of audio frequencies. While checking at 1000 kc. I noticed that the 10,000 cycles from 1000 kc. to 990 kc. was spread over more than 800 readable divisions, with approximately 12 cycles per division. So, with the meter in check position, the resultant beat with the crystal gives highly-accurate audio frequencies.

To double check the accuracy of this signal source, first check the crystal in the meter with WWV. Most BC-221 meters have a small air capacitor across the crystal to zero it. This trimmer is accessible inside the meter. Make sure you have the correct trimmer before attempting this adjustment. After an hour's warm-up, I found that just a small change in this trimmer put the crystal in exact zero-beat with WWV's 15-Mc. carrier, and that all during the checks it remained stable. Having a 'scope available and remembering that you can measure audio frequencies accurately by using the Lissajous method of counting loops, provided you have a

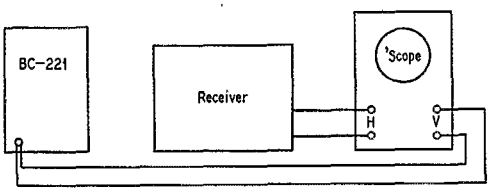


Fig. 1 — Set-up for checking calibration with Lissajous figures and WWV standard audio frequencies.

standard to work with, I used the arrangement in Fig. 1 to take advantage of the 4000- and 440-cycle standard audio frequencies on WWV's carrier.[1] With the frequency meter set to 996 kc. by the calibration, I was very gratified to find an ellipse on the 'scope — proving that the beat note from the meter was exactly 4000 cycles. A check was then made at the 440-cycle standard and subsequently at multiples and submultiples of 440 and 4000 cycles. Checks also were made at 30, 60, and 120 cycles using the test 60-cycle wave from the 'scope.

The results of these tests proved that the BC-221 is a signal source with more than enough accuracy of calibration for making audio measurements such as frequency response of band-pass or low-pass filters in speech amplifiers, and alignment of single-sideband equipment, except possibly for checking a phasing network at the very low frequencies, where the accuracy should

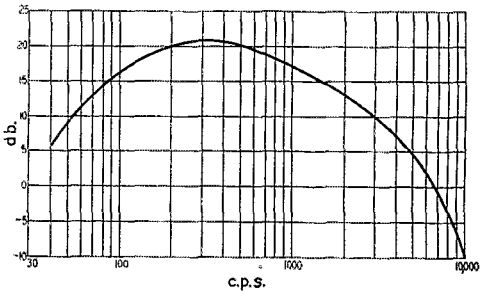


Fig. 2 — Audio output across 250-ohm load resistor. Zero level is 12 milliwatts.

be maintained to a fraction of a cycle. With the aid of your 'scope and a frequency standard accurate enough to give a signal every 10 kc., it becomes possible to measure radio frequencies to a matter of cycles, even in the 10-meter band.

The information available on my meter states that a 250-ohm headset should be used, so with this load I measured the level of the available signal over the range from 40 to 10,000 cycles. These limits are ample for checking speech equipment. With the db. meter in my Hickok 288X and the gain control on the BC-221 wide open the response curve shown in Fig. 2 was obtained. The power supply for my meter uses a selenium rectifier for the plate voltage and a small filament transformer.

* 13 Bachman St., Cincinnati 18, Ohio.

[1] A description of the method of using Lissajous figures with WWV as a standard is given in January, 1950, *QST*, beginning on page 35. Note: As we go to press the Bureau of Standards has announced a revised schedule for WWV (page 10, this issue) which makes no mention of continuation of the 4000-cycle standard frequency. — *Ed.*

Eliminating TVI with Low-Pass Filters

Part I — Installing and Operating — How To Give the Filter a Chance To Work

GEORGE GRAMMER,* W1DF

AT THE PRESENT TIME, interest in low-pass filters for TVI reduction is at a high pitch — in fact, the word "interest" is a pretty mild term for the excitement exhibited in many quarters. Here at last is the gadget that solves all your TVI troubles!

We wish it were so. But despite the unquestionably excellent harmonic suppression a filter can give, it is not a magic short cut that replaces all the other things we've learned to do in reducing TVI. If you install one in that expectation you may be in for a big disappointment.

Low-pass filters were among the first things tried when TVI began to be a factor in amateur operation. A simple type was used at W2MYH,[1] and W2RYI experimented with considerably more elaborate configurations.[2] Although effecting an improvement, they did not by any means eliminate harmonic radiation. It was obvious that something more than a filter was needed. The interim has been spent in refining other harmonic-reducing methods while the low-pass filter dropped into the background. But we know enough about applying these other methods now so that, as pointed out in April *QST*,[3] a filter becomes a pretty sure-fire device.

Although quite simple, the filter described in the April issue did an excellent job, and it is more than adequate for many purposes. However, recent development, particularly in the commercial field ("commercial" here meaning manufactured units and kits intended for sale to amateurs), has tended to more complicated structures. There is a good reason for this, because a filter to be sold over the counter in every part of the country has to be a "shotgun" affair. That is, it has to give good harmonic suppression over the entire range of TV frequencies, and it has to have enough suppression built in to take care of the fellow in the fringe area. Those who build their own can do so with an eye on the local situation and can often, as a result, get away with the simplest sort of filter. We propose to discuss this at more length a little later, but first want to review some of the things that should be done so the filter, whatever its type, will have a chance. Most of it has been said before, but unfortunately it does not follow that it has all been *read* before.

Giving the Filter a Break

You don't carry water in a sieve. And if your transmitter is a sieve for harmonics you can't expect a filter to do much for you. So you might as well make up your mind some holes have got to be plugged up.

This means, of course, that radiation from the transmitter and its wiring must be cut down to the point where it is incapable of causing interference when the antenna is not connected to the transmitter. It's simple enough to make a test with a dummy antenna and settle the point.[3] If you interfere on the dummy, you'll need to do the following in greater or less degree, depending on the severity of the interference:

1) Shield the transmitter, or at least the r.f. chassis.

2) Use shielded wiring for the d.c. and a.c. leads inside the chassis. This simplifies the problem of filtering the leads.[4]

3) Filter the supply leads, using physically small by-pass condensers and chokes, where they leave the shielding.[5] Keep the condenser leads as short as it's humanly possible to make them. The condenser capacitance is usually less important than small size and really short leads. Don't have any more exposed lead inside the chassis than you can possibly help *after* going through the filter. In the tougher cases such as the heavy-current a.c. leads, straight-through condensers of the Sprague Hypass type are considerably better than ordinary mica or paper types. The Hypass condensers are in fact to be preferred in any kind of lead, but are more expensive.

4) Keep in mind that a principal purpose of shielding is to make the lead filtering easier and more effective. Since it's always dangerous to say that anything is impossible, we won't risk saying that good filtering is impossible without shielding. It just comes close to being impossible when you have a weak TV signal and the receiver is in the next apartment. Of course, if the TV signal is

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* Technical Editor, *QST*.

[1] Grammer "Interference with Television Broadcasting," *QST*, September, 1947.

[2] Seybold, "Curing Interference to Television Reception," *QST*, August, 1947.

[3] Grammer, "Pointers in Harmonic Reduction," *QST*, April, 1949.

[4] TVI Tips, *QST*, August, 1949.

[5] The technique is covered in the article referred to in footnote 3. The same article has a comprehensive list of references. A more sensitive harmonic indicator, particularly useful in weak-signal areas, is described in November, 1949, *QST* (Grammer, "The Regenerative Wavemeter").

strong enough so that you don't really *need* good filtering, you may be able to get away with almost anything.

Installing the Filter

Once your direct radiation is eliminated the next step is to make sure that no harmonic currents travel along the transmission line to cause radiation from the line and antenna. This is where the low-pass filter shines, provided it gets an opportunity to work on *all* the harmonic current. A filter doesn't always get that opportunity.

Take the situation shown in Fig. 1A, a common case of coupling through a pick-up coil to a parallel-wire transmission line. Because the tank coil and the pick-up coil are physically close to each other, there is bound to be some capacity coupling between the conductors of which the coils are wound. Hence the actual coupling is not just inductive, but a combination of both inductive and capacitive. Although the line current resulting from the inductive coupling flows around the circuit as shown at *3* in Fig. 1A, the line currents from capacitive coupling flow in the same direction in both wires, as at *1* and *2*. In the average case, assuming reasonably good circuit balance, the parallel currents will have approximately the same amplitude; this means that they cause no voltage difference to appear between opposite points on the line wires.

This is important. A low-pass filter of ordinary

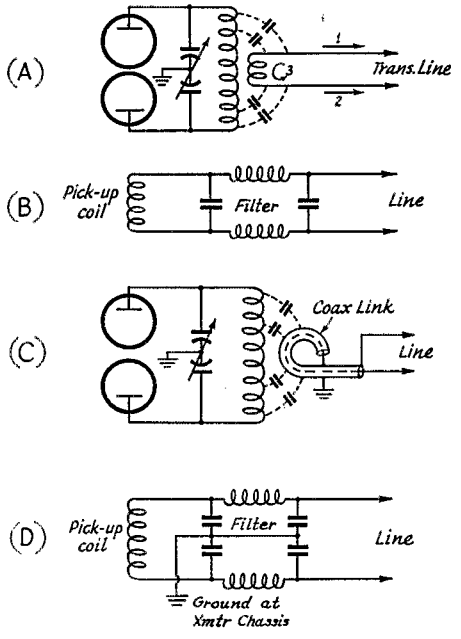


Fig. 1 — Circuits discussed in the text in connection with capacitive harmonic coupling to a two-wire transmission line.

construction, represented by the simple pi network at B in Fig. 1, will go to work on the true transmission-line current (the current resulting from the inductive coupling) because with this current there is a difference of potential between opposite points on the line wires. Consequently the harmonic currents will tend to be short-circuited by the shunt condensers of the filter. But there is no tendency for the parallel currents to be similarly short-circuited, because they cause no voltage difference across the filter condensers. The filter coils are the only opposition these currents meet, and sometimes the coils actually make it easier for harmonic currents to flow because they may tune the entire system to something near resonance at the harmonic frequency. So a filter used in this fashion may, in the end, make harmonic radiation worse.

If there is no capacity coupling the problem ceases to exist. A Faraday shield will help eliminate capacity coupling, but it cannot be depended upon to do a job unless the pick-up coil is completely shielded from the entire r.f. unit. The coax link version of Faraday shielding also will be effective, when properly used. "Proper use," however, is the big thing. The shielded link doesn't prevent capacity coupling; it simply transfers it to the outside of the shield, as shown at C in Fig. 1. Working such a link into a two-wire line, as indicated in the drawing, doesn't accomplish a bit more than grounding one side of an unshielded pick-up coil. In either case one of the principal objects of the ground connection is to detune the transmission-line and antenna circuit from being resonant at a harmonic frequency. Depending on the length of the complete circuit, the ground may be either helpful or the reverse.

A different attack, used in the "Harmoniker," is shown in Fig. 1D. Referring for the moment to Fig. 1A, the voltages that act through the stray capacitance are those existing between the various parts of the tank coil and ground — that is, the transmitter chassis. Hence, if both sides of the transmission line can be short-circuited to ground (chassis) for the harmonics practically all the harmonic current will flow harmlessly to the chassis and none will go out on the line wires. In Fig. 1D the filter condensers have been divided into two units, giving a center-tap that can be connected to the chassis close to the ground on the plate tank circuit. To avoid coupling to the line through voltage drops along the ground connection, the condensers on the far side of the filter should not be connected directly to the chassis. Instead, all the grounding should be done as shown in the diagram. To be completely effective, this system requires (1) that the filter be shielded from the transmitter, (2) that the leads from the pick-up coil to the filter be short and preferably entirely inside a shield that encloses the transmitter, and (3) that no part of the

line after the filter be exposed to harmonic pick-up from the transmitter — which, in turn, means that the transmitter should be shielded.

Even so, the use of filters in a balanced line is a fairly difficult proposition, particularly when a high degree of harmonic suppression is required. A coax line is safer, for the reason that parallel-type r.f. currents cannot flow inside a coax line. The chief problem with coax is to keep the r.f. off the *outside* of the line. This can be done by quite straightforward methods.

Using Coax

The right way to do it is best appreciated when we see what happens as a result of doing it the wrong way. Fig. 2A shows a common type of construction for feeding coax, although perhaps varied sometimes by mounting the receptacle at the link terminals rather than using the chassis. In either case there will be harmonic currents on the link and on the chassis itself, and some of the current will flow on to the outside of the coax and thence up to the antenna. A Faraday screen or a coax link won't make any particular difference here. A low-pass filter won't do the job it is capable of, either, because it can stop only the harmonic current *inside* the line. However, if the same amplifier is fitted with a top shield and a bottom plate, the current stays inside the shield and outside of the coax line is clean. Any harmonics that try to reach the antenna have to go *through* the coax line, where a filter can see to it that their ambitions are thwarted.

Incidentally, one way to frustrate any shielding you may go to the trouble of putting in is to use the kind of construction shown in Fig. 2C. Here the coax is brought through a hole in the shield to the point where it connects to the link. Whether or not the coax is grounded to the chassis inside, the harmonics can easily get on the outside of the cable and follow it on out just as though the shielding were not there. A conductor leaving an otherwise solid metal shield through one small hole will do a thousand times as much damage as hundreds of small holes punched in the shield for ventilation. R.f. hasn't much incentive to go through a plain hole that is very small compared with the wavelength, but give it two conductors, the shield and the wire going through, and it will be outside the shield in a jiffy.

Once you have things under control, as in Fig. 2B, there is no great necessity for Faraday screens or coax links. It becomes possible to build a filter that will handle practically any harmonics that will be fed to it through ordinary circuits.

Antenna Couplers

However, not all amateur stations use coax-fed antenna systems. Those who don't are not prevented from enjoying the benefits of coax line. The coax can simply be installed between the final amplifier and an antenna coupler. Apparently there are some to whom the idea of using an antenna coupler is anathema; oddly enough the group seems to be largely composed of those who operate only on one band, whereas one might suppose that the chief objection to the coupler is the additional nuisance in changing bands. Be that as it may, a properly-adjusted antenna coupler does not make frequency-changing within a band

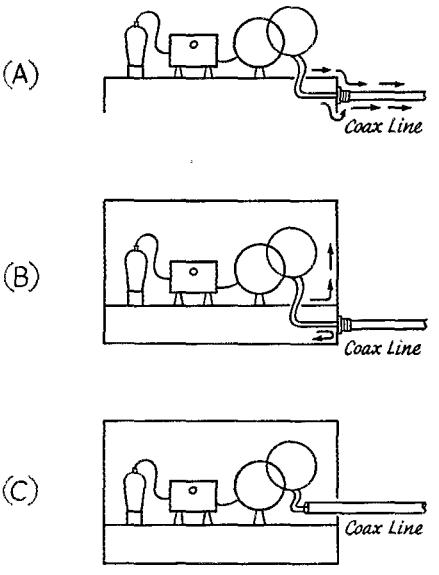


Fig. 2 — Right and wrong ways of connecting coax to an r.f. amplifier.

any more critical than the antenna system itself does, and the coupler is the only salvation of the chap who makes one antenna serve on several bands. This is true both of getting power into the antenna and of preventing harmonics from reaching it.

In most cases, the antenna coupler will be used with antenna systems having open-wire transmission lines. (There is no great point in using one with a coax-fed system, since such antennas are almost always one-band affairs and are adjusted for a low s.w.r. on the line, hence they are already in good condition for inserting a low-pass filter for harmonic suppression.) The coax link is no different from the coax line discussed above, so everything that has been said still applies. Fig. 3 illustrates the type of construction that should be adopted for installing the filter. Complete shielding is a necessity right up to the filter output terminals, but after that it does not matter much. Obviously, if there is no harmonic reaching the antenna coupler there is no necessity for shielding the coupler to prevent radiation. The coax line should be continued from the filter to the coupler, of course, so the proper impedance will be connected to the filter output terminals.

When a coax line is used between the transmitter and antenna coupler it is undesirable, and sometimes unsafe, to disregard impedance matching in the way it is disregarded in most link circuits. If the standing-wave ratio in the coax is appreciable the cable may develop hot spots. Besides wasting power the heat developed may be enough to soften the dielectric, and if the cable is under mechanical strain at that point a short-

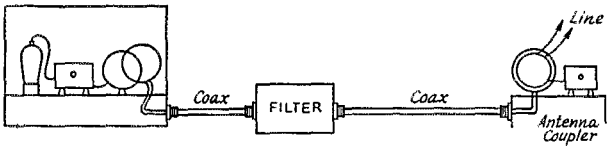


Fig. 3 — The way to connect a low-pass filter between a shielded transmitter and an antenna coupler. If you use a coax line to the antenna the antenna coupler should not be necessary, but the rest of the construction should be as indicated.

circuit between the inner and outer conductors may result. When a low-pass filter is to be connected in the link there is an additional reason for operating the link at a low s.w.r. — to prevent high voltages or high currents from overloading the filter components. From an operating standpoint, a low s.w.r. in the link means that the coupler tuning becomes less critical. In fact, there is every reason to treat the coax line, even though it may be only a couple of feet long, with as much care as though it had to run all the way from the transmitter to the antenna.

Unfortunately, we know of no good cut-and-try procedure for minimizing the s.w.r. in a coax line. In the case of the ordinary parallel-circuit type of coupler shown in Fig. 4A, there are at least two variables, the circuit tuning and the position of the line taps on L, and sometimes a third, the coupling between the link coil and L. Adjustable coupling between the two coils is not necessary for an impedance match; in fact, fixed coupling, rather tight, is to be preferred. Tight coupling makes it possible to operate the circuit at relatively low Q, which is desirable for noncritical tuning. Although tight coupling is not an ideal condition for harmonic reduction, we are not considering the coupler particularly for this purpose now, since we're going to depend on the low-pass filter to prevent harmonics from reaching it. Its more important function is to transform the input impedance of the line to a pure resistance equal to the characteristic impedance of the line.

It is often possible, by cut-and-try, to find a number of combinations of tap positions and tuning adjustments that will load the final amplifier. Generally, none of them will give a low s.w.r. on the line. On the other hand, it is equally possible that no combination of taps and tuning will load the amplifier. There are several reasons for both cases, but they do not need detailed discussion because the best way to find the answer is the same in all — use an s.w.r. indicator. The construction of a resistance-type bridge for coax line is very simple.[6] As nearly everyone has a 1-ma. meter these days, the cost of such a bridge is negligible. The meter does not have to be mounted in the bridge itself, if it is customarily used for something else. Neither does the bridge have to have a calibration, since the object here is not to measure the s.w.r. but simply to get as accurate a balance as possible. In a few minutes the bridge will tell you more about your antenna coupler than days of experimentation ever could.

Matching the Coax Line

The set-up for using an s.w.r. bridge is shown in Fig. 4B. With the output terminals of the bridge short-circuited, feed in just enough r.f. to give a full-scale reading on the indicator. Then open the short, connect the line taps at a trial position, and adjust C to give the lowest possible reading. The reading probably will not drop to zero at this first trial, so move the taps a turn and adjust C again. If the reading is now closer to zero, move the taps again (in the same direction) and adjust C once more; on the other hand, if the reading increases move the taps in the opposite direction. Provided the line is not highly reactive, a few trials should bring the reading down to zero. If you have previously used that antenna coupler, you may be very much surprised at the tap positions and the setting of C as compared with what you had found by cut-and-try. And if your bridge is calibrated, you may also be very much surprised at the s.w.r. at your cut-and-try settings.

[6] Pattison, Morris and Smith, "A Standing-Wave Meter for Coaxial Lines," *QST*, July, 1947; also *The Radio Amateur's Handbook*, measurements chapter.

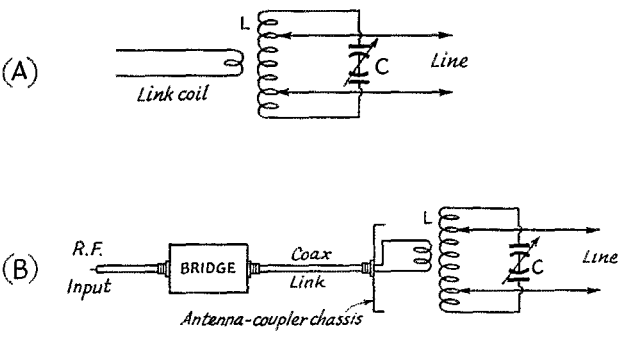


Fig. 4 — Universal antenna coupler and method of using an s.w.r. bridge for adjustment.

If it is impossible to get a complete null, the chances are that the input impedance of the line is highly reactive and some external compensation is required. This can be checked by using a dummy antenna instead of the actual line. Since the bridge operates at a very low power level a 1-watt carbon resistor having a resistance of a few hundred ohms can be used as a dummy. Follow the procedure described above to find the null point, and note the setting of C at which it occurs. If the setting differs very much from that at which the minimum s.w.r. was obtained with the line connected, some compensation is required.[7] In the rather unlikely event that a null cannot be obtained with the dummy antenna, the link coil is too small or it is not coupled tightly enough to L. In connection with using a dummy antenna, it should be noted that although the setting of C should be approximately the same with either the dummy or the actual line, the positions of the line taps may not correspond. The tap positions will be the same only when the input impedance of the line is purely resistive and of the same value as the resistance of the dummy antenna.

This check should be carried out (with the actual line) on each band on which the coupler is to be used and the various settings recorded. It is also a good idea to observe how the s.w.r. varies throughout each band, with a fixed setting of C, and note the proper settings if readjustment seems required for various parts of the band.[8] If the antenna system has a broad impedance characteristic and a low line s.w.r. a considerable frequency range can be covered without readjustment. With a 7-Mc. folded dipole, for example, when C is set for minimum s.w.r. at the center of the band the increase in s.w.r. at either edge of the band will be negligible. Hence one setting suffices for operation anywhere between 7000 and 7300 kc. The range will be in proportion on other bands.

The L/C ratio in the coupler can be of the same order as that used in the final tank. It is not especially critical, but loose coupling between the link coil and L will make it necessary to have a rather high circuit Q in order to get an impedance match. This increases the losses in the coupler tank and makes the tuning more critical, neither of which is desirable. The point is best checked with a dummy antenna as described above. It should be possible to work over a frequency range of at least $\pm 5\%$ without readjustment. If not, increase the number of turns in the link coil and/or tighten the coupling. Decreasing the number of turns in L will have the same effect as increasing the number of turns in the link coil, providing C has enough capacitance to permit tuning to resonance. Roughly, the link coil should have about 10% of the turns used in L.

Although only one type of antenna-coupler circuit has been discussed, the remarks apply in principle to any link-coupled circuit that may be used. In series-tuned arrangements, it may be necessary to adjust both the inductance and capacitance to obtain the optimum operation condition — that is, heavy-enough loading so that the same settings will hold over a considerable frequency range.

Coupling to the Transmitter

Speaking of surprises, there may be another one, not quite so pleasant, in store when you try to couple power from your final tank to the now-flat coax line. Furthermore, changing the length of the coax link won't help, because when a line is flat for one length it's also flat for all lengths. Your problem is that of transferring power from the final tank to a purely resistive load of 50 or 75 ohms, whichever your link line may be. It has been discussed before,[9] but too frequently ignored by those who need it most. We do not propose to go into it thoroughly here, but if you can't load the final amplifier to its normal input the circuit in Fig. 5 will help.

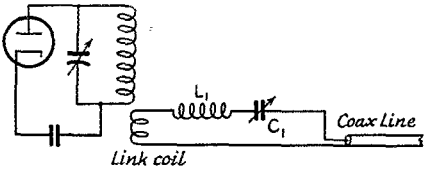


Fig. 5 — Coupling circuit for working into a matched line.

The object here is to tune the entire circuit formed by the link coil, L_1 and C_1 to resonance at the operating frequency. This is a series circuit with the line simply representing a pure resistance. If the final tank and link coils are closely coupled the Q of the circuit does not have to be very high to get sufficient coupling; in fact, the lowest possible Q is preferable because it means that the coupling circuit will tune broadly and thus not require readjustment when changing frequency within a band. L_1 probably will not be needed with the average link coil at 14 Mc. and

[7] Technical Topics, "Impedance Matching with an Antenna Tuner," *QST*, October, 1946; *The A.R.R.L. Antenna Book*, Chapter 3; *The Radio Amateur's Handbook*, antenna chapter.

[8] Subsequent experience has shown that this method of determining the proper operating settings is preferable to judging by the load on the final amplifier, the method outlined in August, 1949, *QST*, page 32. Under some conditions the same loading may be achieved by a number of tap positions and condenser settings, many of which will result in a fairly high s.w.r.

In connection with resonating the link at the antenna coupler, also suggested in August *QST*, the commercially-built fixed-link coils we have used so far have always permitted an impedance match without the necessity for a series condenser, although in some cases only at the expense of using a higher Q in the coupler tank circuit than is desirable for noncritical tuning.

[9] Goodman, "Coupling to Flat Lines," *QST*, August, 1947; *A.R.R.L. Antenna Book*, Chapter 3.

higher frequencies, but 7- and 3.5-Mc. links are comparatively small, in the average case, and the circuit will have to have some additional inductance.

Experiment shows that, assuming a Q of about 12 for the final tank circuit, the Q of the coupling circuit of Fig. 5 should range between about 1 and 3. This assumes that the coupling between the tank and link is of the same order as in the ordinary fixed-link coils commercially available, or a swinging-link coil with the link set for maximum coupling. For a Q of 2, the approximate capacitance required at C_1 on the various bands is as follows:

Freq.	*50-Ohm Line*	*75-Ohm Line*
3.5 Mc.	450 μμfd.	300 μμfd.
7 "	230 μμfd.	150 μμfd.
14 "	115 μμfd.	75 μμfd.
28 "	60 μμfd.	40 μμfd.

The inductance of L_1 should be adjusted so that the entire circuit resonates in the band. If more condenser is used the Q decreases, and vice versa. With a swinging-link assembly it may be advantageous to use a somewhat higher Q, in order to reduce the size of condenser required at the lower frequencies.

Adjustment is easy with a swinging link. Start with the link loosely coupled, and adjust C_1 to resonance as indicated by maximum amplifier plate current. Then increase the coupling until the amplifier is fully loaded. Some readjustment of the amplifier plate tuning may be required to maintain resonance, but the readjustment will be small if the coupling is maintained at the minimum that permits the desired loading. If it turns out that the optimum coupling is loose, the circuit selectivity may be high enough to require retuning C_1 when the frequency is moved to a different part of the band. The remedy for this is to lower the Q by increasing the capacitance of C_1 and reducing the inductance in the circuit correspondingly. If the loading is not sufficient with the tightest possible coupling between the two coils the capacitance should be reduced and the inductance increased.

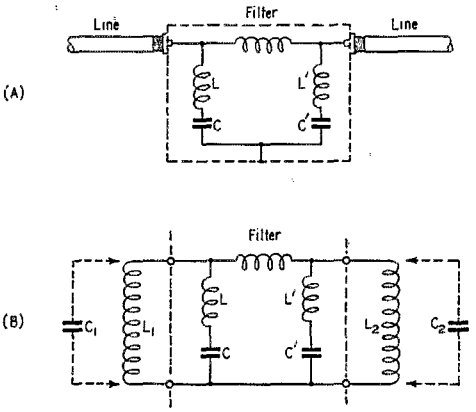


Fig. 6 — How resonances can occur as a result of filter and line characteristics.

With a fixed link the object should be to arrive at the L/C ratio that just loads the amplifier fully when the coupling circuit is tuned to resonance. If the link coupling is tight, the Q will turn out to be low enough to permit operating over an entire band, possibly excepting 3.5 Mc., with a single median setting of C_1. When the system is properly set up C_1 can be used as a loading control, since detuning the coupling circuit will reduce the loading. Of course, when changing frequency within a band it is always necessary to readjust the final amplifier tank circuit, even though the coupling circuit may not require readjustment.

C_1 does not have to have a very high voltage rating. With a Q of 2 and a 75-ohm line, a 100%-modulated kilowatt transmitter will put only about 1000 volts across the condenser. The voltage is somewhat less with the same power in a 50-ohm line. Two hundred watts of c.w. requires a condenser rating of only 250 volts.

Although this entire procedure of matching the line and coupling power into it may seem to represent a lot of trouble as compared with simply hooking a link to an antenna coupler, the fact is that when the job is done right it does not make your on-the-air operations a bit more complicated and usually results in a *decrease* in the amount of adjustment that is needed when changing frequency. In many cases it also results in an actual increase in the power put into the antenna, because losses in an unmatched link can be appreciable.

The Filter and the Line

If the principles outlined so far are followed the filter is in an excellent position to catch all the harmonics that can start out for the antenna. How well it suppresses them will depend to some extent on one last consideration. Even though the filter may be constructed well enough to give the performance that theory predicts for the particular circuit used, its performance under actual operating conditions may turn out to be either worse or better than would be expected. This is because its operation is not independent of what is connected to either its input or output terminals.

This subject also has had some previous mention.[3] The filter circuit shown in Fig. 6A, used here simply for purposes of discussion, is representative of the input and output arrangements of several filters being sold commercially. The circuit formed by LC in series is resonant at some frequency in the filter's stop band, usually in a television channel. The circuit therefore acts as a short circuit across the line at that frequency.

$L'C'$ is similarly resonant, either at the same or another selected frequency. Looking into the input terminals of the filter, the series circuit formed by LC will show capacitive reactance — that is, it will look like a condenser — at frequencies below the resonant frequency, and it will look like an inductance at frequencies higher than the resonant frequency. The values of equivalent capacitance and inductance change with frequency. The same thing is true looking into the output terminals, where $L'C'$ behaves similarly.

In general, the input impedance of the line will be a pure resistance only at the frequency for which the line is matched — that is, at the fundamental operating frequency. In the harmonic range the input impedance of the line will almost certainly be practically pure reactance, so that what the filter itself sees at both its input and output terminals is the equivalent of either a coil or condenser, as indicated in Fig. 6B. Again the values of the equivalent inductance and capacitance change with frequency.

Obviously these combinations will be bound to become resonant at some frequency, and in fact will go through a series of resonances as the effective values of inductance and capacitance change with frequency. If one of these unwanted resonances falls on a harmonic of your transmitter, a great deal more harmonic current will flow into and out of the filter than would normally be the case, so the harmonic attenuation appears to be comparatively poor. With a given filter design the undesired resonances are determined by the lengths of the lines going into and out of the filter, together with the particular conditions existing at the other ends of those lines.

To avoid difficulties of this nature it is a good idea to track down the resonances with a grid-dip meter. In the case of the line running from the transmitter to the filter, the check can be made either at the link coil or at the shunt coil L. The check can be made at L' for the output circuit. If such checks show resonance near a harmonic frequency, the length of the line in question should be changed to move the resonance point somewhere else. Since the input reactance of a line changes more rapidly with frequency when the line is long, it is a good plan to keep the lines, and especially the one that joins the transmitter and the filter, as short as possible.

For simplicity the explanation above did not take into account the effect of the other filter elements on the resonance frequency. These are inevitably part of the circuit, and must be included if an attempt is made to calculate the frequency at which an undesired resonance will occur. However, the grid-dip meter will show the conditions as they actually exist.

Although the m-derived end sections indicated in Fig. 6 are becoming common in TVI filters, there are some configurations simply employing shunt condensers across the line. Resonances can readily occur in these cases, too. Whatever the type of filter, the unwanted resonances represent a unique, not a general, condition, so the chances are on your side that there will be no trouble even if no attention is paid to resonance effects when the filter is installed. But if the filter doesn't seem to work as well as expected despite its being installed according to the principles outlined earlier, dig out the grid-dip meter and do some checking. The answer may be as simple as cutting off a few inches of line.

[NOTE: *The second part of this article, to appear in a subsequent issue, will discuss operating characteristics of filters and practical design considerations.*]

February, 1925

. . . u1KC has worked GHH1, Mesopotamia, and u1KC, u2BGG and u8ADG have QSOd fAIN, Morocco, to add Asia and Africa to the roster of continents actively engaged in international two-way communication.

. . . Haverford (Penna.) College and Oxford University have played the first international chess match via amateur radio. u3OT and g2NM handled communications, which were solid over five and one half hours.

. . . Our new short-wave amateur bands are pointing the way to daytime DX! u1ANA has copied f8AB on 37 meters at 1 P.M. EST; u1XAM and u9EK have been heard by u6AJF at 1:25 P.M. PST while in QSO on 20 meters.

. . . ARRL President Maxim has received a call from the Navy Department for assistance in building a Reserve force of 6000 skilled operators.

. . . Far cry from 200-meter days! — g2VW's experimental 3- to 5-meter tuner features a *one-turn* coil and a *two-plate* condenser.

. . . The theory of one of the newly-developed McCaa anti-static devices is treated in a leading technical article.

. . . A variable tickler coil and audio-stage switching are features of the low-wave tuner of Charles E. Blalack, u6GG.

. . . A method of supporting coils on celluloid strips, developed by Prof. J. C. Sanderson of the University of Minnesota, is described by Don C. Wallace, u9ZT.

. . . The r.f. properties of common insulating materials are authoritatively considered in a paper by experts of the Bureau of Standards.

. . . The radiophone stations of Drs. William H. Johnston, u8BEI, and Don H. Johnston, u8DGS, father and son respectively, are presented in the station descriptions section. Noted foreign stations pictured are Charles D. Macluran's a2CM, Sydney, Australia, Eugene L. Falkenburg's chFAL, Santiago, Chile, and Santangeli Mario's i1ER, Milan, Italy.

. . . ARRL Canadian division managers have met at Winnipeg to discuss items of interest to Dominion amateurs. In attendance were J. V. Argyle, Quebec Div., W. C. Borrett, Maritime Div., A. H. K. Russell, Canadian General Manager, A. J. Ober, Vancouver Div., C. H. Langford, Ontario Div., J. E. Brickett, Winnipeg Div., and A. H. Hebert, ARRL Hq. field man.

. . . Dime-store aluminum pie plates have the makings of excellent low-cost electrolytic filter condensers, this issue reports.

Happenings of the Month

RULES CHANGES

FCC has recently made two minor changes in the amateur rules. In one matter, there appeared to be some misunderstanding as to what constitutes a two-letter call for the purpose of claiming the right to one as a previous holder; some of the boys in U. S. possessions felt they, as "two-letter" call holders, were entitled to such calls when they came to the States. FCC says definitely no, by amending the language of § 12.81(a)(5), effective January 14th, to read as follows:

5) An unassigned "two letter call sign" (a call sign having two letters following the numeral) may be assigned to a previous holder of a two-letter call sign the prefix of which consisted of not more than a single letter.

The second item relates to renewal of licenses. FCC has found numerous instances of amateurs having let their licenses expire, through oversight, and then not discovering their error until a few days or a month too late. In such instances it was necessary, under the rules, for the amateurs to appear again for an examination, resulting only in additional paper work by the Commission and expenditure of time and travel. So FCC has set up a plan to provide a year of grace after expiration, during which time the license would not be valid but would be renewable upon application without examination. However, this provision, an amendment to § 12.27 and § 12.67, becomes effective only with licenses which expire on or after January 1, 1951 (the approximate date of expiration of the first postwar five-year licenses).

NATIONAL GUARD STATIONS OUSTED

In recent weeks the Hq. has received reports from amateurs in several parts of the country that National Guard stations have been making occasional use of 3885 kc., a channel included in one of the war-surplus walkie-talkie units stocked by the Guard. Protesting this operation to the military in Washington through FCC, the League is informed that orders have been issued to units at the points specified to cease such activity, and we are invited to report immediately any further such improper operation so that it, too, may be closed down.

R.M.A. WITHDRAWS FILM

Recently the Radio Manufacturers Association issued a series of film shorts entitled "TV Tips" for use on television stations; the objective was to explain briefly to the public some of the aspects of interference of various types and to suggest appropriate procedure the receiver owner might follow if experiencing interference. One of the shorts dealt with amateur radio. Amateurs who first saw it on television late last year thought the film was unjust, and asked Hq. to investigate. After review, the League protested the showing of this film because of the inference, however unintentional on the part of RMA, that the solution to the TVI problem is to have the amateur stay off the air during his neighbor's favorite television programs. Having already expressed a willingness to adjust this matter to amateur satisfaction, RMA thereupon withdrew the film from circulation.

STAFF NOTES

We regret to announce the resignation from the Hq. staff of LeRoy T. Waggoner, W1PEK, an assistant secretary of the League since 1945. The lone Secretarial Department member during the early hectic days of amateur reactivation immediately upon the cessation of war, in his spare time Roy also held down the post of acting communications manager until W1BDI's return. An able and prolific correspondent, he won many friends; these, plus the many other amateurs he met in person on club contact trips, will certainly join the Hq. gang in wishing him continued success in his new endeavor — a florist business in Indianapolis. He'll be signing W9YMV again soon.

Honestly, there's nothing in the By-Laws requiring the Central Division to furnish assistant secretary material, but by coincidence it's happened again: Harry Paston, W9DJV, is joining the staff as assistant secretary. Well known to DXers as W2OAA/J8 in Korea, Harry returned from the wars to finish college, acquire a wife and youngster and a supervisory post in the Milwaukee office of the Department of Commerce. His amateur interest has long been of organizational flavor: in coming east he leaves Trunk Line L shy one member, the Milwaukee Radio Amateurs' Club bulletin short one editor, the Wisconsin traffic net minus one NCS, the Wisconsin section with one less active participant in SS, CD and numerous other operating activities, and the proposed Badger State Council of Radio Clubs has lost a principal spark plug. Transferring this zealous interest now to West Hartford, he'll be signing Hq. letters and getting around to visiting you at your club soon.

A 2-Meter Station for the Novice

Part I — The Receiver

BY EDWARD P. TILTON,* W1HDQ

• Though most newcomers to amateur radio start in on lower frequencies, there is much in v.h.f. operation to interest the beginner. For him, and for all amateurs who want to get going on 144 Mc. with a minimum of trouble and expense, here is a complete station of simple straightforward design. Each unit is complete in itself, laid out in such a way as to permit its use in a more advanced set-up at a later date without appreciable obsolescence.

OPERATION on the v.h.f. bands has always had a special appeal for the experimentally-inclined amateur, whether he is a newcomer to the game or an old-timer with years of experience on lower bands. Up to the last few years this appeal has been based at least partly on the simplicity of the equipment used in v.h.f. work, but increased occupancy and resulting advanced techniques have tended to lift v.h.f. gear out of the ultrasimple category.

At the same time, however, better utilization of our v.h.f. assignments has opened up new opportunities for interesting work in this field. Once thought of as useful only for communication over purely line-of-sight paths, the 144-Mc. band has been the scene of constantly-expanding horizons. Today many of our better-equipped stations work consistently over distances of 100 miles or more, with contacts up to several times that distance being made when conditions are good. It is probable that we have done little more than scratch the surface of the opportunities open to the enterprising v.h.f. amateur, and the fellow who takes his 2-meter work seriously has a good chance to make real contributions to the record of amateur radio in developing new territory.

We have a way of thinking that things that are new are necessarily difficult. To combat the idea that getting started on 144 Mc. is complicated or expensive a complete 2-meter station, beginner style, is presented herewith. It is not the simplest or least expensive 2-meter gear that could be built; rather it was laid out with the idea of meeting the following objectives:

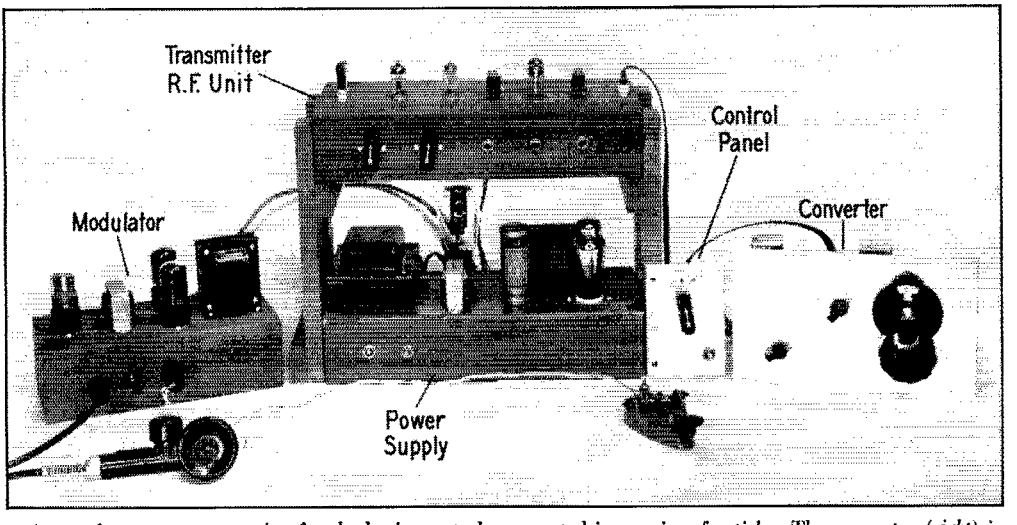
1) Practical straightforward design, without trick circuits or difficult adjustments.

2) Lasting usefulness, through adaptability to higher power or improved performance as the beginner's interest and skill develop.

3) Sufficiently good performance to permit the user to do interesting work on 144 Mc.

Low cost and a minimum of components were

* V.H.F. Editor, *QST*.



A complete two-meter station for the beginner, to be presented in a series of articles. The converter (*right*) is described herewith.

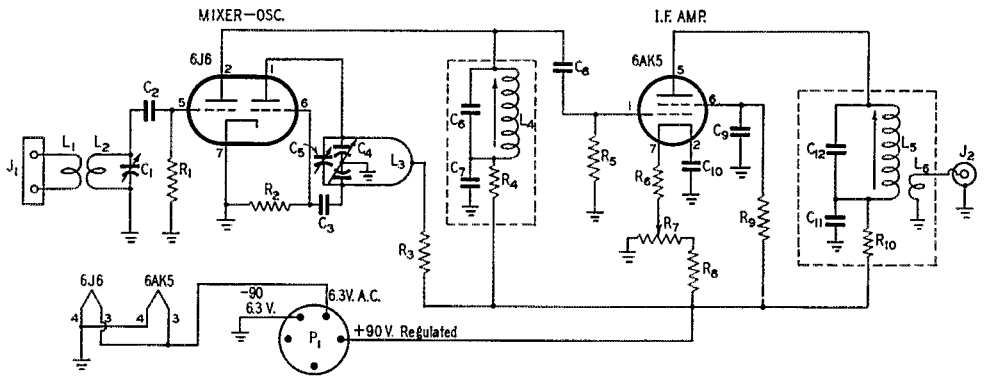
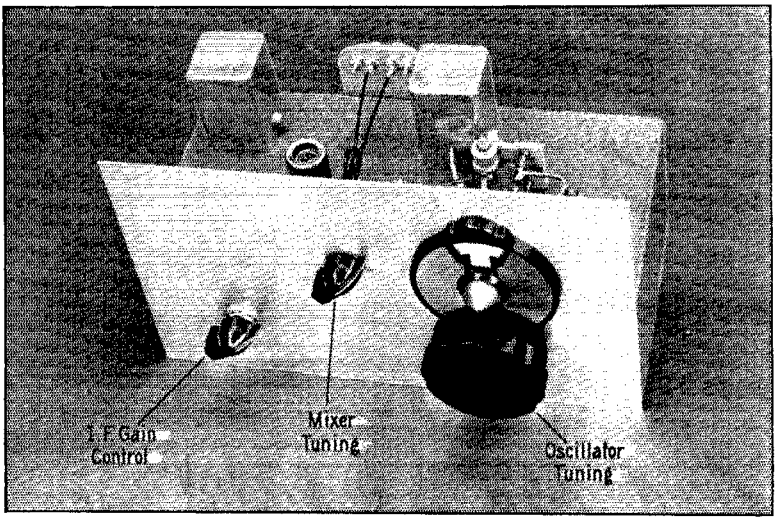


Fig. 1 — Wiring diagram of the simple 2-meter converter.

C_1 — 15-$\mu\mu$fd. midget variable (Millen 20015).
C_2 — 100-$\mu\mu$fd. mica or ceramic.
C_3, C_8 — 50-$\mu\mu$fd. mica or ceramic.
C_4 — Special split-stator variable, 7 plates per section, made from Millen 21935 — see text.
C_5 — 30-$\mu\mu$fd. air-dielectric padder (Silver 619). Alternative: Ceramic trimmer of similar capacitance, such as Centralab 820-C.
C_6, C_{12} — 33-$\mu\mu$fd. mica or ceramic. This value is for a 10.7-Mc. i.f. If 7.4 Mc. is used, increase to 50 $\mu\mu$fd.
C_7, C_9, C_{10}, C_{11} — 0.005-μfd. disc-type ceramic (Sprague 29C-4).
R_1, R_5 — 1 megohm, ½ watt.
R_2 — 10,000 ohms, 1 watt.
R_3 — 10,000 ohms, 1 watt.
R_4, R_9, R_{10} — 1000 ohms, ½ watt.
R_6 — 220 ohms, ½ watt.
R_7 — 2000-ohm wire-wound potentiometer.
R_8 — 22,000 ohms, 1 watt.
L_1 — 2 turns No. 14 enamel, 9/16-inch diameter, close-wound, with 2⅜-inch leads. Insert between turns of L_2.
L_2 — Same as L_1, but turns spaced ¼ inch. Mount directly on C_1, with shortest possible leads.
L_3 — Loop No. 12 tinned wire, 1 inch long and ½ inch wide. Solder directly to stator bars — see photo.
L_4, L_5 — 7.4 Mc.: 22 turns No. 22 d.s.c., close-wound on National XR-50 slug-tuned form. 10.7 Mc.: 20 turns.
L_6 — 3 turns No. 22 d.s.c., close-wound at cold end of L_5.
J_1 — Antenna terminal (Millen 33102 crystal socket).
J_2 — I.f. output terminal (Jones J-201). Coaxial fitting for the cable, not shown, is Jones P-201.
P_1 — 5-prong plug (Amphenol 86-CP5). Matching cable fitting is Amphenol 86-PM5.

kept in mind, but they were secondary to the above considerations. The station is composed of four main pieces of equipment, as may be seen in the composite photograph. There is a transmitter r.f. section, shown in the upper deck of the rack; a modulator unit, including provision for keyed tone, seen at the left; a converter, to provide 144-Mc. coverage when used with any receiver that tunes to 7.4 or 10.7 Mc., at the right; and a power supply capable of handling the transmitting and receiving units. This is in the lower portion of the rack.



Front view of the 2-meter converter. The oscillator tuning (vernier dial) is the only adjustment used in normal operation. The shields at the back of the chassis house the mixer and i.f. amplifier plate-coil assemblies.

The Converter

Though it is, of course, possible to receive 2-meter signals with a one- or two-tube superregenerative receiver, the converter described herewith may be built with little more effort. Even when it is used with an inexpensive all-wave receiver the performance will be much better than is possible with the superregen.

Only two tubes are used — a 6J6 dual-triode mixer-oscillator, followed by a 6AK5 amplifier stage. The first half of the 6J6 is the mixer, its grid circuit being tuned to the signal frequency by L_2 and C_1, and its plate circuit to the intermediate frequency by L_4 and C_6. The oscillator is tuned by means of C_4, C_5 and L_3, in the plate circuit of the second half of the 6J6. The vernier dial, attached to C_4, is the only control used in the course of normal operation of the converter.

The 6AK5 amplifier stage adds somewhat to the complexity of the converter, but it makes such an improvement in its performance that it was deemed well worth the added work and cost. This is particularly true if the receiver with which the converter is to be used is one of the lower-priced models having somewhat low sensitivity. If one is fortunate enough to have a high-grade communications receiver the i.f. stage may be omitted from the converter with only a slight loss in effectiveness, but even with such receivers the gain-control feature inherent in the amplifier stage is very useful.

Mechanical Details

A good rule to follow in laying out any kind of radio gear is to start with a somewhat larger chassis and panel than you think you'll need. With plenty of room to work in a neater job can be done, and the equipment will be easy to service, should trouble develop later on. This principle was followed throughout the design of this 2-meter station. It could have been built in a fraction of the space, but the open construction used results in a clean uncluttered look and makes the details easier to follow. Closely-packed designs are required in some instances, but they are an invitation to trouble, especially for the beginner.

All parts are standard components, readily obtainable in most localities, and detailed layout drawings are provided so that the constructor may make an exact duplicate if he so desires. In some instances, however, the dimensions are not particularly critical, and other parts of similar characteristics may be substituted, even though some variation in layout may be required. Points where dimensions are important will be emphasized in the text. The layout drawings, Fig. 2, show the positions of the holes in the front panel, the top of the chassis, and the rear of the chassis, in the order that they would be seen in picking up the unit and rotating it about its long axis.

Looking at the front-view photograph, we see the vernier dial (National BM) at the right. Notice that a large knob (National HRK) has been substituted for the small one normally supplied with the dial. This helps to smooth out the tuning, a feature that will be appreciated when the receiver is used for extended operating periods. Also mounted on the front panel are the mixer tuning condenser, C_1, and the potentiometer, R_7. These are normally adjusted to the proper setting when the converter is placed in service and seldom used thereafter.

Looking at the rear of the unit, we see the 6J6 socket, mounted bottom up, so that the tube projects below the chassis. It is important that this part of the layout be followed closely, as the length of leads in the mixer and oscillator circuits are quite critical.

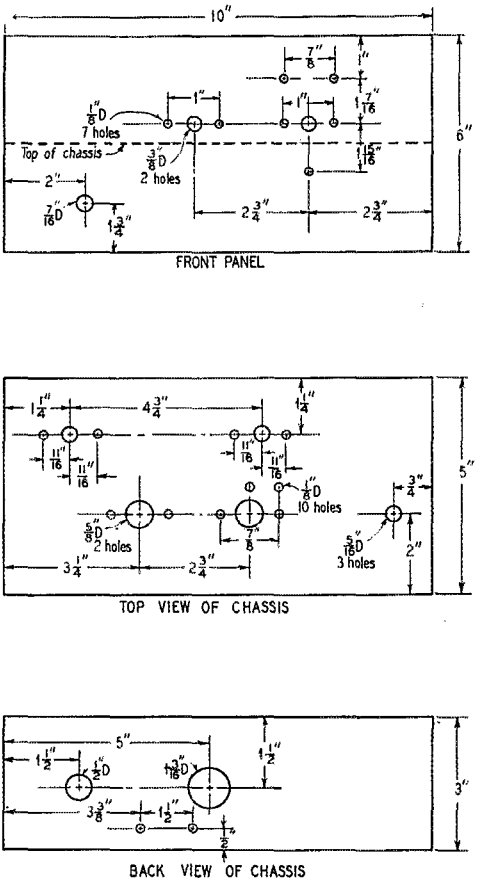


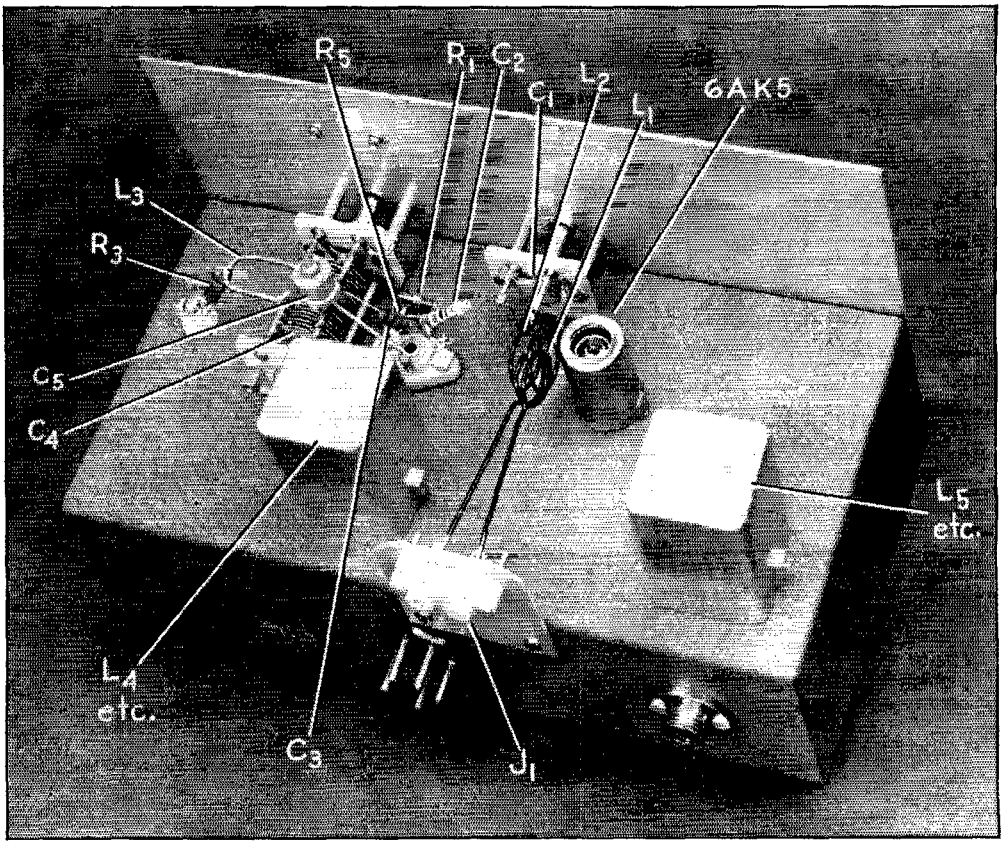
Fig. 2 — Layout drawing of the front panel and chassis used in the 2-meter converter. If the constructor has duplicates of the parts used in the original model these dimensions may be followed to produce an exact duplicate. Views show the panel and chassis as they appear when the unit is picked up and rotated about its long axis.

On the back wall of the chassis are the antenna terminals (a standard crystal socket), the power plug, and the coaxial fitting for the i.f. output. Note that removable plug fittings are used for the cabling between units. Some economy could be effected by wiring the units together, but the detachable fittings add greatly to the ease of setting up or dismantling the station. If the gear is to be used in various locations such as in Field Day operation, this feature will be very helpful.

The oscillator tuning condenser, C_4, requires some revision. It is made from a Millen 21935 double-spaced variable, originally a single-section type. The two bars on which the stationary plates are mounted are sawed through at points just inside the fifth stator plate from each end. The three rotor plates at the middle and one at each end of the rotor assembly are pulled out, and the end plate on each stator assembly is removed. This leaves a split-stator condenser having three rotor plates and four stator plates in each section. There are many small split-stator variables on the market, of course, but none of them does this job as well as this revised model.

The tank inductance, L_3, is soldered directly to the stator bars, as is the air-dielectric padder condenser, C_5. The use of a stable type of trimmer is important in the latter position. If the air padder used in the original model is not available, one of the ceramic-type variables should be substituted. Do not use a mica-dielectric padder. Both the panel-mounted variables are spaced away from the panel by mounting sleeves a half inch long. The holes in the panel should be large enough so that the rotor shafts do not touch the panel. The ground connection to the rotor is made by soldering a short piece of wire from the rotor spider to the mounting stud just below it. It is important that all parts of the oscillator circuit be completely rigid, as the smallest movement will cause a variation in oscillator frequency. Mechanical stability in the oscillator tank circuit is aided by making the dropping resistor, R_3, serve as support for the tank inductance. The power lead is brought through the chassis on a feed-through bushing to which the dropping resistor is attached.

The 6J6 socket is mounted with the heater



Rear view of the converter, showing the position of all the components above the chassis. The leads visible in this view are critical as to length, and the layout shown should be followed closely for best results.

terminals, Pins 3 and 4, toward the oscillator tuning condenser. Fixed condensers C_2 and C_3 and resistors R_1 and R_2 are wired into position with the shortest possible leads. The heater lead and the lead to C_8 are run through two holes drilled in the chassis adjacent to the socket terminals. The lead to the mixer plate coil, L_4, is run through a hole drilled in the side of the shield can.

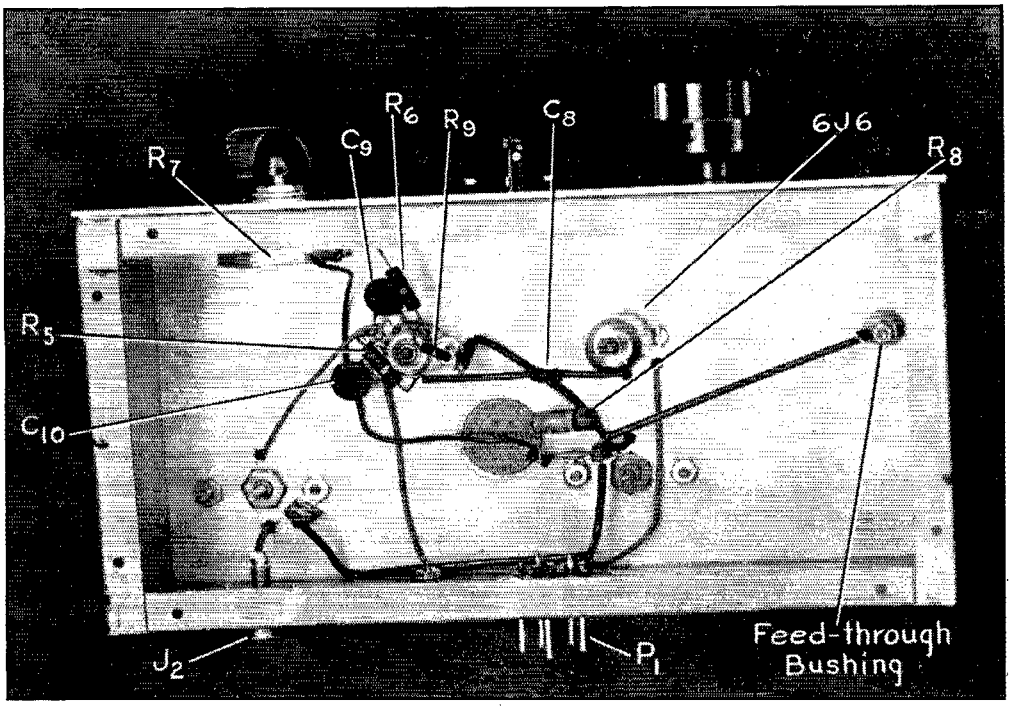
The coil shields are Millen 80003, originally four inches long, cut down to 2¼ inches. Shorter shields may be obtainable, eliminating the cutting operation. The spade lugs can be drilled out of the cut-off part and used for mounting the shields to the chassis. The plate coils, L_4 and L_5, have their core-adjusting screws projecting through the chassis. Leads to the windings are brought through chassis holes, except for the mixer plate lead, which is run through the side of the shield, as explained above. The forms have only two terminals and a ground lug, so the top end of L_6 must be held in place with a drop of household cement. The turns of L_6 may be wound over L_5 and the ends of the wire wrapped around the other terminals temporarily while the cement is drying.

Wiring may be done with insulated wire of the push-back variety, or bare wire of about size 20 may be used, slipping spaghetti over the wires for insulation where it is needed. Use of tie-points at junctions of several wires makes for neat and rugged assembly. Three of these were used in the converter: a two-terminal strip mounted on one of the screws of the first i.f. shield, as a junction for the plate-voltage leads; and two single-terminal plates, one on the 6J6 socket and the other on one of the mounting screws for the second i.f. shield.

Adjustment and Operation

Before any attempt is made to operate the converter it is advisable to check through the wiring carefully to see that no mistakes have been made and no connections omitted. Any power supply delivering 90 to 150 volts d.c. and 6.3 volts a.c. may be used for testing the converter. The power supply to be described in a subsequent issue includes provision for the converter, but the initial tests may be carried out with any supply capable of delivering the above voltages. Two 45-volt B batteries may even be used for plate supply.

Apply the heater voltage, 6.3 volts a.c., first, making sure that the tubes light up. The 6J6 will show its heater plainly when it warms up. The 6AK5 heater will not be so easily discernible, as it is almost completely shielded by the other elements of the tube. It will become noticeably warm to the touch, however, if the heater is drawing the proper current.



Bottom view, showing the components that are less critical as to placement and lead length.

Next we check the operation of the oscillator. A meter (anything from 0–25 to 0–100 ma. will do) will be handy, though not absolutely necessary here. Connect the meter between the bottom of R_3 and the B-plus source and note the current being drawn. If the tube is oscillating the current will probably be between 5 and 10 ma., and it will rise if the oscillator inductance, L_3, is touched with a pencil lead. To check the frequency of the oscillator you will need some sort of absorption-type wavemeter or other indicating device. A Millen 90609 or 91610 will be fine for this purpose, or you can make one of your own out of any small variable condenser and a few turns of wire. The frequency of any r.f. power source in the v.h.f. range can be measured by means of Lecher wires, the construction and use of which are explained in all recent editions of the *Radio Amateur's Handbook*. The beginner in the v.h.f. field will do well to familiarize himself with Lecher-wire technique, as he will find frequent use for it. Calibration of a homemade wavemeter is one example.

When used for checking frequency either Lecher wires or an absorption-type wavemeter will cause a rise in plate current when tuned to the oscillator frequency. If a power supply with a gaseous regulator tube is used the glow in the tube will be seen to change as the wavemeter is tuned across the oscillator frequency. This is one way of checking frequency if no plate meter is available. The wavemeter or Lecher-wire coupling should be as far away from the oscillator circuit as possible and still cause a visible indication, for greatest accuracy.

The oscillator is adjusted to the proper tuning range by means of the padder condenser, C_5. This will be lower than the signal frequency by the value used for an intermediate frequency. Use of 10.7 Mc. is suggested, as this is the RMA standard for converter service. Some communications receivers tune the amateur bands only, however, so provision is made in this converter design for using an i.f. at the high end of the 7-Mc. band, preferably about 7.4 Mc. Values of L_4, L_5, C_6 and C_{12} are given in the parts list for both frequencies. The range of C_5 is more than adequate to take care of either frequency. The complete tuning range of the oscillator should be about 6 megacycles, to allow some leeway at each end of the band. For a 10.7-Mc. i.f. this will mean that the oscillator should tune approximately 132.3 to 138.3 Mc. With a 7.4-Mc. i.f. the oscillator range should be about 135.6 to 141.6 Mc.

Now connect the coaxial cable from the converter output to the antenna terminals of the receiver with which the converter is to be used and set the receiver dial at the frequency to be used for the i.f. Turn the converter gain control toward maximum position. If everything is working correctly there should be some increase in receiver noise as the gain is advanced, even though the i.f. coils have not been peaked.

Setting these coils to the proper inductance is the next step. A signal generator is helpful for this but it is not necessary, as it may be done by merely turning the core screws to the point of maximum receiver noise. If this occurs with the core screw at the all-in or all-out position, the inductance of the coil is too low or too high, respectively. This may be corrected by increasing or decreasing the number of turns on the main winding, or by increasing or decreasing the value of the fixed condenser connected across it. The actual frequency used is not important, so it may be shifted one way or the other to compensate for variations in coil inductance or padder capacitance, if desired.

When the mixer and i.f. amplifier plate coils have been tuned to the proper frequency we are ready to receive signals, the only further adjustment being the peaking of the mixer grid-circuit trimmer, C_1. This is not critical, however, and a fairly strong signal will be heard regardless of where this control is set. Best results will be obtained if this is peaked for maximum response on a signal near the middle of the band, after which it will not usually be necessary to readjust it. The peaking should be done with the antenna with which the converter is to be used connected at the time, as changes in the antenna system may make it necessary to readjust the control slightly. Adjusting C_1 causes slight shifts in oscillator frequency, so C_4 should be swung back and forth across the signal as C_1 is peaked. This two-handed adjustment, familiar to all radio servicemen, may require a little practice at first.

That's about all there is to it, and you are ready to listen in earnest. If your locality is one where there is extensive 2-meter activity, you will probably hear something doing on the 2-meter band almost any evening, even with the simplest sort of antenna. In rural districts, or in locations surrounded by high hills, you may find that no signals are audible under ordinary conditions. A high-gain beam antenna and considerable patience may be required in such instances, but experience has shown that 2-meter operation is possible in many locations that appear hopeless at first. The members of your local radio club will probably know who is active on 144 Mc. locally, and the v.h.f. section of *QST* carries extensive reports of 2-meter doings in many parts of the country. Generally speaking there is more 2-meter activity and better DX during the spring, summer, and fall than there is in the coldest months, but considerable operation goes on in many areas on a year-'round basis. In an average location it should be possible to hear stations up to about 50 miles, regardless of weather conditions, and signals out to several hundred miles may be heard when conditions are right.

(Continued on page 88)

Hints and Kinks For the Experimenter

COMBINED OUTPUT CONTROL AND SCREEN-PROTECTIVE CIRCUIT

BY NOW the use of a 6Y6G or a 6V6 as a screen-protecting device in tetrode stages is well known. The circuit shown in Fig. 1 makes use of this device plus the added feature of output control. It will be found most useful in cases where a tetrode, such as an 807, is used in the driver stage for a final amplifier that requires carefully-adjusted grid drive.

In operation, the 6Y6G draws maximum plate current when excitation is removed, as when the oscillator, or any earlier stage, is keyed. This reduces the screen voltage on the 807, and limits its plate dissipation. When excitation is applied, screen voltage is controlled by the potentiometer, and it can be set at whatever value is required for

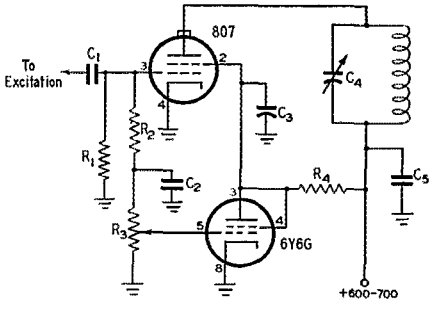


Fig. 1 — A combined screen-protective and output control circuit.
C_1 — Normal coupling condenser (100 $\mu\mu$fd.).
C_2 — 100-$\mu\mu$fd. mica.
C_3 — Screen by-pass (0.01 μfd.).
C_4 — Plate tank condenser.
C_5 — 0.001-μfd. mica.
R_1 — Normal grid leak (22,000 ohms, 1 watt).
R_2 — 0.1 megohm, ½ watt.
R_3 — ½-megohm potentiometer.
R_4 — Screen resistor (50,000 ohms, 25 watts).

the amount of output needed. The potentiometer is part of a voltage divider across the bias voltage applied to the grid of the 6Y6, thus controlling the flow of plate current in the tube. If desired, the potentiometer can be set so that the 6Y6 remains cut off during periods of excitation, resulting in full output from the 807. It can also be set to permit some plate current to flow in the 6Y6 at all times, so that screen voltage is reduced slightly during key-down periods, but not to the extent that it is lowered when the key is up. The result is a really flexible control system that fits many needs for controlled output without circuit complications. — *Ed Roller, W1ORP*

ANOTHER NEUTRALIZING KINK FOR 813s

CLASS C amplifiers are usually rather easy to neutralize, but in some cases, such as the use of 813s in push-pull, the situation sometimes becomes more complicated. Attempting to use these

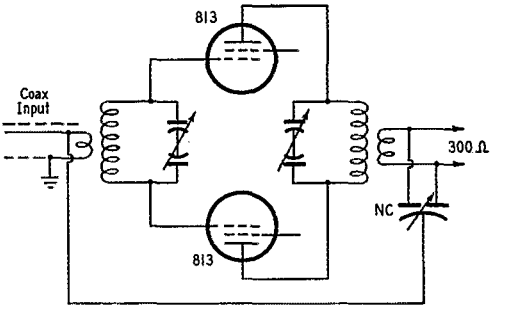


Fig. 2 — A novel neutralizing system for push-pull 813s. A butterfly condenser is connected across the output link, and some of the voltage is then fed back to the grid. The position of the condenser determines the phase relationship and amplitude of the voltage fed back.

tubes in a Class B linear stage, I found it very difficult to neutralize them by ordinary means.

After reviewing various neutralizing methods, I hit upon the scheme shown in Fig. 2. It has worked out to perfection in my case, and may be useful to others.

My grid coil was coupled to the buffer stage by means of a coaxial line, and the output tank was coupled to a balanced 300-ohm line. I connected the output link to the stator plates of a differential-type butterfly condenser of 100 $\mu\mu$fd. per section as shown. The rotor was then connected to the inner conductor of the coaxial line in the grid circuit. Adjusting this condenser completely neutralized the stage for me, and it is now as stable as a rock. To be used as a Class B linear stage it has to be! — *Ward Jensen, WØTLE*

SOCKETS FOR TYPE 15E TUBES

ANYONE who has acquired some of the Type 15E tubes that have been available in surplus will be interested to learn that the problem of finding a socket for them can be solved quite

(Continued on page 90)

• Technical Topics —

Re: Half-Wave Filters

WE have been asked why, in view of the fact that the circuit arrangement is the same as that of a conventional two-section constant-*k* low-pass filter, the half-wave filter [1] is described as a one-band affair. Why not use the same one on several bands?

The answer is one of terms and the method of operation. As a plain low-pass filter it can be used on any frequency below its cut-off frequency. But it will operate as a "half-wave" filter only at the frequency for which it is designed as such.

Examination of the constants used in the filter will show that as a plain low-pass filter it will have a cut-off frequency equal to 1.41 times the design frequency, and that its nominal characteristic impedance is equal to 0.71 times the design impedance. In other words, if it is designed as a half-wave filter for, say, 300-ohm line at 14 Mc., it will also operate as an ordinary low-pass filter having a design impedance of 212 ohms and a cut-off frequency of 19.8 Mc. On the latter basis it can be used at any frequency below 19.8 Mc.

Either method of operation will result in the same attenuation of harmonics above the cut-off frequency. The difference is that when used as a half-wave filter it can be inserted in any line without changing the coupling to the transmitter, but when used as a straight low-pass filter some readjustment of coupling will be required unless the input impedance of the line into which the filter works happens to be a pure resistance of approximately the value given above.

The term "selectivity," as used in December *QST*, refers to the half-wave properties of the filter. When operated into a load equal to its characteristic impedance considered as an ordinary low-pass filter, it will have no selectivity at all in the ordinary sense of the word, within the passband. As a half-wave device its effect on the transmitter coupling will become more dependent on frequency the higher the s.w.r. on the line. — *G. G.*

[1] Technical Topics, "Half-Wave Filters," *QST*, December, 1949.

Gimmicks and Gadgets

IN another article in this issue [1] the writer urged the use of an s.w.r. indicator for adjusting an antenna coupler to give minimum standing-wave ratio in the link line. The recommendation was not made because using a bridge is the "engineering" way to go about it. The reason was far more compelling than technical niceties: we could find no other method that would come even close to giving the right answer. It was not for lack of trying, either; as it happened, when the problem first arose we did not have a suitable bridge in the lab, so we went at it by cut-and-try. The invariable result was heating of the coax link. We finally gave up and built a simple resistance bridge — after which the correct adjustments were found in about the time it takes to say "Jack Robinson."

Of course, not all the technical problems that come up in the course of operating an amateur station are so adamant to cut-and-try methods. But the number of tough ones increases, rather than decreases, with the years. This is because progress is accompanied by growing complexity. But whether they are hard or easy, they have to be solved if the operation of the station is to be satisfactory to its owner as well as inoffensive to those who hear it.

A great many amateurs, we believe, handicap themselves without being aware of it. When something goes wrong or a new situation has to be faced they lack the tools that would help clear things up in a minimum of time and with a minimum of effort. They do not have, in other words, the gimmicks and gadgets that other hams have found indispensable.

Although the subject of measurements holds little intrinsic interest for the average amateur, measurements themselves are intensely practical. How can you adjust the tuning of an r.f. amplifier, for example, without a measurement of some sort? The measurement of plate and grid currents in transmitter circuits is so commonplace that most of us would never think of trying to get along without a milliammeter. But too many of us stop right there, when extending measurements into other fields would facilitate to at least an equal degree the design and adjustment of all sorts of equipment. Direct currents are only one of the many things that we deal with in our radio stations. There are voltages, both d.c. and a.c.; alternating currents; frequencies from 60 cycles on up as far as we can think of going with present facilities; the fundamental circuit elements of resistance, inductance and capacitance; antennas and transmission

[1] "Eliminating TVI with Low-Pass Filters," p. 19.

lines; and, whether we think about it or not, waveforms of various kinds.

We won't attempt to catalog all the measuring gear that can be useful in the ordinary amateur station. But any list would include a few obvious things:

1) A volt-ohm-milliammeter for the many routine servicing jobs that come up from time to time.

2) A crystal wavemeter, for its general utility and convenience in the adjustment and checking of both transmitters and receivers.

3) A grid-dip meter, not only for its unmatched ability to check resonances in "inactive" circuits, but because it offers a simple means for measuring both inductance and capacitance when provided with a few simple auxiliary standards.

4) A frequency standard, even though no more elaborate than a simple 100-kc. oscillator.

5) An oscilloscope, probably the most versatile measuring device available. A very simple one will do many things that can't be done with any other type of instrument.

We could go on to include such things as frequency meters, s.w.r. bridges, audio and r.f. test oscillators, modulation meters — in fact, any sort of meter capable of measuring the quantities we are handling day after day in ordinary station operation.

Formidable? Maybe so, if you take it all at once. But look at it this way: If you're like most of us, you're going to be in ham radio for a pretty long time. Today, maybe, your station consists of just a transmitter and a receiver. Several years from now is it still going to have just a transmitter and receiver? Or will you have spent a small proportion of your time, and a small proportion of the money you'll lay out anyway, in building up auxiliary gear that, because it doesn't become obsolescent so fast, will represent a more permanent investment in the long run? It seems to us that the smart way to go about building up a collection of such gear is to lay out a definite construction program. Pick a couple of the most useful instruments to start with, and put aside a little cash now and then to build up a fund for the next while the current project is under construction. In the course of a couple of years you'll have an assortment of "indispensables" acquired with practically no pain.

As a matter of fact, most of these gimmicks and gadgets don't have to cost very much. There are still lots of surplus tubes and components that fit in, while the junk box can supply many. Mostly, it's a matter of making up your mind to do it. In the process, you'll be building up a solid technical background (you can't help learning a great many things from measurements) that not only will improve the operation of your station but will give you more time on the air because you will spend less in tinkering. — *G. G.*

Annual ARRL DX Contest

C.W.: Feb. 10th–12th, Mar. 10th–12th; 'Phone: Feb. 17th–19th, Mar. 17th–19th

Amateurs everywhere are invited to take part in the 16th Annual ARRL DX Competition. There will be two week-end periods devoted to c.w. participation and two to 'phone. Special certificate awards will be given to the highest-scoring c.w. and 'phone stations for each country and each continental U.S.A. and Canadian ARRL section entered in the contest. Operators outside the U. S. and Canada will attempt to work as many W, K and VE stations as possible. Exchange of serial numbers will be required. Complete rules and details on scoring appear on page 17 of January *QST*.

The contest periods will be divided for c.w. and 'phone as follows: first c.w. period will begin on Feb. 10th at 7:00 P.M. EST and end on Feb. 12th at 7:00 P.M. EST. The second c.w. period will be scheduled during the same hours from Mar. 10th to 12th. The first 'phone period will begin at 7:00 P.M. EST on Feb. 17th and end at 7:00 P.M. EST Feb. 19th. The second 'phone period will be scheduled during the same operating hours from March 17th to 19th.

Though not necessary for entry in the contest, ARRL will supply convenient report forms upon request. You may make up your own forms following the samples shown in last month's complete contest announcement. If you request report forms from Headquarters, please indicate whether you plan to enter the c.w. section, the 'phone section, or both.

If you are located in mainland U. S. or Canada, here is your chance to enjoy the thrill of long-distance contacts with the rest of the world and to compete for the special certificate awards. There will also be the opportunity to work new countries for the DXCC and other awards. If you are located outside the U. S. and Canada, you likewise have the opportunity to compete for an award and to pick up states for WAS or Canadian provinces for a WAVE award. It should be lots of fun for all participants. Be on hand for a DX contest that is expected to be the biggest and best yet!

Two-Band Antenna-Matching Networks

Practical Application of Formulas

PART III

BY JOHN G. MARSHALL,* WØARL

[This is the third and concluding part of a series of three installments. The first and second parts of this article appeared in the October and November, 1949, issues of QST. — ED.]

To demonstrate the use of these networks and their formulas, examples are given of a simple antenna operating on its fundamental and second-harmonic frequencies, using various types of transmission lines. Driving-point impedances (d.p.i.) of 75 and 1500 ohms are assumed for f_1 and f_2, respectively. These may not be the exact values for individual cases, but they are typical and serve here to demonstrate the use of the formulas. The examples are worked out to normal slide-rule accuracy which should be entirely adequate, since the error in determining the d.p.i. in each case is likely to be much greater.

The relationships existing between Z_0, Z_1 and Z_2 determine which of the networks is needed for any certain example. Table I shows the proper network and formulas to use for any combination of Z_0, Z_1 and Z_2 likely to exist in present-day amateur antennas. These formulas are the same as those discussed earlier.

Example 1

Given: A simple center-fed antenna operating on its fundamental and second-harmonic frequencies, using a 53-ohm line. The d.p.i. is 75 ohms on f_1 and 1500 ohms on f_2. Transmitter power is one kilowatt output.

Solution: Since f_2 is twice f_1, $K = 2$. With $Z_0 = 53$ ohms, $Z_1 = 75$ ohms and $Z_2 = 1500$ ohms, this example falls into the general case where $Z_0 < Z_1$ and Z_2. The table shows that the network of Fig. 5 and its associated formulas are applicable. Substituting numerical values in these formulas, we have the following:

$$X_{P1} = 75\sqrt{\frac{53}{75 - 53}} = 116 \text{ ohms},$$

and

$$X_{P2} = -1500\sqrt{\frac{53}{1500 - 53}} = -287 \text{ ohms}.$$

Then,

$$X_{LP} = \frac{(116)(2^2 - 1)}{2\left(2 - \frac{116}{-287}\right)} = 72.4 \text{ ohms},$$

and

$$X_{CP} = \frac{(-287)(2^2 - 1)}{\frac{-287}{116} - 2} = 193 \text{ ohms}.$$

Since

$$X_{B1} = -53\sqrt{\frac{75}{53} - 1} = -34.1 \text{ ohms},$$

and

$$X_{B2} = 53\sqrt{\frac{1500}{53} - 1} = 277 \text{ ohms},$$

$$X_{LS} = \frac{[(2)(277)] - [-34.1]}{(2)(2^2 - 1)} = 98 \text{ ohms},$$

and

$$X_{CS} = \frac{2[277] - [(2)(-34.1)]}{(2)(2^2 - 1)} = 115 \text{ ohms}.$$

$$E_{CP} = \sqrt{(2)(1000)(1500)} = 1732 \text{ volts}.$$

$$E_{CS} = 115\sqrt{\frac{(2)(1000)}{53}} = 706 \text{ volts}.$$

Example 2

Given: Same as *Example 1*, except that the line has a characteristic impedance of 75 ohms.

Solution: With f_2 twice f_1, $K = 2$. With Z_0 and $Z_1 = 75$ ohms and $Z_2 = 1500$ ohms, this example falls into the case of $Z_0 = Z_1 < Z_2$. Table I shows that the network of Fig. 6 and its associated formulas are applicable. Substituting numerical values in these formulas, we have:

* Box 6023, Kansas City 4, Mo.

TABLE I

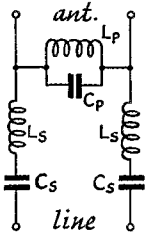
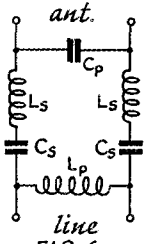
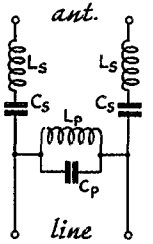
GENERAL CASE	NETWORK SCHEMATIC	CIRCUIT-ELEMENT REACTANCE AT f_1		UNMODULATED PEAK CAPACITOR VOLTAGES	
		PARALLEL	SERIES	ACROSS C_P	ACROSS C_S
$Z_o < Z_1$ and Z_2	 FIG. 5	$X_{LP}=\frac{X_{P1}(K^2-1)}{K\left(K-\frac{X_{P1}}{X_{P2}}\right)}\ \Omega$ $X_{CP}=\frac{X_{P2}(K^2-1)}{\frac{X_{P2}}{X_{P1}}-K}\ \Omega$ where $X_{P1}=Z_1\sqrt{\frac{Z_o}{Z_1-Z_o}}$ and $X_{P2}=-Z_2\sqrt{\frac{Z_o}{Z_2-Z_o}}$	$X_{LS}=\frac{KX_{B2}-X_{B1}}{2(K^2-1)}\ \Omega$ $X_{CS}=K\frac{X_{B2}-KX_{B1}}{2(K^2-1)}\ \Omega$ where $X_{B1}=-Z_o\sqrt{\frac{Z_1}{Z_o}-1}$ and $X_{B2}=Z_o\sqrt{\frac{Z_2}{Z_o}-1}$	$E_{CP}=\sqrt{2W(\text{d.p.i.})}$ Use the larger of Z_1 and Z_2 for d.p.i.	$E_{CS}=X_{CS}\sqrt{\frac{2W}{Z_o}}$
$Z_1 < Z_o < Z_2$ $Z_o = Z_1 < Z_2$ $Z_1 < Z_o = Z_2$	 FIG. 6	$X_{LP}=Z_o\sqrt{\frac{K^2Z_2-\frac{Z_1}{K^2}}{K^2Z_2\left(\frac{Z_o}{Z_1}-1\right)+Z_1\left(1-\frac{Z_o}{Z_2}\right)}}\ \Omega$ and $X_{CP}=K\sqrt{Z_1Z_2\frac{K^2Z_2-\frac{Z_1}{K^2}}{K^2Z_1\left(\frac{Z_2}{Z_o}-1\right)+Z_2\left(1-\frac{Z_1}{Z_o}\right)}}\ \Omega$	$X_{LS}=\frac{KX_{B2}-X_{B1}}{2(K^2-1)}\ \Omega$ $X_{CS}=K\frac{X_{B2}-KX_{B1}}{2(K^2-1)}\ \Omega$ where $X_{B1}=\frac{X_{CP}}{1+\left(\frac{X_{CP}}{Z_1}\right)^2}-\frac{X_{LP}}{1+\left(\frac{X_{LP}}{Z_o}\right)^2}$ and $X_{B2}=\frac{KX_{CP}}{K^2+\left(\frac{X_{CP}}{Z_2}\right)^2}-\frac{KX_{LP}}{1+\left(\frac{KX_{LP}}{Z_o}\right)^2}$	$E_{CP}=\sqrt{2WZ_2}$	$E_{CS}=X_{CS}\frac{\sqrt{2WZ_o}}{Z_o\cos\phi}$ where $\tan\phi=\frac{Z_o}{X_{LP}}$
Z_1 and $Z_2 < Z_o$	 FIG. 7	$X_{LP}=\frac{X_{P1}(K^2-1)}{K\left(K-\frac{X_{P1}}{X_{P2}}\right)}\ \Omega$ $X_{CP}=\frac{X_{P2}(K^2-1)}{\frac{X_{P2}}{X_{P1}}-K}\ \Omega$ where $X_{P1}=Z_o\sqrt{\frac{Z_1}{Z_o-Z_1}}$ and $X_{P2}=-Z_o\sqrt{\frac{Z_2}{Z_o-Z_2}}$	$X_{LS}=\frac{KX_{B2}-X_{B1}}{2(K^2-1)}\ \Omega$ $X_{CS}=K\frac{X_{B2}-KX_{B1}}{2(K^2-1)}\ \Omega$ where $X_{B1}=-Z_1\sqrt{\frac{Z_o}{Z_1}-1}$ and $X_{B2}=Z_2\sqrt{\frac{Z_o}{Z_2}-1}$	$E_{CP}=\sqrt{2WZ_o}$	$E_{CS}=X_{CS}\sqrt{\frac{2W}{Z_1}}$ or $E_{CS}=X_{CS}\sqrt{\frac{2W}{K^2Z_2}}$ whichever is larger

TABLE II

Circuit-element inductance and capacitance for two-band networks for 3.5 and 7 Mc., 7 and 14 Mc., or 14 and 28 Mc., with an antenna having driving-point impedances of 75 and 1500 ohms at f_1 and f_2 respectively, using a 53-, 75- or 300-ohm transmission line.

Line Z₀	*General Case*	*Schematic Diagram*	*Operating Frequencies*											
			3.5 and 7 Mc.				*7 and 14 Mc.*				*14 and 28 Mc.*			
			L_P	L_S	C_P	C_S	L_P	L_S	C_P	C_S	L_P	L_S	C_P	C_S
53Ω (Example 1)	$Z_0 < Z_1 \& Z_2$	Fig. 5	3.29 μh.	4.46 μh.	236 μμfd.	396 μμfd.	1.65 μh.	2.23 μh.	118 μμfd.	198 μμfd.	0.823 μh.	1.11 μh.	53.9 μμfd.	98.9 μμfd.
75Ω (Example 2)	$Z_0 = Z_1 < Z_2$	Fig. 6	31.2 μh.	4.86 μh.	66.2 μμfd.	425 μμfd.	15.6 μh.	2.43 μh.	33.1 μμfd.	212 μμfd.	7.82 μh.	1.22 μh.	16.5 μμfd.	106 μμfd.
300Ω (Example 3)	$Z_1 < Z_0 < Z_2$	Fig. 6	7.87 μh.	5.91 μh.	42.3 μμfd.	236 μμfd.	3.93 μh.	2.96 μh.	21.2 μμfd.	118 μμfd.	1.97 μh.	1.48 μh.	10.6 μμfd.	58.5 μμfd.

$$X_{LP} = 75\sqrt{\frac{\left[(2^2)(1500)\right] - \left[\frac{75}{2^2}\right]}{\left[(2^2)(1500)\left(\frac{75}{75}-1\right)\right] + \left[75\left(1-\frac{75}{1500}\right)\right]}} = 687 \text{ ohms.}$$

$$X_{CP} = 2\sqrt{(75)(1500)\frac{\left[(2^2)(1500)\right] - \left[\frac{75}{2^2}\right]}{\left[(2^2)(75)\left(\frac{1500}{75}-1\right)\right] + \left[1500\left(1-\frac{75}{75}\right)\right]}} = 687 \text{ ohms.}$$

Since

$$X_{B1} = \frac{687}{1+\left(\frac{687}{75}\right)^2} - \frac{687}{1+\left(\frac{687}{75}\right)^2} = 0,$$

and

$$X_{B2} = \frac{(2)(687)}{(2^2)+\left(\frac{687}{1500}\right)^2} - \frac{(2)(687)}{1+\left[\frac{(2)(687)}{75}\right]^2}$$

$$= 322 \text{ ohms,}$$

$$X_{LS} = \frac{[(2)(322)] - [0]}{(2)(2^2-1)} = 107 \text{ ohms}$$

and

$$X_{CS} = 2\frac{[322] - [(2)(0)]}{(2)(2^2-1)} = 107 \text{ ohms.}$$

$$E_{CP} = \sqrt{(2)(1000)(1500)} = 1732 \text{ volts.}$$

$$\tan \phi = \frac{75}{687} = 0.109.$$

From trigonometry tables,

$$\phi = 6.25° \text{ and } \cos \phi = 0.9941.$$

Then,

$$E_{CS} = 107\frac{\sqrt{(2)(1000)(75)}}{(75)(0.9941)} = 556 \text{ volts.}$$

Example 3

Given: Same as *Example 1*, except that the line has a characteristic impedance of 300 ohms.

Solution: As in the other two examples, $K = 2$. With $Z_0 = 300$, $Z_1 = 75$ and $Z_2 = 1500$ ohms, this example falls into the general class of $Z_1 < Z_0 < Z_2$. Table I shows that the network of Fig. 6 and its associated formulas are suitable. Assigning numerical values to the formulas:

$$X_{LP} = 300\sqrt{\frac{\left[(2^2)(1500)\right] - \left[\frac{75}{2^2}\right]}{\left[(2^2)(1500)\left(\frac{300}{75} - 1\right)\right] + \left[75\left(1 - \frac{300}{1500}\right)\right]}} = 173 \text{ ohms.}$$

$$X_{CP} = 2\sqrt{(75)(1500)\frac{\left[(2^2)(1500)\right] - \left[\frac{75}{2^2}\right]}{\left[(2^2)(75)\left(\frac{1500}{300} - 1\right)\right] + \left[(1500)\left(1 - \frac{75}{300}\right)\right]}} = 1075 \text{ ohms.}$$

TABLE III

	*Coil Form — Number of Turns***								
L μh.	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
0.823	5	3	6	10	6	6	3	3	3
1.11	7	3	7	12	8	7	3	3	4
1.22	7	3	8	13	9	7	4	3	4
1.48	8	4	9	14	9	8	4	4	4
1.65	8	5	9	15	10	9	5	4	5
1.97	9	5	10	16	11	9	5	4	5
2.23	9	5	10	17	11	10	6	5	6
2.43	10	5	11	18	12	11	6	5	6
2.96	11	6	12	20	13	12	7	6	7
3.29	12	7	12	20	14	12	8	6	8
3.93	12	8	14	23	15	13	8	7	8
4.46	13	7	15	24	16	14	9	8	9
4.86	14	9	15	25	17	15	9	8	9
5.91	15	10	17	27	19	16	11	10	11
7.82	18	12	19	32	21	19	13	12	14
7.87	18	12	19	32	21	19	13	12	14
15.6	25	21	27	44	30	26	22	18	22
31.2	35	*15	39	64	42	38	41	33	40

A — 1½ inches diameter, 1½ inches long.
B — 2½ inches diameter, 7 turns per inch (National XR10A form).
C — 1¾ inches diameter, 2¾ inches long (National XR13 form).
D — 1 inch diameter, 2¾ inches long (National XR13A form).
E — 1¼ inches diameter, 1¾ inches long (National XR16 form).
F — 1⅞ inches diameter, 3 inches long (Millen 44000 form).
G — 2½ inches diameter, 6 turns per inch (B & W 3905).
H — 2½ inches diameter, 8 turns per inch (B & W 3906).
I — 2 inches diameter, 10 turns per inch (B & W 3907).
* 5 inches diameter, 8 turns per inch (National XR14A form).
** To nearest turn.

Since

$$X_{B1} = \frac{1075}{1 + \left(\frac{1075}{75}\right)^2} - \frac{173}{1 + \left(\frac{173}{300}\right)} = -125 \text{ ohms}$$

and

$$X_{B2} = \frac{(2)(1075)}{2^2 + \left(\frac{1075}{1500}\right)^2} - \frac{(2)(173)}{1 + \left[\frac{(2)(173)}{300}\right]^2} = 328 \text{ ohms,}$$

$$X_{LS} = \frac{[(2)(328)] - [-125]}{(2)(2^2 - 1)} = 130 \text{ ohms,}$$

and

$$X_{CS} = 2\frac{[328] - [(2)(-125)]}{(2)(2^2 - 1)} = 193 \text{ ohms.}$$

$$E_{CP} = \sqrt{(2)(1000)(1500)} = 1732 \text{ volts.}$$

$$\tan \phi = \frac{300}{173} = 1.73.$$

From trigonometry tables, $\phi = 60°$ and $\cos \phi = 0.5$.

Then,

$$E_{CS} = 193\frac{\sqrt{(2)(1000)(300)}}{(300)(0.5)} = 996 \text{ volts.}$$

The reactance values computed in these three examples are valid at the f_1 frequency of any pair of operating frequencies providing that $K = 2$. They could have been worked out for other values of K, of course. However, in such a case, Z_2 might be considerably different from 1500 ohms. Converting the values of reactance shown to inductance and capacitance at 3.5 Mc. permits two-band operation at 3.5 and 7 Mc. Converting them at 7 Mc. provides for operation at 7 and 14 Mc., etc.

Table II shows the values of inductance and capacitance (ordinary slide-rule accuracy) of the network elements in these three examples, for operation at 3.5 and 7 Mc., 7 and 14 Mc., and 14

(*Continued on page 90*)

A.R.R.L. COUNTRIES LIST

Official List for ARRL DX Contest and the Postwar DXCC

Aden and Socotra Island.....VS9
Afghanistan.....YA
Alaska.....KL7
Albania.....ZA
Aldabra Islands.....
Algeria.....FA
Andaman Ids. and Nicobar Ids...VU
Andorra.....PX
Anglo-Egyptian Sudan.....ST
Angola.....CR6
Antarctica.....
Argentina.....LU
Ascension Island.....ZD8
Australia (including Tasmania)..VK
Austria.....(MB9)..OE
Azores Islands.....CT2
Bahama Islands.....VP7
Bahrein Island.....(MP4)..VU7
Baker Island, Howland Island and Am. Phœnix Islands.....KB6
Balearic Islands.....EA6
Barbados.....VP6
Basutoland.....ZS8
Bechuanaland.....ZS9
Belgian Congo.....OQ
Belgium.....ON
Bermuda Islands.....VP9
Bhutan.....
Bolivia.....CP
Bonin Islands and Volcano Islands (e.g., Iwo Jima).....KG6
Borneo, British North.....VS3
Borneo, Netherlands.....PK5
Brazil.....PY
Brunei.....VS5
Bulgaria.....LZ
Burma.....XZ
Cameroons, French.....FE8
Canada.....VE, VO
Canal Zone.....KZ5
Canary Islands.....EA8
Cape Verde Islands.....CR4
Caroline Islands.....KC6
Cayman Islands.....VP5
Celebes and Molucca Islands....PK6
Ceylon.....VS7
Chagos Islands.....VQ8
Channel Islands.....GC
Chile.....CE
China.....B, C
Christmas Island.....ZC3
Clipperton Island.....
Cocos Island.....TI
Cocos Islands.....ZC2
Colombia.....HK
Comoro Islands.....
Cook Islands.....ZK1
Corsica.....FC
Costa Rica.....TI
Crete.....SV
Cuba.....CM, CO
Cyprus.....(MD7)..ZC4
Czechoslovakia.....OK
Denmark.....OZ
Dodecanese Islands (e.g., Rhodes) SV5
Dominican Republic.....HI
Easter Island.....
Ecuador.....HC
Egypt.....(MD5)..SU
Eire.....EI
England.....G
Eritrea.....(MI3, MD3)..I6
Ethiopia.....ET
Faeroes, The.....OY
Falkland Islands.....VP8
Fanning Island (Christmas Island).....VR3
Fiji Islands.....VR2
Finland.....OH
Formosa (Taiwan).....C3
France.....F
French Equatorial Africa.....FQ8
French India.....FN
French Indo-China.....FI8
French Oceania (e.g., Tahiti)....FO8
French West Africa.....FF8
Fridtjof Nansen Land (Franz Josef Land).....UA1
Galapagos Islands.....
Gambia.....ZD3
Germany.....DL
Gibraltar.....ZB2
Gilbert & Ellice Islands and Ocean Island.....VR1
Goa (Portuguese India).....CR8
Gold Coast (and British Togoland).....ZD4
Greece.....SV
Greenland.....OX
Guadeloupe.....FG8
Guantanamo Bay.....KG4
Guatemala.....TG
Guiana, British.....VP3
Guiana, Netherlands (Surinam)...PZ
Guiana, French, and Inini.....FY8
Guinea, Portuguese.....CR5
Guinea, Spanish.....
Haiti.....HH
Hawaiian Islands.....KH6
Heard Island.....VK1
Honduras.....HR
Honduras, British.....VP1
Hong Kong.....VS6
Hungary.....HA
Iceland.....TF
Ifni.....
India.....VU
Iran.....EP-EQ
Iraq.....YI
Ireland, Northern.....GI
Isle of Man.....GD
Israel.....4X4, ZC6
Italy.....I
Jamaica.....VP5
Jan Mayen Island.....
Japan.....JA
Jarvis Island, Palmyra group (Christmas Island).....KP6
Java.....PK
Johnston Island.....KJ6
Kenya.....VQ4
Kerguelen Islands.....
Korea.....HL
Kuwait.....(VT)
Laccadive Islands.....VU4
Lebanon.....AR8
Leeward Islands.....VP2
Liberia.....EL
Libya.....(MD1-2, MT, LI)
Liechtenstein.....HB1, HE1
Luxembourg.....LX
Macau.....CR9
Macquarie Island.....VK1
Madagascar.....FB8
Madeira Islands.....CT3
Malaya.....VS1, VS2
Maldive Islands.....
Malta.....ZB1
Manchuria.....C9
Mariana Islands (Guam).....KG6
Marion Island (Prince Edward Island).....ZS
Marshall Islands.....KX6
Martinique.....FM8
Mauritius.....VQ8
Mexico.....XE
Midway Island.....KM6
Miquelon and St. Pierre Islands.....FP8
Monaco.....
Mongolian Republic (Outer).....
Morocco, French.....CN
Morocco, Spanish.....EA9
Mozambique.....CR7
Nepal.....(VU)
Netherlands.....PA
Netherlands West Indies.....PJ
New Caledonia.....FK8
New Guinea, Netherlands.....PK6
New Guinea, Territory of.....VK9
New Hebrides.....FU8, YJ
New Zealand.....ZL
Nicaragua.....YN
Nigeria.....ZD2
Niue.....ZK2
Norfolk Island.....VK9
Norway.....LA
Nyasaland.....ZD6
Oman.....(MP4)..VS9
Pakistan.....AP
Palau (Pelew) Islands.....KC6
Palestine.....ZC6, ZC8
Panama.....HP
Papua Territory.....VK9
Paraguay.....ZP
Peru.....OA
Philippine Islands.....DU
Phœnix Islands (British).....VR1
Pitcairn Island.....VR6
Poland.....SP
Portugal.....CT
Principe and Sao Thome Islands..
Puerto Rico.....KP4
Reunion Island.....FR8
Rhodesia, Northern.....VQ2
Rhodesia, Southern.....ZE
Rio de Oro.....(EA8)
Roumania.....YR, YO
Ryukyu Islands (e.g., Okinawa).KR6
St. Helena.....ZD7
Salvador.....YS
Samoa, American.....KS6
Samoa, Western.....ZM
San Marino.....M1
Sarawak.....VS5
Sardinia.....IS
Saudi Arabia (Hedjaz and Nejd)..HZ
Scotland.....GM
Seychelles.....VQ9
Siam.....HS
Sierra Leone.....ZD1
Sikkim.....AC3
Solomon Islands.....VR4
Somaliland, British....(MD4)..VQ6
Somaliland, French.....FL8
Somaliland, Italian.....(MD4, MS4)
South Georgia.....VP8
South Orkney Islands.....VP8
South Sandwich Islands.....VP8
South Shetland Islands.....VP8
Southwest Africa.....ZS3
Soviet Union:
European Russian Socialist Federated Soviet Republic UA1-3-4-6
Asiatic Russian S.F.S.R.....UA9-0
Ukraine.....UB5
White Russian Soviet Socialist Republic.....UC2
Azerbaijan.....UD6
Georgia.....UF6
Armenia.....UG6
Turkoman.....UH8
Uzbek.....UI8
Tadzhik.....UJ8
Kazakh.....UL7
Kirghiz.....UM8
Karelo-Finnish Republic.....UN1
Moldavia.....UO5
Lithuania.....UP2
Latvia.....UQ2
Estonia.....UR2
Spain.....EA
Sumatra.....PK4
Svalbard (Spitzbergen).....LA
Swan Island.....KS4
Swaziland.....ZS7
Sweden.....SM
Switzerland.....HB
Syria.....YK
Tanganyika Territory.....VQ3
Tangier Zone.....EK
Tannu Tuva.....
Tibet.....AC4
Timor, Portuguese.....CR10
Togoland, French.....FD8
Tokelau (Union) Islands.....
Tonga (Friendly) Islands.....VR5
Trans-Jordan.....ZC1
Trieste.....(AG2, I, MF2)
Trinidad and Tobago.....VP4
Tristan da Cunha and Gough Island.....ZD9
Tunisia.....FT4, 3V8
Turkey.....TA
Turks and Caicos Islands.....VP5
Uganda.....VQ5
Union of South Africa.....ZS
United States of America.....W, K
Uruguay.....CX
Vatican City.....HV
Venezuela.....YV
Virgin Islands.....KV4
Wake Island.....KW6
Wales.....GW
Windward Islands.....VP2
Wrangel Islands.....
Yemen.....
Yugoslavia.....YT-VU
Zanzibar.....VQ1

NOTE: Prefixes in parentheses are used by occupation forces or others in the countries concerned.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Well, the zero hour is fast approaching.

Developments during the 16th Annual ARRL DX Competition should certainly reveal any improvement or disparagement in those newly-raised rhombics or that new 3.5-Mc. ground-plane job — and beyond a doubt!

Whether you have a man or a mouse of a signal will also be demonstrated but one need have no serious lamentations in the latter event. Many DX connoisseurs find that appreciation of a given quantity of DX worked varies inversely as the square of the power that is employed in the working and this is where you 807/6L6 anglers come in.

Then, too, the affair may be approached according to individual preferences. If not particularly hopeful of copping a section award you have the prerogative of concentrating solely upon new countries or Africans (or CM2s). And DX stations, likewise, may be choosy enough to complete that long-sought WAS on the so-and-so meter band. Shucks, even if you're not able to fire up a rig at all you can still tune in on Juan Lobo y Lobo's frequency and be amazed at the performance of head number-swapper XE1A/XF1A, himself.

Have at it, then, and let the popped fuses fall where they may. There will be more than enough sport to go around!

(Full details and rules in last month's issue if anyone could have missed it!)

So much for the World Series — let's note what has been going on in the regular season skirmishes. . . .

On Facing Page—

UP-TO-DATE COUNTRIES LIST

• For the information of DX-Contesters and DXCC members and aspirants, this *QST* reproduces in full the official postwar ARRL Countries List, including all modifications and additions made to date.

What:

Around the middle of December things started popping on *one-sixty*, of all places. W4NNN kept an observant eye on the o.w.f. chart at WAR, Washington, and stepped his 190-watter across to **G3PU** (1810) for one of the first trans-Atlantic two-ways on the band postwar . . . . . W1EFN has been getting across along with W1BB, and VE1EA established contact with **GD3UB** (1820) who is juice on any band. Clarry also snagged two-ways with G6BQ and G5JU. All the above activity occurred over the period of December 18th through 19th, by the way. Who is going to bid for the first postwar WAC on 1.8 Mc.? (Sounds far-fetched but don't stake your roll against it!)

Eighty has had a few of its kilocycles scorched severely because of **TA3GVU** (3505) who was laid low by many including W1s BPX, FTX, IKU, LGW, W2SOY, W4s BRB, NNN and VE1ZZ. It is also rumored that W4BRB was heard by XZ2EM so it appears as if there will be numerous WACs completed on 3.5 Mc. this season . . . . . **EK1AO** (3516) was garnered by W1s CEG, FTX, W2AIS, W6ZAT, WØSO and a score of others and W4BRB knocked off two nice ones in MP4BAD and VP8AI . . . . . W2EQS is getting his share of stuff and logged LX1DX plus **VK9RH** on Norfolk Island (3510) while working **VP5BF** of the Caicos (3510) and a logful of Europeans. VP5BD in the Caymans is also on the low edge regularly and **ZL**s 1CI, 1BY, 1HM and 4BO have been reaching the East Coast consistently, using frequencies between the band edge and 3515 kc. . . . . VK3FF is among the Aussies striving to work Atlantic Seaboard stations . . . . . If you think only the eastern crew is eligible for fun on 80, here are a few victims of W6ZAT's ground-plane gadget: VP5BF, VR2BU who runs 15 watts, FA8BG, TG9RB, VK9RH, DL1FF, Gs 6GM, 8JR and an 80/40 crossband deal with VS6BL, not to mention a healthy collection of VK mainlanders, ZLs, KH6s and KL7s. W6ZAT is ex-W9YXD, ex-W8NDS, incidentally, and reports that W6CEM, W7JC and W7MZP are also making 3.5-Mc. hay.

Naturally, when 80 is open, *forty* can't be very flat. W5LAK's new rig gobbled up **YO2BU** (7002), **EA8BC** (7028), **HP2RO** (7005), **VP4TAB** (7023), **FA8BG** (7003), **CN8BI**, HA4SA and an SVØ . . . . . The new hand-picked QTH at WØSO features a 1.8-Mc. full-wave running 75 feet above a lake as well as a loafing 4–1000 p.a. tube and Phil's logful of DX includes EK1AO and an undis-

* DX Editor, *QST*. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

closed ZM6 .-.-.-.- W6TDO says that HC2IH (7106) has friend W6UIH at the key and W9BXK is interested in the location of **LB2QC** (7015) .-.-.-.- The West Coast slant on things is plenty pleasant as W7MGO racked up **VS1BX** (7027), **VS6BK** (7005), **VS6BL** (7015), **UAØFJ** (7045), **JA2BQ** (7068) and **KG6GM** (7040).

The fly in the ointment of low-frequency hot stuff is that *twenty* goes flooey in the wee hours, at least in northern latitudes. So W6JTB and his new squirter didn't have to stay up all night for **XZ2FK** (14,115), **VQ8AD** (14,040), **VU2RX** (14,010), **FN8AD** (14,105), **UD6AH** (14,050), **EA8TM** (14,055), **FA9RW** (14,030), **EK1AO** (14,010) and **TA3FAS** (14,100) .-.-.-.- W2SUO caught up with another of the infrequent Polish entries, **SP1CM** (14,080), and W6UJ adds a long-path chat with **ZE2KY** (14,025) .-.-.-.- How W5LAK can court his YL in Cleveland every night and still work DX is a puzzler but he seems to do fair to middlin'. [That's Cleveland, Miss., Boss; wise up!—*Jeeves*] Oh. **ZB1BD** (14,032), **ZB2G** (14,060), **ZB2I** (14,071), **ZD2DCP** (14,050), **ZE1JI** (14,108), **ZE2JN** (14,070), **ZE2KF** (14,045), **CR7AF** (14,081), **CR7IZ** (14,040). **CT3AV** (14,030), **VQ4HJP** (14,042), **TF3ZM** (14,014), **FE8AB** (14,032), **FM8AD** (14,030), **FQ8HC** (14,035 t4) and **3V8AG** (14,008) will all get QSLs with Bourbon on them and—what irony—the town is in bone-dry territory! .-.-.-.- W9AND dragged TA3AA, I1NU/Trieste, MI3ZZ, ST2AM, VP8s AI, AO, 4X4RE and HS1SS from beneath his pet power leak while W4MR captured YK1AC, VQ1CUR, UAØAA and **FY8AA** (14,000) who has certainly been raising a lot of rumpus with his 14 watts .-.-.-.- WØUOX awaits a QSL from **FY8AC** (14,050) (who may sign anything from "8AC" to "BOB") as well as **ZD8B** (14,023)· the latter also apprehended by **WØPNQ** and WØNUC .-.-.-.- MP4BAD, ZS9D and UO5KAA were entered in W8SYC's roster and W8YGR worked TA3AB to help pass the time required for ET3AM and HH2MF cards to arrive .-.-.-.- KH6VP, ex-W7BE, got up to 92 countries with his ten-watter sans beam and then gave in to the power bug again. Just shows to go you that once you get the habit of knocking them off like flies with a big signal it's pretty tough to be satisfied with less, especially with KH6s BA, CT, ES and IJ around for competition. Bill's up to 150 now and hopes to pass his W7BE mark of 160 before his anticipated June reassignment .-.-.-.- Working 200 from the seventh call area is an achievement and W7VY turned the trick with recent aid from FY8AA, CT3AV, MD2PJ, AP5B, UN1KAA, UP2KBC, UJ8AF and VR4AA.

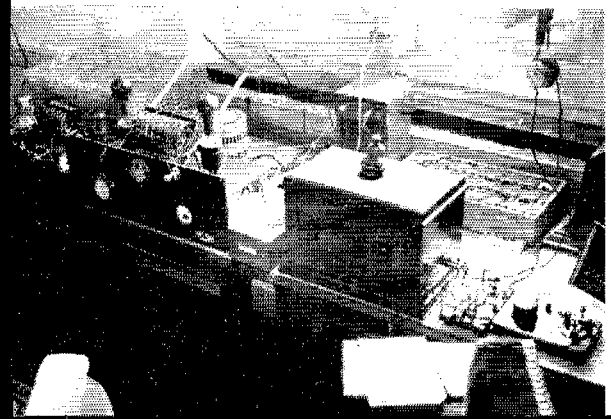
On voice, **PJ5CE** (14,310) has an HT-9 with an SX-42 and assured W5ISF of a 100 per cent QSL policy .-.-.-.- Besides working **HS1SS** (14,105) and FN8AD on c.w., W9RBI thinks the gang will be interested in knowing that HZ1AB, FF8PG, FQ8SN, MB9AD, MD4JG, CR5UP, F9QU/FM8, EA9AI, HE1EU, HA5B and ZC1CL do come through with A3 confirmations. This by no means guarantees that the fellows QSL 100 per cent, of course, but chances are good. W9FDX, by the way, hears that CR5UP is knocking off from Sao Thome directly .-.-.-.- HC2JR collected 'phones **VP8AI** (14,200), **CR6AJ** (14,301) and **AC3SQ** (14,130) and is still stalking **FN8AD** (14,280), **FK8AC** (14,168) and F9QV/Corsica (high end, VFO).

Though *ten* doesn't seem as scrumptious as last year and is probably heading on the downhill part of the cycle, 'phone work at HC2JR found the following catches active: **VS9AH** (28,479), **ZC6DZ** (28,180–240), **ZD1FB** (28,188), **CR7IL** (28,230), **CR1ØAA** (28,140), **IS1RPA** (28,390), **HZ1AB** (28,233), **MP4BAO** on Bahrein (28,140), **ST2KR** (28,180) and **3V8AP** (28,430). Those were QSOd and John is still in pursuit of **AC4RF** (28,440), **AC5CS** (28,120), **CR6AI** (28,393), **CR7RO** (28,250), **CR8AJ** (28,080–950), **FD3RG** (28,250–323), **HE1SW** (28,100), **MD7HV** (28,300) and **MS4A** (28,325). The conclusion is obvious: If you're a ten-meter addict, spend your retirement in Ecuador .-.-.-.- W2ZVS does all right from our neck of the woods, reaching 103 total with TA3FAS, FF8PG, VQ4NSH, CR5UP, MI3SC, GC2RS, VQ2JO, ZS6OS/ZS7, VP1WS, SVØWB and ZD1PW. Incidentally, the ZD1 can often be raised by a c.w. shout just clear of his QRG .-.-.-.- From W8GZ's archives comes word stating that PK3s are restricted to 28 Mc. for the present, according to PK3SJ .-.-.-.- The "UB7AN" with the Brooklyn accent who was hooked by W5HCH is fooling only himself and WØTFM was delighted to discover that his QSO with **I1AHV/M1** (28,010) netted him a new one, San Marino .-.-.-.- W9FDX upped soup from 25 to 400 watts and got out of his Milwaukee back yard to the tune of PK4DA, HL1BJ, DU1AP, KR6CI, KX6BH, ZS8A, ZS9F, FF8FP, ZD4AH, ZP3AW and LX1JW, all voicers .-.-.-.- FF8AH and VR2BC helped make it 123 at W2AEB and more 'phone work eked out ET3AE, EK1AD, HA5BC and UB5BV .-.-.-.- ZP8BL and **ZD6AA** (28,025) were happy c.w. additions to W5LAK's notebook.

Where:

Things are fairly quiet on the postal front in general. W1IKE confirms as official the representative Roumanian QSL bureau that will take care of all YO ducats: AAUSR, P. O. Box 95, Bucharest. Here are a few miscellaneous trifles to riffle through. . . .

CN8ET	Navy No. 214, Box H, USN, % PM, New York City
CR4AF	Box 15, Praia, Cape Verde Islands
CR7IL	Engineering Dept., P. O., Beira, Portuguese East Africa
F9QU/FM8	Box 281, Fort de France, Martinique
FY8AC	R. Martinon, Cayenne, French Guiana
HA5PB	(via HA bureau only)
ex-HC1KP	M/Sgt. V. F. Scott, % Mrs. M. R. Long, 3030 San Marino St., Apt. 109, Los Angeles 6, Calif.
HP1FL	Box 2103, Panama City, Panama
ex-J2AAD	B. Kindred, 817 Shelton Ave., Kingsville, Tex.
JA3AC	S/Sgt. A. P. Reiskis, Hq. Radio Security Det. "F," APO 710, % PM, San Francisco, Calif.
JA3AD	Lt. G. S. Wheeler, Hq. Radio Security Det. "F," APO 710, % PM, San Francisco, Calif.
JA3AF	Capt. G. R. Boring, 5th Air Force, APO 710, % PM, San Francisco, Calif.
JA4AG	Capt. A. R. Blethen, Hq. & Hq. Co., 58th Sig. Bn., APO 301, % PM, San Francisco, Calif.
JA4AH	C. I. Chapman, AFRS–WVTQ, APO 25, % PM, San Francisco, Calif.
JA4AI	Maj. H. R. Smith, 64th FA Bn., APO 25, Unit 4, % PM, San Francisco, Calif.
JA5AK	Sgt. W. Lambert, BCOF Sig. Rgt., BCOF, APO 248, % PM, San Francisco, Calif.



The call PX1A has been "borrowed" more times than you can shake a stick at but here is a photo of the real thing. The rig at left using an 803 final has since been destroyed by lightning and the receiver is a veteran Telefunken job. Zepp antennas are favored. Rick will return to the air as soon as a few replacement parts enable him to reconstruct the rig.

Fortunately there was a camera present at this well-attended gathering at the QTH of CO5PN in Cardenas, Cuba. *Standing, l. to r.:* ham-to-be Olivieri Gianna and Victtorio Corni, IITZ, both of the ship *Delphin;* Bob Thomann, HB9GX/MM, of the ship *Carona;* Manuel Garcia, CO5JK; Ernesto C. de Ugarriza, CO8UV; Pedro Risco, CO5VR; Alberto de Gonzalez, CO5PN, host. *Seated:* Mrs. Oilda C. de Ugarriza, CO8UW, and Mrs. Edna de Gonzalez of CO5PN.

♦

JA5GD	W/O G. C. Dunlop, 77 (F) Sqdn., RAAF, BCOF, APO 248, % PM, San Francisco, Calif.
JA7AF	Capt. D. E. Field, 527th AC&W Gp., APO 929, % PM, San Francisco, Calif.
JA7AG	Capt. B. O. Bush, 527th AC&W Gp., APO 929, % PM San Francisco, Calif.
JA7AH	M/Sgt. F. T. Horn, 8th Comm. Sqdn., APO 929, % PM, San Francisco, Calif.
JA8AC	Lt. W. T. Winter, 49th Comm. Sqdn., Misawa AFB, APO 919, % PM, San Francisco, Calif.
KR6CN	PFC R. L. Daly, Co. "C," 71st Sig. Svc. Bn., APO 500, % PM, San Francisco, Calif.
LZ1ID	(via ARRL)
MD2KP	P. O. Box 66, Tripoli, North Africa
MP4BAE	% International Aeradio Ltd., Bahrein Island, Persian Gulf
PJ5CE	(via ARRL)
SVØAJ	Doug Childs, British Naval Mission, % British Forces in Greece, near Athens, Greece
VK1HV	Box 2611 W, GPO, Melbourne, Australia
VK1WG	Box 2611 W, GPO, Melbourne, Australia
ZC6DZ	% American Consulate, Jerusalem, via Israel
ZD2DCP	D. C. Piccirillo, Radio Officer, Posts and Telegraphs, Port Harcourt, Nigeria
ZE2KY	RAF, Kumalo, near Bulawayo, Southern Rhodesia
ZS6OS/ZS7	(to home QTH)

These through the combined efforts of W1s IKE RWS, W2s AEB CJX ZVS, W4s CYY MR, W5s HCH ISF LAK, W6UX, W7IY, W9s AND CFT.

Tidbits:

The W8SYC-heckling "ghost carrier" mentioned last month also turns out to be bothering W8s CDT and ZY periodically. At last reports the boys were organizing to pin the business down and the outcome should be of interest. The r.a.c. carrier appears to be skipping and may be a source of unrecognized trouble for others. Clint also mentions having had his VK WAS for quite a while now. Regulars in the annual VK/ZL Test are undoubtedly also in this class. We might add that no certificate award for this feat is available for work below 50 Mc. . _ . _ . _ W4CYY takes time out to inform us that VK1HV and VK1WG are soon to make their debut from Heard Island. VK2QL is also supposed to be joining the group. JB further notes from QSO that a batch of MD2PJ cards ran astray via air mail and duplicates will be made out after some delay. MD2PJ can be reached at Box 66, Tripoli . _ . _ . _ Needing just two and seven to fill out his ZD roster, WØUOX has it that ZD8B is leaving Ascension Island. Let's hope his replacement, if any, is another ham inclined toward the active side . _ . _ . _ W4AZD would like to see the boys get together for the sponsoring of more DX journeys to inactive countries, such as Clipperton, Galapagos, et al. (Others feel that there is little sport to fishing in a stocked aquarium.) At any rate there is a lot of fun awaiting the guys fortunate enough to be able to put some of these "unworkables" on the air . _ . _ . _ W2s AEB and KUW are awaiting Stateside news of EQ1RX and we hear that W3PQC is able to sit behind the CT2AB key occasionally on his trips via the Azores . _ . _ . _ "As operator for Messrs. Cable and Wireless on the very infrequent occasions when we go on the air, I can state categorically that the only station here in Keeling-Cocos, QTH 12.05°S–96.52°E, is commercially licensed and has call-sign VPK, operates on international distress wave 600 metres, and offers only distress facilities and port entrance working for ships. Power is about 400 watts and extreme range about 750 miles." So goes a letter from John E. Law written on the premises and this lays the law down so far as recent Cocos activity rumors go. Hmmm. Wonder what John does with his midnight oil. [Probably sleeps, Boss, like a human being. — *Jeeves*] Anyway, here's a spot for some missionary work if anyone would care to befriend the gentleman % Cable & Wireless, Ltd., Keeling-Cocos Islands, Indian Ocean via Cable & Wireless, Ltd., 35 Robinson Road, Singapore . _ . _ . _ Numerous inquiries indicate the necessity of our stating once more the policy of accrediting, for DXCC, countries confirmed by way of ARRL DX Contest logs received at headquarters. The pernt to bear in mind is that these credits are granted only upon application for DXCC and/or endorsement stickers. Procedure: Check the published Test results in *QST* to ascertain whether or not the station(s) in question submitted logs. If this is affirmative, give full details of the QSO (time, et al) along with your application so that said logs may be checked. QSL card confirmation is not issued by the League but memoranda notification of acceptance as confirmed is furnished . _ . _ . _ Dom Constantino of KG4AK still finds it necessary to persuade some contacts that his prefix is legitimate. So before the big brawl beginning this month it is timely to reiterate that KG4 has superseded NY4 for our base at Guantanamo Bay, Cuba — and this *is* a listed separate country . _ . _ . _ W6SAI was slightly mistaken to think that he could settle back to relax and retire after confirming his 200th country. No sooner had he made himself comfortable in front of the TV set and his 80-meter rag-chew rig when he found himself elected prexy of the Southern California DX Club and assigned a share of turning out the club DX bulletin! (If Joe Louis comes back can W6SAI be far behind?) . _ . _ . _ W5FXN wonders how many fellows in addition to one he found are not aware of the fact that stamped, self-addressed envelopes are required by QSL managers from stations expecting cards. Anyone having worked, or figuring to work any DX at all, should oblige his local manager in this small way to give him a chance to clear the files . _ . _ . _ The Scotts of HC1KP announce the QRT of their Ecuadorian station and have firm intentions of swiftly hitting the air with a W call. All contacts will be verified upon receipt of QSL . _ . _ . _ KR6CN still gets a kick out of the BC-610 after monkeying with 15-kw. jobs all day long. Bob says QSLs are tough to come by on Okinawa and this trouble may lie behind any long delays in KR6 confirmations. Right now he's doping out a skywire that should put a respectable signal into the States . _ . _ . _ From KV4AA we have word of a French Antarctic expedition bound for the Kerguelen Islands out of Durban. There is rumored to be a CN8 amateur aboard and the Kerguelen call may be FB9AX on 14 and 28 Mc. Should the bands be dead down there at times they may be able to whip up a local rag-chew with the gang over on Heard . _ . _ . _ Another loud Moroccan to open

(*Continued on page 90*)

TV Interference Problems

BY WILLIAM L. KISER *

[Reprinted from "Radio-Electronics" magazine, New York]

THERE are many excellent television installation and maintenance crews, technically qualified and having the necessary equipment for finding the causes of interference. On the other hand, there are service technicians who merely advise the consumer that the interference is due to "outside r.f. radiation" and advise him to communicate with the Federal Communications Commission.

A large number of letters received by the Commission state that the complaint is being made on the advice of a service technician. Some add that they are doubtful as to the technician's qualifications and ability. These doubts are confirmed when the FCC engineer investigates the case and the technician is called back — on the engineer's advice — to install a wavetrap or make some other modification which removes the interference.

The consumer cannot avoid the correct conclusion that the technician should have been able to diagnose the condition and correct it, and feels, justifiably, that he is paying for inferior servicing.

From a long-range view, this type of servicing does not benefit the television industry nor does it encourage set owners to renew servicing contracts.

Except in extreme cases, it is the responsibility of the service technician to clear interference. If he is not able to do so, the matter should be referred direct to the receiver manufacturer.

Two types of interference to television reception cause difficulty for the service technician. These are interference of the *same* frequency as that on which the program material is televised, and interference of a frequency *different* from that of the television carrier.

In the first type, the interference can be cleared only by suppressing or eliminating it at the source. In the second type, the interference can be cleared only by modification of the set.

Most complaints received at the New York Federal Communications Commission office are due to the second variety.

I.F. and Image Interference

As in all superheterodyne circuits, there are three frequencies to contend with: the frequency to which the receiver is adjusted (and the only frequency in which the user is interested), the image frequency, and the intermediate frequency. The latter two sometimes prove to be a headache in design and service.

For instance, the image frequency for channel 2 on most receivers is between 102 and 107 mc. Frequencies between 88 and 108 mc. are assigned exclusively to FM broadcasting stations.

Point-to-point radiotelegraph services are assigned to frequencies in the lower part of the i.f. band. If the receiver is insufficiently shielded, these signals may cause interference.

Interference due to poor image rejection is continuous and is observed only on certain channels. Interference due to poor i.f. rejection may be continuous or intermittent and can be observed on all channels.

A mistake made by many technicians is taking the receiver back to the service shop. Not only is it a waste of time and money, but the receiver rarely can be correctly adjusted to reject interference unless the adjustment is made while the interference is taking place. A communications receiver capable of tuning through the intermediate frequencies is of great assistance to the technician when servicing a receiver which is being interfered with because of poor i.f. rejection. First, it will tell him whether or not the interfering signal is in or near the i.f. band, and, second, whether the receiver requires i.f. traps or added shielding, if the signal causing the interference is being transmitted on or near the i.f.

Poor Locations

The service technician who agrees to service receivers installed in close proximity to the transmitting sites of point-to-point radiotelegraph stations is in for a lot of trouble, since some of the transmitters at these sites are operating on frequencies in the lower part of the i.f. band and have power outputs ranging between 1 and 50 kw. Special shielding and trapping often help, and a highly efficient antenna and well matched transmission line are necessities. Trapping is rarely completely effective, however, because most of these transmitters use beamed transmission and change power output or shift frequency at unannounced intervals to take advantage of propagation conditions. Reception in such areas is hardly ever perfect, despite all precautions.

Interference from signals on the television station frequency may be due to radiation from the local oscillators of nearby television receivers or to harmonics of FM receiver oscillators. Industrial r.f. heating apparatus and medical diathermy equipment can give trouble in this way too, but those signals are rapidly disappearing into one of the three assigned "noise" bands.

* Radio Engineer, FCC, New York, N. Y.

Ideally no receiver should radiate, but nearly all do, some more than others. Since the worst interference from other sets occurs in thickly populated areas, especially in apartment houses, this type of interference might be classified as resulting from a poor location.

The problem of eliminating it is one for the manufacturer, not ordinarily for the technician. However, it usually saves time and confusion if the technician at least locates the source of the trouble for his customer. The offending set can usually be identified by making simple on-off tests with nearby receivers. Sometimes a slight reorientation of the antenna helps.

The "Amateur Alibi"

The first thought of many technicians and set owners who know of an amateur in the neighborhood is to blame all interference on him. It cannot be overemphasized that the amateur is to blame only when he is transmitting excessive harmonics or other spurious emissions that are on the same frequency as a local television station and thereby cause harmful interference when the complainant's receiver is tuned to that frequency.

In spite of this, amateurs with 60 and 70 db of harmonic attenuation are being taken to task every day. It has been the observation of Commission engineers that most amateurs are willing to cooperate with both the consumer and the service technician. However, in some cases, this cooperation is precluded when the consumer is informed by the serviceman that the interference is due entirely to the operation of the amateur station. Investigations by Commission engineers, have time and again proven conclusively to the set owner that the amateur is operating within his rights and that the apparent interference is due to inadequate design features in the television receiver.

The first TVI complaint may serve to inform the amateur of his rights. In a typical case, a TV antenna 10 feet from a 10-meter ham antenna carried TVI down to the receiver. The ham was notified. He and the service technician got together. With transmitter on-off tests the technician found that most of the interference could be eliminated with a high-pass filter attenuating all frequencies below the TV bands. Addition at the receiver of a trap adjusted to the amateur's fundamental frequency completed the job. The amateur will usually cooperate with technicians investigating complaints in nearby receivers. But he knows that *the responsibility is not his* if he has reduced harmonics and spurious emissions from his transmitter to the extent that they do not cause interference on the same frequency as that of a local television station. He is *not obliged* to conduct further tests. Nor is he to be blamed if his irritation at the number of future unfounded accusations causes him to lose patience and refuse any aid at all. That is one excellent reason for making a genuine investigation of the interference source and not jumping at the nearest "easy" solution.

Some service technicians attempt to analyze the causes of interference by telephone conversations or calling at the customer's home at times when the interference is not observed. The only way to make a proper analysis is to observe the interference while the receiver is installed in the consumer's home. This may involve working evening hours in some cases, but it will certainly reduce the number of future service calls during the day.

Some Conclusions

A very large part of the whole interference problem lies right in the lap of the manufacturers. It is not a matter of "blame" as such, for few receivers have been deliberately designed poorly. By the standards of other types of home radio equipment, TV sets in general are well made. But interference makes a much bigger impression on the eye than it does on the ear — a fact that calls for higher future standards.

It is possible to design a receiver that will reject all interference not on the same frequency as the desired station. For reasons of cost and because the amount and degree of interference was perhaps underestimated, manufacturers have erred somewhat on the side of insufficient rejection. That this is recognized by the manufacturers themselves is evident in the improvements in receivers during the last year.

There are upward of 1,000,000 television receivers in the United States, and there will probably be twice this number in another year. This is a tremendous field for television sales and service and to service television receivers properly will require fast and efficient servicing personnel.

It is hoped that the interference problem may be alleviated to some extent by the tremendous and continued improvement in receiver design made by certain companies on their later models as compared to the receivers on the market a year or so ago.

• This is a clear-cut and forthright summation of the basic problems of interference to television reception. It is an excellent story to show to TV receiver owners who may be experiencing interference from your transmissions. *Radio-Electronics* has kindly provided the League with reprints of this article in its original form. Any ARRL member may obtain reprints by writing Hq.; nonmembers are requested to provide a self-addressed stamped envelope.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

UNTIL TVI became a major problem, the 10-meter band used to be occupied nightly by hundreds of stations, most of them engaged in local rag-chews. Now, in many cities, the 10-meter band is almost wholly deserted in the early evening hours. What has happened to all those hams? Some have migrated to lower bands, where licking the TVI is easier. Others have given up, with or without a struggle. But how many have tried what seems to us to be a better solution than either of these? How about 6 or 2 meters?

We certainly don't want to imply that v.h.f. operation is a TVI cure-all, for experience has shown that many of the v.h.f. fraternity are plagued with TVI, too. But it has also been demonstrated that TVI-free contacts can be made on 6 or 2 meters in some locations where the use of the ordinary variety of 10-meter rig is nothing short of suicide. V.h.f. operation may not be your solution, but have you *tried* it?

Much of the trouble experienced in 10-meter work is the result of harmonic radiation. With reasonable care in the design of a v.h.f. rig TVI from that source is far below that encountered with gear for lower bands. The lowest harmonic from a 50-Mc. transmitter that falls in a TV channel is the fourth, which may be in Channel 10, 11, or 12, depending on the operating frequency. Harmonic radiation from 2-meter rigs will not be troublesome until we have u.h.f. television. Contrast this with the problem faced by the 10-meter operator whose second harmonic is in Channel 2, his third in Channel 6, and his 6th and 7th in various high-band channels!

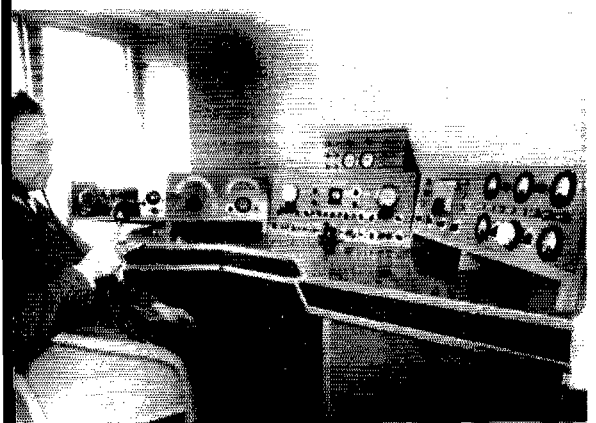
It doesn't help much in keeping peace in the neighborhood, but the interference caused in Channel 2 by 50-Mc. rigs is the responsibility of the receiver maker, not the amateur. This can be corrected in high-signal areas by use of traps at the receiver end, or by reducing power in the transmitter. Much of the rest of the TVI arising from v.h.f. operation results from radiation of harmonics by the oscillator or multiplier stages, a transmitter fault that should not be too tough to lick.

Take the case at W1HDQ. We have a good break, in the form of sparse population in the immediate vicinity. Our nearest neighbor with a television receiver is some 500 feet distant. For several months we operated on 50, 144, 220 and 420 Mc. in this location without causing any trouble, except for blocking out the weak New York signal on Channel 2 when we operated on 50 Mc. A check in the writer's own home showed no interference on our one "local" channel (we have a fair signal from New Haven on Channel 6) except when the 50-Mc. array was turned toward the TV antenna, and reducing power to 200 watts input cleared this. Operating on 144 Mc., there is no interference whatever on Channel 6, even with less than 20 feet between the 2-meter array and the TV antenna, and with 450 watts input on 2-meter 'phone.

Then the rig at W1HDQ (described by W1JEQ in *QST* for September, and appearing in the 1950 ARRL *Handbook*) was modified to permit operation on 10, and the fun began. We don't habitually use the 10-meter band during evening hours, but the first "Hello test" the evening the rig was fired up on 10 knocked out Channel 6 in the two TV sets located within interfering range. Interference with Channel 2 has also been reported over a wide area. Now we've done nothing to attenuate harmonics; the point is, we needed no corrective measure to permit trouble-free operation on 6 or 2, but use of the 10-meter band got us into hot water right from the start.

Another angle that is worthy of more exploration is the use of very low power in work on 6 and

* V.H.F. Editor, *QST*.



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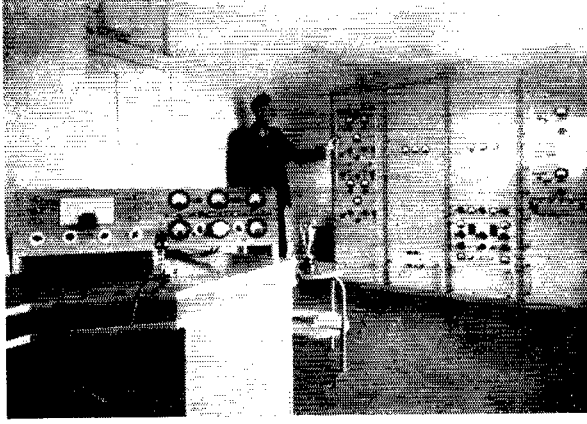
Hilton L. O'Heffernan, G5BY, at the control position of his new v.h.f. layout. The equipment at the left includes a converter tuning from 40 to 54 Mc., a 430-Mc. converter (converted ASB-8), and a BC-455 used as an i.f. amplifier. Next are two converters, one for 50 and one for 144 Mc. The middle section contains a 1600-kc. i.f. amplifier, a BC-453, and converters for 50 and 28 Mc. At the right is a VFO unit and a panel for selecting any of eight final stages. Over the center unit is an antenna selector panel for 12 different arrays, with two direction indicators for rotary systems.



The transmitting section of G5BY. Rigs for 145 and 430 Mc. are in the left-hand rack. Next is an all-band exciter, 28-Mc. final, and antenna tuner. Modulators and power supplies are at the right. All equipment, except for the converted surplus, is homebuilt.

♦

2. So you have TVI with your 500-watt rig on 6 — how about running two or three watts instead? Yes, you *can* work out with two watts. You won't get S9-plus-20-db. reports from many fellows, but they can hear you over a surprising radius. Just recently your conductor had a pleasant surprise in this connection. In the midst of a carpentry job in the radio shack we could not get the regular rock-crusher going for the weekly session of the Horsetraders. Hooking up a little demonstration rig we'd had around at some radio club meetings (6J6 final, 175 volts on the plate) we called the roll with some misgivings and less than 3 watts input. Answers came from W1DJ, Winthrop, Mass., 95 miles, W1ATP, Holliston, Mass., 80 miles, and all the local gang. The 90 minutes of net operation was carried through without a hitch. How much TVI do you suppose a rig like that will cause?

The results obtainable with low power on 144 Mc. are well known. Few 522s are run at more than 15 watts, yet plenty of stuff has been worked with that power. The 522 is not the best design for TVI freedom, by any means, but similar power levels and better designs provide trouble-free operation for 2-meter stations in many localities where use of 10 in evening hours is an invitation to trouble.

December Doings

The run of international DX that developed during the fall of 1949 terminated abruptly when the November page was torn from the calendar. Some of our South American friends continued to find the band open, but almost no DX contacts were made by stations in this country. LU9EV reports the band open on Dec. 2nd, 4th, 6th, 9th, 11th, 12th, 13th, 18th, 20th, 26th and 28th, mostly to Venezuela. CE1AH was worked on the 4th and 5th, and PYs heard on the 6th. HC2OT, who heard nothing in December, 1948, did a little better this year. Though the band was dead most of the month it did open up on the morning of Dec. 18th, when W5VY broke through with an S9-plus signal at 9:28. W5PVR was heard weakly at 9:35, but as no other signals were in evidence Steve hooked W5VY again. Then followed what may have been the first 50-Mc. use of a 'phone patch for international communication. Steve's son was in San Antonio at the time, and the 6-meter circuit was good enough for a fine Christmas-greeting QSO via the W5VY 'phone patch.

There were some good E_s openings in the States. The night of the 3rd saw stations over most of the country east of the Mississippi having short and mostly fragmentary QSOs, as the signals boomed in S9 for a few seconds and then dropped out suddenly as others replaced them. W4s came through the following morning again, and W9ZHL worked two Texas stations on the 5th. W4FWH and W4FI found the band open to the east on the 6th and 7th. Signals were good between the East and Middle West on the night of the 10th. There is a report that a Cuban station worked into W8 on the 12th, but we have no details. W4EQM, Langdale, Ala., W4FBH, Decatur, and W4OVT, Atlanta, Ga., worked W1, 2, 3, and VE3 on the 27th.

The 2-meter front was generally quiet, though good tropospheric propagation was reported during the mild weather that prevailed just prior to Christmas. W4HHK, Collierville, Tenn., reports that his customary three-way with W5JTI and W5NYH (191 and 137 miles, respectively) was interrupted when W9FVJ, Toledo, Ill., broke through from 350 miles to the north, off the back of the beam. Meanwhile, W5JTI hooked W5MKP, Baton Rouge, La., who, in turn, was working W5SM, Beaumont, Texas. Thus presented with an opportunity for some nice relaying, a message from W5SM was sent to Bill McNatt, W9NFK, and delivery was made promptly, with only 144 Mc. employed along the way.

Having maintained almost nightly contact since last May, W5JTI, W5NYH and W4HHK have good reason to believe that theirs is a reliable circuit. It has not failed them once in that time, and they have now gone through all kinds of weather. Heavy rainfall over most of the path provides the poorest conditions, and high winds are attended by weak and fading signals. Otherwise casual observation of weather conditions doesn't give much indication of what is in store, and signals haven't changed much with the seasons. There was a dense fog on the night of the 18th, an unusual condition in those parts, and it was in evidence again the following night, when W9JMS, Cory, Ind., was worked and a short but none-too-good QSO was had with W9FVJ.

G5BY, 1950 Style

In the March, 1929, issue of *QST* ARRL announced a station-description contest, with the first prize, a beautiful silver cup, to go to the owner of the best amateur station described in the pages of *QST* that year. Awards were to be made on the basis of technical excellence, versatility, and the extent to which the gear was homebuilt. Power and high cost were not factors. This was a contest to bring out the best in amateur gear, so that it might serve as a model for others to follow. If you have a file of old *QST*s handy, break out the October, 1929, issue and look over the station description appearing therein — the winner of the cup for the station of the year, when the results were all in.

Now take a look at the pictures of one of the world's outstanding v.h.f. stations on this page. See that silver cup? Yes, the award for the best station of 1929 was won by Hilton L. O'Heffernan, G5BY, whose latest in a long line of fine amateur layouts is pictured herewith. Like all its predecessors that have made his call well-known around the world, this latest edition of G5BY is almost wholly homebuilt, the only exceptions being a few small items of converted surplus gear. All the receiving equipment, and even the console at the operating position, were built on the spot. Antennas include a huge rhombic, aimed at this country, and rotary systems for 28, 50, 145, and 430 Mc.

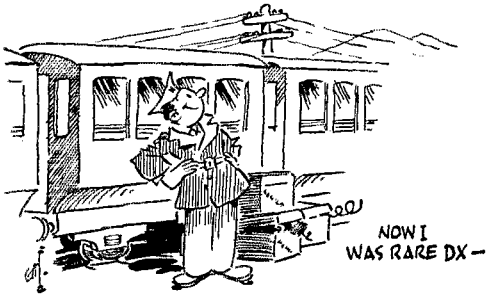
(*Continued on page 98*)

"The Land of Morning Calm"

BY NORRIS K. MAXWELL,* W5FOH/6, EX-J8AAG/HL1AG

"THE last American troops have left Korea" reports the press, and so ends the greatest of all DX adventures for some twenty-odd American hams who were privileged to sign J8 and HL1 during their tour of duty in the "Land of Morning Calm."

In common with many DX-chasers, I often had wondered how it would feel to be able to send CQ twice, sign some rare and swingy combination like YZ4BQ, and then sit back and pick out the nicest signal replying from a selection of thirty or more. It was with great joy, therefore, that I received orders directing me to report to San Francisco for shipment to the Philippines.



I thought at once of the throaty, QRM-cutting prewar signal of KA1HR on 40-meter c.w. Discounting rumors that the Army gave every overseas ham a BC-610, I made ready for the voyage by packing three foot lockers exclusively with ham gear, completely neglecting military equipage.

Several stormy weeks later our ship reached Yokohama. We had hardly completed tying up when a hard-boiled colonel came aboard and directed all infantrymen to debark immediately for rerouting to Korea! With heavy heart I thought of my foot lockers somewhere in the bowels of the transport. One of the ship's officers promised to do something about it, but having lost everything to the Transportation Corps before, I never expected to see my HRO and QRP transmitter again. Five weeks later we were put ashore from lighters in the ice-rimmed bay of Inchon, Korea. There, in the replacement depot, were my foot lockers, still stenciled "Manila." It was a GI miracle!

After an all-night trip on a rickety, slam-bang railroad (which I later found out ran at full speed without lights!) I pulled my heavy lockers of power transformers and chokes off the train, assisted by two grunting soldiers who wondered audibly, "What in the %$#"?/ do these officers carry with them?" I was met by a sleepy adjutant who informed me I was in Taegu, Kyangsang Pukto province, South Korea. Not only was I rare DX now — I also had a romantic-sounding faraway QTH to go with it!

At breakfast in the regimental mess I fired questions at the personnel adjutant. "How do I go about getting a GI ticket? . . . Is an examination required? . . . Where do I get the necessary forms?" He stopped my questions with a wave of his spoon. "You mean amateur radio? There is none . . . in fact, it is specifically forbidden."

The ground rocked and I heard whistling noises. Investigation proved the heartbreaker correct. I had landed on the one spot of the globe where ham radio was still under war-imposed silence! I had broken my back carrying a load of ham gear halfway around the world for nothing!

For six long months I listened dejectedly to DX signals that would make any self-respecting DX hound drool. In the meantime Asiatic spiders were raising a family in my transmitter. Chaplains consoled me; visiting members of the Inspector General's office shook their heads solemnly, "Sorry, it is the Corps' policy — no amateur radio."

After the sixth month it came to pass that a wonderful memorandum was issued authorizing holders of Stateside ham licenses to apply for J8 tickets. My letter was on the way in ten minutes. I chased the spiders out of the rig and got a member of the Engineer Corps to help me put up a long wire aimed at the States. In short time

(*Continued on page 94*)

* Captain, Inf.; Army Language School, Presidio of Monterey, Calif.

United States Naval Reserve

AMATEURS visiting Washington, D. C., are invited to utilize the facilities of W3PZA (ex-K3NRW), which is located in Room 900 of the Printcraft Building, 930 H Street, N. W. This station has five operating positions and four transmitters, which may be operated simultaneously on the 28-, 14-, 7- and 3.5-Mc. bands, with inputs ranging from 50 to 1000 watts. A maintenance shop with all essential test equipment and tools is being established. An Amphenol twin beam for 28/14-Mc. operation is mounted on a 25-foot steel tower atop the roof of the building, giving a line-of-sight range for v.h.f. operations up to 50 miles. The equipment was furnished by the Navy for use as Naval Reserve Alternate Control Station NDM1. For some time ham work has been conducted as K3NRW. Effective October 17, 1949, the amateur call was changed to W3PZA.

Its close alignment with ARRL emergency communications plans, convenient tie-in with Naval Reserve circuits, and location in the same building that houses one of the main East Coast teletype terminals of the American Red Cross place W3PZA in a unique position to serve as a communications center for amateur operations in the event of localized emergencies or remote disasters anywhere in the country.

Cmdr. Lew Sieck, USNR (W4KMG), trustee of W3PZA, has invited amateur radio organizations in the Greater Washington area (including near-by Virginia and Maryland) to make use of the facilities, both as a club station and as a regular club meeting place. Individual operators in the area, or transients who have the urge to do a little hamming, are welcome at any time the station is open.

Admittance may be gained simply by displaying your FCC amateur operator license. To check on whether W3PZA is open at any particular time, telephone the station, Republic 8300, extension 748, or Cmdr. Sieck, Falls Church 4881 (after 6 P.M.) or Republic 6700, extensions 72043 or 72010 (between 8:30 A.M. and 5 P.M.).

♦

The W3PZA (ex-K3NRW) beam, atop the roof of the Printcraft Building, 930 H Street, N. W., provides a ham landmark in downtown Washington, D. C.

♦

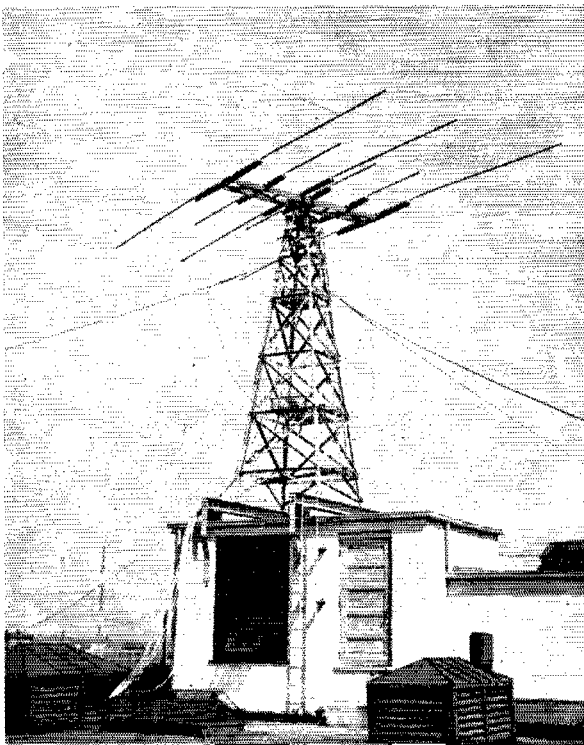
A combination of Navy and Naval Reserve communications facilities provides Secretary of the Navy Francis P. Matthews with radio contact while en route by plane to and from his home town, Omaha, Nebr. On the Washington end, communications are handled by Navy radio at the Naval Air Station, Anacostia. In Omaha, the Naval and Marine Corps Reserve Training Center, manned by Naval Reserve personnel, maintains continuous radiotelegraph contact with the Secretary's plane for the handling of arrival and departure reports, information on the number of passengers, and other flight details.

Operations are conducted by W. T. Schurkamp, RM1, USNR (WØDKV), R. M. Freshman, ETC, USNR (WØGJS), and G. L. Swodeck, RM2, USNR. In addition to activity at KØNRO, the Training Center ham station, WØDKV and WØGJS are on 28 Mc. from their home stations.

—•••—

On October 10, 1949, a B-17 Air Force plane, en route from Albuquerque, N. M. to Hill Field, Utah, crashed in Great Salt Lake. CAA reported the disaster to the Naval Reserve Training Center (K7NRW), Salt Lake City, and requested assistance in rescuing possible survivors. The

(Continued on page 98)



Military Amateur Radio System

HIGHLIGHTING the First Anniversary celebration at MARS headquarters in Washington, D. C., was a world-wide radio broadcast over MARS frequencies featuring the Secretary of Defense, the Honorable Louis A. Johnson; the Chief Signal Officer, U. S. Army, Maj. General Spencer B. Akin; and the Director of Communications, U. S. Air Force, Maj. General Francis L. Ankenbrandt. Brig. General Wesley T. Guest, chief of Army Communications Service Division, was the program emcee and introduced each speaker in turn.

Secretary Johnson's greeting:

"The armed services always have valued highly the splendid contributions made by the radio amateur, in war and peace, to the welfare of our nation.

"It was a happy occasion for all of us when the Military Amateur Radio System was established on the 26th day of November, 1948.

"MARS is further proof of teamwork among the services, since the Army, Air Force and National Guard all work together on this important project. The purpose of MARS in creating interest and furthering training in military radio communications, promoting study and experimentation, coördinating practices and procedures of amateur radio operations with those of military radio communications, and providing an additional source of trained radio communication personnel in the event of a local or national emergency is appreciated by all of the military services.

"With membership open to any individual in the military service, organized reserve corps, National Guard, or Reserve Officers Training Corps who possesses a valid amateur radio operator's license, MARS is becoming larger and more proficient every day.

"It is a real pleasure for me to extend on behalf of the Department of Defense greetings and congratulations to each member of the Military Amateur Radio System on this, your first anniversary."

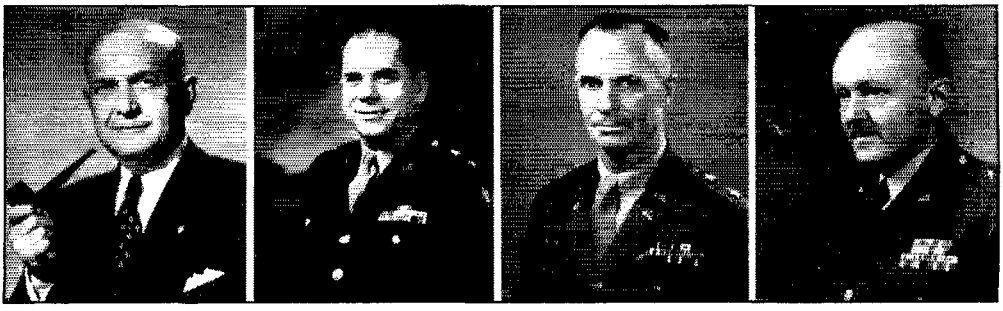
General Ankenbrandt referred to the MARS as ". . . one of the most brilliant and unique experiments of modern military practice — the encouragement of radio amateurs for possible national need." He stated that it is reasonable to assume that in a nation whose armed might becomes more highly mechanized with each passing day, the future requirement for specialized training will be much greater.

General Akin enumerated several organization difficulties which MARS had encountered and mastered successfully in the first year of operation. He said, "The first issue of the *MARS Bulletin* went into the mails this week. Allocation of frequencies has been of much concern to my office. Frequencies which are specifically military and which are within the range of amateur radio are a must. I believe recent assignments have solved that problem.

"Recruiting MARS members during the past year required a great deal of effort. As the second year of MARS begins, we are well along toward our second thousand. The membership at last count was 1800.

"Unit activity and increased member participation now are our primary objectives."

JOHNSON ANKENBRANDT AKIN GUEST



Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

TUNING

7475 Rupert Ave., Richmond Heights 17, Mo.

Editor, *QST:*

I have adopted the policy of not wasting power on DX stations who insist on calling CQ and announce blandly that they are "tuning the band." Maybe I don't understand the problems of those in other lands but I know from experience that it's a long chance in trying to contact someone who merely says that he is "tuning the 10-meter band."

I surely hope there will be more who adopt the policy of stating what portion of the band or at approximately what frequency they intend to listen.

— *M. G. Bullock, W0AJU*

"OF, BY AND FOR"

1700 Walnut St., Philadelphia 3, Penna.

Editor, *QST:*

I have just finished reading in the December issue of *QST* the report on the October meetings in Washington and the editorial on "Unity." No one who has had any experience in executive processes could fail to recognize in this whole procedure, dating back several months and culminating in the Washington Board meeting and FCC conference, the typical signs of masterful management, high-grade diplomacy, unwavering good will and, above all, integrity of purpose.

The extraordinarily friendly yet efficient "atmosphere" of the ARRL became apparent to me from the first membership correspondence through the period when I had contact with your V.H.F. Editor. Likewise the real friendliness of the few hams whom I have met has brought much pleasure and considerable help and encouragement. Consequently, this picture of friendship and unity sustained somewhat of a shock when I became aware of the cleavage caused by something or other but brought to the surface by the FCC "blueprint" plan. I don't profess to know enough about the game to hold any specific views on the pros and cons of this or that proposal but I have been distressed to see signs of discord.

To me, amateur radio as it has been developed and practiced in the United States is an outstanding example of the best in American traditions and the American way. We tend to lose these treasures of life all too rapidly. It takes "big" men to accomplish what appears to have been achieved in the amateur radio service during the past few months, culminating in the Washington meetings. You have done and are doing a fine job.

— *Lawrence LePage*

122 Kenny Drive, New Haven 13, Conn.

Editor, *QST:*

When I entered into the hobby of ham radio I did so with the sincere hope of some day looking back upon a lifetime of enjoyment of a worth-while hobby, of getting genuine value received for the financial outlay necessary, the time spent, the sleep lost. Then, suddenly, almost before I felt firm ground beneath my feet and really began to grasp the true value of amateur radio, two specters raised their heads — TVI and a "plan for the direction, etc., etc." of amateur radio. I very seriously considered retrenching and converting my present equipment into some other hobby. It would have been a reluctant change, I assure you.

Little by little, through the efforts of the League in presenting technical articles aimed at TVI reduction, I have managed to suppress that deterrent to a reasonable degree. And now, through your efforts to present the true amateur viewpoint to the FCC — a viewpoint which I always felt would be respected and considered by the Commission, once it was adequately presented to them — I now feel again that my hobby was advisedly chosen, and that a very enjoyable future is in store.

I am sure that many amateurs felt as I have felt, that they got there too late. You have changed all that now, for them and for me. I hope they appreciate what you have done.

— *Arthur W. Coffland, W1RVE*

QSLs

418 Kiva St., Los Alamos, N. M.

Editor, *QST:*

Please remind the gang the percentage of answers and speed of reply to their SS and other contest QSLs will be increased if the other fellow's number is included on their QSL cards. This is especially important if there is a possibility your call may have been copied wrong.

— *Bob Freyman, W5NXE*

TVI DX

211 West 11th St., Grand Island, Nebr.

Editor, *QST:*

Enclosed is a copy of the original letter I received dated December 4, 1949, from Mr. Earl G. Arnold, W2YRB, 705 Arthur St., Syracuse, N. Y. [W2YRB's letter repeats receipt of W0QYY on Channel 13 of a TV receiver in Syracuse. — *Ed.*]

In view of the fact that we are having a considerable amount of TVI, I thought this information might be of interest to you. I am at a loss to give any logical answers unless it was propagation conditions, but it shows what can happen in the front end of a TV receiver.

I have not read of nor know of any other case like this one. I claim to be the first to cause TVI over a distance of 1200 miles. I think this is a record. What do you say?

— *E. W. Kincade, W0QYY*

[EDITOR'S NOTE: One possible explanation, and a fairly reasonable one, is that the 10-meter signal was simply so strong that it was getting into the intermediate frequency of the receiver. Under good propagation conditions distant signals will frequently approach local signals in strength on this band. As a general rule, i.f. interference is more likely to occur in the actual passband of the i.f., and we have seen bad interference of this type from European stations.]

VISIT SWAPPING

Box 434, Singapore, Malaya

Editor, *QST:*

In common, I imagine, with a large number of other hams in the British Isles, I have a great ambition. It is to take my family to visit America. "Well," you may ask, "why don't you?" I will tell you. There are two little things which are very difficult to obtain in large numbers. In order of difficulty they are — the dollar and the pound.

My home, by the way, is in London and I hope to be returning there next year. I had thoughts of a grand trip via

(*Continued on page 106*)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
JOHN E. CANN, W1RWS, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
L. G. McCOY, W1ICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

A New W1AW Service. Last November W1AW initiated a new type service for radio amateurs on a test basis. Short bulletins which accompany the daily information addressed to amateurs now give predictions of ionospheric disturbances from the forecast data furnished by the Central Radio Propagation Laboratory, Bureau of Standards. This information is sent simultaneously on all our frequencies. The advance information on ionospheric storms should be of value to amateurs. Such will help the operator on our lower frequencies to arrange schedules for maximum effectiveness. DX men will have warning of periods when long-distance propagation may be generally poor. The v.h.f. experimenter can often anticipate DX opportunities frequently associated with disturbed periods. Any suggestions or reports on this new service are invited.

W1AW Telegraph Bulletins for All Amateurs (Mon. through Sat.)	W1AW 'Phone Bulletins for All Amateurs (Sun. through Fri.)
8 P.M. & Midnight EST	9 P.M. & 11:30 P.M. EST

On FCC Monitoring for Power Levels. Quite a lot has been said in *QST* concerning the ethics and legality of observing the kilowatt level! Some amateurs have thought from time to time they could get away with more than the legal limit. FCC points out that in their regular duty of checking for over-power, amateurs should *not* be misled to think that advance station inspection is always necessary. The new application of field-intensity meters of the continuously recording type now makes it possible to "get the goods" on almost any offender and go about the check quietly. With the new equipment and present know-how FCC is in a position to make a recording of field strength without advance calling upon the amateur. On the strength of the data accumulated, constituting legal evidence, it is then practical and in the power of FCC to take any steps that might be warranted. A visit to any station does not have to be made until after the accumulation of the more vital data, at which time the correlation of actual power levels used with the field strengths recorded will speak eloquently.

DX Test Operations. The annual DX competition will be an operating highlight during February and March. Get in it if you can, whether for a score or to look for particular rare countries. Note that this year a slight revision in making up all the identifying serial numbers makes these of interest from the viewpoint that each number tells you the power level the station you are working is using. Hope you like this feature! This paragraph is to express the hope that all participants will *give honest reports* in accordance with the RST system and that individual attention in looking into these reports and their suffixes (K for click, C for chirp, etc.), may help every participant to keep his signal *clean*. It is to be expected that FCC will be on the job as at all times, but hoped that if the above precautions are observed there may be fewer citations than last year! ARRL observers will also be on the job sending the coöperative notices to the end that hams avoid FCC trouble if possible. Care to observe the calling instructions where given by DX stations as to tuning HM, ML or — U, — D, for kc. up, kc. down, etc., from a given frequency should expedite work and minimize QRM, as necessary to the greatest operating success and enjoyment in the activity. Luck and DX.

Present as guests at a hamfest staged by the Sandia Base Radio Club at the New Mexico State Fair in early October were, *left to right*, Dr. Norris E. Bradbury, director Los Alamos Scientific Laboratory; Wayland N. Groves, W5NW, ARRL West Gulf Division director; Paul J. Larsen, ex-W2XN, director Sandia Laboratories; D. H. Dickinson, Albuquerque Chamber of Commerce. In addressing the assemblage, Dr. Bradbury and Mr. Larsen stressed the part amateurs have played in atomic development in addition to their well-known contributions in other fields. The hamfest was attended by thirty per cent of New Mexico's amateur population.

Give the Newcomer a Break. We can remember going some ten miles to another city to view with wonderment the "big station" that had a rotary spark gap at a time when we were still at spark coil level; we had worked the station and got a cordial invitation to drop around. There were honest helpful answers to our questions. Here is a word from our counterpart of today.

Have you ever sat before a second-hand 6L6, with parts from discarded receivers carefully wired together, drawing every ounce of power from a tired, worn-out junk box transformer . . . sat for hours with your proud little ten watts, hoping to work one or two locals through the kilowatts?

What do they do to you? Just because you're a beginner, not sending more than ten words a minute, not on the other side of the earth you get excuses, "My XYL has chow now" or "Must QRT to get to work!" Ten minutes later when they think you have left the air you hear them on again, rulers of the air waves. *What a break.* For young guys with 50¢ in their pockets, who must take every piece of radio equipment from some old receiver or junk box, *what a break.*

Next time you hear a faint, slow CQ that you know is coming from a new man, *please give him a break.* Work him. Put it down in your log as local-DX. We're *not* asking a band for ourselves or for you to run low power so our ten watts can be heard. All we want is *a break.*

Some day we'll be glad to carry on the tradition of ham radio you have so gallantly fought for. If needed in the future as so often said, if you want us then, *just give us a break now.* — *W3PSU/9*

Sometimes we ask ourselves if the amateur of today has all the virtues of yesteryear. Is he properly helpful to the newcomer; does he extend the helping hand and join him to the brotherhood with a fraternal QSO and kindly encouragement? The "real amateur spirit" is indeed the spirit of helpfulness; most all persons new in amateur radio get their assistance and early advice and inspiration from other amateurs. Think back to the days when *you* were a newcomer and you will *want* to give all the assistance you can. Give the newcomer a break!

— *F. E. H.*

HIGH CLAIMED SCORES — 1949 SWEEPSTAKES

Advance indications are that the 16th ARRL Sweepstakes will surpass all previous such contests on all counts. Scores, contact totals and the number of entries appear to have been greater than ever. Comments received with entries agreed that it was the liveliest and best SS yet!

The tabulations below list the highest claimed scores received up to mid-December, the deadline for these columns, and should give all participants an idea of how they will stack up against other entrants in their particular section or area.

The most notable fact revealed by the list of claimed scores is the large number of SSers who worked all ARRL sections. The final results of the 15th SS showed eight contestants with all sections worked. In the preliminary listing this year are no less than 27 operators (22 c.w. and 5 'phone) who claim to have made a clean sweep!

For the first time in SS history, the 'phones broke into the 100,000-point class. The honors for this achievement go to three West Coasters, W6OGZ (operated by W6UBT), W6QUE and W6ITH.

The following listings show score, number of contacts, and number of sections worked. All figures are *claimed* by the contestants and are subject to further checking. Final results will appear in an early issue of *QST*.

C.W.

W4FU	192,780–1071–72	W3FQB	118,300–676–70
W3BES	183,600–1032–72	W3GHM	118,215–667–71
W4KFC	181,849–1026–71	W9NII	118,125–675–70
W2IOP	177,500–1006–71	W4IA	118,038–676–70
W6WIP	164,430–915–72	W1JYH	117,150–660–71
W9VSO	160,637–905–71	W2NNL	116,900–673–70
W9RQM	158,900–908–70	W8OYI	116,338–675–69
W3GAU	147,574–859–69	W3EQA	114,660–640–72
W7KEV	146,160–813–72	W1TS	114,625–655–70
WØDYX	146,160–812–72	W1BIH	112,713–640–71
W3DPA	145,695–709–72	VE3KE	112,350–644–70
W5PKF	142,378–811–71	W9PNE	111,860–662–68
W9ERU	138,862–805–69	W4IIY	111,435–650–69
W3CPV	137,160–762–72	W3OCU	111,387–637–70
W9LVR	137,160–762–72	W2YLS	110,938–625–71
W2BXA	134,575–774–70	WØNCS	109,725–630–70
W4KFT	133,170–772–69	W5BLU	109,550–627–70
W6EPZ	131,750–732–72	W9KZZ	109,480–652–68
W2IMU	131,425–754–70	W3BXE	108,000–600–72
W2HEH	131,490–731–72	W9VFZ	107,565–609–71
W6MVQ	131,400–762–72	W2BTG	106,855–602–71
W3EIS	130,995–738–71	KP4KA	106,776–743–72
W3FQZ	129,237–740–70	WØOYB	106,088–615–69
W9JNC	128,944–749–69	W3GJY	105,000–600–70
W6KRI	128,599–725–71	W4BRB	104,673–761–69
W2PWP	126,875–725–70	W3CPS	104,387–604–70
W3JTC	126,735–714–71	W7GBW	104,299–743–71
W2RDK	126,000–700–72	W2RQH	103,759–602–69
W9WFS	125,730–699–72	W6SRU	103,500–577–72
W3FUF	125,235–726–69	W1AWX	103,275–608–68
WØTKX	124,516–703–71	W4ZWR	103,180–616–67
W7QAP	124,290–693–72	W7HKT	103,032–723–72
W5KC	124,200–720–69	W1CJH	102,960–574–72
W8UZJ	123,855–736–36	W9GFF/9	102,725–586–70
W3GRF	123,338–715–69	WØPHR	102,350–637–65
W9AEW	122,850–702–70	W9DJV	102,091–610–67
W4NNN	121,440–705–69	W5GEL	102,612–761–68
W8CEG	120,922–701–69	W4NNJ	101,500–580–70
W3HRD	120,600–670–72	W2TNN	101,258–587–69
W2FXN	120,405–702–69	W4FPK	101,104–712–71
W9WEN	119,103–673–71	W4YFA	101,080–722–70
W2GFG	118,925–710–67	W5PES	100,888–578–70
W5USN	118,890–664–72	W3KEW	100,800–576–70
W9AEY	118,490–700–68	W1LVQ	100,323–713–71

'PHONE

W6OGZ[1]	122,400–853–72	W8VDJ	34,816–256–68
W6QUE	115,632–803–72	W7SSY	34,365–243–58
W6ITH	112,320–780–72	W8PXP	34,204–252–68
W6TT	86,336–608–71	W9QIX	33,726–256–66
W6AM	77,106–543–71	WØIPC	33,619–258–55
W7DTB	70,840–506–70	W4IWO	32,844–238–69
W1ATE	65,959–465–71	W3LEU	32,480–203–64
W3LTU	64,260–459–70	W5EVZ	32,472–246–66
W6CHV	61,020–339–72	W4AGB	32,348–246–68
WØJYW	58,030–416–70	W5FAB	32,128–254–64
W6VUW[2]	57,188–433–68	W4KAE	31,488–252–64
WØPRZ	53,100–295–72	W8TAP	31,815–253–63
W4LXE	47,232–333–72	W4LIM	31,076–231–68
W4CYC	46,505–328–71	WØAXE	30,352–218–57
W7EYD	46,320–292–64	W9JBF	30,195–200–61
W5SMA	45,712–266–69	W7JUO	28,578–217–66
W7MLJ	44,336–328–68	W3DKT	28,152–210–68
W4AQR	43,960–314–70	W3HFD	27,962–226–62
W7QP	42,140–301–70	W4MRH	27,648–221–64
W6CBE	41,976–318–66	W2BWC	27,537–206–67
WØOMG	41,875–319–67	W6ZIO	27,342–217–63
W7ENA	41,333–252–66	W4KCQ	27,260–213–64
VE6NA	40,988–240–69	WØIWE	27,170–210–52
W8BDI	40,296–293–69	W8LAX	26,796–205–66
W8TRX	40,044–284–71	WØMCX	26,664–202–66
W2SKE	39,402–301–66	W9ZCI	26,334–209–63
W6UZX	37,812–276–69	W5JWM	26,264–199–67
W3KQU	37,660–271–70	W3LQX	25,870–200–65
W1BFB	37,122–275–69	WØGFG	25,438–188–55
W2PVG	36,584–269–68	W2YOS	25,152–197–64
W8ALC	35,700–255–70		

[1] W6UBT operator. [2] Multiple-operator entry. Six operators.

Two things that are essential for an effective emergency communications organization are a "plan" and the means to carry it out. The plan itself is simple enough, and many fine ones exist; but some of those that exist have never been tried. It is just assumed that they will work.

There is only one thing better than a simulated emergency to give your plan, your equipment, your operators and your facilities a test: a *real* emergency. No local AEC organization can know how it will function unless it is actually called on to function during a real crisis; prior to that, all that is known is how it is *supposed* to function and how it *seems* to function. The more realistic you can make your test emergencies, the better test you are giving your equipment and facilities; but your operators get the acid test only in the event of the real article. Up until then, you do not know and they do not know how they will behave. If only we could conjure up a real emergency now and then (just a little one!) to see how the untested will stand up in battle; for the human animal has reserves of energy, determination and endurance which cannot be called upon at will, which are manifested only in the event of dire need.

We are not trying to say that simulated emergency tests are valueless. Far from it. They are the best means we have of preparing ourselves for whatever service we think we are most likely to have to perform. But there is more to advance planning than just "dreaming up" a situation. History will tell you what type of emergency is most likely to strike your community, and in many cases you can profit from the experiences of those amateurs who participated in former local communications emergencies. In preparing to do a job for your community, consult not only your local relief and disaster agencies, but also the back files of your local newspaper to see what was needed in previous disasters, and amateurs who supplied or attempted to supply emergency communication at those times in order that they might pass along to you the pills, bitter or otherwise, of their former experience.

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On December 14th we received an appeal from the Regional Coördinator of the Columbia River Basin (W7DIS) to assist in clearing 3885 in order that the frequency might be used by walkie-talkie units being used for a search for a person in the mountains. We do not yet have full details of the operation, but would like at this time to extend W7DIS's thanks for the fine coöperation in keeping 3885 clear. In his own words, "The coöperation of not only Columbia River and Pacific Northwest stations but all stations across the nation as they responded to our request for voluntary assistance in keeping the channels clear through ARRL Headquarters was a thrill to observe and a credit to the AEC program. This coöperation paid off in another job being well done by ham radio."

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Amateur participation in a rescue mission always makes a good story. Publicity-wise, it is a better story if the mission succeeds, but from our own standpoint this need not be so. It requires just as much hard work, inconvenience and public-spiritedness to participate in a mission destined to fail as one destined to succeed, and those who participate, in all fairness, should receive the same amount of credit. Such a case in point was the participation by sixteen amateurs, members of the Coastal Emergency Radio Net, the South Texas Emergency Net and the Harris County Emergency Corps, in a search of the wilderness in the vicinity of Houston, Texas, for the missing Harrington plane. Three fixed stations were set up at search headquarters and five mobile rigs were sent into the jungle with the searchers. The search began at 8 A.M. and was concluded at dark with all members of all search parties fully checked out by ham radio, which functioned perfectly all day and kept search headquarters and field leaders fully informed at all times Participating amateurs included W5BHO, W5EEX, W5EZE, W5GLS, W5HAQ, W5HMN, W5HSX, W5IGS, W5IRP, W5JIY, W5LHJ, W5NQA, W5ON, W5OX.

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On Sept. 27th a serious fire in the Lytle Creek Canyon (Calif.) area threatened two heavily-populated resorts and recreational areas. Federal Forest officials called on local amateurs to assist as radio operators in fighting the fire. W6EXB, W6QUK and W6ZUU responded and were on the job through October 2nd when the fire was brought under control. We are indebted to W6HKD, EC for the San Bernardino area, for this information.

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This page, each month, will reflect what has come to us in the way of information and illustration. First consideration will be given to stories of actual emergency operation. Secondly, recommendations or suggestions for betterment of the AEC, and thirdly, descriptions of set-ups and simulated drills. This is only a general policy, subject to variations according to circumstances. We would also like to have at least one picture on the page every month, on some AEC subject.

What we are getting at is that, in general, we need your help in keeping the AEC page full and interesting. From time to time we shall be able to editorialize on subjects which correspondence indicates needs some discussion or explanation — but we'd rather have you fellows do the contributing and we'll confine our work, for the most part, to editing. What have you to offer that would be of interest to *all* AEC registrants? What subjects would you like to have discussed? What can you offer in the way of photographs? This AEC "page" is going to dwindle to considerably less than a page if you fellows don't come through.

SKAGIT VALLEY EMERGENCY

On Saturday evening, November 26, 1949, heavy rains precipitated high water in the Skagit River Basin from its origin at Ross Dam. By late Sunday morning the road from Ross Dam to Sedro Woolley was cut off by the high water, and all power and telephone service east to that region was disrupted, and flood conditions threatened in Mount Vernon and the lower Conway-Stanwood areas. The American Red Cross office notified the Anacortes police department of the situation, who in turn contacted Norm Ray, W7LFA, to ask if he could set up any radio facilities.

W7LFA assembled W7KGV and W7LAN, also an automobile, a Mark II tank transmitter, a 100-watt transmitter and two NC-183 receivers. All this was sent to the premises of KBRC in Mount Vernon, where they were met by W7MGG and W7GAT. The 100-watt rig was set up at KBRC under the call W7LFA/7, and W7KGV and W7LAN went out with the tank set as a mobile unit. W7MGG and W7GAT took a fixed station to the fire hall at Stanwood. Meanwhile, other 75-meter 'phone stations joined into the activities and maintained contact with the only station in the cut-off area, W7BPP. A few messages were passed. Watch was maintained all night on 3970 kc.

By Monday afternoon the impending emergency receded, but a watch was maintained at W7LFA/7 until 0430 Tuesday. Although a disaster did not develop and FCC did not declare a radio emergency, amateurs were lined up and ready to supply whatever was necessary in the way of emergency communication should the need arise. Special credit is due to the following: W7BBP, W7FOK, W7FXD, W7GAT, W7ILR, W7IT, W7JKB, W7KGV, W7KLB, W7KYV, W7LAN, W7LFA, W7LJG, W7LVB, W7LVO, W7MGG and W7MVH for their tireless efforts to *be ready* for the worst. — *W7MVH, EC Skagit County, Wash.*

A.E.C. TIP-OF-THE-MONTH

Put a 'speaker plug in the output circuit of the car radio to be used with the microphone in the audio system. This makes a simple but effective public-address system which is very useful in disaster areas for addressing crowds, obtaining quick passage through road blocks, etc. — *W6ESR*

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Wyoming	Marion R. Neary, W7KFV	Oct. 21, 1949
Western New York	Harding A. Clark, W2PGT	Nov. 21, 1949
Kentucky	Dr. Asa W. Adkins, W4KWO	Dec. 15, 1949

In the New Mexico Section of the West Gulf Division, Mr. Lawrence R. Walsh, W5SMA, and Mr. J. G. Hancock, W5HJF, were nominated. Mr. Walsh received 85 votes and Mr. Hancock received 43 votes. Mr. Walsh's term of office began Oct. 20, 1949.

In the Eastern Pennsylvania Section of the Atlantic Division, Mr. Jerry Mathis, W3BES, and Mr. John Callaghan, W3DZ, were nominated. Mr. Mathis received 258 votes and Mr. Callaghan received 145 votes. Mr. Mathis's term of office began Nov. 24, 1949.

In the North Dakota Section of the Dakota Division, Rev. Lawrence C. Strandenaes, WØJWY, and Prof. H. L. Sheets, WØDM, were nominated. Rev. Strandenaes received 36 votes and Prof. Sheets received 33 votes. Rev. Strandenaes's term of office began Dec. 20, 1949.

In the Utah Section of the Rocky Mountain Division, Mr. Leonard F. Zimmerman, W7SP, and Mr. James L. Dixon, W7LQE, were nominated. Mr. Zimmerman received 37 votes and Mr. Dixon received 27 votes. Mr. Zimmerman's term of office began Dec. 20, 1949.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below:)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the..... .. ..ARRL Section of the..... Division, hereby nominate..... as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Georgia	Feb. 1, 1950	Clay Griffin	Mar. 8, 1950
South Dakota	Feb. 15, 1950	J. S. Foasberg	Jan. 15, 1950
New Hampshire	Feb. 15, 1950	Gilman K. Crowell	Resigned
Yukon *	Mar. 15, 1950	W. R. Williamson	Mar. 17, 1949
West Indies	Mar. 15, 1950	Everett Mayer	Dec. 15, 1949
Arizona	Mar. 15, 1950	Gladden C. Elliott	Apr. 1, 1950
San Joaquin Val.	Apr. 3, 1950	Ted R. Souza	Apr. 15, 1950
Maritime *	Apr. 3, 1950	Arthur M. Crowell	Apr. 15, 1950
Missouri	Apr. 3, 1950	Ben H. Wendt	Apr. 17, 1950
Santa Clara Val.	Apr. 3, 1950	Roy E. Pinkham	Apr. 30, 1950
Alberta *	Apr. 3, 1950	Sydney T. Jones	May 1, 1950
Eastern Mass.	Apr. 3, 1950	Frank L. Baker, jr.	May 15, 1950
Louisiana	Apr. 3, 1950	W. J. Wilkinson, jr.	May 31, 1950
Vermont	Apr. 3, 1950	Burtis W. Dean	May 31, 1950
Montana	Apr. 3, 1950	Fred B. Tintinger	June 1, 1950
Virginia	Apr. 3, 1950	Victor C. Clark	June 14, 1950
Nevada	Apr. 3, 1950	N. Arthur Sowle	June 15, 1950
Ontario *	Apr. 3, 1950	Thomas Hunter, jr.	June 15, 1950
Manitoba *	Apr. 3, 1950	A. W. Morley	June 15, 1950
Idaho	Apr. 3, 1950	Alan K. Ross	June 17, 1950

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

BRIEF

The South Carolina 75-meter 'phone net has a novel twist for keeping the XYLs happy. After net roll call is completed on Friday night, the mikes are turned over to the XYLs, with the OMs working the switches. The girls discuss everything from babies' formulas to coming dances, and most of them have decided that "ham" radio is not the husband-stealer they thought it was. Makes it easier to meet a net six times a week if the XYL is also interested.

• Inspired by the Westchester Amateur Radio Association's success in scoring a "turkey run" (see p. 46, March, 1949, *QST*), the Racine Megacycle Club undertook to provide communications for a similar run sponsored by the Racine Motorcycle Club. Five 28-Mc. mobile units were operated at points along the course and sent information to W9KZZ/9, headquarters control station at Racine, or W9HFL, subcontrol at Rochester. The latter were linked on 3.5-Mc. c.w. *Left*, W9IHM operating his mobile unit. Participating in the successful communications set-up were W9s ACQ, FKA, HFL, IHM, KZZ, NSQ, STN and UHB. • *Right*, members of the WARA assisted the Yonkers Motorcycle Club again in its 1949 Turkey Run. A new feature of the '49 affair was the use of teletype. W2EQD, *left*, and W2YBK, *right*, are shown receiving reports from the check points; W2BFD, *center*, is punching these on paper tape for teletype transmission to the finish line. (*Photo by W2PHO*)

TRAFFIC TOPICS

We have just prepared a "net directory to end all net directories" — and what a job it was! Copies of it were sent out to a mailing list of ECs and NCSs in a recent traffic bulletin, and we have a few hundred extra copies. This directory includes all traffic nets registered with ARRL up to December 1, 1949, plus a few "squeakers" whom we were able to stick on the end of the list. The nets (over 150 of them) are arranged alphabetically by name, by states, and by frequencies from low to high. Because the directory occupies six pages, we were not able to include it with the CD Bulletin, so if you want a copy drop us a line.

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Elsewhere on these pages you will find a listing of the "National Calling and Emergency Frequencies." Those who read the fine print under the listing of the frequencies will perceive that these frequencies now have a traffic as well as an emergency application. If you get stuck with some traffic you can't get rid of, try a directional "CQ TFC" on one of these frequencies. Traffic men who are on the lookout for incoming traffic should also have a listen on these frequencies from time to time. *Listen first* to be sure the frequency is clear of emergency or other traffic work before transmitting; then when you make a contact, move to another frequency to conduct your business.

Some nets operate six or seven nights per week, but most of them do not operate week ends, and traffic received Friday night is often held up until Monday night. It is hoped that more nets will operate on a seven-day-per-week basis as available personnel to divide the duties increases. Meanwhile, it seems to us that the National Calling and Emergency Frequencies might have special use during week ends for those who are "stuck" with traffic. Let's give it a try, fellows. Remember, emergency work has priority; if you hear any emergency calling on the frequency, steer clear of it.

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The common practice of omitting certain refinements in message-handling procedure is apt to cause some confusion on the part of the receiving operator. We call your attention to two points:

(1) Use the signal $\overline{AA}$ after each part of the address. Otherwise an address of 14 Smith St., West Palm Beach, Fla., might be copied as 14 Smith St. West, Palm Beach, Fla. Military addresses are especially confusing if not transmitted with proper separation signals.

(2) Always send $\overline{AR}$ at the end of each message to indicate the end of the message — otherwise the receiving operator might keep right on copying! Also, add the letter B if you have more traffic for him, or the letter N if you have no more.

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A check of our net directory frequency chart shows the following facts which may be of interest:

(1) Dividing the 80-meter c.w. band into 69 channels five kc. apart, we find that only 16 of these channels are not occupied by *any* net.

(2) Of these 16, eleven are above 3750, where VE 'phone QRM is often considered to be intolerable.

(3) Of the remaining 5, one has a net within two kc., and one is the frequency of W1AW. If these are ruled out (although they can be used at certain times or distances), only three are left, 3505, 3510 and 3625. The former two are considered to be too close to the edge of the band for net use, and the latter is an alternative frequency for an adjacent net.

(4) Twenty-four of the 69 channels are shared by two or more nets, conflict being avoided either by time-sharing or by distance of separation.

(5) 95 nets are registered in the 3800–3850 segment; 32 from 3800–4000.

It is to be expected that when or if the 'phone band moves down to 3800, the VE 'phone QRM between 3750 and 3800 will drive most of the nets now operating in that segment down into the 3700–3750 region. In addition, the use of 3700–3750 by the new Novice class of licensee (when or if it becomes effective) may drive c.w. traffic and emergency nets into the 3500-3750 region.

What it all boils down to is that the eventual necessity for greater sharing of net frequencies is inevitable if we are to avoid QRM between nets. It is not a matter on which immediate action is required, but rather a look into the probable future. It seems that we should think about it a little, prepare ourselves for the probability that the net frequency on which we now operate and which we consider "ours," we may some day have to share on a time basis with one or more additional nets. We may have to soft-pedal the use of QNY procedure, eliminating it entirely at times when traffic is light and limiting it to one or two adjacent frequencies known to be clear of nets at that time when traffic is heavy.

Several suggestions have been made. One is that we consider each 2.5 kc. as a separate channel, another that we stick strictly to our own net frequency and not send net stations to other frequencies to clear their traffic. Each has a disadvantage. Concerning the first suggestion, it is hard to see how 2.5 kc. separation will be feasible unless a great many more than now are able to spot the exact net frequency — most nets are spread out over 3 kc. or more. The second has the disadvantage of greater consumption of time in clearing traffic on nets and loss of interest by those who have to sit and wait for their turn.

Another suggestion was that more use be made of lower and higher frequency bands, and we feel that this is the best suggestion yet. Some traffic nets are even now using 10, 6 and even 2 meters. Only one we know of has an operating frequency on 160. The so-called "long-haul" nets *need* frequencies on 80 or 40. Local-coverage nets can make out on other bands provided their participants have the necessary equipment.

Give these matters some thought, fellows, and let us in on them.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for November traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6CE	46	2120	2065	31	4262
W7CZY	64	1850	1705	123	3742
KG6DI	1571	1003	0	998	3572
W4PL	5	1382	1283	57	2727
WØZJO	23	885	841	38	1787
W7KWB	1149	0	0	0	1149
W5GZU	2	617	486	28	1133
W3CUL	77	390	307	81	855
WØHMM	4	388	379	5	776
W5PWV	17	375	349	23	764
W6IOX	2	383	363	12	760
K5NRJ	246	243	206	35	730
W6DDE	28	343	210	145	726
W5LSN	7	347	283	57	694
W8NOH	141	272	212	60	685
W2PRE	30	325	248	61	664
W9EVJ	32	281	279	35	627
W5MN	5	309	217	92	623
W2CLL	47	297	253	15	612
W6JQB	24	286	280	1	591
W4APC	8	290	290	0	588
W5DRW	10	285	281	0	576
W1NJM	26	277	146	83	532
W8RJC	18	272	237	25	552
WØQXO	10	268	245	21	544

The following made the BPL for deliveries:

W7AXJ 110	W8SCW 65	W6FDR 53
W7DRA 101	W6GWB 62	W6OT 53
W6NW 82	WØRJF 61	W6RXT 53
W1RWS 72	WØOUD 60	W9SXL 52
W9CMC 67	W2TYC 54	W6ELQ 51
W7ZU 66	W1AW 54	W7FIX 51

A message total of 500 or 50 or more *deliveries* will put *you* in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

W5KWE suggests that members of traffic nets establish schedules with nonmembers, especially beginners in traffic, in order to collect traffic for their nets and to "break in" the new boys to traffic handling, with the eventual aim of getting them into the net as full participating members. Those sections who do not have "slow-speed" nets, and other nets who want more members, might try this device. There are many would-be traffickers who would like to get into nets but are "bashful" about it. (W8UKV says "If they're bashful, send 'em to me!")

DISTRESS AT SEA

On November 11th, about 1800 EST, Charles Mellen, W1FH, was listening on the 20-meter band when he heard a station signing PUMK/VP3JM sending a distress call. W1FH established contact and PUMK identified himself as an operator aboard the freighter *Novo Banderente*, 45 miles off Cayenne, French Guiana. The ship was disabled and running low on food and water. The operator had been trying to raise FY8AC in Cayenne without much success.

W1FH contacted FY8AC, who notified the Brazilian Consulate and they immediately sent a trawler to the reighter's assistance.

W1BLF, John Bartlett, had also contacted FY8AC and took the distress message. He notified the ARRL Headquarters and they in turn called the Coast Guard.

Both W1BLF and W1FH are to be complimented for their alertness and service rendered.

FAST OPERATING PAYS OFF

Some fast operating paid off in relaying a Minneapolis doctor's diagnosis to a Munich Army hospital where a soldier's child was critically ill.

W1ONK, Don Sleeper, contacted a D4 who was calling Minneapolis with an emergency message. The message stated that Army doctors at the 98th General Hospital urgently needed the diagnosis of Dr. H. D. Good of Minneapolis, who had treated the child for an illness shortly before her departure to Germany.

W1ALZ, Clarence Whitaker, maintained contact with the D4 while W1ONK contacted WØSJX, David Gerrish, who got the information needed from Dr. Good. W1ONK then 'phoned the information to W1ALZ and he in turn relayed to the D4 in Germany. These amateurs can look with pride at their quick thinking and decisive action in helping out in this emergency

CODE-PRACTICE PROGRAM

The following list of code practice stations should be added to the list appearing on page 61, Nov. 1949 *QST:*

W1RSY, Harry Nielsen, P.O. Box 57, Bedford, Mass., 28.86 Mc., Mon. thru Fri., 1900–1930 EST.

W3KVL, C. J. Lauer, 345 S. Millvale Ave., Pittsburgh 24, Pa., 29 Mc., Mon. and Fri., 2200 EST.

W3PHP, R. A. Kopecki, 2910 W. 3rd St., Chester, Pa., 29.5 Mc., Friday from 1730 to 1830 EST, Saturday from 1800 to 1900 EST.

W5CNK, E. F. Bray, 506 Holsen, Poteau, Okla., 28,700 kc., Mon. thru Fri., 0900–1000 CST beam east, 1500–1600 CST beam west.

W6DTW, E. H. Bailey, 1602 Rheem Ave , Richmond, Calif., 28,890 kc., Mon., Wed., Fri., 1845–1945 PST.

W8BNB, R. L. Ross, 839 Western Ave., Zanesville, Ohio, 29.3 Mc., Mon. & Fri., 2230–2300 EST.

W8LQB, R. E. Swope, 917 Federal Ave., Zanesville, Ohio, 29.3 Mc., Mon. & Fri., 2230–2300 EST.

W9BCJ, C. B. Keller, 930 26th. South Bend, Ind., 29.5 Mc., Mon. thru Fri., 2000 CST, 5–30 w.p.m.

W9IWT, E. V. Stolberg, 1024 E. Knapp St., Milwaukee 2, Wis., 29,400 kc., Mon., Wed., Fri., 2100–2200 CST, 3–20 w.p.m.

KØNRZ, sponsored by Kaw Valley Radio Club, E. N. Johnston, WØICV, 624 Roosevelt St., Topeka, Kans., 29.5 Mc., Mon. thru Fri., 1900–2000 CST.

Jamestown Amateur Radio Club, E. V. Folkestad, WØTNL, 615 First Ave. N., Jamestown, N. D., WØSKE Mon., WØYIZ Tue., WØNBS Wed., WØHJK Thu., WØTNL Fri., 2000–2100 CST.

Persons using any of the above practice transmissions are requested to notify the addressee so that the lessons may be planned accordingly. Amateurs interested in helping out in the ARRL Code Practice Program should drop a line to ARRL Headquarters for information.

SOUTH DAKOTA DAYS

In order to assist amateurs who need a contact with South Dakota for WAS, the Sioux Falls Amateur Radio Club will sponsor "South Dakota Days." S. D. stations will stand watch on 3700–3725 kc. and 7100–7150 kc., starting at 6:00 P.M., February 25th and ending at 4:00 A.M. CST, February 26th, and from 6:00 P.M. to midnight on February 26th, and will answer calls of CQ SD.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W.	*'PHONE*
7100 kc. (day)	3875 kc.
3550 kc. (night)	14,225 kc.
14,050 kc.	

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic.

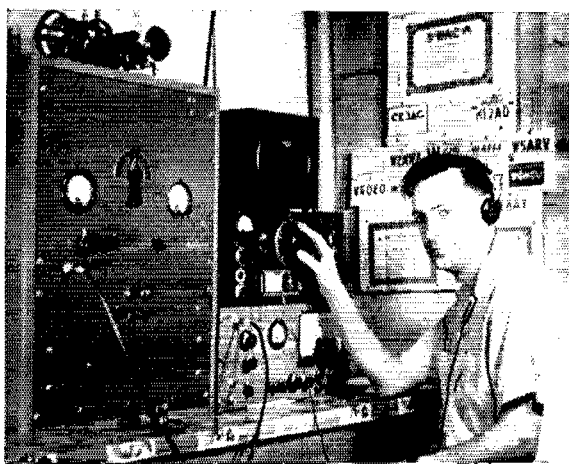
At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

If clear of emergency utilization, and if any current amateur calling-and-answering has been completed, a directional CQ or a QSTed "traffic list" should bring results. If you get a reply, tell the station you hook up with what traffic you have and what frequency to go to in order to complete your *QSO.*

Use the above frequencies for making contact only. Do not tie them up with rag chewing or traffic transmission.

♦

An increasingly familiar call on the NTS nets these days is W1EOB. For years one of our outstanding contest performers, Vic suddenly sprouted forth on the traffic nets last fall and has been doing an exceptional job as NCS and liaison station on three nets: Western Mass. Net, First Regional Net and Eastern Area Net. The VFO under the receiver and the amplifier to the left are both homebuilt and give a good account of themselves on the air. Vic is a member and past president of the Hampden County Amateur Radio Club.



A.R.R.L. ACTIVITIES CALENDAR

Feb. 3rd: CP Qualifying Run — W6OWP
Feb. 10th–13th: DX Competition (c.w.)
Feb. 13th: CP Qualifying Run — W1AW, WØTQD
Feb. 17th–20th: DX Competition ('phone)
Mar. 5th: CP Qualifying Run — W6OWP
Mar. 10th–13th: DX Competition (c.w.)
Mar. 17th–20th: DX Competition ('phone)
Mar. 17th: CP Qualifying Run
April 1st: CP Qualifying Run — W6OWP
April 19th: CP Qualifying Run — W1AW, WØTQD
April 22nd–23rd: CD QSO Party
May 5th: CP Qualifying Run — W6OWP
May 16th: CP Qualifying Run — W1AW, WØTQD
June 3rd: V.H.F. Contest
June 4th: CP Qualifying Run — W6OWP
June 15th: CP Qualifying Run — W1AW, WØTQD
June 24th–25th: ARRL Field Day
July 7th: CP Qualifying Run — W6OWP
July 17th: CP Qualifying Run — W1AW, WØTQD
July 22nd–23rd: CD QSO Party

CODE-PROFICIENCY AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from W1AW/WØTQD will be made on February 13th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7215, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP* only will be transmitted on February 3rd at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from December *QST*
Feb. 1st:	*Miniature Tubes in a Bandswitching* . . . p. 11
Feb. 3rd:	Qualifying Run, 2100 PST, from W6OWP only
Feb. 7th:	*Lumber Facts and Figures*, p. 16
Feb. 9th:	*Installing a Practical 75-Meter Mobile* . . . p. 25
Feb. 13th:	Qualifying Run, 2130 EST, W1AW/WØTQD
Feb. 15th:	*A 53-Foot Rotating Antenna Mast*, p. 33
Feb. 17th:	*Technical Topics*, p. 36
Feb. 21st:	*A Regenerative Oscillator for Harmonic-Type Crystals*, p. 46
Feb. 23rd:	*A Ham's Mother Has Her Say*, p. 48
Feb. 27th:	*On the Air with Single Sideband*, p. 58

DXCC NOTES

DXCC has grown to such proportions that an occasional refresher course on the inner workings of the award's administration seems appropriate. Recent inquiries concerning listings in the "Endorsements" column of the DXCC box have prompted this word of explanation. Endorsement listings in *QST* are based on endorsement stickers issued. Except in the case of the Honor Roll, in which a fellow's call may appear even if his countries total may not have changed for several months, all calls in the "Endorsements" column represent amateurs who have passed at least one ten countries "land-mark" such as 110, 120, 130, etc., and who have qualified for the corresponding sticker or stickers. For example, if an amateur progresses from 171 to 179 countries over a six-month period, this progress will not be reported. As soon as he qualifies for his 180 sticker, his call will appear in the DXCC box. If you have qualified for an endorsement sticker and your call hasn't appeared in the DXCC box, check your latest issue of *QST*. Mention is made in each DXCC box of the one-month period during which endorsements and new applications were handled for the amateurs listed therein. If we have failed to list your call when it should have been listed, let us know so that we can check our records and give credit where credit's due.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH....227	W3BES....215	WØYXO....209
W6VFR....223	W2BXA....213	W4BPD....206
G2PL.....216	W8HGW....211	W6MEK....206
W6EBG....215	W3GAU....209	G6ZO.....206

RADIOTELEPHONE

W1FH.....183	VQ4ERR...160	W8HGW....155
W6DI.....170	W1JCX....158	G2PL.....155
XE1AC....168	W4CYU....158	W1NWO....152
	W2BXA....156	

From November 15 to December 15, 1949, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

ZL1MB....120	W7KWC....105	G6XX.....100
W9ELA....114	CO8AJ.....104	W7AYJ.....100
G3CCO....110	G2YS.....102	W4KCQ....100
SM5PA....108	W6TGH....102	W9DGA....100
W2UEI....108	G3CFK.....102	W7DET....100
ON4PZ.....107	G8WF.....102	W3KHU....100
W6PWR....107	W5BDI.....102	W9QLW....100
W2KJZ....105	G4GJ.....101	W5RS.....100
W2TUD....105	W1ODU....101	ZS5YF.....100
W3VZD....105	W6NIG.....101	G2FFO.....100
	W1MRP....100	

RADIOTELEPHONE

W8HRV....115	W1PDF....103	VE3BNQ...101
W9NLP....106	G3CCO.....102	G8KP.....101
F3WV.....105	W6PWR....102	W1CJK.....100
W1BPH....104	W3DKT....102	WØFUH....100
HC2JR.....103	WØANF....101	W4MB.....100

ENDORSEMENTS

WØNUC....203	VK5JS.....158	W3ALX....130
W3KT.....202	W8UDR....153	GM3AVA...130
W9KOK....201	ZL3BJ.....152	W3LVJ....130
W4AIT.....193	G2VD.....150	I1LT.....130
W2HZY....191	W8SYC.....150	KV4AA.....124
PY1AJ.....190	W2YW.....149	LA6U.....124
PAØUN....190	PY2CK.....143	W9ABA....122
W1ENE....180	VE3IJ.....142	W9FKH....122
W6MVQ...180	W5JC.....141	W5CGC....121
W6MJB....180	W6CIS.....140	W3ARK....121
W6RM.....180	W6BVM....140	WØAZT.....121
F8BS.....180	PY1AHL...140	W6JK.....120
W3OCU....172	W3HRD....135	W1BGW....120
CE3AG....170	G3BI.....134	W8WWU...120
W1HX.....170	KP4CC.....131	W8HFE....120
KH6IJ.....162	W2LSX.....131	I1XK.....120
I1KN.....160	W5LGG....130	W6ATO....110
W6TI.....160	W2GVZ....130	W9UXO....110
W2IMU....160	W6CTL.....130	W9MXP....110

RADIOTELEPHONE

W9RBI....150	W6KQY....121	W1HX.....113
W1HKK...142	W2EOH....120	W8ZMC....111
W4EWY...141	GM3AVA...120	OZ7TS.....111
W1ENE....140	ZL2GX.....120	W4OM.....110
W3LTU....130	W6MJB....118	W2NHZ....110
HB9DS....127		W4MKB....110

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — The new SEC for Eastern Pennsylvania is ISE, and all communications relative to emergency work should be addressed to him. The E. Pa. Net has a new frequency and a new RM, the frequency being 3610 kc. and the RM PMG. Please give him all the support you can. WTS missed a couple of weeks of the net by being on vacation in Florida. The West Philly Club is running its own WAS Contest. The novel features are the 250-watt power limit and one-frequency band. ITZ made WAS during the SS on 14 Mc. so it looks like he has it in the bag if he can get the cards in. New officers of the Harrisburg RAC are KCL, pres.; ASW, vice-pres.; KEK, secy.; ADE, treas.; ABG and PUK, trustees. The Penn-Harris 2-meter emergency net is on every Monday 9 to 10 P.M. MBK sends along some other dope on the Harrisburg Club but the writing defies interpretation. PMD announces the forming of a new mobile club in the Glenside area. The temporary net frequency is 29,492 kc. and the meeting place is the Memorial Hall, Glenside, on Monday nights. Present members are PMD, OQI, AAG, MXP, and KCG. Interested mobile men are invited to contact PMD. The U. of P. is on the air with ABT, 700 watts. There are 35 members in the U. of P. Club with ODC, pres.; KBW, vice-pres.; and NZW, secy. CUL delivered Guam emergency traffic the day before it was filed. She has a new BC-221 frequency meter. ELI has joined the MARS Net. He has been QRL cleaning up haywire. PST now sports a VFO. PSU is in Chicago as PSU/9 working 3.5 and 7 Mc. QAG, of Bethlehem, is ex-1ONI. AQN has his TVI licked and invites inspection to prove it. LTU mowed 'em down on 'phone in the SS. QV had a copy made of the ARRL TVI film and is passing it around to the Atlantic Division clubs. KT is now over the double DXCC mark. CPV needs one more card for his 200 sticker. The York Road Radio Club means business in the VHF SS this year. JPP is ready to go on 2-meter teletype and is looking for other TT stations in the Philadelphia area. Traffic: W3CUL 855, PMG 153, ANK 46, AXA 30, OML 30, ABT 20, WTS 15, PST 12, ELI 9, AQN 2, LYU 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — The Chesapeake Amateur Radio Club, at its first November meeting held a "Symposium on Antennas," presided over by Zeke Wilson, NIJ. Dr. Keats Pullen, jr., discussed the "Design and Applications of R.F. Coupling Loops" at the Nov. 10th meeting. The Baltimore Amateur Radio Communications Society held a Stag Smoker for its members November 18th. The Club's installation committee completed the antenna at PSG, Red Cross Headquarters, and will begin regular operation there when new receiver is ready. Club meetings are held on the first and third Monday of each month at 1714 Park Ave., Baltimore. The November 7th meeting was "Auction Night"; LZM was guest speaker. The Washington Radio Club's November meeting was held at PZA, National Red Cross Disaster Control station. The members inspected the station, and were invited to operate same if they had brought along their tickets. The Washington Mobile Radio Club conducted a drill November 14th for the benefit of the Naval Reserve. The mobile units were divided into three nets covering three areas. Naval Reserve personnel were allotted to each car for the drill period. Traffic was handled and 'phone patches were made. KBE called the roll and was NCS. Both shacks at EAX, the University of Maryland Radio Association, are humming with activity these days. Beginners and advanced members monitor a tape puller, NSS or W1AW at code table. 28- and 144-Mc. rigs are in operation; the 28-Mc. rig is connected to a beam. The five-man traffic committee runs a student message service using the Swing Shift Net on 7 Mc. as main outlet. The BC-610 also can be heard frequently on 14- and 3.85-Mc. 'phone. EQK now is Class I Official Observer, being the only station who has so far qualified in the section. MNR gets out FB on 28 Mc. UF has been appointed Official Observer. NST, NNX, EQK, JLX, LUE, AJX, and GZO form a "Ham Settlement," their QTHs being in close proximity in Baltimore. KKN gets out well on 28 and 144 Mc. LSX vacationed in Los Angeles over Thanksgiving. CDQ was active in the SS Contest. EYX has been on the sick list. MFJ has the rig on 3.5-, 7- and 14-Mc. c.w., VFO, and gets out nicely. IL has been reinstated as ORS. Traffic: W3ECP 189, EAX 68, AKB 51, FWP 47, QL 47, NNX 25, JHW 18, BWT 8, CIQ 6, AKR 3, CDL 2.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — BAY and PAU worked the West Coast on 50.4 Mc. during the November opening. ZI has a new mast up and hopes it will stay up! ZYX and KHA are new ORS. RM RPH needs some more live-wire hams for his nets. ORS has a brand-new WAC. YAD keeps schedules with KG6FI. UKS is building a new kw. rig. WJE has TVI with his 160-meter rig. BEI keeps daily schedule with G6BY. RFF has recovered from his recent illness. PFT and UZP are active in K2USA net. The Ocean County Radio Assn. meets on the third Tuesday at Bayville Lodge Tea Rooms, Atlantic City Road, Bayville. The Delaware Valley Radio Assn. meets on the second Wednesday at the Chamber of Commerce Room, Hotel Stacy-Trent, Trenton. The Hamilton Township Radio Assn. meets on the first Tuesday at Nattingham Firehouse, Hamilton Square. The South Jersey Radio Assn. meets on the third Wednesday at American Legion Hall, Collingswood. Visitors are always welcome. Secretaries of other clubs, please contact your SCM. Traffic: W2RPH 83, ORS 19, RG 18, ASG 10, ZYX 10, ZI 5.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — This section was well represented in the SS. In all fairness to others there will be a complete clean-up of all 'phone as well as c.w. appointees who have failed to fulfill their obligations with their appointments. So come on, fellows, let's get those reports in. The first new Brass Pounders certificate issued in the Western Pennsylvania section goes to BWL, of Altoona, who piled up a total of 1000 messages handled during November. Through *Hamateur News*, of Altoona, we find one club which claims it is broke financially but is one of the best-attended clubs in the area. KQD still leads the pack in DX. LIV is doing fine with his TBS-50. RBH can be heard on 7 Mc. RYN is rebuilding for 14 Mc. *Hamateur News* carries simple circuits monthly to help the boys become active with any junk they may find around the shack. KFB and BKS are back with the gang. OB finds working the Mobile Marine quite interesting. The Polecat Net is back on 3665 kc. at 11:30 A.M. Sundays. MTI and his XYL, GGO, are settled at new QTH. The Upper Ohio Valley Emergency Net is looking for new members for c.w. in Charleroi, Greensburg, Beaver Falls, and as far north as Erie. If interested, contact NUG. Thanks LFK for a job well done on the club paper. The Steel City Amateur Radio Club reports a new club house being completed. The 144-Mc. activity of the club station shows 13 states and five VE3s. OKU is the engineer of that v.h.f. gear. If you ever hear KWH on 144 Mc. you will hear something that sounds like an Irishmen's picnic when RXT, OKU, LBE, PAP, and UHM get together. UVD, of Jeannette, sends in his monthly OO report. LEJ is doing a wonderful job of code instruction with 8 "hope-to-become-hams" taking advantage of his teachings. NCJ, in Erie, hopes to be with the Western Pennsylvania traffic gang soon. NRE is one of the most reliable on net schedules. AER still mixes traffic with his DX hunting. LFM now is 4PZC in Miami. VNE again is rebuilding. Traffic: W3BWL 1000, NRE 275, GEG 272, GJY 138, NUG 116, KWL 75, POW 37, LSS 19, AER 12.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — SEC: QLZ. RMs: SXL and SYZ. PAM: UQT. Section nets: IEN, 3940 kc., and ILN, 3765 kc. JMG added an audio filter and has antenna in the attic. BON is experimenting

(Continued on page 60)

with Clapp oscillator. CFV has new 32V-2 rig. CEO sports a new 75A receiver. CSK now is on 3.85-Mc. 'phone. We extend our sympathy to CTZ, who recently lost his wife. EVJ, CMC, and SXL made the BPL this month. VOQ is the father of a baby boy. KOK made DXCC twice with 200 countries confirmed. UIJ had a hand in erecting a new home for UNG. There is a new baby at AUU's. Rumors are that ZHB is building an eighty-element 144-Mc. beam. GA visited GNU. QWT soon will be in the radio business for himself. EBX has been on the sick list. GDI thinks hams are getting more signal conscious and notes are improving. PGQ keeps busy working on his house. It was thought that ERU had forsaken us for TV but guess he will turn out all right. PGQ, CMU, and CZB are all employed by same firm. New officers of the Elgin Amateur Radio Society are WJS, pres.; FRP, vice-pres.; HHB, secy. NN concentrated on DX for a month and brought the count up to 85 countries, all on 7 Mc. NN also reports three men on the WGN staff ready for ham exams. ASN, EHS, and UBP are new on the ILN Net. FRP left the rig at the factory to be modified to a 32V-2. 5QLT, of Biloxi, Miss., now is a resident of St. Charles. LIN installed new 24-hour clock. JNC reports a score of about 131,000 points in the SS Contest using 100 watts. DTC reports new 200-watt final working FB. FFD has new Lazy H antenna for 14 Mc. but finds conditions not too good for DX. New officers of NWARC are IT, pres.; EHS, vice-pres.; BDV, secy. ACJ says the IVRA gang is going for 160 meters in a great way with JVC, IQC, and PBY showing them how. HCP is having feedback troubles with 28-Mc. rig. HKI is having good luck with short skip work. PBY spent two weeks on the East Coast. LHK is battling beam troubles. BIN is hard at work on MARS schedules. YNE is drooling over new 51J1 receiver data. QLZ visited CFV and BPU recently. DKW has gathered together the workings of some DX with new antenna, new rig, and Super Pro. TLC manages to get on 160 meters now and then. CXT still is in Japan and reports no time for hamming. IDA spent the month chasing DX on 14 Mc. EVJ has new TV receiver and is finding out first-hand about TVI, just one step ahead of the neighbors! The boys at K9FAE, Scott Air Base, have been doing a nice job of traffic-handling. Want to try something? Spend a half dozen sessions with either IEN or ILN Nets and see if you can break away from the friendly atmosphere which prevails. You will come back for more! JMG, with the help of others, is publishing a monthly bulletin for the ILN gang. Your SCM hopes he has not overlooked anybody this month as the correspondence was heavy. Traffic: (Nov.) W9EVJ 627, SXL 253, CMC 216, DUA 102, CTZ 101, LIN 89, UBP 86, FFR 78, EBX 75, CBA 73, CMU 57, BUK 48, MRQ 31, FKI 30, FRP 30, PEK 19, ZPC 15, BPU 14, FFD 13, AND 11, YTV 11, JMG 10, EHS 5, JNC 5, ASN 2, DTC 2. (Oct.) W9KQL 92.

INDIANA — SCM, W. E. Monigan, W9RE — DGA needs two more countries for DXCC. DHJ is on 3.5 and 144 Mc. GWA is on 28-Mc. phone. SQN is on 3.5- and 7-Mc. c.w. AQO has new speech amplifier. GFO has QTH picked out and plans kw. and antenna farm. HQF burnt out two filament transformers. EHU plans to return to school. CVN has rebuilditis. GHK is on 7-Mc. c.w. GFS says break-in system works FB. AJ says DX is good on new beam. The Michiana Amateur Radio Club and its auxiliary, the Michiana XYL Club, held a joint dance and buffet supper to dedicate the new club transmitter and call, W9AB. Honor was shown to Mrs. Harry Miller, widow of Harry Miller, former holder of the call and long-time member of the Club. Mrs. Miller was presented with a Life Membership in the XYL Club. Traffic: W9TT 168, BKJ 111, RCB 93, RE 34, KTX 32, DHJ 26, DKV 21, DOK 14, QLW 14, RJD 10, DGA 2.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — C.w. net (WIN) 3775 kc., 7 and 10 P.M. 'Phone net (BEN) 3950 kc., 6 P.M. SEC: YYY. RMs: CWZ, LFK, SZL. PAMs: ESJ. IVE and HKL are conducting a code and theory class weekly at Appleton. IQM, at Fond du Lac, has 55 watts on 3.5- and 7-Mc. c.w. HDZ is OBS on 1880-kc. 'phone. UIT participates in the Early Bird Fone Net at 0400 daily. UFX has Collins 310B-1. SZL is vice-chairman of local Red Cross Disaster Relief. CWZ has been doing a swell job with the slow-speed c.w. net at 6:30 P.M. ERW completed WAS during the SS with 16 watts on 7 Mc. A new call at Wausau is IUQ. MRAC presented initial showing of ARRL's new TVI film at its November meeting. RKT, operations manager of Mancorad, presents the following local news: HPC, at Two Rivers, works 3.5- and 7-Mc. c.w. FMH has new 40-ft. windmill tower. DKH is active again! BZU, DDG, and LBC have been working via 144 Mc. and would like to hear from others in the State to expand coverage. OVE is new EC for Manitowoc-Two Rivers area. IQW is building a new operating position. It looks like VSO takes top SS honors in the State with 905 stations and 71 sections. Others include RQM, 915 in 70; LVR, 762 in 72; AEY, 700 in 68; DJV, 611 in 67; WEN, 673 in 71; KZZ, 650 in 70. DJV and CBE renewed ORS appointments. JBF put up 14-Mc. 8JK rotary with 144-Mc. beam above it. JEK is interested in emergency organization at Baraboo. VQ4HJP makes 35 zones and 84 countries for WEN. KXK has been gunning for a couple of TFs. GPI was guest speaker at Mancorad and Rock River Club meetings. A Clapp VFO and a pair of 826s will put AEY on 3.5 Mc. and the WIN. Traffic: (Nov.) W9CBE 382, ESJ 366, AEY 127, SZL 78, IVE 69, IQW 65, LFK 61, DJV 54, CWZ 50, FCF 29, YCV 25, DND 24, HDZ 23, UIT 16, SFL 15, EIZ 13, UFX 9, BZU 7. (Oct.) W9UIT 2.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, J. S. Foasberg, WØNGM — HDO has a new beam on 28 Mc. and also is sending code practice nightly. HYV is debugging his new 813 final. A gang from the Mitchell Club paid a visit to CWC, at Spencer, and helped chase bugs out of his 696. TVI reared its ugly head in Sioux Falls. The first station to be seen was the club's ZWY. RRN announces that the Sioux Falls Club plans to sponsor an opportunity for stations to work South Dakota for WAS. All stations in the State are welcome to join in and help. The dates will be Feb. 25th and 26th, from 6:00 P.M. to 4:00 A.M. on the 25th and 6:00 P.M. to 12:00 on the 26th. The frequencies to be used will be 3700–3725 and 7100–7150 kc. South Dakota stations are to listen for CQ-SD and will reply on the above frequencies. 160 meters is being used quite a bit in the State and seems like a good bet for a state net. Traffic: WØGCP 42, FJS 2.

MINNESOTA — SCM, John B. Morgan, WØRA — Asst. SCM, Jean E. Walter, ØKYE. SEC: BOL. RM: RPT. KYE has recovered from his long siege in the hospital, and is back home working 7-Mc. c.w. HRY now is EC for the Duluth area. DOQ, with the assistance of NRV, is working 3.85-Mc. 'phone after several years lay-off because of illness. SGW and OEH are newcomers on 28 Mc. in Duluth. JVD has his new Stancor 203 mobile working. The Arrowhead Club put on a swell 144-Mc. demonstration for the Duluth Fire Department, after which the chief bought them all coffee. QIG has his mobile working. VOB and YUP are getting out well on 160 meters. LNE has a new NC-173. JNC has moved to Chicago and now is 9JNC. AES is a newcomer. IPN, an old-timer, is back with the 80-meter c.w. net. Traffic: WØRJF 178, MXC 89, RPT 62, BGY 45, LDI 34, TKX 25, RXL 8.

DELTA DIVISION

MISSISSIPPI — SCM, J. C. Wallis, W5DLA — SEC. MUG. PAM: LN. RM: WZ. KIE has moved to Columbia. PAF is now Class A. PDN, of Hattiesburg, also is Class A. KYC says his patch gadget keeps him busy on 3.85 Mc. JHS and QNN, of Keesler AFB, move traffic via the Shrimp Net thence to the Rebel Net. ANP is Acting NCS of the Magnolia Net, relieving KUT. WZ has been busy with Sweepstakes and European and LO contacts. A new station at Columbus is PPB, active on 7 Mc. BEV and JJA are working 14-Mc. 'phone. Visitors to WZ were 4OKD and 4BAQ. Recent visitors to DOL and ANP were ØYPN and ØITQ. New appointments are FGE, as OBS, DOL and LN, as OPS. NNZ is building 3.85-Mc. mobile rig. BZG still is around and was heard from this month. Next month will round out my first year as SCM. I have tried to do a good job and hope I've met with your approval. Traffic: W5JHS 113, WZ 82, ANP 7, DLA 7, OMK 7, DOL 6.

TENNESSEE — SCM, Ward Buhrman, W4QT — LCB has been working 28-Mc. c.w. and is trying out new emergency rig. APC is newcomer to the BPL list. LNN nearly made it and would have pushed harder if he had realized he was so close. The Memphis boys were active in the SS Contest. Exchange of traffic between 'phone and c.w. nets is working nicely. EC reports were received from ETN, FLW, KKR, LCB, CBU, and PSB. Traffic reports are good but items of general interest are not being reported. Traffic: W4PL 2727, APC 588, LNN 432, NNJ 136, BAQ 120, ETN 95, CZL 38, LNF 37, JWO 26, QT 16, NPS 1.

GREAT LAKES DIVISION

KENTUCKY — SCM, W. C. Alcock, W4CDA — BAZ moved with Trunk Line "J" to 3565 kc. Through his activity, the following new stations are on KYN Net: KZF, NZH, KFA, JSH, BNP, KRC, and JPV. More than 20 stations make up the KYN Net. JEI has been appointed Asst. EC for Louisville. KWO is active on the KYB and Corncracker Nets. FKM finds time to operate a problem. BXU sets another good attendance mark on the KYN Net. JPV has a kw. rig on 3.85-, 14-, and 28-Mc. 'phone (also 3.5-Mc. c.w.). He reports as follows on Pikeville: NSZ is on 14-Mc. with 500 watts, and works the world easily with three-element beam; MVU has kw. on all bands; IOK is on 14 and 28 Mc. at Broadbottom! NVJ is on 7 Mc. and 14- and 28-Mc. 'phone. NVR has a pair of 813s, 805s Class B, and an "A" ticket, but few QSOs. NEY is now DL4HA in Germany. *Blue Grass Club Ham News* reports: PJC is on 3.85 Mc. with s.s.s.c. BOF is on 28- and 3.85-Mc. portable. OOX returned to 7 Mc. JTL is heard on 28-Mc. 'phone. Those on 160 meters include BNP, OBG, KKA, and PJC, keeping schedule every night. MGT has new Collins 310B. JJA is on 160 meters. LQF gets Russian SWLs but no QSLs. NVK moved to Lynch. PJE is putting S-meter and limiter in BC-348. PRT has 32V-2 on the air — TVI-proofed and all. MWX reports: JQV was dismissed from the hospital. OGB is trying to conquer Mon-Key. Traffic: W4BAZ 227, YPR 154, JQY 129, NBY 41, MWX 39,

(*Continued on page 62*)

S-O-J

What's in a name? Sometimes a name is truly descriptive of the object to which it is attached and sometimes not. Here at National, we have a habit of trying to make the name of our various devices as descriptive of that device as is feasible. Sometimes, as in the case of the HRO, this name may have a touch of humor as those who are in the know can verify. In the case of the Select-O-Ject, a truly descriptive name was applied. "Select" describes the c.w. capability of the device to select any one of several c.w. signals with a twist of the wrist. "Ject" describes the ability of the device to reject a pitch such as a heterodyne when receiving a phone signal. The "O" was intended to indicate its use as an audio oscillator but could indicate the verbal reaction of those who have seen it work.

As in the case of the crystal filter when it was first introduced, it has been found that a certain amount of training and practice is necessary to get the excellent results that the device is capable of.

After the first half-hearted try, the operator may be tempted to alter the name to "Select-O-Junk" but after mastering the operation of the device, he may change this again to "Select-O-Jet" as more descriptive of its high-powered performance.

The adjustments of the controls are quite critical but at the same time are not as touchy as that of a crystal filter, especially in the sharper position. It has the advantage over the crystal filter of divorcing dial tuning and IF selectivity from the process of heterodyne elimination making this procedure more straightforward and easy to accomplish. The most critical adjustment to make is the setting of the Reject knob. This adjustment is very critical and the proper setting must be made coincident with the proper setting of the pitch control. If these settings were not critical, the selectivity of the device would be poor and the darn thing wouldn't be any good. One hint, so that you will start off "hot" instead of "cold" in your adjustment of the Reject control, the final adjustment will be around "2 o'clock" on the knob.

The Select-O-Ject works well with the various National Receivers and has been thoroughly checked with the NC-57, NC-173, NC-183, HRO-7, and HRO-50. We cannot, of course, guarantee that trouble may not be encountered with receivers built by other manufacturers. For example, a call from a local ham informed us that the new Select-O-Ject that he had just purchased was not working well. He was using it connected to a competitor's receiver. Out of curiosity, the writer payed this ham a visit. The unit was connected between the output of the limiter and the audio gain control as recommended. It worked well if the noise limiter was in the circuit but did not work at all well if the noise limiter was switched off in which case the signal was somehow bypassed around the Select-O-Ject. This was shown by shorting the input to the Select-O-Ject in which case considerable signal was still heard from the loud speaker. According to the circuit diagram, it shouldn't happen, but it does! The remedy is merely to leave the Noise Limiter in the circuit all the time.

Although all of the new National receivers are now wired for use with the Select-O-Ject, many hams having older receivers hesitate to buy a Select-O-Ject for fear that the wiring changes may be too difficult. These changes are actually very simple. They are described in detail in the instructions supplied with the unit. Actually, all necessary connections are already supplied at the accessory socket except one. This one missing connection is needed to bring the audio output of the unit back into the receiver. In order to do this, the pin which now supplies a regulated 150 volt supply to the accessory socket is rewired for the job. One merely clips off the lead connecting the voltage regulator to this pin and then this same pin is connected to the proper point in the audio system by a shielded lead. As my boss used to tell me, "Even you should be able to do that."

CAL HADLOCK, W1CTW

P.S. If the owner of an NC-57 receiver already has an S meter plugged into the Accessory socket where the Select-O-Ject is supposed to go, the S meter can still be used along with the Select-O-Ject. This is done by removing the plug from the S meter cable and rewiring the S meter leads into the corresponding leads of the Select-O-Ject plug in addition to the leads that are already there.

CDA 36, KWO 20, MMY 20, JTB 15, BXU 11, FKM 5, KZF 4.

MICHIGAN — SCM, Robert B. Cooper, W8AQA — Asst. SCM c.w., J. R. Beljan, 8SCW. Asst. SCM 'phone, P. A. Kohn, 8TTY. SEC: GJH. RMs: UKV, TRN, and NOH. PAM: YNG. SCW reports the high SS unofficial score to date in this section with 88,750 points. Others are DLZ/RRT 57,525, TRN 35,520, BXZ 23,600, DSE 13,330, EGI 2520, and WVL 2486. UKV reports the 5/7 P.M. QMN making splendid progress this season and would welcome anyone who wishes to perfect his traffic-handling procedure. Congratulations to SPF on his election as Director. DPE wishes to thank everyone who has supplied a fine spirit of coöperation these past 13 years of supervisory activities. DSE proved to be a fine outlet for the Arizona State Fair and also reports EVP has a 28-Mc. mobile rig. ESE is a new operator in the Muskegon area. YLS is doing some fine work on 50 Mc. and reports ERV is a new operator in the Ishpeming area. ENT has a 15-w.p.m. Code Proficiency certificate. DWB is having antenna trouble. JUQ joins the traffic-handlers rank again. ZHB is prepared to participate in the Air Force Military Amateur Radio System as a civilian when the final permission is granted. TNO is putting the finishing touches on TVI-proof VFO, n.f.m. rig running 250 watts and has made some satisfying contacts with his son in the Canal Zone. YNG reports KHK is moving East to join R.C.A. YMO finds learning to teach does limit his amateur activity somewhat; however, he does find time to maintain a good traffic total. WXO reports a new code class at ACW with 35 members. COW is back in business with the DX gang by installing a new beam rotator. AHV finally makes the CD column by the use of the proper address on his report, and we wish more operators would get those cards headed to the SCM. DNM has moved out on a farm and we hope it will produce many antennas. NQ is a newcomer on the QMN and does his share of the traffic-handling in the Detroit area. OAF and YLA are among the lucky deer hunters who did deliver the venison to the home QTH. Traffic: (Nov.) W8NOH 685, RJC 552, SCW 287, TRN 210, UKV 128, DSE 121, YNG 80, YGS 77, AQA 63, TDO 41, URM 37, YMO 34, IHR 33, CRH 31, YFI 30, BVY 28, UGD 28, LR 27, IV 23, DLZ 15, QBO 14, MQU 11, FX 10, MGQ 9, YAO 9, EIR 8, ENT 7, TQP 7, ZBT 7, ZDF 7, WVL 6, DWB 4, JUQ 4, BXZ 3, ERT 3, EGI 2, ZHB 1. (Oct.) W8UKV 92, WXO 89, YGS 51, YER 14, DOI 7, DWB 7, COW 5, EGI 3.

OHIO — SCM, Dr. Harold E. Stricker, W8WZ — Asst. SCMs, Charles Lohner, 8RN, and C. D. Hall, 8PUN. SEC: UPB. PAM: PUN. RM: PMJ. Past-Director Bird and myself wish to thank the members of the Great Lakes Division for their support during the past election. Past-Director Bird also wishes to thank the members of the Great Lakes Division for their coöperation while he was in office; he leaves office with the highest respect for members of the division. At this time I want to thank UPB, RN, PUN, PMJ, JRG, and many others for their help. I know that I never would have been able to have gotten all the SCM work done if it had not been for your coöperation. As I will not be up for reëlection I want you fellows to have plenty of time to think over who you want for your next SCM. New appointments are BFH as OBS and YCP as ORS. We welcome the TUSCO Radio Club of New Philadelphia as the newest ARRL affiliated club. Visited with FGX and JIN in Cincy recently; and ZY dropped in for a nice chat one Sunday. From the *Voice Coil:* ANN has worked plenty of DX with a mobile rig using only 15 watts. DKF finds that a Gamma math works very well. WEN sent in a very nice DX list. HRV is up to 209 countries and is working up an emergency plan for East Palestine. DQE got his Class A license. New hams in Conneaut are ERQ and ETZ. DKF and PWH have new Collins 75As. From the *Q-5:* DCJ made Class A. QCU is building a TVI-proof rig. EUW is a new ham in South Charleston. OG and AUP are working with n.f.m. From the *DARA Bulletin:* The following are new members of the Club: QEQ, JXM, YJQ, WGA, ABE, ESF, and FUN. TPP, WYU, PRS, and OUG are working on 160 meters. From the *Carascope:* New officers of CARA are CPA, pres.; ZCQ, vice-pres.; OWA, secy.; ABO, treas.; ZYU, BMP, and QVV, directors. QQ, WXM, OWA, and WRN visited WJC and BFQ in Everett. WRN reports that v.h.f. activity is not too good but that UZ, CPA, WAB, MEG, and AER are active in Columbus and vicinity. The Cleveland Area Council of Clubs is going to sponsor a 10-meter groundwave contest twice a year to be held in March and September. The meeting of the Ohio Council of Amateur Radio Clubs was held Jan. 14th at the YMCA in Columbus. From the AMC *Arcover:* The club station, K8AIR, has a new 10-over-20 beam. DWT is working on a gasoline-powered generator. DTR has a new Collins 310-B. DZX is building an all-band exciter from 6 to 160 meters. Through an error the call LBH was omitted from the list of 100 per cent reporters. BZX has a pair of HK-54s fired up. QHV is rebuilding as a result of TVI. FNX thinks that 3.85-Mc. 'phone QSOs have a tendency to be too long. ICC is set up in his new QTH. PUN is in new 3.85-Mc. 'phone traffic net that meets at 5:45 A.M. with ØBVL as NCS and PUN as ANCS. ZJM is operating in TLS for Ohio. 6GUU/8 now is operating in Athens. CBI and RN finally got up their new masts. DGG has new 813s but beam only 14 feet high. ZJM worked all sections in the SS. UW received his B.S. in E.E. and now has more time for brasspounding. IVC now is on battery power. EXI has completed bandswitching rig. The call K8FAD has been assigned to the new 28-Mc. 'phone, 7-, and 14-Mc. c.w. rig operated by the airmen of the 1914th Squadron of the worldwide Airways and Air Communications Service (AACS). Traffic: W8SJF 323, UPB 125, DAE 102, CBI 98, PNY 52, ZJM 46, QIE 41, EIU 39, RN 38, PMJ 37, WE 29, PUN 24, BEW 17, TAQ 17, YFJ 17, EQN 12, ROX 11, WAB 10, DXO 9, BUM 7, VZ 6, YCP 6, DZO 5, OUR 5, IVC 4, WZ 3, AQ 2, BFH 2, BHE 2, UW 1.

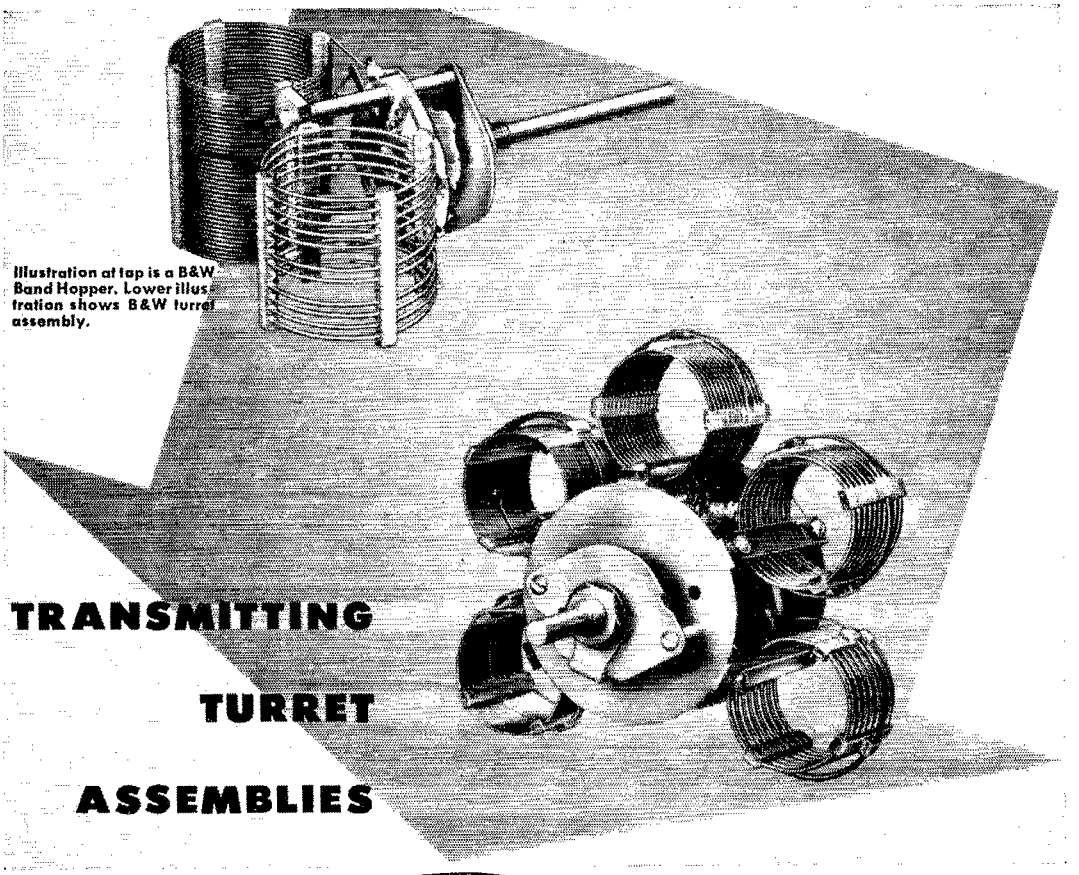
HUDSON DIVISION

EASTERN NEW YORK — SCM, Fred Skinner, W2EQD — SEC: CLL. BSH, CJP, CLL, EQD, PHO, and TYC have received Section Net certificates for NYS Net operation. CLL made BPL again this month and is new manager of EAN. He also reports into 2RN, CAN, MAN and PAN. CDQ, PHO, OUT, and YGW are NCS for NYSS Net. PCQ reports formation of the Orange County Net operating Mondays and Tuesdays at 9 P.M. EST on 146.25 Mc., with PCQ and VPG as NCS. PCQ is spending most of his time on the air in testing equipment after a general revamping. WIK is busy with new job, night school, and building a new 100-watt 10-160-meter bandswitching rig. BSH has new ½-wave doublet with permanent wave feeders using Toni Curlers for spreaders. He only has ten more states to go for WAS on 3.5 Mc. KUJ spoke at the Pittsfield Radio Club on s.s.b. RYT spoke at the RPI Radio Club on "Restricted Range Speech Amplifiers." RYT complains of not enough activity on 50 Mc. from the Albany, Troy, and Schenectady gangs. BRS was in the 1949 SS on 3.5, 7, and 14 Mc. Traffic: W2CLL 612, TYC 233, WIK 50, GTC 32, BSH 27, EQD 17, PCQ 8, BRS 1.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, W2OBU — SEC: BYF. RM: TYU. The best news this month comes from Suffolk County, where CJZ is activating the AEC group out there by establishing rigs at five Red Cross stations. The Nassau County group, under the leadership of County EC FI, is going great guns. RPZ is new EC for Massapequa and Massapequa Park. GG/TUK now is equipped with 144-Mc. rig in the car. NZJ is new EC for Southern Queens. WHB is NCS of 80-meter c.w. AEC groups one and three, which have been combined, on 3600 kc. at 2030 on Wednesdays. PRE has been appointed RM for Second Regional Net of the National Traffic System and has received his Section Net certificate. MZB reports the following stations operating portable mobile in Suffolk on 3.85-Mc. 'phone: BTC, MZB, PIA, SAH, UGH, and WDP on 3995 kc. PF got new 32V-2 and expects no more TVI. Dave put in lots of time on the QCWA dinner. New OBS appointees are FI and JZX. BQP now is on 28 Mc. with TBS-50A and made Class III OO. DKH, heading the program committee, put on a good show at the Federation of Long Island Radio Clubs' party, which everyone enjoyed. URX earned A-1, WAC-c.w. and WAC-'phone certificates. Our old friend, DGJ, now is living in Acra, N. Y., and schedules UHF Club members at 1000 Sundays on 7295 and 7199 kc. The UHF Club's new officers for 1950 are: DKH, pres.; ZEO, vice-pres.; ZPG, treas.; CIC, rec. secy.; QPQ, corr. secy.; ZEO and TZU, fed. del. KDB now is located in Suffolk County. The Sunrise Radio Club now meets in Jamaica Hall the 1st and 3rd Fridays. Visitors are always welcome. TYU prepared a section bulletin but it was destroyed in a production room fire. He promises it won't happen again so the gang will have the section news on time. Pop asks for more stations to QNI into the NYC-LI Traffic net at 1900, Mondays through Fridays, on 3710 kc. IAG, prexy of the Tu-Boro Club, tried different antennas but wound up with a dipole and was surprised at the excellent results. BVL, Nassau Radio Club, had 11 operators in the recent SS Contest. BGO built p.p. 813s and schedules G6GM on Mondays and Tuesdays at 2:00 A.M. on 3.5 Mc. OQI is attending Stetson University, Deland, Fla. SJC received ORS appointment. ZKK, only 16, got the biggest kick of his life QSOing F8ZW and G3BDJ for his first DX contacts. Charley earned his OES appointment by experimenting on 220 Mc. The Quarter Century Wireless Association boasts 220 members after 4 years of operation. Members are from VE, W, XE, LU, and OA-Land. Newly-elected officials are: FX, pres.; IN, vice-pres.; PF, treas.; FIT, secy.; and BW and WZ, directors. The North Shore Radio Club recently elected GX, pres.; KSZ, vice-pres.; BT, treas.; PKD, secy. ORS appointments were renewed by HXT, BO, RQJ, PZE, URX, and YDG. RQJ renewed OPS appointment. Traffic: W2PRE 664, TYU 390, VNJ 249, EC 125, OUT 65, OBU 44, BGO 43, CSO 27, SJC 23, TUK 23, YIR 18, JBQ 16, PF 6, WHB 2.

NORTHERN NEW JERSEY — SCM, Thomas J. Lydon, W2ANW — The SEC is IIN. Please send all EC applications direct to him. The N.N.J. c.w. net meets Monday through Saturday at 7 P.M. on 3630 kc. VQL has new final using 810 running 400 watts n.f.m. modulated. EWZ now is Class A. K2BC, W2s BTZ, CCY, HUK, GJC, GKQ, ZEE, QOB, and BRC participated in UCARA AEC drill. NPJ has moved to Cranford. APU is on 144 Mc. ZF has a new NC-183 and loves it and 75. VJN is using electronic

(Continued on page 64)



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keyer. BSS is back on 7 Mc. chasing DX. PIX has a twelve-element beam atop the house on 144 Mc. It's rotated from the bathroom. BTZ is AEC coördinator for Rahway. He is getting together with the Rahway Chapter of the Red Cross for an emergency station there. DFV has worked 525 miles on 144 Mc. PIY is on 144-Mc. mobile. TH is n.f.m. on 28 Mc. LTP has 112 countries confirmed and is working them on 'phone now. AZL has moved to Plainfield. Recent speakers at UCARA include SOX, AFG, AZL, and ZGU. NIY has resumed schedules. The MCARA has elected the following officers: BTG, pres.; LNK, vice-pres.; WRG, secy.; DME, treas., and SOY, chief engineer. Traffic: W2KUS 86, NKD 58, LMB 54, NCY 46, NOZ 14, AWY 12, OUS 10, ZEP 10, NIY 6, CJX 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — HMM has been elected president of the Quad City Radio Club. A nice report was received from TVC who is building a shack in a completely shielded room. New members on TLCN are QAO, YTA, NWF, and PHR, of Sioux Falls, S. D. QVA put in a full 40 hours in the SS Contest, working 573 stations in 68 sections for a score of 97,155. New hams in Ottumwa are ADT and ADP. You'll find 'em on 7 Mc. AZR held an informal roll call of the Milwaukee Railroad Net November 28th. A new ham in Boone is ACW. VRA would like to contact other hams who are chemists. SWI now is located in Waterloo. AEB is a new ham in Waterloo. NVN, IGL, KZ5AO, and 2ETW were recent visitors at SWD's shack. NEQ has new four-element beam. SWD has new Class A and is now a member of Iowa 75 'phone net. LQY has new 75-A receiver. HMM has renewed as RM. SCA renewed ORS appointment. New ORS are QAO, GJT, and AZR. The c.w. boys are showing some swell work through their traffic count this month. Keep it up, boys. IFI has moved to Estes Park, Colo., where he is building a new tourist court. PP visited his brother, UZE, and helped put up new TV antenna. AED is working on 50-Mc. job. SCV finally cracked 3.85-Mc. 'phone. PP started roll call on Iowa 75 but couldn't get an answer. After turning the net over to SRR, he found some buzzard had moved his band set dial. Traffic: WØHMM 776, NYX 167, WMU 153, QVA 143, SCA 108, AZR 77, YDN 60, VHK 58, VRA 51, SRR 34, JAD 8, SCW 4.

KANSAS — SCM, Earl N. Johnston, WØICV — AHW, the K.U. club station, is operating 7 Mc. as well as 3.5, 14, and 28 Mc. FTD is new engineer at KFKU. BNU's drop in activity is explained by his admission of being tied up breaking in a new Olds. FER, at Hayes, is keeping busy as NCS on QKS, Regional, and other nets. IZJ, Emporia, is holding schedules with ZKF on 144 Mc. at 2000. He has worked into Wichita and Kansas City. Here's the 144-Mc. activity some of you have been looking for. Ralph is using HFS to NC-173 for receiver and 25 watts to an 832A. LIX is active on 3920 kc. and is holding down his OBS schedules. LQS worked an OK2 with 35 watts and got a QSL, too. He also received an SWL card from URSR-2-626 in Russia. DEB, of Wichita, was heard on OZN 3.85-Mc. 'phone and now threatens to get on 3.85 Mc. EIM, of Topeka, recently got on 3.85 Mc. and had the time of his life. ICV is using his TV tower for 7-Mc. vertical when the OW isn't watching Kukla and Ollie. DYX, of Norton, worked 812 stations and all sections in the SS. SSB, of Topeka, has an 8JK between his TV tower and a 40-ft. tower in the back yard. Jim just completed half-kw. rig in 6-ft. cabinet with a pair of 8005s in final modulated with 811s. HOC is building a Meissner Signal Shifter and treating it for TVI. FLZ is working out FB with 25 watts to his 3.85-Mc. mobile. Traffic: WØFER 166, WGM 105, SOE 34, OZN 11, ICV 9, AHW 5, LIX 5, BNU 4, TVU 2.

MISSOURI — SCM, Ben H. Wendt, WØICD — A meeting was held to reorganize the old MOARKY Radio Club at the QTH of ZZB. OMG was selected as the master oscillator, ZZB as first buffer, QMF as second buffer, and MFN as log. The newly-organized club set up its goal to rebuild membership to its prewar status of more than a hundred members from Missouri, Arkansas, Tennessee, Illinois, and Kentucky. The SMARC held a special dinner meeting at which AEC organization, Field Day, Club federation, the new Docket 9295, and highlights of the Midwest Division Convention were discussed. Director DEA, SEC VRF, Asst. SCM ECA, and SCM ICD attended in an official capacity. The recently-organized Dan'l Boone Radio Club now is affiliated with ARRL and meets the first Monday of each month. The South St. Louis Radio Club also has become an ARRL affiliated club. DEA scored 263 and 60 sections in the SS contest, operating about 17 hours. OMG scored 208 contacts in 60 sections. ZAO has a new service shop in Poplar Bluff. OMG and NNU boast contacts with G3s on 28-Mc. mobile. LSA and another mobile is added in the section. MON, 3755 kc., and the Mo. Em. Net, 3905 kc., are complaining about terrific QRM during net operation. OUD suggests that clubs collect back-dated *QSTs* to send to foreign hams. PME is teaching code to three future hams. OZS is operating 160-meter 'phone, 3.5- and 7-Mc. c.w., with 50 and 100 watts respectively. ARH has 86 countries confirmed. BIL and QXT are new hams in Columbia. GCL erected a three-element beam for 28-Mc. operation. CGS is building a VFO with no drift and no chirp. WRQ is experimenting with TV. WAP completely rebuilt his rig. IAC finds available time lacking in getting his rig back in top shape. Traffic: WØQXO 544, OUD 150, PME 150, KIK 80, CGZ 64, WAP 31, ICD 18, NNH 10, OZS 1.

NEBRASKA — SCM, Scott E. Davison, WØOED — RQK has been appointed SEC, with JED as alternate. All hams are urged to get in touch with these men and apply for EC membership. HSO reports the c.w. net is shaping up with CXT, DMY, EDI, FAM, FHA, FMW, GMZ, HYR, IXL, JDJ, KPA, KJP, LJO, SAI, YDE, VOI, KON, and FQB having earned their net certificates. A simulated Nebraska emergency was carried out very satisfactorily by the net. IJB is on 28 Mc. MZG has a c. w. class at Chadron. FHA has a new V-type antenna. AY is active on all c.w. bands. JCK lost his three-element beam in the wind. ZOQ is back on 7 Mc. GPX reports 3.85 Mc. is getting "loaded." ERM gets out now with his new close-spaced beam. LKE now is on 28-Mc. 'phone. SAI had the misfortune to mangle a finger in a gun accident during the hunting season. CBH can be found on 3.85-Mc. 'phone now. FAM reports TEN Net operating nicely. ADK is a new call at Fremont. EIE has been transferred to Shenandoah. GMZ really runs up a score with his 274N rigs. The QRM Club made 354 contacts in the SS Contest. Your SCM wants to hear from all amateurs who are interested in net operations of either the 'phone or c.w. nets. We have room for several OPS, ORS, EC, and OO appointees throughout the State. Any interested in the UP Net are asked to get in touch with FAM. Traffic: WØGMZ 367, FAM 277, FQB 134, KJP 131, HSO 101, CBH 74, FMW 72, JDJ 48, KON 28, SAI 23, IXL 14, DMY 11, LJO 10, AY 5, VML 5, FHA 3.

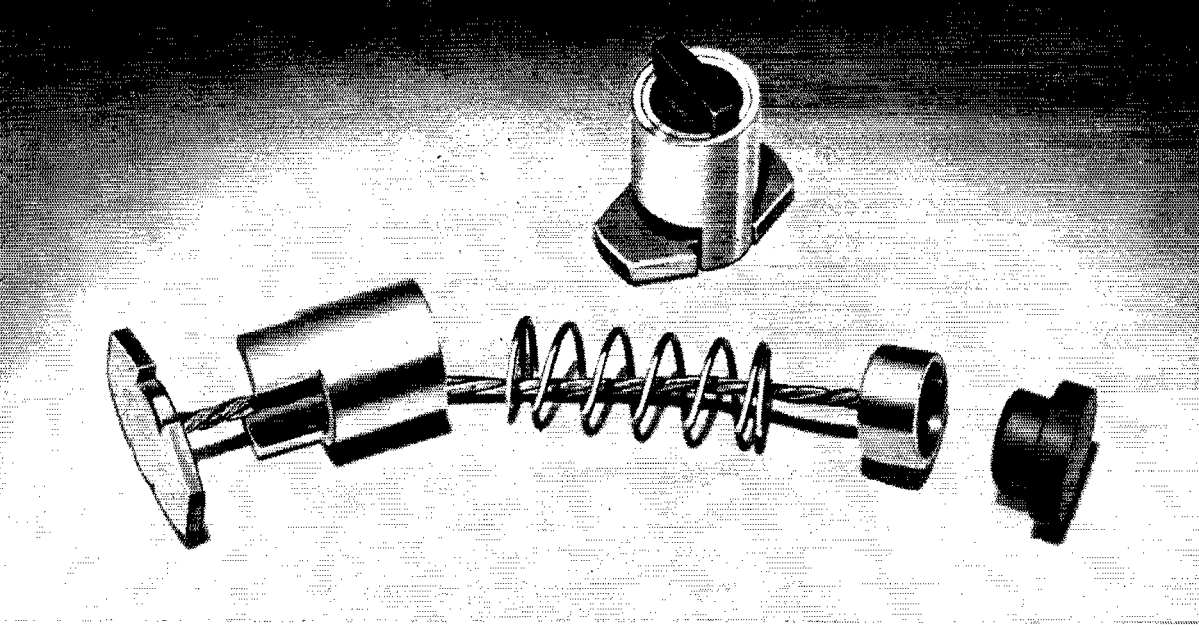
NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — HYF has come forth with another issue of the CN bulletin, including among other information a listing of CN net attendance for the month of November showing KV in the lead. Rog is to be complimented on the fine job he is doing with the bulletin. Our PAM, VW, reports the Connecticut 'Phone Net was started up again Dec. 11th at 10 A.M. on 3880 kc. with sixteen stations reporting. It meets every Sunday morning on that frequency and all section 'phones are invited. TD sent in his ORS certificate for endorsement, but finds little time for operating, except for his OBS schedule on 146 Mc. BIH reports an SS score of 112,890. BDI worked a W6 on 50 Mc. with 90 watts. The AEC of Norwalk is planning monthly drills on 28 Mc. with the club station, SGZ, as NCS. RWS is off the air for a time rebuilding. QAK has TVI trouble. NJM keeps busy jumping around on the traffic nets. RVE is getting set up again with 400 watts on 3.5 Mc. and 7 Mc., and 50 watts on 14 Mc., with separate antennas for each band. BVB is having his troubles with TVI on 3.5 Mc. but none on 7 Mc. so he is sticking to the higher band. VW comes through again with the best report in the November Frequency Measuring Test with a maximum error of .012 cycles and a minimum of .000 cycles, the latter, of course, being "on the nose" on 14 Mc. Nice going. Traffic: W1NJM 532, RWS 293, AW 203, HYF 105, ORP 89, CTI 77, BDI 71, KUO 68, DAV 67. KV 59, QAK 44, JTD 37, BIH 35, QIS 30, FTX 21, HUM 20, LV 15, CJD 10, SJ 8.

MAINE — SCM, Manley W. Haskell, W1VV — Pine Tree Net: RM NXX, 3550 kc., 1900, Mon. through Fri. Sea Gull Net: PAM FBJ, 3961 kc., 1700, Mon. through Fri. New OBS is RJQ, of Orono. RJQ has graduated from his faithful 6L6 to a Stancor 202 with 125 watts input to put out those bulletins from Hartford. NGV, of Richmond, now has his ORS certificate endorsed for another year and will be on 28-Mc. 'phone with an 829B in the final for an input of 100 watts. He says, "Don't expect to be a radical 'phone man as c.w. has always been my favorite, but thought would give it a fling." QIQ gathered in a total of 165 messages at the Farmers Fair and transmitted them from YA at U. of Maine. COV reports a QSO with VE2AV, Montreal, at extreme QRP. 2AV used an input of 1 mill at 8 volts; COV 10 mills at 65 volts. The Maine Communications Net of the CAP, Maine Wing, threw a baked bean supper at the Duck Pond Grange Hall Dec. 8th. Invited guests were amateurs from Millinocket, Maine, to Cape Ann, Mass. Among the 125 members and guests attending was PU, whose unrehearsed act with his trumpet stole the show. In addition to IGW and LOZ, Auburn now has MFJ on tap to handle traffic for the Twin Cities. Traffic: W1YA 421, LKP 231, BWR 194, QIQ 165, NXX 144, KLH 108, NGV 88, VV 54, FBJ 42, QUA 26, AFT 21, AWN 20, KDE 18, LBJ 17, JAS 16, TO 16, EFR 15, FV 13, RJQ 12, PTL 8, GMD 7, COV 6, QDO 6, ROM 6, GKJ 4, AMR 2, KEZ 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — The following have had their appointments endorsed: JYC, MBQ, DDC, MRQ, BHD, and FIK as EC; BHD as OBS; BB as OPS; BB and LM as ORS. NBS has a new jr. operator at his QTH. Skipper Hill, ex-1HUV, is now 7HUV and his new QTH is Shady Acres Motel, 1302 W. Casa Grande Hy, Tucson, Ariz. Drop him a line, gang. RXT is ex-4KDE and now is living in Westford. MQ says he is very busy at TV work. The QRA is

(*Continued on page 66*)



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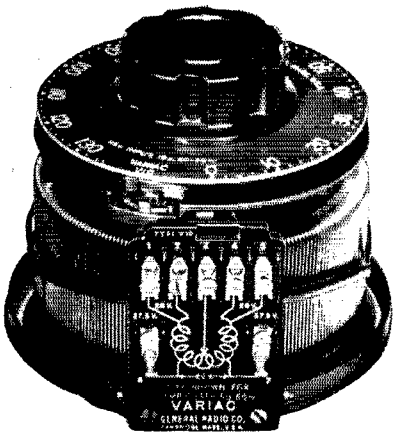

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holding code and theory classes. The South Shore Radio Club had movies and a talk by BB on mobile antennas. The Brockton Radio Club had ARRL's film "Inductance." The Plymouth Radio Club had ARRL's film on TVI. JJY has taken on as EC for the National Guard work in this section and now is ORS. The Brockton Club had an equipment demonstration by NZP. CGB renewed his license and will be on 28 Mc. The T-9 Radio Club held a meeting at MQR's QTH. MGP/4 writes from Sumter, S. C., but will be back in Saugus soon. He is on 28-Mc. mobile. SJX is busy at school. QZS went into the SS. DMS finally made WAS. WU is working on TVI. K1WAF is the call of the National Guard in New Bedford. The Norfolk County Radio Assn. met at PCR's in Quincy and ALP attended the meeting. DDC had his third baby at his QTH so has not much time for radio. SGL, down on Martha's Vineyard, has a rig on 28 Mc. that the Lions Club gave him. He is bedridden and ham radio means a lot to him. Give him a call, gang. The Club meets at SGL's QTH and has 16 members. BHD has a car and will have a rig in it. ICO reports that the Framingham Radio Club has a 2-kw. emergency power supply gas-driven. The Radio Shack sponsored a meeting for the Eastern Mass. Radio Assn. with quite a gang present. There were eats, and even the Braves Troubadors were present. SAK is a new ham in Marblehead and is on 3.5- and 7-Mc. c.w. QQB is on 144 Mc. PLQ is busy at M.I.T. but gets on the air some. You hams in Watertown see him on the emergency work. AHP is busy in fraternal work but gets on the net when he can. The South Shore Club held a meeting at Squantum Naval Station. Eastern Mass. held an auction with AKY doing his stuff. ALP is building a monitone as per Sept. '48 *QST*. Traffic: (Nov.) W1LM 262, PYM 152, EMG 91, TY 57, QZS 54, QJB 41, DMS 35, DWO 22, JJY 22, BB 20, MDU 18, WU 12, RBK 7, PU 6, PLQ 3. (Oct.) W1JJY 56, QZS 33.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — SEC: UD. RM: BVR. Net frequency: 3725 kc., Mon. through Fri. 7 and 10 P.M. JE is buried with outside work and can't find time for much activity. ODU now has 100 confirmations for DXCC. MUN got a bang from catching the SCM with a chirpy signal. New officers of the Worcester County Radio Assn. are RO, pres.; RCS, vice-pres.; KDW, secy.; and LSZ, treas. LSZ has TV beam above 28-Mc. job. RLQ, the only active YL in Worcester, has WAC with 25-watt 28-Mc. 'phone. The Hilltop Radio Club of Worcester held a small hamfest recently. The Pittsfield Radio Club recently heard 2KUJ talk on "Single Side Band." IZN recently moved to new QTH. COI cured some TVI with 3-section high-pass filter and tried "Harmoniker" in transmission line. Result — he blew it to pieces; answer — standing waves. DPY renewed OPS and OBS appointments. 8VCW/1 moved to an apartment where he could string a 3.85-Mc. antenna. RZG finds that blocked grid keying is the answer to chirpy signal with his BC surplus rig. BDV got in a few hours in the SS but TVI and sickness interfered with activity. GZ has an "Oscar" for audible tuning which JE built for him. MOK has appointed CJK and LHW as Asst. ECs in the Holyoke area. BVR says he spends a little time for traffic. EOB did right well in the SS with 526 contacts in 71 sections. New officers of the Hampden County Radio Club are JYH, pres.; MNG, vice-pres.; SIT, secy.; NLE, treas. RHU cut off the tip of his bug finger. *Zero Beat* is a corking good club publication and with RHU as traffic editor, QWJ as technical editor, KFV as DX editor, and EOB as contest editor, it can't go wrong. MNG takes care of the swap section. Traffic: W1EOB 357, GZ 120, BVR 103, RHU 91, RZG 31, AZW 30, JE 10, MOK 3, BDV 2.

NEW HAMPSHIRE — Acting SCM, Clifton R. Wilkinson, W1CRW — RM: CRW. The following hams have earned WNH certificates: Nr.1 BFT, Nr.2 IJB, Nr.3 APK, Nr.4 AOQ, Nr.5 FTJ, Nr.6 QYZ. POK is using an FL8A filter in the receiver so no more QRM, QGU, from Snowville, has left our State but will be back in May. FTJ worked F7AJ, who is ex-FFL from Manchester. He s operating on 28,200 kc. and is working at an airdrome outside of Paris; he would like to have a schedule with New Hampshire on 3.5, 7, 14, and 28 Mc. APK now is a captain with New Hampshire State Police. RZD, RIS, SKU, RBX, and SLK are newly-initiated members of the Concord Brasspounders. How about hearing from you fellows. QJY is taking a rest from traffic-handling. KYG, running 600 watts, drops in NHN often. RFP is running 50 watts to an 807 and is building a modulator to operate 28-Mc. 'phone. He is a new ORS. ATJ puts out a potent signal. SAL is doing a little hunting when not busy with traffic. 7MNZ is located in Keene for the present. CRW is using bandswitching transmitter, which takes 5 seconds to change to any band from 3.5 to 28 Mc. BFT is using Collins 310B VFO exciter. Traffic: (Nov.) W1CRW 412, SAL 67, KYG 26, PFU 20, QJX 6. (Oct.) W1SAL 28.

RHODE ISLAND — SCM, Roy B. Fuller, W1CJH — RM: BTV. PAM: BFB. Rhode Island Net schedule is Monday through Friday, 3540 kc., 1900 and 2200 EST. NCS in order are CJH, QR, BBN, BTV, and BBN. Westerly, Pawtucket, and Woonsocket hams please notice, we need outlets in these areas to insure success. If you know nothing about net procedure this is a good way to learn. AQ has started a junior membership with reduced dues to

(Continued on page 68)

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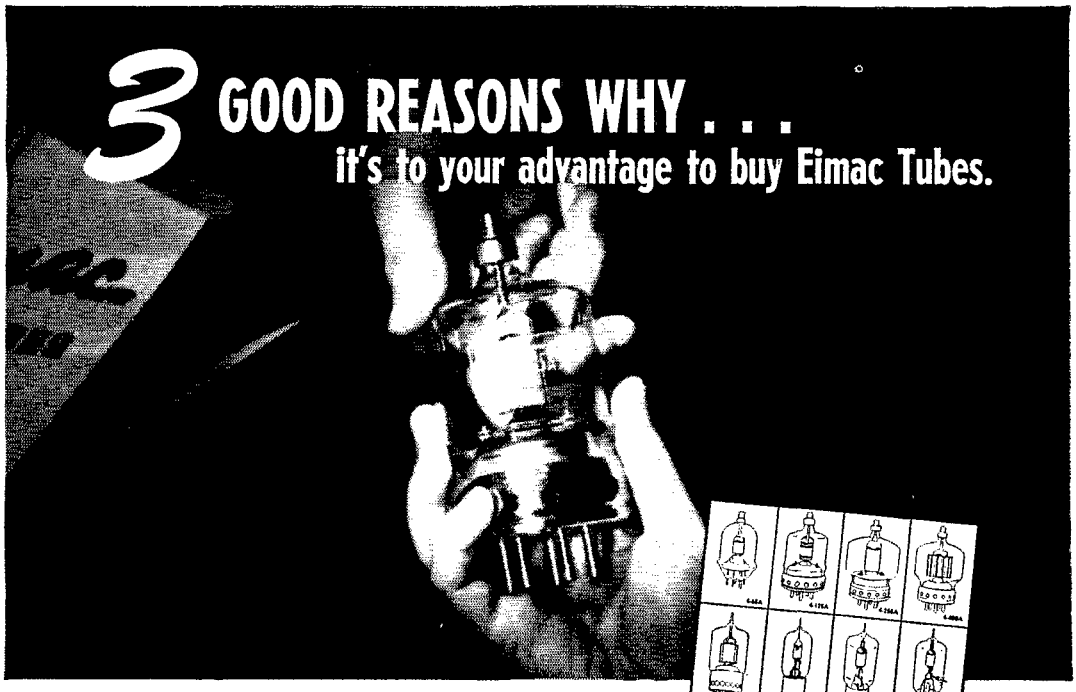

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help youngsters get started in ham radio. IMY, OW, JER, AMJ, CPV, AWE, BGA, all AQ members, are active on the air. The Newport County Radio Club now meets on odd Mondays at Naval Reserve Radio Quarters for code and theory classes. SKJ and SKL are new hams. JFF, MMX, and OIK are active in the Newport Emergency 28-Mc. net. NAARO elected the following officers for the coming year: KHZ, pres.; BFB, vice-pres.; QOG, treas.; RVQ, secy. The following stations are reporting to RIN regularly: BBN, QR, BTV, ODJ, RVO, and CJH. Let's see this list grow. Traffic: W1BBN 86, CJH 27, BTV 22, QR 13.

NORTHWESTERN DIVISION

ALASKA — SCM, Charles M. Gray, KL7IG — Quite a number of hams left the territory this month. GF is going to Tacoma as a parts salesman. SM has gone out on rotation to Kansas City. CM has moved from Ketchikan to Sitka. OK now is at Petersber with a 32-V. JK transferred from Sitka to Tanacross. W7LYI now is working portable at Kodiak. W4FHF has been heard portable-mobile on Alaska Highway headed north. ABF has a new 32-V at Yagatagа. SB says there's nothing like his QTH for hearing DX. AB, EV, and GI are all low-power 3.85-Mc. 'phone in Juneau. AH has the application blanks for the emergency net so contact him or the SCM at Douglas for one. Net Control Station for the Alaska Emergency Net reports a total of 80 messages handled during October.

IDAHO — SCM, Alan K. Ross, W7IWU — News was rather scarce this month. Everyone was too busy with traffic, as you will note below. Twin Falls: NH is on again with the Gem Net. Moscow: WJT is on the Idaho Net, 7155 kc., each Friday, and was active in the SS Contest. Lewiston: Activity is picking up with FRM and the gang. Mountain Home: IY was active in the SS and now is meeting with the Gem Net on 3745 kc. Latest DX is JA2BQ. American Falls: Sorry to hear that DMZ lost four toes in a farm machine accident a few months ago. The FARM Net is active on 3935 kc. with DMZ as NC, BZT as Alternate NC north, and MFQ as Alternate NC south. Boise: GTN was reëlected president of the Gem State Radio Club and is planning s.s.s.c. rig. KJO was reëlected secretary-treasurer. Traffic: W7EMT 77, GTN 60, DMZ 48, IWU 34, BDL 26, GHT 12, BAA 7.

MONTANA — SCM, Fred B. Tintinger, W7EGN — SEC: CT. RM: KGJ. PAM: CPY. On Nov. 27th the Great Northern train master at Whitefish called BNU and asked for amateur radio help in dispatching train orders between Whitefish and Spokane as a heavy wind and rain storm had disrupted both Great Northern and commercial communications lines between the two cities. BNU notified EGN, who immediately contacted HCJ, in Dishman, and IDA, in Sandpoint, Idaho, on 3.85-Mc. 'phone. BNU proceeded to EGN's shack to man the local telephone to the GN depot and assist in transmitting and receiving train orders by radio. HCJ put a direct telephone patch from his station into the G.N. train master office in Spokane and IDA stood by to help relay if needed. Train orders were handled until long-distance commercial lines were restored. AOD, ex-Missoula, is back on the air at Seattle and wants to QSO old friends in Montana. ØSDS now is 7NXE. CAL is on 144 Mc. with 522. AYG flew his plane to IBG's and CBY's shacks for a visit. NJY and NXW, of the AACS, took the Electric City Radio Club on a tour of the aircraft and ground station radio equipment at the Great Falls Air Base. Traffic: W7KGJ 104, EGN 84, CT 48, FTO 27, FGB 24, BNU 10.

OREGON — SCM, J. E. Roden, W7MQ — Astoria: COZ reports the loss of beam elements in a windstorm. Baker: Baker Amateur Radio Club officers are HAZ, pres.; NUR, vice-pres.; NQD, secy.-treas. FFR has one of the best 3.85-Mc. mobiles in Oregon. NQD is new ORS and LQW new EC. Bend: HHH has her new four-element beam high up on a 35-ft. pole. Coos Bay: EJF is whipping up things in shape with his AEC program. Eugene: LVN is new Net Control Station on OEN 'phone net. Grants Pass: LWW is another OEN mainstay. KEN is very successful with 50-watt mobile. Klamath Falls: NOJ, MYI, and JRU are very active in new Oregon Slow Net. Lyons: KJU is active again. Milton Freewater: FMJ is active on 29-Mc. 'phone and also 160 meters, fixed and mobile. LaGrande: HBO and KVG are helping to organize a new net on 1996 kc. NOB is finding the Oregon Slow Net lots of fun. Medford: HLF, our SEC, reports very successful AEC tests. Pendleton: ADX is new Net Manager for 1996-kc. 'phone net. Portland: DIS, Columbia River Regional EC, reports drills each evening at 7 P.M. on 29.4 Mc. with mobile check-ins and fixed stations on 29.2 Mc. and jump stations to move traffic to the 3 to 4 Mc. channels under AEC Plan. IHI and JCU are working teletype schedules each Wed. on 3820 kc. at 8 P.M. Traffic: W7ESJ 284, AXJ 261, GWE 145, JRU 143, HLF 115, MQ 113, HDN 91, GNJ 80, IIV 51, FY 46, NOB 43, MNS 35, SO 34, AJN 32, BDN 29, FRT 28, NQD 22, ADX 16, FKA 15, GXO 15, JVO 14, LT 14, DIS 11, MVJ 8, JKU 5, FPK 4, GZW 3, JOP 3, NGG 3.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — SEC: KAA. RM: CZY. PAM: CKT. KTL purchased

(Continued on page 70)

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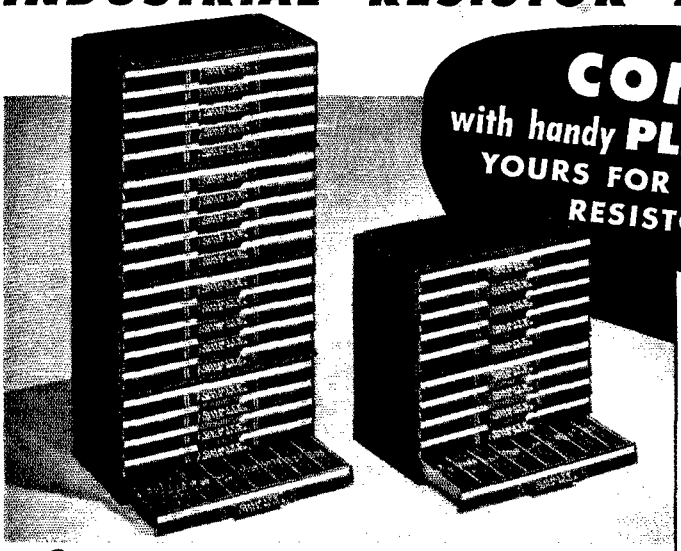

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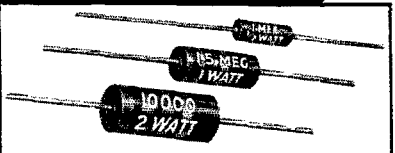

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HQ-129X receiver from 1OU. KAA is hard at work on his directory for AEC units. GAT says there is interest in 160-meter 'phone net. Those interested should contact CKT. the PAM. EYS, our new QSL Manager, had to give up the job — the house wasn't large enough to hold all the cards. Mary Ann Tatro, FWR, took over the job and promptly moved Tate out to the woodshed again while his radio room became the new QSL Bureau. The Skagit Valley fellows received a vote of thanks from the Red Cross and city officials for their part in the recent high water. They did a fine job in furnishing communications in sections that were inundated. JJK is handling lots of traffic between WSN and WARTS. ETO is having trouble getting his new 500-watt Millen rig on the air. KCU is busy campaigning for CZY for our next SCM. EAU ran up a nice score in the Sweepstakes. CZY says, "One more typhoon in the South Pacific and I will have to have a 26-hour day to clear my hook." FWD has gone into the beam-building business — for a fee of course. ZU is having plenty of trouble with skip. APS is experimenting with Marconi antennas. LVB is doing a nice job as NCS on WSNET Friday nights. FIX has a big demand for his *PAN News* from all over U.S.A. FRU spends most of his time between WSN and the Big Dipper Net. CWN wants to know where he can do some duck hunting. The Walla Walla Radio Club was pleasantly surprised on its Nov. 21st meeting night when guests showed up from all over the State. A fine meeting was had and there was much discussion concerning more intercity activities. The following stations made the BPL: CZY, DRA, ZU, and FIX. JZR missed BPL by one point. LJM bought a new exciter. JDC has quit radio and taken up violin-playing. NOF is rebuilding her rig. JKO has moved next door to a television fan and he says, "It's the end." JER has moved to Bellevue, where he has built a new home for his kw. MVF is heard on all bands at the same time. LRQ is on the air with surplus ship transmitter. Traffic: (Nov.) W7CZY 3742, KCU 359, FIX 338, ZU 268, DRA 208, JJK 166, JZR 132, FRU 107, KAA 77, FWD 75, ACF 68, ETO 58, EHB 51, LVB 51, LIL 27, GFM 26, KTL 15, EAU 13, GAT 3, APS 2. (Oct.) W7FRU 42.

PACIFIC DIVISION

HAWAII — SCM, Dr. Robert Katsuki, KH6HJ — Oahu AEC members now number 18 with drills being conducted every Tuesday at 7 P.M. HST on 28 Mc. An inter-island 'phone net has been organized under MN (PAM) and includes 1N (Hilo, Hawaii), FS (Kaunakakai, Molokai), PX (Lahaina, Maui), PG (Kalaheo, Kauai), FQ (Kapaa, Kauai), BI (Honolulu, Oahu), and AY (Honolulu, Oahu). The members chose the name 49th State Phone Net and meet every Tuesday at 8 P.M. HST on a check-in frequency of 3900 kc. The Hawaiian Regional Net (c.w.) operates on 3725 kc. on Mondays, Wednesdays, and Fridays at 8 P.M. HST but the mainstays, BW (RM) and PL (ORS), have been unable to participate regularly because of night work. More ORS are badly needed and all who can spare a night a week are urged to contact BW and participate in the operation of this net. UL schedules W6CE nightly. Traffic: KH6UL 546, PL 331, BW 177, HJ 21.

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. ECs: HJ, JVW, JLV, KSR, TJY, KOA, KWZ, and ZT. RM: PST. OBS: JLV and MZP. BVZ reports an unusual QSO in working W1AW at 3 P.M. PST. NNA, KJQ, SXD, and BVZ, of Boulder City, have moved to 7 Mc., as have KTH, LVP, KWZ, and W4KMC/7, of Las Vegas. JUO, on 'phone, and KEV, on c.w., seem to be high Nevada men in the SS. KSR is on 3.85 Mc. at Henderson. 6AFK/7 now is 7OAL on top of Peavine Mt., 8500 ft. in the clouds. BIC has opened his own radio sales and service business in Reno. The ARRL Convention in Reno seemed to make all comers happy. PST reports the Nevada Net (3660 kc.) is running very nicely with more check-ins each week. TJY is very busy as Traffic Manager of the Mission Trail Net (3854 kc.). Several of the Reno Club members have a private WAS contest going on 3.5 Mc. Traffic: W7TJY 194, CX 20, QYK 12.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — NW made BPL on deliveries. Chick is active in RN6, Trunk Line S, and VN. VIQ is trying his luck on 14-Mc. 'phone during the day and nights on 3.85-Mc. 'phone. DAE and WGO were busy building transmitter for SCCARA to be used at the club station located in Red Cross Headquarters in San Jose. The SCCARA Christmas Party was a grand affair. KIN is using Selectoject with very good results. Al says it sure pulls the weak ones out of the noise. JSB is using BC-610 on MTN now with low input. ZRJ is QRL with school work so not much traffic. WOZ had a bad cold and lost his voice for a short while so Jock was absent from his net activities. AYL has his new shack and rig all in tip-top shape and can be heard blasting in with his kw. on 3.85-Mc. 'phone. Well, gang, sure hard to give you a column without any reports coming in. Let's get the news in on time so we can keep the column full of dope. Your reports should be in the mail not later than the fourth of each month. Traffic: W6NW 403, BPT 273, JSB 114.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst.

(*Continued on page 72*)

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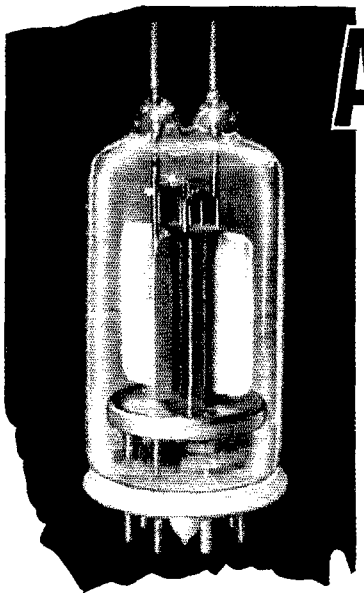
SCM, Charles P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, WGM. Asst. EC u.h.f.: OJU. RMs: FDR, ZM. Good old television interference is now catching up with the boys slowly but surely in the East Bay section. Channel four seems to be the heart-breaker in these parts. Boys moving from the city to better country locations find that the city boys might be a little better off as fringe areas are tough. What to do? The ARRL CD has letters and circulars for your use. See the *QST* index for remedies and that W3NJE article in January *QST*. A good low-pass filter is half the battle. First off get that transmitter shielded. At the Dec. 2nd meeting of the Richmond Amateur Radio Club the following officers were elected for 1950: DTW, pres.; ZET, vice-pres.; VFW, secy.; EJA, treas.; GKN, sgt. at arms; PWR, public relations. DTW is giving code instructions on Mon., Wed., and Fri. at 6:45 P.M. PST on 28,890 kc. CHT has new sky hook and a pair of 35TGs on 7 Mc. Bill has made an outstanding sergeant at arms the past year for the ORC. YMO has his 813s in new QTH in an apartment house. On Dec. 8th the following officers were elected at the Northern California DX Club for 1950: LDD, pres.; ATO, vice-pres.; CTL, secy.-treas.; MVQ and TI, board of directors. DQL, of Pacific Union College, reports that mobile and emergency equipment are the center of interest. A new 20-kw. gasoline generator and a new rig with 813s have been added to the station. OJU has moved to Sebastopol. FDR reports that the Pioneer and Car Nets are on 3725 and 3645 kc. OT is plugging right along. YDI changed 'phone rig to plate modulation. DTW is operating on 7, 14, and 28 Mc. VDR is on the Mission Trail Net. WII is sending out Official Bulletins on schedules. CTL is doing a good job as OO. PB has new beam up at last; it looks like a submarine. 1KQ is rebuilding 14-Mc. beam. ITH, on 'phone, and MVQ, on c.w., took top honors in the SS Contest for East Bay. OBJ is feeling much better. Traffic: W6FDR 259, OT 249, DQL 24, YDI 24, DTW 16, VDR 11, WII 11, EJA 4, TI 2.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W6ZF — Asst. SCMs: Northern Area, W6YNM; Central Area, W6CKV; Southern Area, W6SUP. SEC: KME. ECs: Met. Sacramento, BVK; Walnut Grove, AYZ; Dunsmuir, JDN; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OESs: PIV and GHE. OBS: AF and BTY OO: ZYV, BTY GDO, and YV. OPS: JDN. Sac. Valley Emergency Net, 146.52 Mc., NCS KME. Sac. Emergency Network (city), NCS AUO. Section Traffic Net, 29.4 Mc., NCS ZYV, Asst. NCS BTY. *Northern Area:* It is with pleasure the SCM announces the appointment of YNM, 1110 Florence Ave., Dunsmuir, as Asst. SCM. JDN has as Asst. ECs EWG, CFU, and NCV, and is active on MTN nightly. REB has new NC-183 and Collins push-button 150-watt transmitter. *Central Area:* HBM is active in EC work in the Chico area. Espie A. White, who is blind, received the call HNL. ZNU, a deaf mute, is very active on c.w. KUI is trying n.f.m. on 144 Mc. Golden Empire Radio Club officers for 1950 are TKE, pres.; CKV, vice-pres.; GUV, secy.-treas.; and ZFJ, sgt-at-arms. New meeting place is Naval Reserve Bldg. at Chico Airport. *Southern Area:* ZYV is lecturing on TVI cures. EMK and GKW are new hams in Sacramento on 144 Mc. BVK, MYL, MIW, and BLP worked VLS and JPU in Fresno over a 160-mile path in November. GDE is secretary of new Inter-City 10-Meter Emergency Net operating Tues. at 8 P.M., with COI as NCS. ASE is on 28-Mc. mobile with 350 watts. WSI is NCS and ASE Alternate NCS of Mother Lode Network on 29.2 Mc. Mon. at 8 P.M. MIW has new 144-Mc. beam. GQS has new 28-Mc. beam and says every CQ heard is a station worked. QDT uses coax to make capacitors for TVI elimination. ZF is rebuilding 813s in final and soon will be on 144 Mc. Traffic: W6PIV 280, ZYV 227, JDN 191, GDE 28, ZF 18, BTY 6.

SAN JOAQUIN VALLEY — SCM, Ted R. Souza, W6FKL — Asst. SCM, James F. Wakefield, 6PSQ. SEC: JPS. ECs: PHL, AJE, and WBZ. ZYR is thinking in terms of high power. The SJVRC station, TO, is showing great progress in the accumulation of equipment. A high-frequency club is in the making in Fresno. All those interested, contact PSQ or JPU. UVN reports his new SX-42 really inhales the DX. CUA has moved to Delano. QEU was really busy on 'phone during the Sweepstakes Contest. GRO assisted in the Washington State flood emergency. EXH and GQZ are getting up a new 24-element beam for 144 Mc. PJF is Net Control on YLRL Net. VKD has been doing some fine work on 50 Mc. lately. MDQ's main activity has been on 28-Mc. mobile. INP has just completed a new 28-Mc. rig with 250 watts input. ADB is on 50 Mc. besides participating in Pioneer Net traffic. DIY is old in the game but new on 50 Mc. ERE has a new rig on 28 Mc. FYM has a 24-element beam on a 50-foot pole and is doing very well. QER is putting the shack in the new home. BCL has been busy on the job but managed to get on during the SS Contest. PSQ is busy working on his mobile gear. FKL is thinking seriously about n.f.m. for his rig. PHL is very busy with police radio so OHB is keeping Merced on the air. It is with regret that we record the passing of the following amateurs: IHV, CHF, and ex-RSQ. Traffic: W6GRO 43.

(*Continued on page 74*)



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DOUBLE TETRODE—AX-9903

Cathode	Indirectly heated Oxide Coated
Voltage	
Series	12.6
Parrallel	6.3
Current (Amps.)	
Series	0.95
Parallel	1.9
Amplification Factor	9
Maximum Ratings (per unit) Class "C" Telegraphy	
Plate Voltage	600
Plate Current (Ma)	110
Plate Dissipation (Watts)	20
Frequencies (Mc)	150 | 300
***Typical Power Output* (Watts)**	80 | 40
(2 sections, push-pull)	
Inter-electrode Capacitances (mmf)	
Grid-Plate	0.08
Input	6.7
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AX-9903.....Net $15.00

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	AX-9900/5866	AX-9901/5867	AX-9902/5868
Filament — Thoriated Tungsten			
Voltage	6.3	5	10
Current (Amps.)	5.4	15	9.7
Amplification Factor	25	25	27
Maximum Ratings — Class "C" Telegraphy			
Plate Voltage	2500	3000	4000
Plate Current (Ma)	200	400	550
Plate Dissipation (Watts)	135	250	450
Frequencies (MC)	150 | 200	30 | 120	100
Typical Power Output (Watts)	390 | 200	820 | 520	1450
Inter-electrode Capacitances (mmf)			
Grid-Plate	5.5	8.0	8.0
Grid-Filament	5.8	8.0	11.0
Plate-Filament	0.1	0.3	0.3

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ROANOKE DIVISION

SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT — All League appointments, such as OPS, ORS, OBS, and EC, must be endorsed yearly. Several of these appointments in South Carolina have expired but will be renewed if certificates are sent to the SCM before Feb. 28th. Any certificates not received by that date will be considered cancelled. Ben Team, DX, has been made Phone Activities Manager for South Carolina and will actively promote nets and other 'phone operations in the State. ILQ and EOZ are 3.85-Mc. 'phone Official Bulletin Stations. HCZ is the c.w. OBS. Listen for their broadcasts of Official Bulletins. HCZ also is Route Manager for Western South Carolina. We invite applications from 28-Mc. 'phones in Columbia, Charleston, and Greenville for OBS appointment. Friday night on SCAN is XYL night but more attendance is needed by the XYLs. NKA, JSM, PNL, OBT, HXZ, ODU, and PST are active in Anderson. BSS has 200 watts and sixteen-element beam on 144 Mc. GIT, GTW, and HSM are active around Sumter. PXZ worked KV4AA on 3505 kc. See following notice about the All South Carolina QSO Party, with prizes for the three top scores. Traffic: W4ANK 308, AZT 60, EOZ 13, DX 12, PXZ 7, BSS 2.

SOUTH CAROLINA QSO PARTY
February 4, 5, 1950

All amateurs in South Carolina are invited to take part in a QSO party sponsored by the Greenville Amateur Radio Club.

All bands may be used. Cross-band contacts will be permitted and are suggested for achieving a high score. 'Phone to c.w. contacts are suggested and any type of transmission may be used that is legal. Scores will be computed by multiplying number of contacts by number of different towns and cities worked in S. C. No extra credit will be allowed for cross-band or multiple-band contacts with the same station. Copies of log showing call of station worked, time of QSO and location of station worked should be mailed to Garland O'Steen, P. O. 1884, Greenville, S. C. not later than Feb. 28th. Prizes for the top three scores have been secured by W4DX from Radio Laboratories in Charleston and will be awarded by the GARC Committee as soon as the logs can be checked.

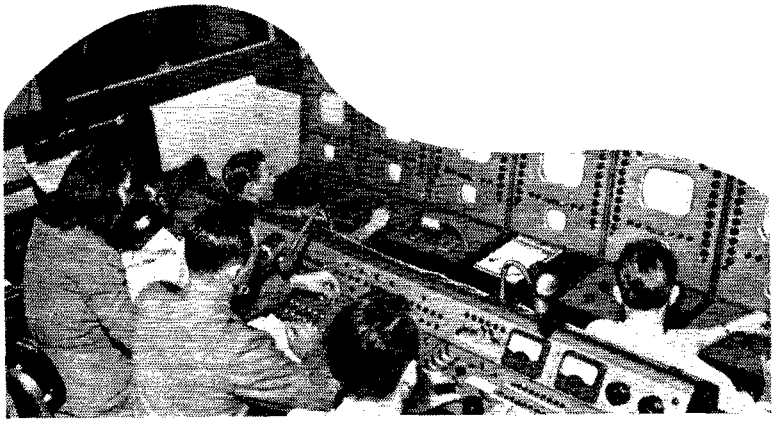
Here is an excellent opportunity to meet the fellows around South Carolina. It is suggested that stations on 80 c.w. work the 3525 kc. net frequency and that 75 'phones operate on the 3940 net frequency. This will permit locating stations easily for cross-band work. Get on the air Feb. 4th and 5th and see how many fellows you can work in your own section.

VIRGINIA — SCM, Victor C. Clark, W4KFC — Asst. SCM, E. Etheridge, 4KYD. PAM CLD reports VFN (3880 kc.) enjoying large nightly (7:30 P.M.) attendance with traffic much heavier than last year. DTV, IHN, IWO, IYI, JDS, MWH, MZM, NAD, and PWX have qualified for VFN certificates. Net Control Station IWA has issued a bulletin including a roster of VFN members and outlining net operating procedures. PYV (ex-5CHA, 6CHA) and BCI are new reporters on VN, which meets nightly in two sessions, 7 and 10 P.M. on 3680 kc. PVA (ex-KZ5AX, W6WOQ, W2BXH, VP4TAV) is new Class I OO. PYN is the new club call of the William & Mary College gang. BZE's new QTH is 7709 Pine Hill Dr., Richmond 22. ZA, our new Director, has confirmed appointment of Virginia Asst. Directors made by former Director, IA. OVK, at new QTH, 1565 Kile Circle, Norfolk 9, is active on 28 Mc. NNN worked VP5BF, Turks & Caicos I., on 3.5 Mc. for No. 205. NQV put up 28-Mc. rotary, and rolled up 37,000 points in the SS. MLH visited W3s CUL, KBP, NHI, and VR and W1s QJY, QJX, and KYG during vacation. PAS, PED, PYN, and PYV express interest in ORS appointments. CJS's invisible (No. 32) antenna blew down during the SS and he garnered 25,000 points using feeders only! NJV has his Collins rig back on the air. VE worked EP2A for No. 153. FF, KYD, LAP, and LUE report equipment breakdowns in the SS. MWH commissioned Collins 32V-1 and acquired 35-w.p.m. Code Proficiency certificate. CVO, EMJ, KVM, and PED report SS activity. IWS and PWX joined the AEC. Congrats to new officers of the Richmond Club: IWA, pres.; NAD, secy.; MK, treas. KFT expresses enthusiasm for his new QTH, 2FXN, of FRC, was a visitor to PVRC. Traffic: W4LAP 213, PYN 213, KVM 153, MLH 122, KFC 71, FF 54, KYD 36, NAD 35, IA 28, IPC 25, NV 25, PAS 25, YEJ 11, CVO 7, PED 6, QWM 5, CJS 2.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — Dunbar amateurs have started a radio club with DHX,

(*Continued on page 76*)

Are You Prepared for a Good Paying Job in Television?



Television technicians are in demand — in stations, factories, research labs; in installation and trouble-shooting jobs. And the opportunities are increasing daily.

The future belongs to those who prepare for it. This school gives you up-to-date technical training required to help you step ahead!

By E. H. RIETZKE

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CREI invites investigation and comparison. An accredited technical institute founded in 1927, CREI's home-study graduates today fill important engineering, research, and radio-TV posts throughout the industry. While CREI makes no job promises to its graduates, the CREI Placement Bureau generally has on hand more requests than it can fill. During the war CREI trained thousands of technicians for the Army, Navy and Coast Guard. Hundreds of thousands of special CREI technical texts were used in the Navy's own training program. Leading industrial firms — RCA Victor, United Air Lines, TWA, Pan American Airways, All-America Cables & Radio, Inc., Sears Roebuck & Co., to name only a few — have CREI group training programs now in operation.

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YKX, IRN, and BNL doing the organizational work. AUJ is working 7 Mc. between schedules. MOP may be heard regularly on the Hoot Owl 'Phone Net on 75 meters at 5 A.M. QHG has completed new Collins 70-E VFO. ZFJ is building new rig. SFT has been inactive recently because of illness. DFC spends time on traffic nets and EC work. Director Keys has announced appointment of the following as Asst. Directors: BTV, CSF, GBF, HUK, BDD, OXO, and JM. PZT plans to keep big rig on the air in Weston and install small one at Fairmont for net operation. BWD, now in Buckhannon, is active on 50 and 144 Mc. The MARA held its 2nd Annual Christmas Party in Clarksburg. BWK, a WVN member, now is ORS. WSL schedules a Holland amateur on 28-Mc. 'phone and has received a pair of wooden shoes which he wears to radio meetings. JRL and WVF are active on 28-Mc. 'phone, with JRL recovering from an illness which confined him to his home. BOK finds duties as MARA secretary keeping him off the air. Traffic: W8GBF 186, AUJ 109, OXO 90, DFC 67, BNL 40, BWK 27, JM 2, MOP 2, BOK 1, BWD 1, VCA 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SECs: KHQ ('phone), IC (c.w.). RMs: ZJO (IUN), LZY (CSSN), ZJO, new RM for IUN, hits the jackpot and makes BPL again this month. LZY reports the CSSN gradually is folding up. He also reports that he will put Official Bulletins on 3560 kc. at 7:00 P.M. Fridays and 7225 kc. Fridays at 8:30 P.M. MST. SGG reports that KSB is active in Black Forest on 28-Mc. 'phone and JMB is working considerable DX on c.w. JVR is working considerable DX on 28 Mc. with 18-watt rig built by SGG. He says the antenna is the secret. IA reports from Boulder for the first time in ages. He would like more traffic for the University. DYS has new Class A ticket but can't get on 3.85-Mc. 'phone until the coal miners go back to work and pay for the radios he has fixed for them. DYS is an invalid at Trinidad, Colo., and W. E. Clyne, the local engineer in charge, went there to give him his exam. MOM has trouble getting on in the evenings. It seems he is required to show 16mm. movies to his children each night in place of telling them bed-time stories. SFS is working 28-Mc. 'phone with 15 watts and a cubical quad antenna. PQZ is active on the CSSN. OPF is on 3.5- and 7-Mc. c.w. HJX, at Lamar, is building new VFO for 160 and 75 meters. He reports two are waiting for new tickets but that two of the licensed boys are leaving town. Check your certificates for renewal. Traffic: WØZJO 1787, IC 240, LZY 63, SGG 28, IA 27, MOM 17, IQZ 8, OWP 8.

UTAH — Acting SCM, A. M. Phillips, W7NPU — UTM is busy with the following nets, but finds time to build a Q-5er: IUN, TWN, MAN, and TLAP. BQJ will see the gang on the air soon. A new call is NQC and will be heard on 14 and 28 Mc. SSY still is knocking off good DX on 'phone. NAU is working over an ARC-5. Another new call is NHQ and will be heard using an ART-13. FYE divides his 'phone interest between 3.85 and 14 Mc. LXX is planning a new 100-watt job. NMK has a new 28-Mc. beam. ONH had a 60-foot cedar pole planted in his yard and will support a new 10-20 array. A new arrival in Salt Lake City is 6DYA/7, heard on 28 Mc. DKB is getting back on the air and will be found on 3.85- and 14-Mc. 'phone. NPU has a 46-foot pole waiting for a beam which is under construction. Traffic: (Nov.) W7UTM 238. (Oct.) W7UTM 131.

WYOMING — SCM, Marion R. Neary, W7KFV — HNI is rebuilding 3.85-Mc. 'phone rig. HFV is representing the northwestern part of the State in the Pony Express Net. FLO is manufacturing his own a.c. for the rig. Anyone interested in EC appointment or AEC membership, contact HDS. NMZ is on 14-Mc. 'phone. NDF is on 3.85-Mc. 'phone with 15 watts to 2E26. HRM moved to new QTH. KFV has Gon-Set 3-30 for mobile 3.85-, 14-, and 28-Mc. 'phone. NFW is having good luck on 28-Mc. 'phone with 5 watts to Signal Shifter. JXJ took Class A exam; look for him on 3.85-Mc. 'phone. JDB is pres. and GZG secy.-treas. of the Laramie Club. JJO lost his rig in a fire. PGS is hunting that elusive DX trying to keep ahead of ØAZT. LHW is turning out some FB QSLs these days. The present complement of the Pony Express Net (PEN 3920 kc.) consists of CGK, EVH, HDS, IRX, JGS, GOH, HFV, FLO, GSQ, HNI, GZG, NDF, LE, NAC, NLH, and KFV.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Leland W. Smith, W4YE — Thanks for your response! Keep it up and we will have the most active section in the Southeastern Division during 1950. JYB, our new OO, worked ZL on 28-Mc. mobile. EHC is working everything he can hear on 4-Mc. mobile with his base-loaded whip. BA, our PAM, is back on 4 Mc. after a long absence. HA has p.p. 810s on 14 Mc., an ART-13 on 4-Mc. 'phone. LEO has his 100 watts going strong on 14 Mc. PXO, our "Sunshine Girl," received her new transmitter from the Birmingham Club as a Christmas present. FYB is new Assistant Emergency Coördinator for the Dothan area. DMV, NLB, LUT, NIK, and OJJ are the rag chewers in Dothan. NLB is proud of his new three-element

(*Continued on page 78*)

beam on 28 Mc. IVC and HDI are the latest 28-Mc. mobile addicts in Montgomery. NOF is Acting NCS of the Montgomery Emergency Net on 29,520 kc. OBV puts out a phenomenal signal on 4 Mc. with 3 watts input. AUP is waiting for longer days for his 160-meter operation. PNO and PTB are new hams in Decatur. Your SCM welcomes correspondence and reports from all Alabama hams. Traffic: W4GJW 91, BFM 25, JYB 18, YE 12, ATF 9.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — Congrats to our new Director, BOL, and a goodly amount of praise to ASR for the splendid job he has done the past ten years. A partial list of BOL's assistants includes IQV, BT, BP, FNR, HWA, and FWZ. As the Dade Radio Club points out, "Your Director is as close as your Assistant Director," so Lamar should be well posted on Florida. Congrats to AUP on his reëlection as Alternate Director. By the way, is your radio club affiliated with ARRL? It's really worth while, fellows. Deland: WS handled some nice traffic during the Stetson Homecoming. The Deland Club now meets two nights per month. De Leon: How is this for net schedules? It's PEI: Palmetto Net at 7 P.M., 4RN at 7:45, ERN at 8:30, TLCS at 9:00, and also RBL and TLJ. Holly Hill: OAV is Palmetto NCS on Tuesday. Jacksonville: New officers are LZM, FS, NMG, and PMZ, with EEW as activities mgr. Trustees are HWA, FRP, and CCG. HWA, working mobile 28 Mc., had a nice chat with his mother in Albuquerque via a 'phone patch. CGY is new EC for Jacksonville. Lake City: Here's IQV's net schedules: Palmetto, RBL, 4RN, Florida 'Phone, and Hit and Bounce. A good plug for ham radio was IQV's talk at the Lions Club. Miami: ES is in Puerto Rico. BXL is holding down the USCGA Net for him. New Port Richey: KJ, as A4KJ, is holding NCS for MARS in Florida as KQP has gone back to F.S.U. If you can qualify for MARS let KJ or FWZ know. Palatka: GZV handles traffic on 3945 and 7150 kc. Clearwater: AYX has been appointed EC. It's OO for BMR at Ft. Lauderdale and OPS for OAV at Holly Hill; also OO and OPS for MVJ at West Palm Beach, in addition to ORS. Hats off to HGO for his article on 'phone patches in the *Peanut Whistle*. Traffic: W4PEI 171, IQV 157, GZV 110, WS 41, HWA 40, KJ 29, OAV 14, FWZ 6, NFY 6, LMG 5.

WESTERN FLORIDA — SCM, S. M. Douglas, jr., W4ACB — OYR is knocking holes in 7 Mc. with his home-brewed 150-watter. TL managed (again) to beat out QB in the SS Contest. OCL and NHR have new Class A tickets and are trying out 3.85- and 14-Mc. 'phone. OKD still is looking for volunteers for the Suwannee Net. ACB is building new rig around a pair of 4-125As. LDT is heard on 28-Mc. 'phone with his new rig. The Tallahassee gang is eagerly waiting for the new ham-call license tags. NOX has her new Class A ticket. PAA has Class B, while OCX fights 28 Mc. EQR is building TV receiver. MS is chasing some DX with his 100-watter, and also works 14-Mc. c.w. Interest in 50 Mc. is lagging somewhat but the faithful have hopes of organizing a Gulf Coast net on 50 and 144 Mc. LRC has new QTH at Shalimar and will be one of the links in the net. AXP remains the old standby with his traffic nets. Traffic: W4AXP 116.

GEORGIA — SCM, Clay Griffin, W4DXI — Congratulations to BOL, who has been elected Director of the Southeastern Division. Lamar will make a good one. GGD expects to be back on 3.85-Mc. 'phone soon. CLF, formerly of Columbus, now is in Oklahoma. Savannah: KGP reports that he has been active with 3.5-Mc. traffic. GMA is rebuilding. ORR has a quad on 28 Mc. FEH has a new tower. DEJ moved to Omaha. Cedartown has a new ham, PNC, reported to be on 28 Mc. The South Georgia Slow Speed Net has changed its name to the Georgia Slow Speed Net. The following are new officers of the Atlanta club: HDC, pres.; MZO, vice-pres.; FKN, treas.; OFT, secy.; IEN, act. mgr. Traffic: W4GGD 112, BOL 43, KGP 11.

WEST INDIES — SCM, Everett Mayer, KP4KD — KO reports from Ramey with traffic. DJ, NCS 3.5-Mc. c.w. net and EC, reports traffic. IT sends in nice reports on the Ramey gang. HU changed QTH and works nice DX on 3.5 Mc. DJ works some 14-Mc. DX and reports AEC c.w. net growing. AJ still waits for some Island activity on 50 and 144 Mc. JD checks in from West Virginia on the way out of the Army. KL is fighting 28-Mc. QRM with SCR-522. KM sports a pair of 814s. KO's beam works swell except for Texas, where he wants to QSO. KY and 807 are doing OK with modulator coming up. JF is working 14-Mc. 'phone with ART-13 and folded dipole. CH now is with C.A.A. HZ has schedule with N.Y.C. going FB on W2DD. W6WZA/KP4 was active on 28-Mc. 'phone between Duffy's Tavern programs. CM is boring through to California on 28-Mc. 'phone. IG is active with schedules back home. Traffic: (Nov.) KP4HU 18, KD 14, KO 3, DJ 2. (Oct.) KP4HU 27.

CANAL ZONE — SCM, Everett R. Kimmel, KZ5AW — SEC: GD. RM: PA. PAM: CG. Ike Price, KZ5IP, Box 407, Balboa, C. Z., is now QSL Manager. Get your envelope on file with him now. See bottom right page 112, Dec. '49 *QST*. The Crossroads Net, call CRNET, meets Tuesdays at 2100 on 7150 kc. It's slow speed, and the object is training in QN signals and message handling. NM is vacationing Stateside. His XYL is KZ-Land's newest YL operator with the call LM. WJ flirted with p.p. 812s but returned to his first love,

(Continued on page 80)

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Eldico Transmitter Filters

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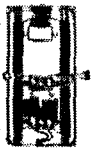

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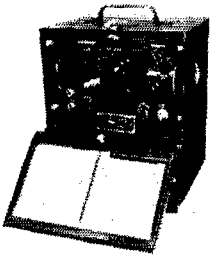
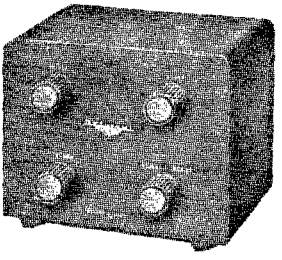


SELECT-O-JECT



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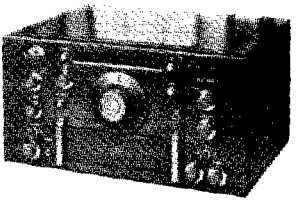

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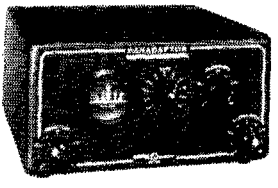

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p.p. 807s. Middleman in a multicornered traffic deal between W5OPQ, OA1D, and PK4DA, our EC, FL, piled up quite a traffic score for the month. GM tamed his VFO; he needs only four states for WAS. WJ made OO Class I with RM also in the September run. There are 75 stations listed in the latest bulletin from the HP boys in Panama. Traffic: KZ5FL 81, WJ 34, BL 26, BE 18, AW 14.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Vincent J. Haggerty, W6IOX — November traffic was heavy. Six stations, CE, IOX, DDE, JQB, GWB, and RXT made the BPL. CE led the section in traffic with a total of 4262 points, which represents a lot of work. Tim is manager of the Sixth Regional Net and is largely responsible for the development of the National Traffic System (NTS) in this section. Traffic to and from the section works through the So. Calif. Net or Mission Trail Net, thence to Regional Net 6 and on to the Pacific Area Net, from whence it proceeds across country or overseas. JQB boosted power to 200 watts for long haul schedules. ANT works traffic exclusively on the Mission Trail Net during the week and goes to 14 and 28 Mc. on week ends for relaxation. MU gave LYG a pep talk on traffic-reporting and then forgot to report himself. LYG has been on 28-Mc. 'phone and 7-Mc. c.w. from the National Military Home at Sawtelle for more than two years; daily schedules with the Marine Corps Net for traffic work and providing personal 28-Mc. 'phone contacts for overseas service personnel with their home folks are some of the worthwhile activities of LYG which MU urged him to report. QAE, BHG, and GWB received ORS appointments. QAE had a visit from DU1ZM of the Philippines, a 14- and 28-Mc. c.w./'phone ham who is on with a BC-610 from Manila. It is reported that UPK was seen operating a 144-Mc. mobile rig from a baby buggy. FKO uses a wire recorder in connection with his Official Bulletin transmissions. TFC has a new 14-Mc. three-element beam and a 40-ft. tower prepared for erection. WMQ is QRL building a new home. AMD, FFF, and K6BG knocked off some delectable 50-Mc. DX from Santa Barbara. CMN confidently reports that his TVI problems are solved and that his attention is now focused on stabilizing an errant VFO. NUF reports that the Pasadena Short Wave Club meets on the second and fourth Fridays, 7:30 P.M., at 736 Rosemead Blvd. In a personal visit by SML, "Strat" reported he must return to U.C. for one more semester to get his degree. In the interim he is attending radio school in Los Angeles; he has acquired a telephone 1st-class ticket and upon completion of his college work plans to enter the broadcast field in far-off Brazil. The AEC is progressing nicely under the leadership of Section Emergency Coördinator ESR. ECs in each area should report monthly to ESR. The AEC has a special page in *QST* so let's let the others see what we are doing. The Red Cross-AEC radio station in Los Angeles now is operated under the direction of Phone Activities Manager MVK. ARRL's film on TVI was shown at the December meeting of the Long Beach Club. Following the film K6AO gave a demonstration on the ways and means of curing TVI. How to Count Your Traffic Total: 1 point for each origination; 1 point for each message received by radio, add 1 point for each received message which is relayed or delivered by your station. Messages addressed to your own station are listed in the received column only. There is no longer an Extra Delivery Credit category. 500 points total or 50 deliveries merit BPL rating. Traffic: W6CE 4262, IOX 760, DDE 726, JQB 591, LYG 188, GWB 153, QAE 120, RXT 120, ANT 70, CMN 65, BHG 56, FMG 32, VG 32, NAZ 25, FKO 8, FYW 8, TFC 8, BUK 3.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — Arizona amateurs deeply regret the passing of GV. Meade was a real "old timer," getting the first Arizona call in Bisbee in 1914. He received a Navy Award for putting the *Shenandoah* on course when it became lost in Arizona. New Tucson calls: NYT, Blackwell; NYK, Harowitz; Joan Harowitz, operator's ticket. HDO is on 14-Mc. 'phone with a new Class A ticket. MES, LHD, OOH, and MLL attended the Division Convention at San Diego. NAP QSOed the Phoenix gang on 28-Mc. mobile while on honeymoon. KWL is on 3.85 Mc. from Grand Canyon College at Prescott. MJN reports better results since raising his beam. QNO keeps regular DX schedules with an FB mobile installation. JUY is getting good results with a Signal Shifter to the antenna. MID is using break-in. LQB is working Europeans with a quad on the ground. KWB has a nifty new beam and rotator. Congratulations to the Sahauro Club on handling 1149 messages at the State Fair. An Arizona net on 160-meter 'phone is meeting regularly on 1910 kc. OT, LQB, MAE, MID, UDI, at Phoenix, and JPY, KYJ and MLL are handling Tucson and Phoenix traffic on 3515 kc. Traffic: W7KWB 1149.

SAN DIEGO — SCM, Dale S. Bose, W6BWO — The San Diego Amateur Radio Club sponsored the Southwestern Division Convention, which was very well attended and was one of the finest affairs of this type I have had the pleasure of attending. YXE is vacationing in Illinois. GSQ is on the air with a Collins 32V-1. YXE and VJQ are doing a swell job getting the AEC operating in the San Diego section. ELQ and FMZ are carrying the ball getting the

(Continued on page 82)

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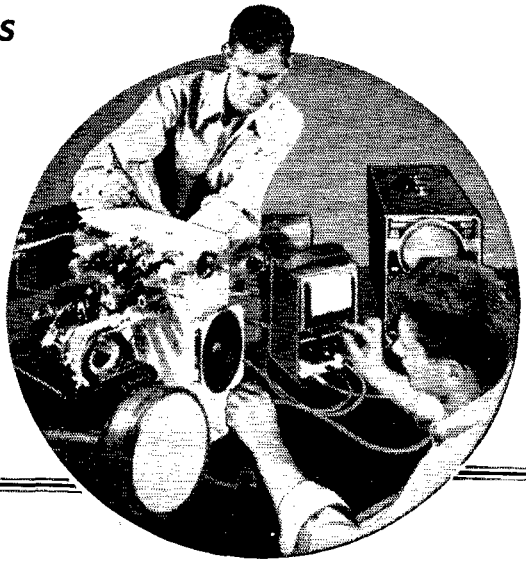

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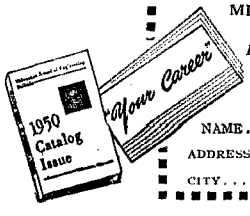

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Southern Border Net organized and going again Monday through Friday at 2030 PST on 3550 kc. BYX attended his first ARRL convention at San Diego. YYN got his last two states for 7-Mc. WAS in the SS; he expects to be on 3.5 Mc. soon. HMJ and HMF are brand-new tickets in the Imperial Valley. DJU is a newcomer to the El Centro area. About twenty-five of the Valley hams and XYLs took in the Convention and did all right with the prizes, with Mrs. Bob Rosenbaum taking home the XYL's main door prize and YES, FLD, UQI, and AWZ also grabbing their share. The Orange County Club had a very interesting talk and demonstration on transisters by the telephone company. Traffic: W6ELQ 192, VJQ 128, YYN 67, FMZ 41, YXE 5.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, Joe G. Buch, W5CDU — AAO, our SEC, has enlisted the help of BKH as Assistant SEC. BKH is NCS for the 3830-kc. EC c.w. net and reports the following active members: HBD, ILZ, ISD, JAD, KPB, NKG, QAN, QEW, DN, NKH, and PXR. QMJ, a new ham in Benjamin, is active on 3.5-Mc. c.w. ATG resigned his teaching position. IYO moved to Shreveport, La. CVW, a prewar traffic operator, has resumed activity with NTX. Bill spends his working time beaming a DC-6 between Fort Worth and Chicago for American but finds enough spare time to work NTX and MARS and hunt 144-Mc. DX. He reports the following Texas stations worked on 144 Mc.: CZZ, CEL, KMJ, ABN, AJG, IRP, and AQS. KUP has eight boys studying for ham tickets in the McCamey Radio Club. LGY is working her receiver overtime to make up for the two months it was in the repair shop. BFA reports the following new members of NWT EC net: EIF, FTK, LZD, HUU, JQD, MNG, NIC, OWS, ILJ, and HWA. This net has 39 active members. JNB is the newly-assigned call of the Big Spring Club. AW is enjoying 14-Mc. DX. It's been fifteen years since Andy has been active on the band. GER, of Dallas, is NCS for MARS. Member stations are NSF, CVW, WAA, KXS, and LKM. It appears that TVI got EVI. If AAK doesn't run out of coax cable, connectors, relays, filters, traps, and time he may whip TVI. LSN makes BPL and GZU makes it for the tenth consecutive month. Traffic: W5GZU 1133, LSN 694, ARK 109, CDU 32, LGY 9, PXR 9.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM. RM: MBV. PAM: ATJ. The OCARC and ACC at Oklahoma City enjoyed a visit and talk by Secretary Budlong. Enid ARC new officers are KWE, pres.; LHZ, vice-pres.; OQF, secy.; and GVV, asst. secy. The Club is sponsoring a code class with LHU as instructor. OQF has 28-Mc. mobile working now, while PCQ leaves his mobile work while wrestling with a new bug on 7 Mc. NGE still is trying to put his 813s on 28 Mc. PAA finished teletype receiving installation. OYP had Tulsa Chess Club at his shack for a radio game with the Stillwater Club with YJ at the other end. II sold his station and is in the antique business. EHC is new EC for Oklahoma County. HEV is working on filter-type s.s.s.c. while using his phasing type rig. OYP and HXT have purchased new homes. 6FDR schedules OLZ each day for traffic going west. MBV is resigning RM appointment preparatory to a move east. Lee has done a swell job; we will miss him greatly. JFY is back on the air after a spell as ØHTS. FRW returns to OLZ after a 10-year absence. We regret to report the death of NMD, Tulsa's only active woman amateur. Death resulted from cerebral hemmorhage on November 3rd. NVB also joined the ranks of the Silent Keys when late in October he contacted high voltage on his transmitter in the basement of his home. This brings forceably to home the slogan, *SWITCH TO SAFETY*. Traffic: W5PWV 764, K5NRJ 730, W5NMM 196, OYP 106, AHT 86, GVS 63, MEZ 26, FRW 22, FRB 11, HKH 4, EHC 3.

SOUTHERN TEXAS — SCM, Ammon O. Young, W5BDI — KSW is on 160 meters at about noon but longs for night-time operation on that band. MN has a new buffer coming up. ACL is VFO on 3.5, 7, and 14 Mc. JKB is spending most of his time experimenting. MMK is on 3.85-Mc. mobile. The Coastal Emergency Radio Net is working in connection with the Harris County Emergency Corps, and has been active in a hunt for a lost airplane. The Houston Amateur Radio Club started a code and theory class on November 28 with 40 registrations. KFY, OUG, and EIB are on the Committee in charge. The local DX gang gets together on the first Monday of each month for a dinner, no officers, no business, just DX chatter and food. Top DX men at the December dinner were ADZ-142, IGJ-135, ACL-124, BDI-103, NMA-97, and LXY-82 confirmed countries. Traffic: W5MN 623.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — SEC: BYX. PAM: BIW. RM: ZU. PAM v.h.f.: FAG. BIW is very active on 3.85- and 14-Mc. 'phone. His XYL, DRA, is even more active on 28-Mc. 'phone. FAG is getting the 144-Mc. gang organized. JOT, El Paso, contacted LWL, Los Cruces, who in turn worked BYX, Hot Springs. QAG, VWU, and MYP were read at Los Alamos by MYQ. PGY, Los Alamos, also contacted QAG. The 75-meter 'phone net coöperated fully with the 144-Mc. gang by relaying reports where two-way contacts were not established. QNQ, EC of San Juan Pueblo, is using an 807 final and BC-454, BC-455

(Continued on page 84)

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receivers. EXG is on 3.85-Mc. 'phone seeking information on the meteor which recently fell near Albuquerque. PXN is on 7 Mc. with 70 watts and is building a 600-watt rig. MSG and KAO, Class I OOs, were busy sending out notices during the recent SS Contest! QIV is on 7 Mc. with 15 watts. BYX reports that signals on 144 Mc. between Hot Springs and Los Cruces faded out after 10 P.M. with the strongest signals being received around 8 P.M. CA and LFR are on 144 Mc. GYS is on 14- and 28-Mc. 'phone with 150 watts. FJT is on 28-Mc. 'phone with 200 watts. Traffic: W5ZU 109, IGO 77, NXE 48, A5ZU 45, W5NJR 44, OCK 23, NKG 17, A5OCK 15.

CANADA

ONTARIO DIVISION

ONTARIO — SCM, Thomas Hunter, jr. VE3CP — Asst. SCM c.w., M. J. MacMonagle, 3AWJ; Asst. SCM 'phone, Earle B. Kimble, 3FQ. SEC: KM. RMs: ATR, AWE, BMG, BUR, DU, GI, TM, and WK. PAMs: BSA and DF. QE is on 3.8 Mc. AKZ kept in touch with home by 3.85-Mc. mobile while on his honeymoon. TO has taken up new QTH in Riverside near Windsor. DBG is new in Leamington and BXJ is new in Windsor. New appointments are BSA as PAM, DCW and BUG as ORS, AER and OJ as OPS. APS is on 3.5 and 3.8 Mc. with high power. BNQ has DXCC. Anyone interested in AFARS on 3645 kc. is asked to get in touch with BMG. VU has new job with O.E.H.P.C. BL worked 61 sections in the recent SS with 90 watts. ANY worked an HC on 50 Mc. AWB has new two-element. AJQ and YJ have new 28-Mc. beams. AQA is on 28-Mc. mobile. BKM has new S-40. BTQ is back on with complete new rig. ATR reports QRL office work and 7-Mc. net. AUG is new president of Frontier Radio Club. The Ontario 'Phone Club has resumed the Food for Britain Fund. FU schedules his brother, G2FZK. At this writing it looks like yours truly will be residing in Regina when this is being read as I am being transferred by my company. BUG is on TL "I." DD is on 28 Mc. when not on Ontario 'Phone Net. BIW is back on 28 Mc. with 813s. DU, BUR, WY, and GI represent Ontario on TRN. BLY is operating DEH while attending U. of T. DU will welcome new stations for the Beaver Net, 3535 kc. IB has new VFO and can be heard on 3.8 Mc. Traffic: VE3BUR 210, IA 165, CP 118, IL 113, NI 101, ATR 89, BBM 71, WY 71, WK 61, GI 56, BCZ 45, FQ 39, BL 33, BUG 26, YJ 22, BER, 21 KM 20, AQB 19, AG 18, YS 17, DF 14, HK 14, DH 13, BNQ 12, AWI 10, AER 9, VD 7, DDM 5, ADN 3, DCW 3.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — ZO is using n.f.m. on 3.5 and 14 Mc. with 813 in final. A sightless pupil of XR, AEG, GE, and DU has now obtained his ticket and is signing AKM. Watch for him on 7 Mc. and give him a call. ALA, also a pupil of XR, is new in Lakeside Heights. XO is heard more in the U.S. section (so-called) of the 3.8-Mc. band than in the bottom end and has some fine QSOs. EC reports AIZ, LE, and AKF new in the St. Maurice Valley region, and that nearly all of the 35 members of the club there are active on the air. LO built himself a VFO and keying monitor during the summer and again is active on the PQN and SSN as well as maintaining schedules with VE3WK and W1LM and reports that OW is a new ham in Drummondville. XB has renewed ORS appointment and is on SSN and QON from new QTH. Congratulations to BE on being re-elected CGM. Volunteers are wanted to work the Quebec section of Trunk Line "I," at 10 P.M. each evening on 3690 kc. Drop a radiogram or card to GM or GL if you can take part in this all-Canadian coast-to-coast net. Reports are very scarce again, gang. Drop me a card of your activities and of those you know of in your community. Quebec City and the Chicoutimi district reports, as well as those of individuals in other sections, are needed. Traffic: VE2GM 126, XR 55, LO 43, EC 39, GL 17, XB 15, AIE 10.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — SEC: MJ. KX has been appointed OPS and OO Class IV. HI is new call at Minburn. RP now has low-powered rig at his bedside installed by members of NARC. The West now has a representative with the election of LQ as Alternate Canadian General Manager. NB has rig changes in progress in preparation for ORS appointment. MJ finally received the African QSL for WAC. ZW did a fine job on low-powered rig for RP. EA gave a very interesting demonstration of beam antenna at recent NARC meeting. FB has hoisted antenna poles at new QTH. LX would like to see endorsement for 40 w.p.m. OD is experimenting with n.f.m. The Hat Ham Club has achieved 100 per cent ARRL membership. TK is heard on 3.8 Mc. and reports progress in Calgary AEC. PV and VJ are making supreme efforts on new house construction. How about reviving the Alberta C.W. Net, gang? We need more ORS. If interested, contact your SCM. VQ has 815 perking. IR is chasing DX. WS must anticipate 50-Mc. operation. ART has installed 6-over-10 beam. EO requests envelopes from the gang to clear his QSL Bureau

(Continued on page 86)

New AMPRO Magnetic Tape Recorder

ONLY **$94.50**
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COMPLETE RECORDER-PLAYBACK!
DUAL TRACK: 1 HR. EACH WAY!

Built by famed Ampro, maker of motion picture equipment, it's the LOWEST-PRICE and SMALLEST recorder/playback ever developed. Complete with mike, radio speaker adaptor cord, tubes, speaker, monitor feature, etc. 105-120 VAC. Net 15 lbs. 8½x8x12". Records TWO full hours from one standard 7" reel of tape! Wonderful for ham shack, home, office, school, church, dramatics, speech correction, clubs, music groups, sound for home movies (provision included for synchronizing recorder to movie projector). Only $94.50 complete! *Tape extra: 1200 ft. plastic $5.50, paper $3.50; 600 ft. plastic $3.50, paper $2.25. Empty reels: 1200 ft. 60c, 600 ft. 50c.*

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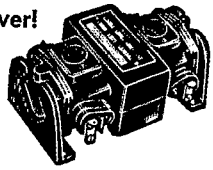

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What a buy for $9.95 — 6 volt Carter Magmotors that are FIVE TIMES LIGHTER than PE-103 and over ¼ its size! These are 5¼x3¾x2½" and weigh only 5 lbs. Here's the PREFERRED power supply for mobile rigs, taxicabs, police mobile radio, small aircraft transmitters, etc. Permanent magnet field design; low-drain: ball-bearing equipped. Input 5.5 volts at 19 amps; output 400 volts at 150 ma. 6500 rpm. We repeat: these dynamotors are practical . . . NOT war surplus . . . and have a list price of $57.50. This is a Radio Shack EXCLUSIVE, and quantities are LIMITED! NEW, but may show some slight signs of handling.

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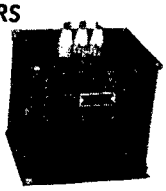

Brand new power transformers in battleship gray enamelled potted metal cases, with porcelain high voltage terminals. Conservatively rated — will handle much larger than stated capacities. Mount upright or inverted. Excellent for ham rig, experimenters, broadcast stations. Available in two ranges, both with input of 115/1/60:

2600-0-2600 AC at 550 ma (ICAS) — size 7¾x7¾x8½". Weight 50 lbs. LIST Price $150. OUR PRICE ONLY $29.95
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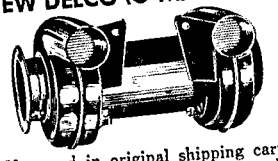

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$14.85 Ea. lots of 1-9
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Type	Each	Special!
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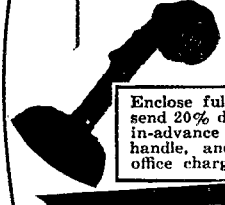
These guaranteed new, unused Jan Spec tubes will be shipped by Railway Express only, for your protection. Inspected for mechanical breakage by us before shipping.



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files. JP has nice DX results on 14-Mc. c.w. Traffic: VE6NA 148, MJ 26, NB 6.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — Storms top the British Columbia news, and what did the nets do? They went to work. FC, FB, DW, WH, RV, CX, AAZ, and FB stood watch all day on Sunday for the Alberni district. The SEBC Net and Washington Net, all-emergency nets, were working or standing by. DT, formerly of Summerland, is living in Vancouver now. AOQ has been hunting at LC's estate. TF has been in Seattle and paid the Washington Net lads a visit. He runs his traffic up into the hundreds. US has been working 28 Mc. with good DX reports. ALJ has a new member at Ashcroft, ANF, who is a 28-Mc. man. XN also is on 28 Mc. so radio range will have beams for sure. The Naniamo Amateur Radio Club has club rooms and a transmitter and the club call is NA. BQ has worked LU9MA and Florida on 50 Mc. Victoria held another successful simulated emergency test with British Columbia amateurs taking part with fixed and mobile stations. Traffic: VE7TF 182, BJ 86, AOQ 27, FB 6.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Congrats to MC on the addition of a jr. operator. YO, on 'phone, and SS, HS, TM, YZ, and AM were all heard during the SS Contest. DY is in Shilo brushing up on his c.w. CE, LF, IA, TX, and KC all work with the Winnipeg Police Force. 8FW was in town renewing acquaintances. AB is using TBS-50 and a BC-348Q on 28 Mc. PA, in Dauphin, is building VFO. XP is overhauling the speech-amplifier. XL, in St. Boniface, is using p.p. 814s on 28 Mc. CU has 807s in final and 807s AB2 in modulator which goes out on a vertical doublet. An S2OR pulls them in. FE spent 20 days in the Far North with DQ. FS has new NC-173. AX visited CE. WJ is new call on 7 Mc. using a 6L6 and an S-40A. GA is on 3.85 with the 28-Mc. job and 123-ft. flat top. TM is building new VFO. ML has four-element rotary on 28 Mc. GV is testing 'phone on 3.85 Mc. IW has BCI. The Manitoba 'Phone Net now has 26 members and if you want to hear something good listen on Sunday nights. It's interesting. All amateurs in the section are welcome to report in. FA, DN, GB, CE, and AM act as NCS. We need more ARRL appointees. Which appointment do you want? Traffic: VE4AM 35, FA 32, CE 12, GB 9, DJ 8, DN 6, DQ 6, GQ 6.

Solution to Keyed-VFO Problem

(Continued from page 15)

as small as possible. Because all condensers have a certain amount of leakage, and because they discharge exponentially through resistance, the output tube does not stop operating the instant the key is opened, but allows a decaying backwave to leak through from the oscillator for a short length of time after the key is opened. The duration of this backwave depends on the size of the condenser. This may interfere with break-in operation in the 80-meter band if you keep the gain of the receiver turned up high for weak-signal reception. This disadvantage is not encountered when blocked-grid keying is applied, however.

Results with this simple system have been remarkably good. Just to be sure that it works in other stations, the VFO described has been tried out successfully at W1CEG, W1FWH and W1QIS. In addition, to make sure that power level has nothing to do with it, it was used as the frequency control unit for the 80-meter kilowatt transmitter at W1AW. Here too the backwave just couldn't be heard.

Thus, we have a new method of improving our signals. The improvement can be made at low cost, and with less effort than is required to build most other VFO units, because the keying problem is solved so easily. The improvement is useful, and needed, as a check of any of our bands will show. You really owe it to yourself, OM, to give this system a trial.

Terrific Newark Scoop!

Famous HALLICRAFTERS S-37 AM-FM RECEIVER

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BRAND NEW! SMASHING VALUE! LIMITED QUANTITY! Covers 130 to 210 Mc. An Amazing Buy! These famous Hallicrafters S-37, High Frequency AM-FM Receivers are regularly priced at $591.75. Now you can get 'em **Far Below Manufacturer's Cost!** Applicable to Telemetering, Amateur Reception and Special Industrial Uses. A pre-loaded gear drive with separate bandspread dial provides easy tuning. Covers entire range of 130 to 210 Mc. No band-switching! 2 RF stages, (using acorn tubes), and intermediate frequency of 18 Mc assure high ratio of image rejection, high sensitivity and selectivity. AVC switch, ANL, RF and AF Gain Controls, Tone Control, Dual-purpose S and Tuning meter. Compensated for frequency drift. 500 and 5000 ohm output. Beautifully built, shock mounted. Tubes: 3—954, 2—6AC7, 6AB7, 6SK7, 2—6H6, 6SC7, VR150, 6V6GT, 5U4G, 955. Black wrinkle steel cabinet 19¼"W x 9½H x 14¾"D. Shpg. Wt. 95 lbs. **No. A2062, Special $169.50**

Only $16.95 Down — 12 Months at $13.48

Smashing Reduction!

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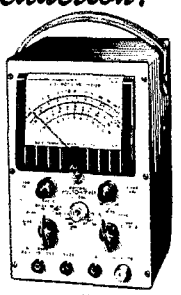

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The Famous RCA Battery-Operated Voltohmyst at a Sensational Low Price! Accurately reads AC-DC volts and DC current. 6 ranges for each function, except AC volts which has 5. DC volts: 0-1000; AC volts: 0-1000; Ohms: 0-1000 megs; DC current: 0-300 ma. 0-10 amps. 2-tube bridge circuit. 11 megs constant input resistance on DC. Uses 4—*1½ V and 2—45 V batteries. Complete with* 2—1C5GT, 1—NE51. 9½ x 6¼ x 5½" D. 8 lbs. **No. A8, with probe, less batteries....Special $39.50**

HALLICRAFTERS HT-17 TRANSMITTER

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Save $32.00 on this famous Hallicrafters 10 Watt Xmtr. and coils for 10, 15, 20, 40 and 80 meters! Also works beautifully on 160 meters with proper crystal and coil in final. Complete with 6V6GT, 5U4G, *and 807, coils instructions. Less xtal and* meter. 25 lbs....**No. A2056.**

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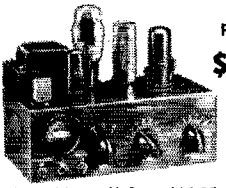

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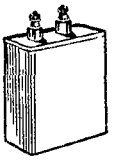

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S-858	2	2000	1¾x1 x3⅞"H	$1.50
S-859	8	2000	3¾x1¾x3⅞"H	2.75
S-860	4	3000	3¾ x 1¾ x 3½"	3.75

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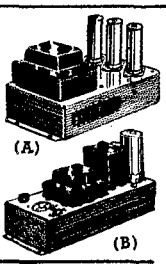


(A)

(B)

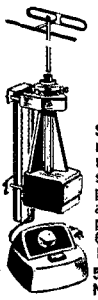
(A) Delivers 250 V @ 50 ma, 100 V @ 15 ma, 6.3 V @ 2.5 amps, and —24 V bias. Hum level is 94 db below 250 V, and 57 db below 100 V. 4¾ x 8 x 2" Less 5Y3 rect. 8 lbs.

No. S-977 .....**Special $6.95**

(B) Output: 250-300 V @ 2-8 ma, or 280-320 V @ 8-16 ma. Filament: 6.0-6.3 V, adj. @ 1.5 amps. 3½x10¼x6" Less 80 rect. 6 lbs.

No. S-978 .....**Special $4.95**

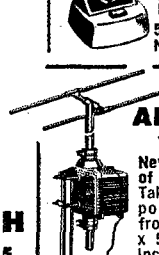
CROWN Heavy Duty ANTENNA ROTATOR with Dial Indicator



Supports up to 175 lbs! Takes mast up to 1¾". 1 RPM. 365° rotation — changes direction instantly! Illuminated dial in compass points and numbers. Radial and thrust ball bearings. Weatherproof. Alum. casting. For 110 V, 60 cps., 12 lbs. **No. A16200 Complete $39.66**

5-Cond. Cable No. 41634....Ft. 4¢ **100 ft. for $3.60**

NEW! ALLIANCE ANTENNA ROTATOR with built-in Direction Indicator



New Model! Meter indicates position of antenna at any time. Turns 360°. Takes mast up to 1⅜" dia. — supports up to 20 lbs. Operates from 110 v, 60 cps AC. Rotor: 7¾ x 5¼ x 8". Control Box: 5 x 5". Incl. instructions. Less 4-wire cable. 12 lbs. **No. A16182, Complete..... $29.37**

Alliance "Tenna-Rotor" without Direction Indicator. No. 16180..... $23.49

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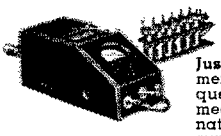

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Antenna for Ten Meters

(Continued from page 17)

the wire is still under tension, place a mark on the mast at a point exactly 16 feet 2½ inches from the top end of the antenna wire. Fasten the uppermost double-wire insulator to the mast at this point with *four* angles.

Now feed the open bottom end of the wire through the second hole in each of the two-wire insulators. Pull the end of the wire up through the second hole in the anchored two-wire insulator until the whole system is under tension and then anchor the end of the wire to the insulator, cutting off any excess. The rest of the insulators may now be lined up along the mast, spaced out evenly and fastened in place.

The antenna is now complete except for placing the shorting bar at the bottom of the J and connecting the transmission line from the transmitter. The shorting bar is simply a piece of copper wire soldered across between the two wires of the matching section, exactly 8 feet 2 inches below the top double insulator. Now solder the 300-ohm transmission line to the matching section exactly 11 inches above the shorting bar and you are ready to put the pole up and go on the air.

A grounding wire is desirable and can be fastened to the 2 by 4 with staples. Leave a loop of slack at the top of the ground wire to allow the bottom spring to do its work. The 300-ohm line also can be fastened to the 2 by 4 using very large staples of the sort used by electricians. Use a piece of insulating material over the line so that the staple does not come in direct contact with the line when the staple is hammered in.

The dimensions given should be satisfactory for operation over the entire ten-meter band if the antenna is fairly well in the clear with no near-by conductors or other objects which might alter the antenna impedance. If a check shows the standing-wave ratio to be excessive, or if a different type of transmission line is used, the system may be adjusted by following the procedure outlined in the *A.R.R.L. Antenna Book*.

A lot has been said about polarization and vertical antennas on 10 meters. But extensive comparisons between this antenna and a horizontal folded dipole have failed to show any significant difference in either DX or local ground-wave work. Any slight discrepancy in favor of the horizontal seems to be more than outweighed by the nondirective characteristic of the vertical.

Two-Meter Station

(Continued from page 32)

This converter has been designed to give good 2-meter reception with a minimum of complication. It is nearly equal in performance to the best that it is possible to build, and it may be made to hold its own in top-flight company by the addition of a low-noise r.f. amplifier. The 2-meter beginner who becomes a dyed-in-the-wool addict may want to take this step eventually, but meanwhile he will have a smooth-working receiver that will enable him to hear anyone he can work with low power, and probably a good deal more.

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Hints & Kinks

(Continued from page 88)

simply. The filament pins, which extend out of the base of the tube, are just the right size and spacing to fit snugly in a crystal socket designed for the new small crystal holders (½-inch spacing, 0.125-inch diameter pins). For grid and plate "caps" the pins can be removed from an Amphenol type 54 miniature socket and slipped over the pins of the tube. — *Tom McMullen, W1QVF*

Antenna-Matching Networks

(Continued from page 39)

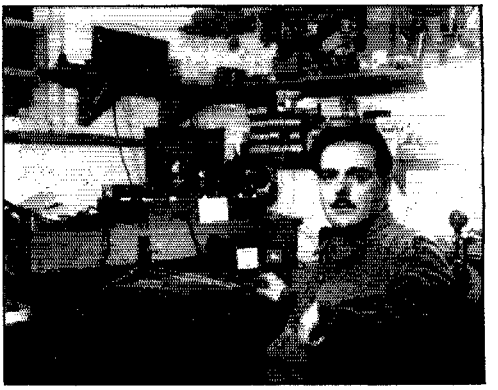
and 28 Mc. D.p.i. values of 75 and 1500 ohms are assumed for f_1 and f_2 respectively. These values correspond closely to those of a simple center-fed antenna operating at its fundamental and second-harmonic frequencies. While actual practical values may depart somewhat, the values shown are likely to be close enough for all practical purposes, unless an extremely-low s.w.r. is demanded.

Table III shows several coil dimensions for each of the inductance values given in Table II. These dimensions were chosen to fit various standard coil forms or manufactured strip coils. They are given to the nearest full turn.

How's DX

(Continued from page 45)

fire is CN8ET, manned by W3KZQ. Walt used to be prewar KB6RSJ, you know, and is enjoying the pleasures of a U. S.-oriented umpty-hundred-foot Vee array . _ . _ . _ No sooner do we mention W4MR's 7-Mc. ground-plane than he takes it down again due to its adverse effect on the 20-meter beam. Al gives an account of N. C. DX activity in noting that W4GQU quit 20 c.w. for 10 'phone after confirming 101, W4AIT has a new AC4-working 3-element



Aurelio Flores of CX6AD is one of the more active Uruguayan fellows on 14-Mc. c.w. (*Photo courtesy W8UOX*)

beam, and W4GG keeps his 250-TL almost exclusively on 20 aided and abetted by a couple of stacked collinears . _ . _ . _ VP5BF has swapped his 15-watt 807 Tri-tet oscillator for a 6V6-807 60-watter, according to W4LYV. Ken is contemplating giving the Caicos a good representation on 20, 40 and 80 this season after working all call areas but W7 with the QRP effort . _ . _ . _ Adding a Guantanamo note, KG4AG keeps schedules with his dad, W9ZMK, of Rock Island, Ill. W9AND learns that VP1WS is rather

(Continued on page 92)

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LYSCO MOBILE VFO

MODEL 381
6AK6 Buffer, Stable 6C4 6AK6 "Clapp" Oscillator, 6AK6 Doubler supplies plenty of drive to replace 3.5 Mc. or 7 Mc. X-tal direct reading illuminated slide rule dial. Ideal size 3"x4¼"x5". Operates on 200 to 400 V 25 Ma. D.C. Complete with tubes ready to go **$21.95**

MODEL 381R
Calibrated for 40, 20 and 10 meters. OUTPUT: 40 meters. 15 foot co-axial cable with tuned circuit to plug into X-tal socket. Complete with tubes ready to go **$27.95**

LYSCO CONVERTERS MODEL 135

Full calibrated coverage in the 144 to 148 Mc. band and the 26 to 30 Mc. band. Clock type illuminated dial. Size 3"x5"x 4". May be operated fixed or mobile. Power requirements 200V. D.C. @ 25 Ma., 6.3V A. C. or D. C. @ 1 Ma. Complete with tubes **$37.50**

FILAMENT TRANSFORMERS

Type 940	2.5VCT @ 10 Amps. 7500V Ins	$2.79
Type 040	5. VCT @ 3 Amps. 2500V Ins	$2.06
Type 941	5 VCT @ 6 Amps. 2500V Ins	$2.35
Type 943	5 VCT @ 20 Amps. 2500V Ins	$5.29
Type 946	6.3VCT @ 3 Amps. 2500V Ins	$1.91
Type 947	6.3VCT @ 6 Amps. 2500V Ins	$2.79
Type 948	6.3VCT @ 10 Amps. 2500V Ins	$3.67
Type 960	7.5VCT @ 4 Amps. 2500V Ins	$2.35
Type 143	7.5VCT @ 8 Amps. 2500V Ins	$4.12
Type 146	10 VCT @ 10 Amps. 3000V Ins	$4.99
Type 961	Dual 6.3VCT @ 3 Amps. 2500V Ins	$3.38
Type 041	5VCT @ 3 Amps. 2500V Ins 6.3VCT @ 3.6 Amps.	$3.38

HOW ABOUT THESE!

G.E. Wire Wound Pots. 4 watt: 2K, 3K, 10K, 20K, 75K, 100K. All New in Boxes. While they last. Each ..... .39c
3C 24 Triodes. Each ... .39c
10 for $3.50

SUPERIOR POWERSTATS

Smooth, efficient voltage control. 0 to 135V. output from 115V. AC line.

Type 20 (illustrated 3 amps	$12.50
116 for table mtg 7.5 amps	23.00
116U for panel mtg 7.5 amps	18.00
1126 15 amps	46.00
1156 45 amps	118.00

Also available for 230 volt input. Write for descriptive literature.

CHOKES

SMOOTHING TYPE	Hy	SWINGING TYPE	Hy	PRICE EACH MA	Price
C-80	10	C-87	4–16	150	$3.09
C-81	10	C-88	4–16	200	$3.82
C-82	10	C-89	4–16	250	$5.29
C-83	8	C-90	3–14	300	$5.59

All above 3000 Volts Insulation

SHURE MICROPHONES

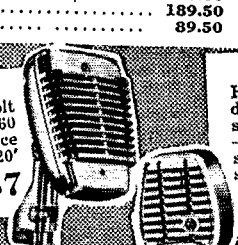
Super—Cardoid—Unidyne

Model 55 — Unidirectional smooth peak free response 40 to 50,000 CPS Switch permits selecting 35-50 ohms, 150-250 or High Impedance output level: —56.1 DB into 50 ohms, —56.8 DB into 250 ohms and —57.5 DB ohms into high Impedance. With 25' two conductor shielded cable **$39.69**

MODEL 556 SUPER
Cardioid Broadcast Dynamic Meets rigid requirements of Broadcast Studios. Ideal for highest quality recording and P.A. installations. Output level and impedance same as Model 55 double winding screen for quiet outdoor operation. Internal unit spring suspended to prevent mechanical vibrations. With 7' two conductor cable **$54.39**

National HRO-50 with coils	$335.00
National HRO-50 TS matching speaker	14.00
National Selectoject	24.95
National NC-183T or NC 183R	268.00
National NC-173T	189.50
National NC-57	89.50

MODEL 51 DYNAMIC
Output—52 DB below 1 volt per bar. Frequency range 60 to 10,000 CPS. Impedance same as Model 55. With 20' two conductor shielded cable .. **$23.37**



MODEL 710A X-TAL
High impedance, high output, diaphragm type unit. Response 60-9,000 CPS. Output —50 DB. Die Cast case with stand adapter. 7' shielded cable .. **$5.88**

MODEL 737A X-TAL
Frequency response 60 to 10,000 CPS. Output level —53 DB. Can be pointed toward desired sound or upwards for non-directional horizontal plane pickup. Metal Seal X-Tal for long life. Built in cable connector. With 20' cable **$23.37**

Complete line of Shure Microphones in Stock.

STANDARD STEEL CHASSIS

Black Crackle

4 x 4 x 2	59c
6 x 14 x 3	$1.06
10 x 14 x 3	$1.44
10 x 17 x 3	$1.44

NOW . . . QUICKLY AND EASILY CUT SQUARE & OBLONG OPENINGS IN RADIO CHASSIS

Greenlee No. 731 square punches are time saving tools that pay for themselves.

⅝" square . . $2.95 ¾" square . . $3.44
1" square . . $3.97

Standard Greenlee No. 730 punches size ½" to 3½" diameter, in stock.

½", ⅝", ¾", ⅞" . .	$1.94	1⅜" . .	$2.52
1"	$2.12	1½" . .	$2.54
1-1/16", 1⅛", 1-5/32", 1-3/16", 1¼" . . .	$2.25	2¼" . .	$5.37

PLATE TRANSFORMERS

For Small Transmitters. DC Voltage Ratings are Approx. Values Obtained at Output of a 2 section Choke input Filter. Using Mercury Vapor Rectifier Tubes Pri. is for 115 V. 60 cy.

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. MA.	Dimensions H.	W.	D.	Price Each
P 57	660–660†	500	250	4⅝	3⅛	4⅜	$ 6.76
	550–550	400					
P 58	1080–1080	1000*	125	4⅝	3⅛	5	8.23
	500–500	400	150				
P 59	900–900	750	225	4⅝	3⅛	5⅛	7.94
	800–800	600					
P 67	1450–1450	1200	300	5¾	6⅛	4	19.84
	1175–1175	1000					
P 68	2100–2100	1750	300	5¾	6⅛	4¼	24.99
	1800–1800	1500					

* For dual operation with simultaneous use of both sec. ratings.
† Has 40-volt bias tap.

ALUMINUM CHASSIS—

Heavy Duty

7 x 7 x 2	94c
7 x 9 x 2	$1.06
5 x 10 x 3	$1.00
7 x 11 x 2	$1.15
7 x 13 x 2	$1.23
10 x 17 x 3	$1.88

GRID DIP METER LYSCO "DIPMASTER"

3 Mc to 150 Mc frequency range; calibrated dial. Ideal for Signal generator, 3.4 to 300 Mc range phone monitor, F.S. meter, or absorption wavemeter. Complete power supply and tubes. Really a good buy at $32.83

LYSCO TRANSMITTER MODEL 500

Calibrated for 160, 80, 40, 20, 15 and 10 meter bands. POWER INPUT: 25 watts on all bands VFO or X-tals in 160 or 40 meter bands. POWER REQUIREMENTS. 120 volts, 60 cycles, 50 watts. Illuminated dial. Complete with tubes **$87.50**

NATIONAL MULTI BAND TANKS

MB—20 10 to 80 meter Multi-Band Tank ..... $ 9.92
MB — 150 10 to 80 meter Handles 150 watts 18.50

ALUMINUM PANELS

⅛" Thick Black Crackle Finish

7"	93c
8¾"	$1.17
10½"	$1.32
12¼"	$1.62
	$1.86

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under $2.00
We ship to any part of the globe.

LEEDS RADIO CO.

75 Vesey Street — Dept. QS2

R.E.F. DX CONTEST

The 1950 REF DX Contest celebrates the 25th anniversary of the founding of the IARU. It is a contest between REF, Swiss, Luxembourg, Belgium, and Belgian Congo stations on the one hand *versus* all other prefixes.

C.W. Section: 1200 GCT, Feb. 25th to 2400 GCT, Feb. 26th.

'Phone Section: 1200 GCT, Mar. 4th to 2400 GCT, Mar. 5th.

Scoring: (for contestants other than those specifically named above) 3 points for each complete QSO; total points to be multiplied by the sum of REF sections, Swiss cantons, and LX, ON4, and OQ5 prefixes worked on each band. (REF sections and Swiss cantons will be identified by appropriate letters appended to calls signed by stations in those areas.) (Note also that REF stations include F, CN8, FK8, FE8, FM8, etc.)

Exchanges: Serial numbers consisting of self-assigned group and signal report.

Awards: Certificates to high scorer in each country and each W, VE, and VK district.

Logs: Complete logs with summary sheet similar to that used in ARRL DX Contest report to be mailed to Coupe du REF, 72 rue Marceau, Montreuil S/S Bois (Seine), France.

new on the air and desires to exchange photos with stations he works, for his album. What's more, 100 per cent QSL is guaranteed . . . . . TA3AA's latest jaunt, that to the Greek isle of Khios which is some 50 miles west of Turkish territory, has some interesting highlights. Jules thought he had let a nice 20-meter vertical down from the hotel window only to find next morning that the wire was coiled directly below on an adjoining roof. Despite this, a 6L6-6L6 25-watt rig raised W7ETK on the first CQ; the receiver was his trusty 1T4–3Q4 blooper with flashlight-cell filament power and 45 volts of B. Beside his 63 W QSOs, VE7ZM, CM2SW and G5UX were able to crash the U. S. barrage, the last being SV7AA's final QSO. Whither next, OM Wenglare? . . . . . To quote W5LAK, when ZS6OS is not occupied giving the boys a break as portable-ZS7 he is attempting to work Delaware, Montana and N. Dakota on 14,070 kc, around 2230 CST from the home station . . . . . PJ5TR dropped in on W4BYF in Miami and went back to Aruba with a considerable assortment of radio gear. He'll be back on shortly and Mac will continue to handle his confirmations.

— . . . —

Jeeves is no little miffed concerning his guy-wire predicament as publicized by W1CJD in December's issue. Nobody seems to have given a hoot as to whether he got down okay or not but several people have inquired as to how in the world he got up there in the first place.

Strays

During 1949 the ARRL W2 QSL Bureau handled 105,000 DX cards — an all-time record. At the end of the year QSL Manager Hank Yahnel, W2SN, had on hand a stack of envelopes 62 feet high, a stack of "active" cards 18 feet high, and a stack of "inactive" cards (approximately 30,000) 20 feet high!

$AVE $ ON $UN $URPLUS AND $TANDARD $PECIAL$!

CRYSTALS!

All crystals have Army MC harmonic ratings but Sun encloses directions for deriving the correct fundamental frequency in kilocycles.

JUST ARRIVED! NEW FREQUENCY CRYSTALS FOR HAM AND GENERAL USE
— FT-243 Holders, ½" pin spacing
(Fractions Omitted)

GENERAL USE

6006	6208	7873
6025	6773	7906
6040	6840	7925
6073	6873	7950
6075	6906	7973
6100	6940	7975
6106	6973	8240
6140	7740	8273
6150	7773	8306
6173	7806	
6206	7840	

49c each
10 for $4.50

HAM USE
2, 6, 10, 11, 20, 40 METERS

5305	5775	5940	6473	6740	7540
5675	5806	5973	6475	6806	7573
5677	5825	5975	6506	7306	7606
5700	5840	6273	6540	7340	7640
5706	5850	6340	6573	7373	7673
5725	5873	6373	6606	7406	7706
5740	5875	6406	6640	7440	8173
5750	5900	6425	6673	7473	8175
5760	5906	6440	6706	7506	8340
5773	5925	6450			

99c each 10 for $9.00

CRYSTALS WITH A MILLION USES

Fractions Omitted

kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc
412	422	433	442	462	481	492	503	507	511	516	522
413	423	434	443	468	483	493	504	508	512	518	523
414	424	435	444	472	484	494	506	509	515	519	
415	425	436	445	473	485	495					
416	426	437	446	474	487	496					
418	427	438	447	475	488	497					
419	429	440	448	477	490	498					
420	431	441	451	479	491	502					

49c each

Xtal. Freq. Stan. 3-prong holder 98.356Kc

Easily altered for 100kc Standard. Mounted in low loss 3 prong holder.

$3.89 each

For Crystal Controlled Signal Generators Ft. 241-525Kc

526,388	533,333	537,500
527,777	536,111	538,888
529,166		
530,555		
531,944		

99c each

I.F. Frequency Standards

kc	kc
450	461.111
451.388	464,815
452,777	465,277

99c each

200 KC CRYSTALS

Without Holders 21/32" x 23/32". **Each** **69c**

3 for $2.00

Assorted Miscellaneous Crystals
Fractions Omitted

372kc	379kc	384kc	387kc
374	380	386	388
375	381		
376	383		
377			

39c Each

priced at a fraction of the cost of their holders alone.

For Ham and General Use
Fractions Omitted

390kc	396kc	403kc	408kc
391	397	404	409
392	400	405	111
393	401		
394	402		
395			

79c each

Crystals for SCR 522

kc	kc
5910	6547.9
6370	6610
6450	7350
6470	7480
6497.9	7580
6522.9	7810
	7930

$1.29 each

CRYSTALS FOR HAM USE

FT-243 Holder ½" Spacing

ea.

3735 KC...**69c**
4190 KC...**39c**
5030 KC...**39c**
5485 KC...**39c**

Crystals from BC 610
¾" Spacing—2 Banana Plugs

2045	2305	3202	3550
2105	2320	3215	3570
2125	2360	3237	3580
2145	2390	3250	3945
2155	2415	3322	3955
2220	2435	3510	3995
2258	2442	3520	
2260	2532		
2282	2545		
2300	2557		

$1.29 each

• Payments must accompany order. Enclose 20¢ for postage and handling. Minimum order — $2.00 plus postage.
Crystals are shipped packed in cloth bags inasmuch as they are shock mounted. All shipments guaranteed.

TERMS All items F.O.B., Washington, D. C. All orders $30.00 or less, cash with order. Above $30.00, 25 per cent with order, balance C.O.D. Foreign orders cash with orders, plus exchange rate.

SUN RADIO
OF WASHINGTON, D. C.
938 F STREET, N.W. WASH. 4, D. C.

HAM EQUIPMENT

DISPLAY MODELS REDUCED FOR IMMEDIATE SALE!

Gon-Set 6-meter converter. Reg. $39.95. Reduced to.....$27.95

Crystal Mikes, Astatic JT-30. Reg. $10.17. Reduced to.....$5.95

CML Broad Band 10-meter converter with external voltage regulated power supply. Reg. $47.25. Reduced to $29.95

RME HF 10-20 10, 11, 15, 20 meter converter. Reg. $77.00. Reduced to $51.50

BC-348N with AC power supply built in, like new.....$124.95

VARIABLE CONDENSERS

From SCR-522

2-gang, 220 MMF per sec.....**$1.29**

3-gang, 220 MMF per sec..... **1.59**

600 MMF variable cond. 1-gang. **.59**

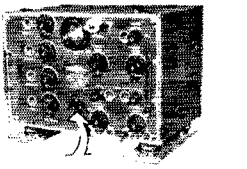
Filter Chokes — 2–2 HY, 65 MA, 70 Ohms, 1500 V. Insulation, Jefferson Electric. Hermetically sealed....$ .69

Carbon Mikes F-17 B, brand new. $1.29

2-6 MC Pushbutton Receiver, with tubes and speaker BC-728.....$9.95

RCA AVR 20 A. Aircraft Receiver, 2300–6500 KC with tubes.....$14.95

Radio Hat, 2-tube battery operated, broadcast receiver, complete with battery.....$7.95



100 WATT TRANSMITTER

Bendix TA-12, 4 ECO's tubes: 3–807, 4–12SK7, *with complete conversion* instructions for 10, 20, 40, 80 meters. Like New $39.95. Used.....**$29.95**

FAMOUS MAKE BUTTERFLY TRANSMITTING CONDENSERS
SPLIT STATOR
All New—Boxed—Below Cost

.500 spacing Cap. per. sec.	Price	.375 spacing Cap. per. sec.	Price	.250 spacing Cap. per. sec.	Price
96MMF	$22.15	22 MMF	$9.95	13 MMF	$7.95
115	25.29	82	17.29	30	9.80
124	26.65	94	18.75	111	16.80
		106	20.15	159	21.00
		118	21.63		
		130	23.10		
		141	24.50		
		153	25.95		

REPLACEMENT PARTS

FOR SERVICEMEN

SPEAKERS

4" PM	$ 1.85
5" PM	1.95
6½" PM	2.49
6" x 9" PM with transformer	2.89
8" PM	2.95
10" PM	3.95
12" 1000 ohm field	6.95
15" 5500 ohm field	19.95

PHONO ARMS

American Model 1J with CR1A — 3.5 volt High output cartridge.....$1.65

Astatic SL-8 with L-26A cartridge. $1.89

Astatic D-9 with L-26A cartridge. $1.89

CONDENSERS

for TV Replacement

.05–6000 v.....$ .69
.001–10,000 v..... .59
.0005–6000 v..... .49
.005–5000 v. mica. $.39. Four for $1.25

Potentiometers, Assorted. 10 for $1.99

Amplifier, 20 watts, Mike & Phono inputs, P.P. 6L6's Regal. Regular $65.00, reduced to.....$24.95

Record Changers, Single speed, various types, removed from new consoles, values up to $65.00.....$14.95

TEST EQUIPMENT

CLEARANCE OF DISPLAY MODELS!

RCP Electronic Multitester, VTVM, Model 668. Reg. $77.50. Only $ **44.50**

Reiner, Laboratory VTVM. Measures R.F. up to 700 MC Model 451. Reg. $165.00. Only.....**$99.50**

RCP, Pocket Signal Generator, Model 710 AM. Reg. $17.95. Only....**$12.60**

Model 720 FM. Reg. $19.95. Only **$13.97**

RCP, Pocket Multitester, 5000 ohm per volt. Model 499 A. Reg. $24.50. Reduced to.....**$17.50**

RCP, Standard Signal Generator Model 705 A. Reg. $49.50. Reduced to.....**$35.00**

General Electric VTW1 Tube Tester, Reg. $49.50. Reduced to.....**$37.50**

Approved Electronics A-200 Signal Generator. Reg. $47.50. Reduced to **$24.95**

Ferret Model 720 TV-FM Sweep Generator. With built-in variable marker. Reg. $165.00. Reduced to **$115.50**

Speco, Capohmist Condenser & Resistor substitution box. Reg. $16.95. Reduced to.....**$11.95**

Industrial Instruments, Wheatstone Bridge, Model RN-2. Reg. $125.00. Reduced to.....**$94.50**

Decade Box DR-50. Reg. $65.00. Reduced to.....**$49.50**

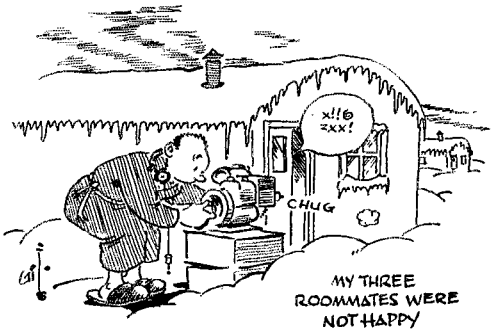
Weston Ohmmeter, low range 0–10/1000 ohms in leather case. Model 689-1F. Reg. $25.50. Reduced to.....**$14.95**

The Land of Morning Calm

(Continued from page 48)

I was the holder of a mimeographed license, call J8AAG. I was happy . . . the ham world beat a path to my receiver daily. In the evening I worked W6s and W7s, late at night Europeans and Africans, early in the morning New Englanders. My brothers-in-arms began to wonder about the guy who never left his room, never went down to the bar for a drink, sat starry-eyed before the HRO every off-duty moment. It was ham heaven, indeed.

Tragedy struck one morning before reveille. There was an alarmed cry of "Fire!" Our quarters were roofed with flames. Clad only in shorts, I roared down the smoke-filled hall with receiver under one arm and transmitter under the other. Two overloaded trips cleared the ham gear, and then I started evacuating uniforms and other



professional equipment. Korean firemen wearing asbestos capes were able to salvage our part of the building, but my battalion was ordered to move in order to make room for those burned out of their quarters. That night I looked gloomily at the tin wall of a Quonset Hut by candlelight. We now lived in the rice paddies outside town with no water and, horrible to contemplate, no power!

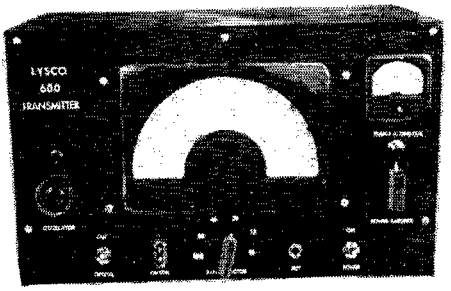
Weeks later the engineers installed a motor generator to supply lights to our isolated battalion for four hours each evening. I hung a folded dipole among the tin shacks and was in business again. Soon, however, crusty old first sergeants began to complain to the Colonel. At night, when they sat down to work on the morning report and duty roster, the lights flickered and blinked. They had a suspicion that the cause was over in the high-rent district inhabited by the brass. In due time J8AAG was QRT **again.**

I was off the air for a longer period this time, until I made friends with a medical officer who had a small 1.5-kw. generator designed to operate a portable X-ray outfit. The two-lung motor sputtered and banged, but it had a fairly-stable 115-volt output for the transmitter. I was able to run the receiver on the camp supply without trouble. However, all efforts to filter or screen

(Continued on page 96)

CALLING ALL HAMS! HARRISON IS TRANSMITTER HEADQUARTERS

LYSCO'S AMAZING NEW TVI-LESS BAND SWITCHING VFO TRANSMITTER



Lysco Transmaster Model 600 **$99.50**

Now in stock for immediate delivery!

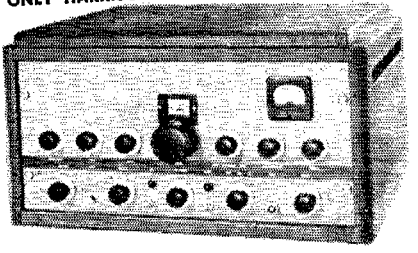
- TVI SUPPRESSED! – Xmtr designed with 3-section, low-pass filter incorporated in output – all leads by-passed for RF – most effective shielding – etc., etc.
- 35 WATTS! – 6AG7 Clapp Oscillator, 6AG7 Buffer Doubler, and 807 Final Amplifier with 35 watts input on all bands.
- VFO CONTROL! – Calibrated output on 10, 11, 15, 20, 40, 80, and 160 meters. Provision for crystal control, too!
- CW BREAK-IN! – Oscillator keying for clean, chirpless, full break-in operation. Built-in key click filter.
- MODULATION PROVISION! – Terminals provided for external modulator. Add 15-watt amplifier and enjoy phone operation. (Special 18 Watt Modulator – $39.95 complete!)
- FINGER TIP CONTROL! – Completely band switching! All controls, xtal socket, VFO-xtal selector switch, etc., on front panel. Large illuminated vernier dial.
- REGULATED SUPPLY! – Built-in supply uses VR-150 voltage regulator and 5R4GY, high output rectifier!

Excellent as a compact portable or home station transmitter. Coaxial connector output to 50 to 75 ohm cable to feed antenna or high power amplifier. Attractive metal cabinet finished in black crackle with chromium trim – 15" x 9" x 8" deep. Weighs 35 lbs. Supplied complete with all tubes. Nothing more to buy! Simply plug into 115V AC line! Complete installation and operation instructions including antenna data furnished. Operate all bands – QSY at will – eliminate TVI!

A HARRISON EXCLUSIVE! — ONLY HARRISON HAS IT!

JOHNSON VIKING I

ONLY HARRISON HAS THE DE-TVI'ED VIKING!

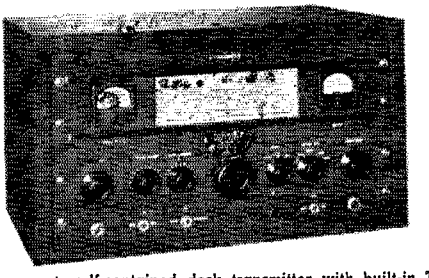


Here's America's newest fine quality transmitter, completely laboratory wired and tested, and incorporating TVI preventive measures. Conservatively operated 4D32 final amplifier delivers 100 Watts phone or 125 Watts CW OUTPUT! Push-pull 807 modulators! Completely band switching – 160-80-40-20-15-11-10 meters – optimum final tank Q on all bands – oscillator keying for break-in CW – low impedance coaxial output – provision for VFO – xtal selector for 10 frequencies – dual power supply – all circuits metered. Entirely self-contained in desk cabinet, 11" x 15" x 21" wide. Supplied complete with tubes and instruction book – ready to operate!

Johnson Viking I Wired, tested, complete! **Only $298.50**

Standard Viking I Kit, as supplied by the factory. Complete with instructions, less tubes $209.00

NEW COLLINS 32V-2



A compact, self-contained desk transmitter with built-in TVI reduction features. Covers 80, 40, 20, 15, 11, and 10 meters; conservatively rated at 150 watts. VFO control over entire range with famous Collins PTO – more reliable than most ham xtals! Features push-to-talk phone – break-in CW. Best medium powered rig available today – ask any Ham who's operated one!

New Collins 32V-2 Latest Improved Model **$575.00**

"For those who deserve the best!"

SUPREME AF-100 TRANSMITTER

100 Watts Minimum Output on 10-11-15-20-40-80 meters. AM Phone – CW – ICW – NBFM! Built-in VFO, gang-tuned multipliers. Entirely contained in attractive desk cabinet. Just plug into AC line and you're "on the air!" Regular net price $550.00. Three lucky Hams will buy them at only $395.00, complete! Rush your order today!

OTHER TRANSMITTERS

AUDAR T-60-2 Improved model of the famous Meck T-60. 60-watt phone-CW rig for 10 to 80 meters. Entirely self-contained. Complete with tubes and coils for 10-11	$150.00
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COLLINS 30K Deluxe 500 Watt Transmitter	$1450.00
HALLICRAFTERS HT-17 Compact CW Transmitter	$36.50
HALLICRFATERS HT-18 Five-band VFO with NBFM	$110.00
HARVEY-WELLS Bandmaster Jr. 2 to 80 meter CW	$87.50
HARVEY-WELLS Bandmaster Senior Phone Xmitter	$111.50
HARVEY-WELLS Bandmaster Deluxe. Xtal Mike Input	$137.50
HUNTER Cyclemaster 20A Bandswitching Exciter	$168.00
LYSCO 10-Meter Mobile or Portable Phone Xmtr	$23.95
MILLEN 90800 6L6-807 Exciter-Transmitter	$42.50
MILLEN 90981 500-Watt Push-Pull Final Amplifier	$89.50
STANCOR ST-202A 125 Watt CW Xmtr Kit	$92.00
STANCOR ST-203A Mobile Xmtr Kit $44.70 Wired	$58.90
SONAR SRT-75 75 Watt CW-NBFM Transmitter	$175.00
SUBRACO MT-15X 10-Meter Mobile Transmitter	$79.95
TEMCO 75-GA CW-AM Phone Xmtr with built-in VFO	$375.00
TEMCO RA Custom High-Output CW-AM Phone Rig. VFO	$603.00

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CABLE ADDRESS "HARRISORAD"

HARRISON HAS IT! – HAM HEADQUARTERS SINCE 1925

(Continued from page 94)

the ignition QRM were unavailing with the equipment on hand. Consequently it was necessary to run out into the snow and start the generator for each transmission. This arrangement caused trouble with my three roommates, who were not happy about the door being opened and slammed every few minutes. Besides the annoyance of noisy c.w., the non-hams had solder splashed on their desks and wire strung across their bunks during antenna-construction periods. All swore their next roommate could collect reptiles or build model airplanes, but under no circumstances would they allow a ham anywhere near their quarters!

Orders again! Tear it down and move. My new assignment took me to Seoul, the capital city, where power (85–100 volts) was available commercially. My troubles were over, I thought. Korean prefixes were changed to HL1. I drew HL1AG and hopefully set up the ham shack for the fourth time in a year.

Korea was a divided country. The northern part was controlled by the Communist-satellite People's Republic while the south was guided by the American Military Government. The conflict practically ruined ham radio. Because of an alleged breach of contract the Communists shut off all electric power running into the southern zone. Generators became impossible to obtain for personal use. Ham radio came to a screaming halt for all of us.

Now I am set up Stateside again with the most seductive QSL cards imaginable adorning the wall. Was it worth the trouble? Well, just as soon as my little twin harmonics reach port-of-embarkation age I am going to load my travel-scarred foot lockers and volunteer for overseas duty again. I like to work DX from the other end.

Strays

Here's a bit of news from up Ontario way which we pass along to you as a heartwarming example of the true ham spirit. Having won his amateur ticket and the call VE3DEM through the help of the local gang, A. D. (Doug) Thompson, 26-year-old bedridden arthritic of North Dryden, was in need of power for his special electric blanket and his newly-licensed station (also furnished by local hams). Meeting the call for action, local amateurs approached the civic authorities of near-by Dryden and offered to dig the 14 pole holes required for a power line to VE3DEM's QTH if the town would supply and erect the necessary poles and wire. Their proposal met immediate approval, and the Dryden Council has since appropriated $800 for building the extension. Amateurs assisting Doug in getting on the air were VE3s AFH, AFS, AWT, AXN, AXO, BHR and BJD.

U.S.N.R.

(*Continued from page 49*)

National Guard provided a plane for air search and the Naval Reserve manned its picket boat and proceeded to the scene of the crash. Communications were coördinated between the Naval Reserve Training Center and the search plane and the boat, using Naval Reserve frequencies. There were no survivors, but the Naval Reserve crew succeeded in recovering two bodies.

—•••—

Establishment on November 23, 1949, of a radioteletype circuit between Electronic Warfare Company 8-45 (K5NAN), Harlingen, Texas, and the USNR master control station at New Orleans marked a new era in the Eighth Naval District training program for Naval Reserve electronics personnel. Other Naval Reserve activities in the Eighth District have reported near readiness for initial tests and are expected to join the radioteletype circuit soon in an expansion of the program for training in both the operation and maintenance of radioteletype equipments.

50 Mc.

(*Continued from page 47*)

Here and There on the V.H.F. Bands

By now most hams have come to recognize that rasping noise that drowns out the high end of the 10-meter band in this country when conditions are good to Europe. We know that it is a navigational aid operating on 30.7 Mc., on the southwest coast of England. But did you know that there are others that can provide a good check on propagation on other frequencies? G6LK lists the following: Central Scotland, 73.8 Mc.; Central Germany, 83.5 Mc.; Reims, France, 43 Mc.; Loire, France, 50.5 Mc.; Carcassonne, Southern France, 46.79 Mc. Now if someone will tell us what those f.m. tones are that are heard from the northwest during high m.u.f. periods, we'll be happy. They are heard all through the range between 42 and 50 Mc., apparently from Northwestern Canada or Alaska.

Brattleboro, Vt. — This town, in common with most others in the Green Mountain State, is located in a deep valley. Less than 20 miles to the south is Greenfield, Mass.,

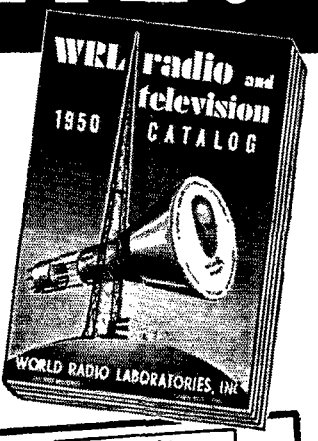
(*Continued on page 100*)

The happy occasion pictured above is one reason why no 50-Mc. contacts were made with HC or OA over the Christmas week end. Taken in Lima, Peru, it shows Homer Stevenson, HC2OT, flanked by Mrs. Mary Dittmore, *left*, and Mrs. Stevenson. *Left, rear*, Mrs. (Tex) Busby, with Carroll Busby, OA4AE, and John Dittmore, OA4BG.

IT'S HERE!

LEO'S 1950 CATALOG

What every ham has been waiting for!



YOURS FOR THE ASKING

A brand new catalog containing the most complete listing of radio and television parts and accessories—everything for the radio man and the amateur. We feature well known nationally advertised brands at lowest prices. Get acquainted and save money dealing with WRL—"The World's Largest Distributor of Amateur Radio Transmitting Equipment".

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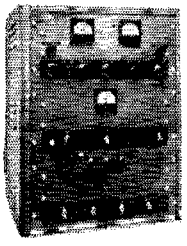

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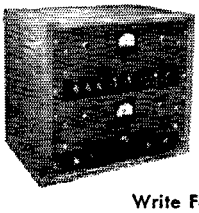

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- ☐ Globe Champion Info

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Address_____

City_____ State_____

50 WAS Mc.

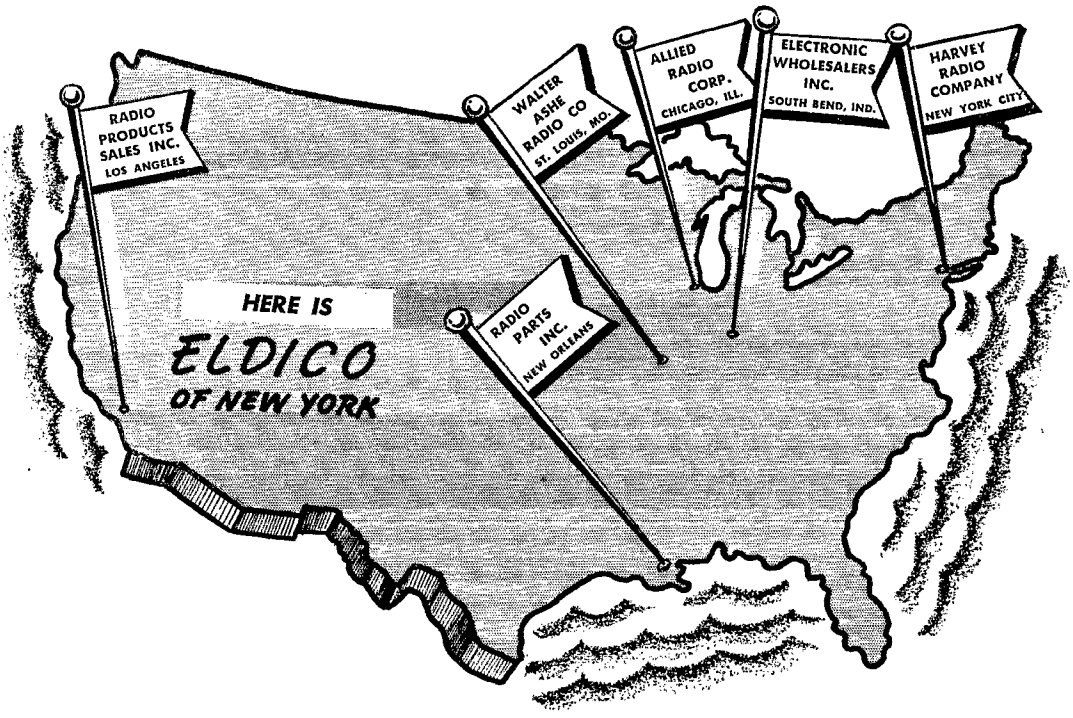
Standings as of December 25, 1949

W9ZHB	48	W5AJG	47	W8QYD	44
WØZJB	48	W5VY	47	W8CMS	39
W9QUV	48	W5JTI	44	W8YLS	38
WØBJV	48	W5JLY	43	W8NQD	38
WØCJS	48	W5ML	42	W8WSE	36
W6WNN	48	W5VV	42	W8LBH	36
		W5ONS	41	W8RDZ	27
W1CLS	45	W5FSC	41	W8RFW	25
W1CGY	44	W5HLD	40		
W1LLL	43	W5FRD	38	W9HGE	47
W1HDQ	42	W5DXB	35	W9ZHL	47
W1KHL	41	W5ZZF	34	W9PK	47
W1LSN	40	W5NHD	33	W9ALU	46
W1HMS	38	W5GNQ	32	W9JMS[1]	45
W1GJO	37	W5JBW	32	W9QKM	45
W1RO	36	W5IOP	30	W9RQM	44
W1ELP	36	W5IRP	29	W9UIA	43
W1DJ	36	W5LWG	26	W9UNS	42
W1JLK	35				
W1EIO	35	W6UXN	47	WØUSI	47
W1ATP	33	W6OVK	40	WØQIN	47
W1HIL	31	W6IWS	40	WØDZM	47
W1CGX	31	W6ANN	38	WØNFM	47
W1FZ	30	W6BPT	35	WØINI	47
		W6AMD	35	WØKYF	44
W2RLV	45	W6NAW	35	WØJHS	44
W2BYM	42	W6FPV	34	WØPKD	43
W2IDZ	40	W6BWG	25	WØYKX	43
W2AMJ	38	K6BF	17	WØTKX	43
W2QVH	37	W6JKN	11	WØSV	42
W2FHJ	33			WØHXY	41
		W7HEA	47	WØIPI	39
W3OJU	44	W7BQX	45		
W3OR	35	W7DYD	45	VE3ANY	38
W3RUE	34	W7ERA	43	VE1QZ	32
W3MKL	33	W7JRG	40	VE1QY	28
		W7BOC	40	VE3AET	27
W4FBH	45	W7JPA	40	HC2OT	25
W4EQM	44	W7FIV	40	VE4GQ	20
W4QN	43	W7CAM	40	XE1GE	19
W4FWH	42	W7KFM	40	XE2C	14
W4LNG	42	W7FDJ	36	VE2GT	14
W4GIY	40	W7FFE	35	XE1QE	10
W4EID	40	W7KAD	35		
W4EQR	40	W7ACD	32		
W4CPZ	39	W7QAP	32		
W4DRZ	38	W3CIR/7	32		
W4MS	38				
W4FQI	34				
W4GMP	34				
W4WMI	33				
W4FNR	33				

Calls in bold face indicate holders of special 50-Mc. WAS certificates, listed in the order of the award numbers. All other listings are based on unverified reports.

also in the same valley, the Connecticut. But as anyone who has driven over the road between the two towns knows, there is rough country in between. The Connecticut River does a lot of wandering to make it, and Brattleboro and Greenfield stations never worked on 144 Mc. until they started rotating their antennas in various directions other than the direct line between their two locations. Just to the northeast of Brattleboro lies Mt. Wantastiquet, rising up about 1200 feet on the other side of the river. When W1AZV aims his 2-meter beam at this steep hillside he gets a good signal from W1RYL in Greenfield. Nothing is heard via the direct route. W1CGX is also able to hear W1RYL, though weaker. Strangely enough, W1CGX works out of the valley more successfully than W1AZV on 50 Mc., however, and

(*Continued on page 108*)



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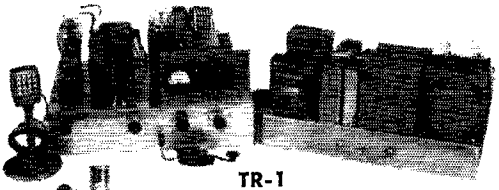


TR-1

Cramerton, N. Car.

Dear W2UOL:

I already have my TR-1 Transmitter on the air. I am using a folded dipole antenna and getting a good many contacts.

I am a blind ham. I got my ticket in February of this year. I have been wanting to get on the ten meter phone band but did not feel that I had the money to buy what I wanted until I heard of your kit. Some of my local ham friends wired it up for me.

Oscar W. Norris, Amateur Radio W40XH
542 Brooklyn St., Cramerton, N. C.

Pomona, Calif.

Dear Sir:

I am very to report great pleasure and success from building your "grid-dipper" kit. It works very well far better than I had hoped!

George Stringfellow, W6BMH
1160 No. Garey Ave.
Pomona, Calif.

GDA

Wayne, Mich.

Dear Don:

Rcvd a real FB Xmas present last nite — one of Ur TR75's tho' I had been raving abt it since the first time I had seen ur ad in the "CQ" and the Swap & Shop" I didn't really expect to get it. Really a pleasant surprise. The XYL knew I had bn planning on gettint one rite aftr the first of the year. Hi. Unpacked and inspected it tonite and I must say that U boys sure do live up to ur word — the components parts are top quality stuff. Sure anxious to get to work on it and get it on the air — but as you advz I'm going to take my time with it and do a gud job.

Joseph A. Butkiewicz
W8EHC
4487 Mildred Ave.
Wayne, Mich.

TR-75

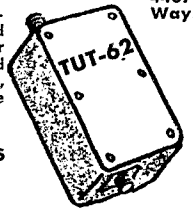
South Bend, Indiana

Dear Sir:

I am using the transmitter filter with complete success and have passed the word around town to the rest of the boys. The transmitter filter is wonderful. I run a KW on 80-40-20 and where my neighbor was out of business before, he can now watch his weak signal in complete enjoyment.

Thanks again and

Arthur E. O'Neill, W9PDS
Radio Station WSBT
South Bend 26, Indiana



ELDICO OF N.Y.

44-31 Douglaston Pkwy.

Douglaston, L. Is.

always by direct paths, so far as he is able to determine.

Guayaquil, Ecuador — With 6 quiet in December, HC2OT had a chance to check back through his log and see just where he'd been working in the past two years. Sorted by call areas and countries, Steve's roll call of the Tropical Tramps looks like this: W1 — 14, W2 — 6, W3 — 5, W4 — 8, W5 — 30, W6 — 9, W7 — 1, W8 — 5, W9 — 11, WØ — 6. Total in this country — 95. Others include LU — 15, XE1 — 7, XE2 — 2, YV5 — 4, VE3 — 2, and 1 each in CX, OA, CE, PZ, PY, VE1, and HC. Grand total: 132 stations in 25 states and 11 countries. Ecuador, now also represented by HC2JR, who is being groomed to take over 6-meter duties when Steve's stay in Ecuador is completed, was the last country to be added to the list.

Brooklyn, N. Y. — Anybody interested in 50-Mc. teletype? W2NSD has had teletype gear in working condition

(Continued on page 104)

2-Meter Standings

Call	States	Areas	Miles	Call	States	Areas	Miles
W1PIV	13	5	550	W5JTI	9	5	660
W1HDQ	13	5	480	W5ML	2	1	425
W1BCN	12	4	500	W5AJG	2	1	400
W1CTW	12	4	500	W5IRP	2	1	365
W1REZ	11	4	–	W5FSC	2	1	250
W1JSM	10	3	–	W5JLY	1	1	1000*
W1GJO	10	3	–				
W1JMU	9	3	–	W6ZEM/6	1	1	415
W1OOP	9	3	–				
W1QXE	9	3	–	W8UKS	18	7	720
W1MBS	8	2	275	W8WJC	18	7	700
W1AW	5	2	–	W8BFQ	15	6	600
				W8WSE	14	6	620
W2BAV	14	5	430	W8WRN	13	5	–
W2NLY	13	5	515	W8CYE	12	6	–
W2NGA	13	5	–	W8CPA	12	–	650
W2DFV	13	5	350	W8BAX	9	–	–
W2CET	12	5	405	W8DIV	8	4	–
W2WLS	12	4	–	W8RDZ	7	4	340
W2DPB	12		500	W8WAB	4	4	–
W2QNZ	11	5	–				
W2NPJ	11	5	500	W9FVJ	13	6	680
W2PJA	10	4	–	W9JMS	12	5	600
W2PIX	9	4	–	W9PK	10	5	–
W2WGH	9	4	–	W9OBW	8	4	–
W2BNX	7	4	300	W9NFK	8	4	410
W2FHJ	7	3	–	W9UIA	5	3	205
W2RPO	5	4	–				
W2UTH	5	4	–	WØNFM	14	7	660
W2UXP	4	4	–	WØEMS	13	5	860
				WØWGZ	10	4	760
W3RUE	15	7	760	WØIFB	9	6	–
W3KBA	13	6	–	WØBZE	8	4	520
W3OWW	13	6	600	WØHAQ	8	4	–
W3GKP	13	5	610	WØDEN	7	4	520
W3KUX	12	5	575	WØZJB	6	3	–
W3PGV	12	5	–	WØGOK	6	–	–
W3KWH	11	6	–	WØHXY	5	2	–
W3BLF	10	6	–	WØJHS	4	2	–
W3KWL	10	5	–				
W3GV	9	5	660	VE1QY	9	3	650
W3HB	9	5	–	VE3AIB	8	5	520
W3LMC	9	4	–	VE3BPB	6	4	–
W3KWU	8	3	–	VE3ANY	4	–	–
W3VVS	7	4	430				
W4IKZ	13	5	500				
W4CLY	12	5	500				
W4FJ	12	5	450				
W4FBJ	11	5	–				
W4MKJ	10	5	475				
W4HHK	10	5	650				
W4JFV	9	5	860				
W4OLK	9	4	500				
W4ODG	9	4	500				
W4JHC	8	4	500				
W4AJA	8	4	–				
W4NRB	8	4	–				
W4FWH	7	–	–				
W4FQI	6	–	–				
W4KKG	5	–	–				
W4LNG	4	2	–				

* Crossband.

Note to 2-meter operators: If your listing is incorrect or incomplete, please send in the correct information. Also, how about more mileage listings from W6 and W7, and more information on leaders in W9?

for about a year on 144 Mc., but his location is such that he has not done too well on 2. His coverage on 6 is better, and he'd like to hear from anyone who is equipped for teletype operation on 50 Mc.

Westville, N. J. — W2VX reports that the Society of Wind-Jammers, Eastern Pennsylvania and Southern New Jersey Sections, get together nightly on 144 Mc. Object: to promote good fellowship and increase activity on 2 meters during periods when DX is *not* coming through. Round-table operation is encouraged, with frequent stand-bys to look for new recruits. Social get-togethers are scheduled periodically, the first being held at Limerick, Pa., Dec. 3rd, with W3s PBR, EPO, NWQ, TF, NAD, ADV, GYB, KBP, NHI, W6YBY/3 and W2VX, as well as numerous members of the fair sex in attendance. The above calls, plus W2PEN, and W3s LNQ, MJB and UX, comprise the charter membership. Such informal groups can do a lot to promote activity on any v.h.f. band, and formation of local chapters of the Wind-Jammers in other areas is invited.

Manitowoc, Wis. — Tests are being conducted regularly by W9s BZU and LBC with W9DDG of Sheboygan at 6 to 6:30 each evening in the hope of improving the signal strength over this 24-mile indirect path. They have been able to hear W9PM in Pt. Washington and W9TQ in Milwaukee, though no contacts had been made with them up to early December. The Manitowoc stations would be glad to hear from others in Eastern Wisconsin who would be interested in keeping regular schedules on 144 Mc.

Mattapoisett, Mass. — Low-*C* tubes are not an unalloyed blessing, according to W1ZE. Irving had been using a pair of HK-354s (top frequency for full ratings: 30 Mc.) on 50 Mc., and he'd had no trouble from fourth-harmonic radiation in Channel 11, where WJAR-TV provides the best signal in the Cape Cod region. Then he changed to VT-127As, with a considerable improvement in efficiency on 50 Mc. But the trouble started with his TV neighbors, and W1ZE was blanking out the picture on Channel 11 entirely. Traps and stubs corrected the trouble, but they were not needed with the older bottles.

The World Above 420 Mc.

Not much news of 420-Mc. activity this month. W8LBH, Akron, reports that he's been doing some work on the band in between 6-meter openings. With 30 watts input to a 316-A, a converted ASB-3 receiver and a corner-reflector antenna system, he's worked W8s VO, RHM, NYS, NLB and BFH, all local.

After considerable effort, W6CFL has been able to work 1215-420 crossband with W6NLZ, about 5 miles away. The 1215-Mc. rig at W6CFL is a 703-A line oscillator feeding a discone antenna. The oscillator was adapted from ideas in the Sulzer-Ammerman job of April, 1948, *QST*. More details in the OES Bulletin now in preparation.

Have you investigated OES? If you are genuinely interested in the experimental side of v.h.f. and u.h.f. work you should be lined up with the ARRL Official Experimental Station program. Details and application blanks are available from your SCM or from ARRL Headquarters.

Strays

Percy L. Spencer, W1GBE, manager of the power-tube division of the Raytheon Manufacturing Co., received the Distinguished Public Service Award in ceremonies held recently at the Waltham, Mass., plant. The award, highest civilian honor bestowable by the Secretary of the Navy, was made for W1GBE's development of the vacuum tube used in proximity fuses and his simplified method of magnetron production.

—•••—

Our best wishes for the future go out to a real old-timer, L. J. N. du Treil, W5DU, a radio engineer of the FCC and its predecessors for the past 30 years, who has retired from Government service to enter the consulting field.

Correspondence

(Continued from page 51)

W6 when I first came out here, but that I am afraid is now out of the question. However I have been thinking quite a lot about this business and the results of my ponderings are here outlined.

As well as there being hams in U.K. who would like to visit U.S.A., it is my guess that there are other hams in U.S.A. who would like to visit G-land. Right? Assuming you said "Yes" I will continue. Emerging from several sheaves of paper on which I have calculated the cost of a trip to America, I arrive at this salient and all-important conclusion. By far the greatest amount of money is going to be spent on accommodations and so on *after* we have arrived in U.S.A. or U.K. as the case may be.

Let us become technical and make an hypothesis. WOICU would like to spend a few weeks in U.K. and G2HRDUP would also like to visit the U.S.A. By some scheme, yet to be devised, they get in touch with each other. It is obvious that large sums of money are going to be saved if G2HRDUP accommodates WOICU for nothing and vice versa. There is also the added advantage that two hams will be together and you know what that means.

Pursuing the matter a little further, it might even be possible with the aid of such organizations as the ARRL and the RSGB to reduce the cost of travel by booking a number of passages at once. Anyway, what do you think about it all?

— *George R. A. Wright, VS1CE*

"QRS, PSE"

933½ So. Topeka, Wichita 11, Kans.

Editor, *QST:*

After receiving my December 1949 issue of *QST* I immediately tore into it, devouring its usual luscious contents. But that which tasted the best was W9BRD's letter about the treatment that 13–15 w.p.m. boys are receiving from the higher w.p.m. sharks. Not all higher (around 30 to 45 w.p.m.) speed men are like this but just a few. I agree wholeheartedly with W9BRD.

After I first got my license there was no enthusiasm for 'phone, only for c.w. It was wonderful! On my second month of c.w. I became very discouraged. Several consecutive times I picked out a station of about my own rate of speed, but when I answered his CQ he would speed up to 15 or 20 w.p.m. faster than when we started. I asked one fellow to slow down, but alas, alack, to no avail. I think I got only 10% of his message; and this is only *one* QSO out of the many who butchered my friends' as well as my own c.w. heart. What am I using now? Why, 'phone of course!

— *Keith R. David, W0ZYH*

24 Florida St., Springfield, Mass.

Editor, *QST:*

Of late there has been much talk about many c.w. operators going too fast for and refusing to slow down for a beginner. I am 14 and got my ticket in March. I would like to say that I have never had any trouble getting anyone to QRS. Also it must be remembered that operators calling CQ at a high rate of speed are probably desiring a QSO at that speed.

— *C. Dewey, W1RZG*

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

Please note the 7¢ rate on hamads is available to ARRL members only.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 100, $1.25 up. Stamp for samples. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

AMATEUR radio licenses. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

QSL's, SWL's. Finest stock. Fairest prices. Faster service. Dossett, W9BHV QSL Factory, 857 Burlington, Frankfort, Ind.

QSLS! Kromkote cards at a fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, W7LCM.

DON's QSL's. "The finest". Samples. 1108 Madison, Maywood, Illinois.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. $1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

QSLS! Original designs priced to fit hams' pocketbooks. Stamps for samples. Leonard's Print Shop, 854 View, Hagerstown, Md.

QSL-SWL cards, personalized with photograph. The very best. Samples for addressed, stamped envelope. Bob Payne, WØOJC, Marshall, Missouri.

QSL's high quality, fair prices. Samples? W7GPP R. D. Dawson, 1308 F Street, The Dalles, Oregon.

FOR Sale: A supply of first-class equipment, such as HF converters and transmitters, power supplies, modulators, test equipment, adjust-a-volts, Vibrapaks, HF beams, coils, condensers, xtals. All at 50% off regular price. Send card listing your requirements. Orval Hanson, WØHBA, Box 383, Watertown, South Dakota.

FOR Sale: Collins Kilowatt on 14,265 Kc. Price: $1500. Also: Collins 30K, price: $850.00 F.o.b. Both guaranteed perfect. W1CPI.

QSLS. Samples free! Refunded on ordering. Narvestad, Granite Falls, Minnesota.

10-METER Beams, $19.50. Send Card for free information, Riverside Tool Co., Box 87, Riverside, Illinois.

TECHNICAL Manual on Recvr-Trans. RT46/TRC10 with PE-214B. Original, 150 pages, schematics, detailed instructions. $1.75. W3NB, F. Dunan, 1717 Lang Place, N.E., Washington 2, D. C.

MAGAZINES: Radio, Electronic, sold and bought. Landa, 157c Leverett, Boston 14, Mass.

UNCLE Fred's QSLs. For Hams of distinction! Three colors and up. Rainbow map QSLs. Special DX QSLs. Samples, 10¢. Uncle Fred, Box 86, Lynn, Penna.

ZIPPO lighter, ARRL insignia and call sign, inlaid enamel, $5.00. Ideal birthday gift. McCarron, W2BNO, 3050 Decatur Avenue, New York 67, N. Y.

NEW 1-82A Selsyn Indicators, $3.95; new BC-1206C, "Lazy Q-Fiver", $5.95; new BC-453B, $12.95; FL-8A filters, $1.37. FL-5F filters, 92¢. Excellent used AN-APS-13, $14.95. Guaranteed T-17 mikes, 69¢. Trouble-shooting Manuals (includes schematics) BC-348, BC-779, SCR-522, BC-610, $1.00 each. Add postage. Free catalog. Lectronic Research Laboratories, 1021-Q Callowhill St., Philadelphia 23, Penna.

CARDS? QSLS? SWLS? America's finest! Big variety. Samples 3¢. QSL printer Sakkers, W8DED, Holland, Michigan. Made-to-order QSL Printers!

CLOSING out demonstrator models and slightly used AC lighting plants. 500 watt, $80.00; 1000 watt, $150.00; 2000 watt, $200.00; 250 watt, $260.00; 5 K.W., $370.00; 15 K.W., $850.00. Manufacturers of converters and motor generator sets. Katolight, Mankato, Minnesota.

QSL Quality cards, priced right! Samples. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

QSL's. The finest there are. Samples today will prove it by far. Larry's QSL's, P. O. Box 59, Opportunity, Wash.

BARGAINS: New and used transmitters, receivers, parts: Globe King, $299.00; Meissner 150B, $295.00; Hallicrafters HT-9, $295.00; Sonar SRT-75, $149.00; New 150-watt 'phone, $199.00; 60-watt 'phone, $99.00; Globe Trotter, $57.50; HT-17, $39.50; new Meissner Signal Calibrators, $29.95; MB611, $35.00; HRO 5TA1, $199.00; HRO complete, $149.00; SX-43, NC-173, HQ-129X, $139.00; RME-45, SX-25, $99.00; S-38, $29.95; S-41, $22.50; latest signal shifter, $59.50; DB22A, $49.00; BC610's, AF100, and many others. Large stock trade-ins, Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Labs, Council Bluffs, 740-44 West Broadway.

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10 and 20-meter beams, $19.25, and up. Aluminum tubing, etc. Willard Radcliff, Fostoria, Ohio.

OSLS-SWLS. Meade, WØKXL, 1507 Central Ave., Kansas City, Kansas.

FOR Sale: Meissner, 150-B transmitter with signal shifter, heavy duty modulation transformer, crystal microphone input. Excellent condition, $200.00. John Spiegel, P.O. Box 1011, Lake City, Florida.

FOR Sale or swap: HR07, complete, SX-28 and RCA175, recvrs; Hickok vac. tube voltmeter, new HT9 xmitter with 10–20 meter coils; Meissner analyst, 8 mm. projector and camera, Kodak tourists, Argus C3 and slide projector. W8UAN, L. Mamas, 1134 Norton Ave., Columbus, Ohio.

SELL: 500-watt fone/cw transmitter in 42" black cabinet rack. Neutralized PP 813's driven from Millen exciter, modulated by 203A's. Complete with tubes and coils for 10, 20, 40, 80 but less speech amplifier. Crated F.o.b. First $225.00 takes it. Clair Brown, Solon, Iowa.

WANTED: National 1–10 with coils, less power supply and speaker. B. L. Norcross, W2PXZ, Linwood, N. Y.

SELL: Postpaid if cash with order, all in excellent condition and complete. VHF 152A with instructions, $65.00; BC-224H converted 110v., S-meter noise limiter, book, was new surplus, $80.00; BC-221M, calibration book, xtal, $60.00; 3–4 command transmitter, $10.00; pair new MAB tranceivers 75m, $45.00 each; New SCR-522, $25.00; BC-654 with PE-103 and 104, was new surplus, $60.00; ARB rcvr, $30.00; PE 75 3-KVA, 110v. 60 cycle gas generator $150 (300 lbs. not postpaid). C. Barker, 305 Ash, Pullman, Wash.

QSL's, SWL's. High quality. Reasonable price. Free samples. Write Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vt.

SELL: BC-348P, separate large regulated power supply housed in speaker cabinet. Separate O5er can be switched in or out at will. Germanium noise limiter. Original two instruction books plus diagrams of changes made. Best offer over $100.00. Write John A. Smets, 2329 Farwell Ave., Chicago 45, or phone Shel. 3-1090.

"HEATH 5" 'scope, MODG 0–4, used only 3 months, $30.00. Cran Baldwin, Hardinsburg, Ind.

SELL: BC-610-C, in excellent condx, BC-614-C speech amplifier, coils 10 thru 80, doublet antenna changeover relay, spare modulation transformer and h-v filter condenser, all tubes except 250TH. $550.00. Deliver within 100 miles. A. Monderer, Box 683, Solana Beach, Calif.

NEW single sideband selector GE type VRS-1. Will ship express collect for best offer over $55.00. W. L. Hamilton, W4AAW, 1817 Beechwood Ave., Nashville, Tenn.

FOR Sale: Temco 75GA xmitter, 100 watts phone, 125 watts CW, in excellent condition. Sonar XE-10 F.M. unit, 3-element Workshop rotary beam. No reasonable offer refused. W. J. Romaine, 11 Broadway, New York 4, N. Y.

"TAB" guaranteed tested tubes: 6AG5, 6AK5, 6BG6G, 6BH6, 6J6, 6SN7GT, 1R5, 1S5, 7Y4, 12AT7, 117Z3, each, 37¢; GE/2J1G1 Selsyns tested perfect used pair, $1.49; tuning meter, 5 Ma, 98¢; 6V Carter Magmotors 400V/150Ma, $8.98; 250V/100 Ma, $4.98. Both $12.49. Write for bargain "Tabogram". "TAB", 109 Liberty St., New York City, N. Y.

QSL's, SWL's. Samples free. W4HUD, Albertson, Box 322, High Point, N. C.

BC-348 new, converted with internal power supply, $65.00. W4MXU, 406 Nimitz, Jackson, Mississippi.

MUST sell: Make an offer! Complete 600 to kilowatt xmitter, phone and c.w. 810's final; 813 buffer, Meissner Ex signal shifter, 810's modulators with high level clipping, 6As7G speech amplifier, separate power supplies and meters. Lambda 'scope, D-104 and 22-X mikes, spare parts and tubes. All inquiries and offers will be considered and answered. Joseph J. Hoff, WØTEA, 164 West Arrow, Marshall, Missouri.

QSL's, SWL's! Free samples. W1HJI, Cushing, Box 32A, Manchester, N. H.

SACRIFICE! BC-610E and speech amplifier BC-614E, $550.00; BC-459-A, BC696-A, $8.50 each. Power supply for same, $15.00. Three element 10-meter beam, prop motor, transformer and 36 foot tower and guy-wires, $40.00. HQ-129-X, $115.00. Q5'er, $12.50. WØFGU, Milford, Nebraska.

BARGAINS: New and reconditioned Collins, Hallicrafters, National, Hammarlund, RME, Millen, Meissner, Sonar, etc. Reconditioned S40A, $59.00; S53, $49.00; SX-42, $179.00; NC57, $59.00; NC173, $139.00; NC183, $199.00; HQ-129X, $129.00; RME45, $89.00; RME70, $59.00; RME84, DB22A, HF 10–20, VHF152A, HFS, HRO, NC-200, S38, SX25, SX28A, S47, BC610, Collins 75A1, Collins 32V1, etc. Shipped on approval. Terms. List free. Henry Radio, Butler, Mo.

BC-457's good used condition, $3.00. BC-430's $2.50 (good 80-meter mobile xmitter, 7½ watts output. Pair 250 modulator and bas 0-1½ thermocouple. One Deluxe Meissner signal shifter with 160, 80-40, and 20-10 sets of coils, $37.50. Prices F.o.b. R. L. Kalmbach, W4IW, Lykesland, S. C.

FOR Sale: 75 ft. Wincharger 3-leg self-supporting steel tower unassembled, cost $300.00, for $195.00. Also new unused Amphenol 10–20 beam and Rotor, cost $300.00, for $195.00. Also will sell BC-610C with speech amplifier, 10–20–40–80 coils and tuning units plus full set of spare tubes and antenna loading unit for $675.00. Also Meissner signal shifter for $65.00. All equipment first class. Ten percent discount for the lot. Grant F. Ashbacker, W8BJA, 615 Ruddiman Avenue, North Muskegon, Michigan.

THORDARSON 100-watt CW and 'phone xmitter in steel cabinet, ECO in metal cabinet, RME-45 receiver, Astatic mike approximately $75.00 worth of parts and tubes. All for $190.00. Lew Dautman, 5213 Ventnor Avenue, Atlantic City, N. J.

WILL trade BC-221 frequency meter with crystal and calibration book; new DM-35 dynamotor; BC-1068 receiver converted to 2 meters. Want Heath oscilloscope kit, latest model; McMurdo-Silver all band multiplier unit. W7KKB.

SELL: BC779 surplus Super Pro, complete, $100. VHF 152A $40.00. Two Brush Mail-A-Voice recorders, cost $40.00 each new, take $22.50 for both. One surplus Command transmitter. Five Command receivers, two less tubes, rest complete, $20.00 for the lot. Bruce Vaughan, W5HTX, Springdale, Ark.

BC-348-P, AC supply, S-meter, instruction manual. Best offer over $70.00. Jim Cotten, W5PVI, Weatherford, Texas.

$60.00 buys complete 125 w. fone, T55 final; sell Deka variable holder and 10 xtals that double to 10 meters, $10.00. New 203Z, $5.00. 152A for $40.00. Want old SX-25 and Midwest receivers for parts. W2SBR, Raquette Lake, N. Y.

HRO-7, in brand new condition, complete, including tilt-base. Must sacrifice for $239.00. W1RS, 35 Tower Ave., Needham Heights, Mass.

SELL: HFS complete with power supply, $100.00. NC-120 (RAO-6) .55 to 30 Mc; 2 stages RF, xtal, etc. 115/60 cy, $60.00. Weston 772, $30.00. All $175.00. W2RQI, Urbach, 449 Hill, Boonton, N. J.

FOR Sale: Onan gas generator 2.5 Kw, 120 Vac. 60 cps. 2.5 Kw. $225.00. 500-watt station. Bargain. APN/1 altimeter and test set TS-10A/APN. $15.00. C. H. Frederick, 3005 Harrison, Louisville, Ky.

NEW crystals for all commercial services at economical prices, also commercial regrinding. Over fourteen years of satisfaction and fast service! Eidson Electronic Co. Phone 3901, Temple, Texas.

KILOWATT F.M. phone, c.w. transmitter, VFO, tube keyer. Sell reasonable or trade for? Los Angeles area. W6UQQ, 144 East 57th, Long Beach, Calif.

TIMING devices 24-hour clocks available exclusively in northern New England from Evans Radio, Concord, N. H.

QSLS! G. L. Taylor, Sumrall, Mississippi.

CARBON tetrachloride, cleaner, solvent 27 oz. $1.50. Polystyrene high frequency coil and splice dope, $1.00 pint. Special thinner, 65¢ pint. Craft Chemical Lab, 453½ East Exchange St., Akron 4, Ohio.

BC-610-E converted for 10, tuning units and coils, speech amplifier, complete complement of tubes, in very good condition, good buy for first $450.00 F.o.b., RME-DB20, $45.00 F.o.b.; RME VHF-152, $50.00 F.o.b., W6SAN, 9002 Castro Valley Blvd., Hayward, California.

SELL: Collins Autotune transmitter, 350 watts. Automatic band-switching. Built-in precision VFO. 75, 40, 20, 10. Including heavy duty supply $300.00. George Kravitz, 7919 20th Ave., Brooklyn, N. Y.

FOR Sale: Transmitter, Temco 75, with coils for five bands. Like new, $350.00. Also R-9'er with 10 mtr. coil, used 3 hours, $22.00. Webster wire recorder, Model 78-1, perfect condition, $50.00. W3IUC, 312 Court Square Building, Baltimore 2, Md.

TECHNICAL Manuals (army originals, brand new), BC-312 — BC-342, $1.50; BC-314 — BC-344, $1.50; BC-221, $2.00; TG10 Keyer (code machines) $1.25; 779B, $1.50; Wilcox F3-CW3, $2.00; BC-191 (same as BC-375), $2.00; RT46/TRC10, $1.75. Radar Electronic Fundamentals, $2.25. Sell all together or separately. W3NB, Frank A. Dunan, 1717 Lang Place, NE, Washington 2, D. C.

BC-221 tone modulated. The necessary transformer, plus instructions, $1.25. Audio Tours, 17 East 48th Street, New York City.

FOR Sale: Electronic Instrument Company, 5 in. oscilloscope. Brand new with full instructions. Best offer. D. G. Bishop, 32 East Eighth Avenue, Clarion, Penna.

FOR Sale: NC-173 and speaker, $140.00; Sylvania modulation meter, like new, $15.00. Gon-Set 3–30 and Lysco noise limiter, $25.00. Few W.E. 1N21-B diodes, new, 75¢ each. Precision 1054, like new, $85.00. Jack Garretson, 1600 West 5th, Brooklyn 4, N. Y.

SELL: IRE Proceedings, 1948 and 1949. $9.00 per year, plus shipping charge. Ferd. C. W. Thiede, W2EC, 169 Buckingham Road, West Hempstead, L. I., N. Y.

SALE: Super Pros 100–400 Kcs. 2.5–20 Mcs. in 5 bands, $150.00. .54–20 Mcs. in 5 bands, $200.00. Both rack-mounted, in perfect condition. W5OVX, McIntyre, 814 W. 43rd Street, Houston, Texas.

DB-22A, VHF-152A, (slightly used). W8QJC, Box 218, Holland, Michigan.

FOR Sale: BC-348N, 110 VAC, $55.00; E-200 Signal generator, $40.00; ST-203-A mobile xmitter, with new tubes, complete, $55.00. All like new. W4ORU, Chip Weems, 1563 Forrest, Memphis 12, Tenn.

CO'AX connectors PL-259 for RG-8U, 18¢; $15.00 per hundred. W. C. Doonan, W1AMO, Malden, Mass.

FOR Sale: New condition, Workshop Associates 20-meter 3-element, beam in original box, $80.00. F.o.b. Washington, D. C. New condition Temco 500GA, Kw, xmitter, complete with microphone, spare tubes and all coils. Original cost approximately $1800. First $950 takes it F.o.b. Washington, D. C. All letters answered. Lt. John Adel, W3PWR, Andrews Air Force Base, 1909 AACS Sqd., Washington 25, D. C.

WANTED: QSTS before 1930. State best price and condition. W7LWN, P.O. Box 912, Phoenix, Ariz.

NATIONAL 1–10 with factory coils, power supply, speaker, in new condition, $60.00; BC-221 in metal cabinet, original xtal and calibration sheets, sel, power supply, new condition, $70.00. New BC-645, $5.00. New UTC S46 plate xformer, $10.00; new UTC S57 fil xformer, $3.00; misc. xformers, chokes, filters. Blum, 2661 Dibblee Avenue, Columbus 4, Ohio.

AMATEURS all over are acclaiming remarkable value provided by our special Westinghouse transformer which provides 2400 Vct at 1500 Ma. from either 110 or 220, 50–60 cycles. Only 8" x 8" x 12", and weighing 42 lbs., this costs but $16.00, f.o.b. The Overbrook Company, Overbrook, Mass.

SELL: 110 VDC to 350V 150 Ma. Genemotor, $9.75. Special low drain auto receiver, $8.00. Compact 12V 300 w. DC gasoline power plant, $54.00. DeLuxe selenium rectifier power supply 0–30V at 2.5A output $12.00. Howard G. McEntee, W2SI, 490 Fairfield Ave., Ridgewood, N. J.

FOR Sale: MB-150 National tuning unit, new, in original box; BC-348 unconverted; Super Pro "R" meter, calibrated, 2-inch diameter; Custom Pontiac car radio, fits 1942 to 1948 model; 3–4 Mc Command xmitter; 3–6 Mc Command receiver; Transformer, two secondaries, 900 vct, specially wound for ART-13 transmitter conversion. All items are new or are in excellent condition. Send for prices, or make an offer. W6PHL, 207 19th St., Merced, Calif.

BC-459 VFO transmitters, slightly used, but in excellent condition. With plug and circuit diagram. $8.75 F.o.b. Al Williams, W7HYA, 75th Ave. S., Seattle 88, Washington.

1 Kw final including pair 4–125-As, antenna tuner, swinging link, and relay, $40.00. 3300 V. 400 Ma supply, $25.00. Both for $60.00. 12V BC-348(O) receiver AC converted, $50.00. 20-meter Premax vertical antenna with base, $10.00. Two 4-125-As like new, $10.00 each. Write for list. J. Lane Ware, 5401 SW 4th Street, Miami, Florida.

PUSH-pull 24-G, complete AM rig for sale, $100.00. You pay the crating and shipping from Kansas City. WØTLY.

BC-610 bought new, factory converted for 10A, $500.00. BC-654 with Army stand, generator, telephone box, hand generator and extra BC-654 for spare parts $50.00. HRO5TA1, speaker, power pack, coils from 550Kc to 30 Mc, $235.00. VHF-152 used very little, $75.00. ARC 5 transmitters and receivers BC-655, 459, 696, 453, 454, 455, all good condition, $45.00 takes the lot. SCR-522 xmitter and receiver working condx. $15.00. F.o.b. Ithaca. No charge for crating. R. R. Sprole, W2QJT, 101 Homestead Road, Ithaca, N. Y.

TRADE extra radio equipment for U. S. and foreign stamps. Have a large variety of top-grade components. W2IOP, Larry LeKashman, 1634 Kent Drive, Hewlett, L. I., N. Y.

SELL: Meissner 150-B, converted for 10 and 20 meters, xtal mike. Two doubler stages with associated 600 v. supply added on separate chassis. Band-switching from high to low frequency. Overload and underload relay added. Spare parts, tubes, mike, and key. No time for ham radio. $325.00. Come and get it. J. Beavers, Ripley, Tenn.

C. FRITZ for QSLs. 1213 Briargate, Joliet, Ill.

10 and 75 meters Motorola T-69-20A, two transmitters, power supply, mike, control box, cables, antenna with base loading coil, $125.00; PE103, new, $15.00. Mark II Genemotor, new, $12.00. Brizzolari, W2TG, 42–68 247th Street, Little Neck, N. Y.

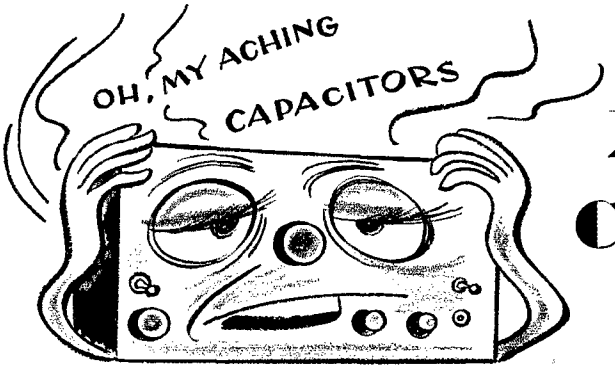
WANTED: R-28 UHF Rec. ARC-5, in any condition. BC-1148 synchr; BC-1151, 1152 indicators. Continental Electronics, Ltd., Brooklyn 22, N. Y.

COLORTONE QSL'S! "America's Finest!" No junk! Samples? Colortone Press, Tupelo, Miss.

WANTED: ER-213 Type Aenclosed relay rack cabinet, 16½" x 22" x 42". Write WØOMG, 1103 Gardner St., Poplar Bluff, Mo.

Index to Advertisers

MALLORY HAM BULLETIN



There's a MALLORY CAPACITOR For Every Need

Did it ever occur to you that more capacitors are used in an amateur transmitter or receiver than any other single component? As a result, the chance of a capacitor failing and putting you off the air, or permitting your transmitter to emit spurious, illegal signals to land in your neighbor's radio or TV set, is more likely to occur because of a poorly made or defective capacitor, than any other component in your set.

For that reason, every amateur should be especially critical of the capacitors he selects for use in his equipment. Nothing less than top-grade, first line capacitors should ever be tolerated in by-pass, coupling and filter circuits in his equipment.

For a long time Mallory capacitor engineers have recognized the importance of designing and building good capacitors for use in radio and electronic circuits. They have recognized that a truly good capacitor must have low DC leakage and low operating impedance in addition to the usual requirements of full capacity and voltage ratings.

For example, more than 10 years ago Mallory engineers recognized the need for electrolytic capacitors of lower and more uniform impedance. The result: they did something about this need by designing the exclusive Fabricated Plate (FP) anode construction to assure the production of a capacitor with a consistently lower impedance.

Mallory capacitor engineers anticipated the trend toward increased amateur activity in the VHF range above 50 megacycles. The result: ultra small, Mallory tubular and disc type ceramic capacitors were made available for efficient by-passing and coupling at those frequencies.

A number of years ago Mallory vibrator engineers first stressed the importance of proper buffer and timing capacitors to assure long, trouble-free vibrator life in your portable-mobile rigs. But there were no suitable vibrator capacitors available. The result: Mallory capacitor engineers attacked the problem and designed capacitors especially suited for vibrator service.

Mallory engineers have seen to it that almost every conceivable size, shape, and type of fixed capacitor the amateur might need, is included in the Mallory list. And they have seen to it that each Mallory capacitor has had individual, painstaking design effort to make it the finest of its type made.

The next time you have need for a capacitor for use in your station, see your Mallory Distributor, and specify Mallory. With the Mallory label on that capacitor, you'll know without question that you're getting a top-grade, first line capacitor of excellent operating characteristics.

And see your Mallory Distributor for the other Mallory parts designed for amateur service . . . including resistors, ham band switches, rheostats, potentiometers, pads, dry disc rectifiers, vibrators and vibrator power supplies.

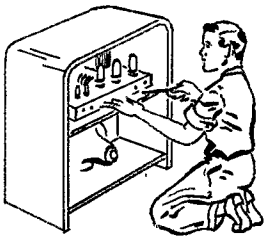
P. R. MALLORY & CO., Inc.
INDIANAPOLIS 6 INDIANA

P.R. MALLORY & CO. Inc.
MALLORY

Where Will You Be In Radio,

In February, 1951?

HERE?



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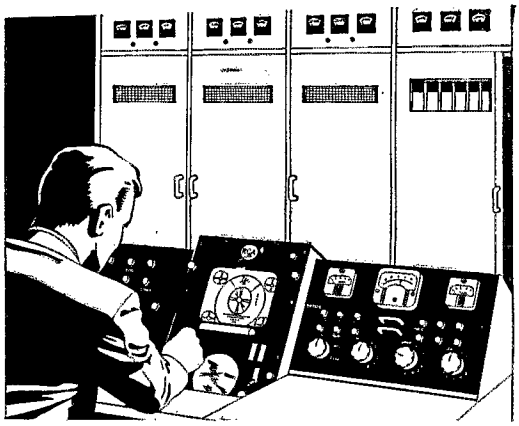

- A Screwdriver Radioman
- Low Pay • Insecurity • Hard Work

You, too, May

- GOOD PAY JOB • SECURITY
- KNOWLEDGE • RESPECT

EARN $3000 - $7500 YEARLY!

(Average Pay Reported by FCC Nationwide Survey)

Get your FCC COMMERCIAL Radio Operator LICENSE *in a few short weeks ...Then—Use Famous CIRE JOB-FINDING SERVICE*

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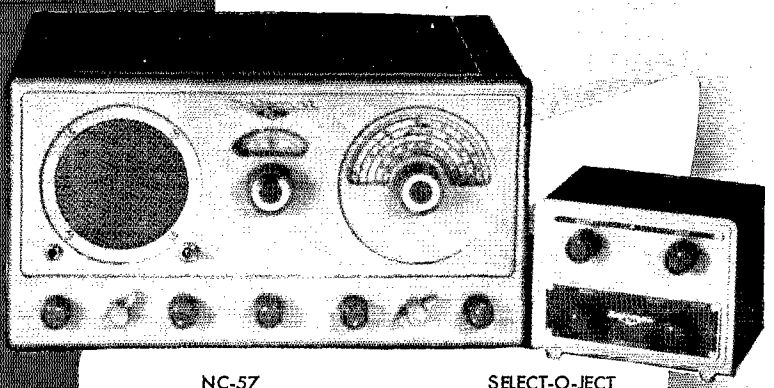

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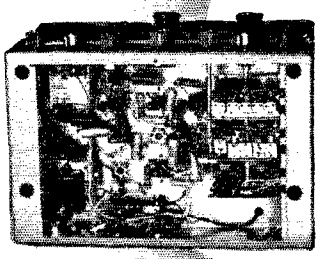

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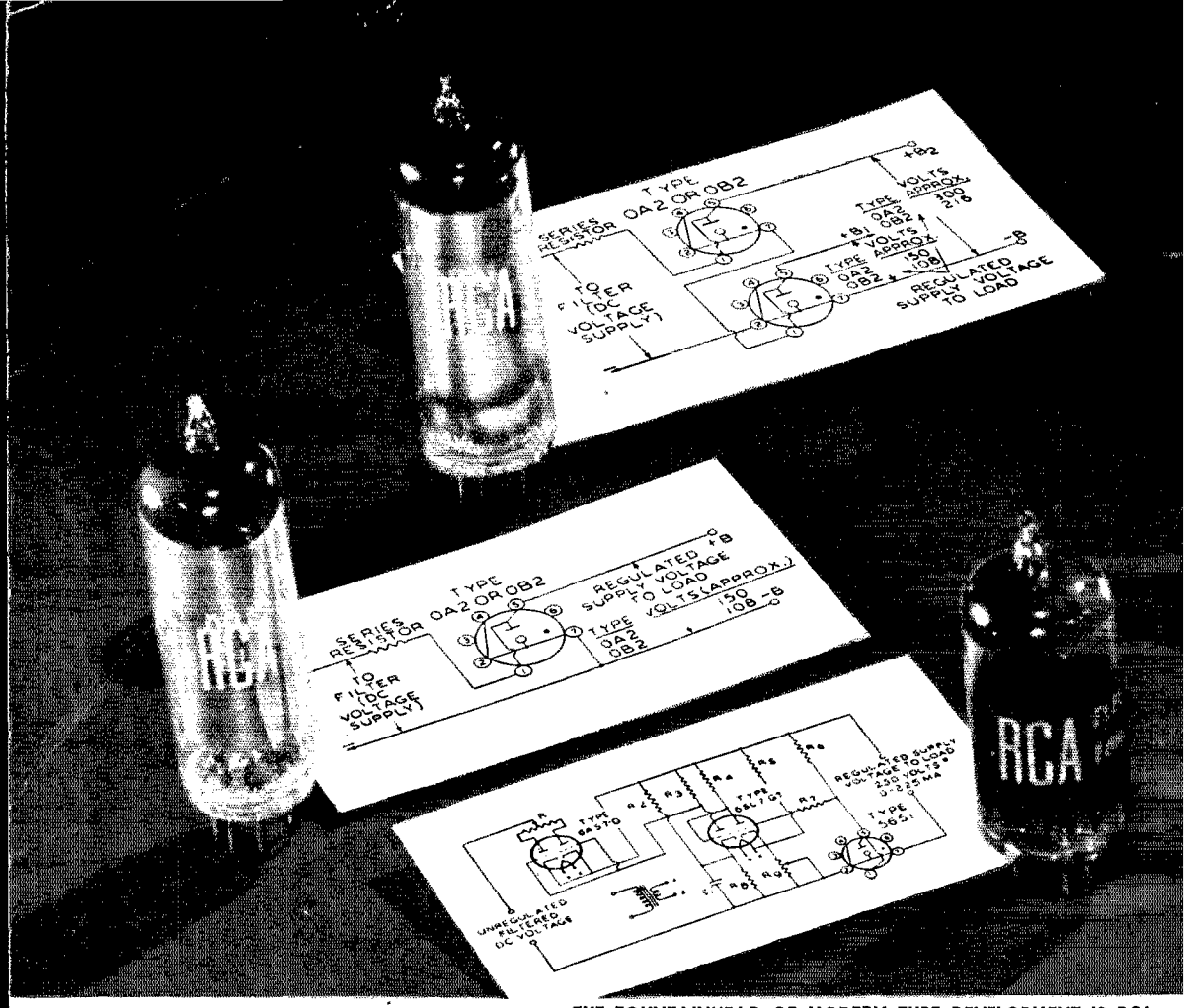

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