

July, 1948

40 Cents

# QST



devoted entirely to

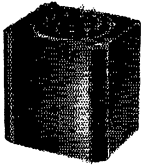
# amateur

# radio



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

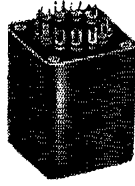
# COMPONENTS FOR EVERY APPLICATION



**LINEAR STANDARD**  
High Fidelity Ideal



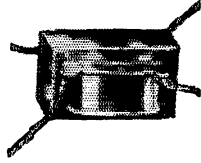
**HIPERM ALLOY**  
High Fidelity . . . Compact



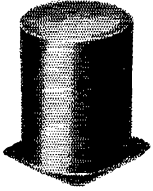
**ULTRA COMPACT**  
Portable . . . High Fidelity



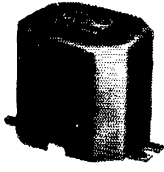
**OUNCER**  
Wide Range . . . 1 ounce



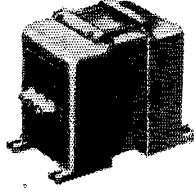
**SUB OUNCER**  
Weight 1/3 ounce



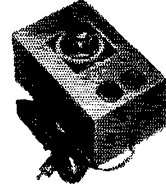
**COMMERCIAL GRADE**  
Industrial Dependability



**SPECIAL SERIES**  
Quality for the "Ham"



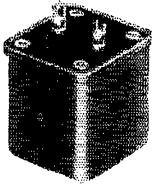
**POWER COMPONENTS**  
Rugged . . . Dependable



**VARITRAN**  
Voltage Adjustors



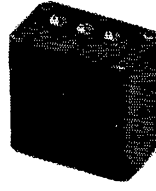
**MODULATION UNITS**  
One watt to 100KW



**VARIABLE INDUCTOR**  
Adjust like a Trimmer



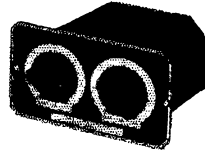
**TOROID HIGH Q COILS**  
Accuracy . . . Stability



**TOROID FILTERS**  
Any type to 300KC



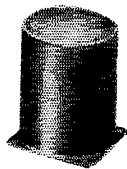
**MU-CORE FILTERS**  
Any type 1/2 - 10,000 cyc.



**EQUALIZERS**  
Broadcast & Sound



**PULSE TRANSFORMERS**  
For all Services



**SATURABLE REACTORS**  
Power or Phase Control



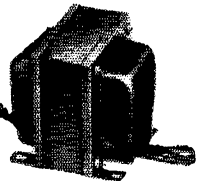
**LARGE UNITS**  
To 100KW Broadcast



**PLUG-IN TYPE**  
Quick change service



**CABLE TYPE**  
For mike cable line



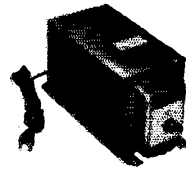
**VERTICAL SHELLS**  
Husky . . . Inexpensive



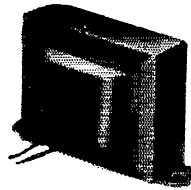
**REPLACEMENT**  
Universal Mounting



**STEP-DOWN**  
Up to 2500W . . . Stock



**LINE ADJUSTORS**  
Match any line voltage



**CHANNEL FRAME**  
Simple Low cost

*United Transformer Co.*

420 mc

1,215 mc

Explore the ultra-highs  
with G.E.'s great 2C43  
**LIGHTHOUSE TRIODE!**



**H**ERE'S a famous General Electric tube that hastens your progress to the u-h-f bands. Type 2C43 takes in stride frequencies that are far above the limits of other general-purpose tubes in the same power class.

Widely used by the armed forces for radar of various types, the 2C43 was designed primarily as an amplifier and oscillator from 200 to 1,500 mc. (In special applications, such as plate-pulsed amplifier service, usable frequency is up to 3,370 mc.)

Exceptional efficiency, plus ease of application, stem from features that emphasize the up-to-dateness of lighthouse-tube design. For example, the r-f cathode connection is through a disk-type capacitance which is an integral part of the tube. This makes for a low-impedance r-f path from cathode to external circuit, and so does away with much of the grief associated with bypassing problems.

Other advantages of the tube—there are many—will appear as you fire up on the u-h-f bands. In Type 2C43, G.E. offers you a *proved* means to pioneer successfully in those parts of the spectrum which challenge the adventurous ham.

Value-giving price and further information about the 2C43 await you at your nearby G-E tube distributor. Or, write direct to *General Electric Company, Electronics Department, Schenectady 5, New York.*

#### TYPICAL OPERATION CW Oscillator

Frequency	1,250 mc
Plate voltage	350 v
Power output	1.5 w

#### Plate-modulated Amplifier

Frequency	425 mc
Plate voltage	350 v
Power output	5 w

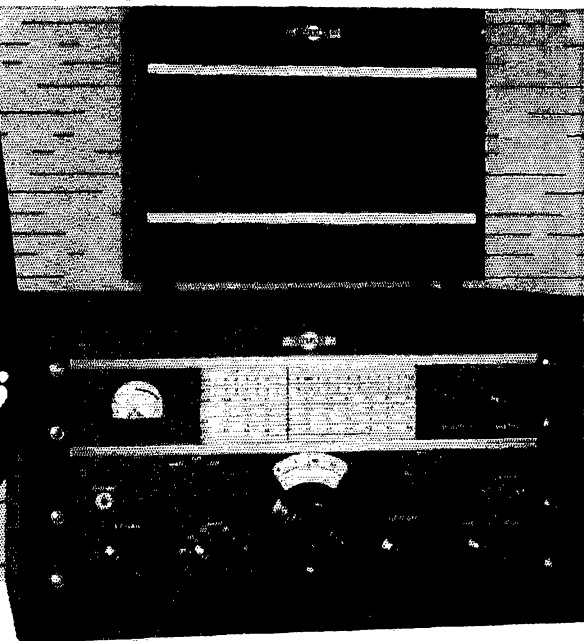
● Complete data is given in July-August Ham News for building the new MEGA-BOOSTER, which may be driven by any moderate-power 2-meter rig. This 420-mc Megabooster features a pair of 2C43's used as a push-pull tripler, with power input of approximately 17½ watts. At minimum cost to you, it lifts your present signal into the ultra-highs. Ask your G-E tube distributor to reserve a copy of this important issue for you.

ELECTRONIC TUBES OF ALL TYPES  
FOR THE RADIO AMATEUR

**GENERAL**  **ELECTRIC**  
161-GA7-L-850

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General Electric Company

Pick 'em out  
of the QRM  
with your Collins  
75A-1



Add up these receiving advantages when you use a Collins 75A-1 amateur receiver:

**SELECTIVITY:** The bandwidth is variable in 5 steps from 4 kc to 200 cycles at 2X down (6 db down from the peak of the resonant frequency).

**IMAGE REJECTION:** The double conversion circuit of the 75A-1 has inherently high rejection to image frequencies, giving attenuation greater than 50 db for all bands.

**SENSITIVITY:** The 6AK5 r-f stage in the 75A-1 receiver makes possible a threshold sensitivity far better than can be realized in normal installations, corresponding to a receiver noise factor of from 5 to 10 db above a perfect receiver of the same bandwidth.

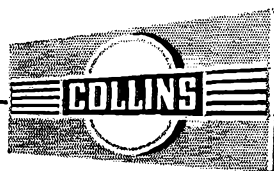
**ACCURACY AND STABILITY:** Three factors contribute to very high accuracy and stability—(1) the use of precision quartz crystals in the first conversion circuit, (2) the inherent accuracy and stability of the VFO in the second conversion circuit, and (3) linearity and absence of backlash in the tuning mechanism.

Your investment in the 75A-1 pays off in results! Amateur net price, complete with speaker, \$375.00. If you do not know your Collins dealer, we will be glad to furnish his name and address. Stop by our booth at the National ARRL Convention in Milwaukee September 4, 5, and 6.

FOR RESULTS IN AMATEUR RADIO, IT'S...

**COLLINS RADIO COMPANY, Cedar Rapids, Iowa**

11 West 42nd Street, New York 18, New York



458 South Spring Street, Los Angeles 13, California



PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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## What hallicrafters **MODEL HT-18** variable master oscillator does for improved amateur transmission

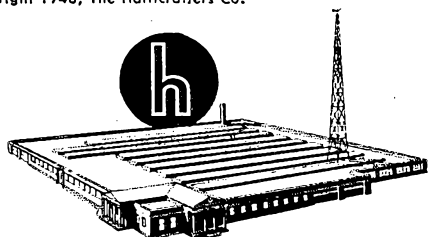
The HT-18 is called by hams who have used it the most efficient, flexible piece of gear to be developed in recent years. Easily added to your present transmitter, it brings it right up to date. Narrow band FM and calibrated 5 band V.F.O. complete in one compact cabinet with all coils and power supply concentrates and simplifies your entire operation. Put your transmitter anywhere, place the neat, highly functional HT-18 on the operating table and you're in action. Narrow band FM quality like you've never heard before. The HT-18 places your signal *anywhere in the band* with excellent stability. Go to your nearest Hallicrafters distributor today for a demonstration and complete technical data on this splendid instrument . . . . . **\$110<sup>00</sup>**

Amateur Net

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- Converts any good CW transmitter to a high quality phone transmitter.
- Eliminates 90% of broadcast interference.
- Puts your signal *anywhere in the band* with stability comparable to crystal controlled transmitter.
- Gives you direct calibration, direct output on all bands 80, 40, 20, 15, 11, 10.
- Simplifies operation of entire station. Puts both frequency selection and power control at your finger tips. 72 ohm output. Remote power control terminals.

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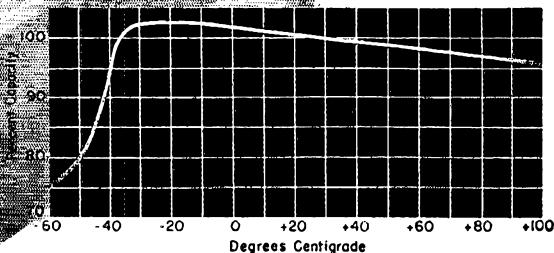
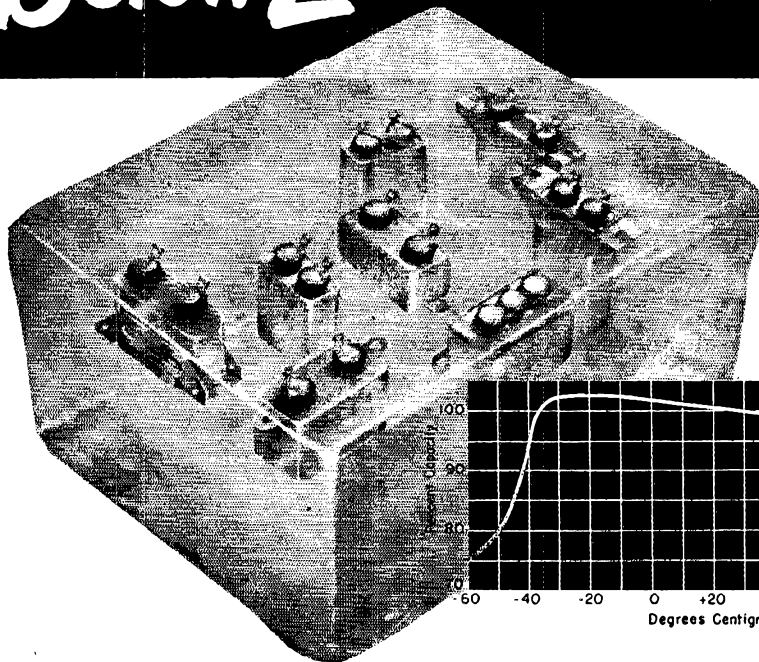
## RADIO

THE HALLICRAFTERS CO.

4401 W. Fifth Ave., Chicago 24, Illinois

MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT

# D-C CAPACITORS FOR Below Zero OPERATION?



Take advantage of the small size and light weight of Pyranol® d-c capacitors for those applications in freezing temperatures and below. No need to penalize your designs with oversize capacitors resulting from the use of other dielectrics.

Pyranol capacitors, as improved in recent years, are not only suitable for operation at temperatures up to 85 C, but can also be operated at temperatures down to -40 C. Throughout this wide temperature range, the capacitance remains within plus or minus 5% of its 25 C value.

Here are some of the advantages you'll secure by using Pyranol capacitors—styles 50 through 69 like those pictured above—

built to commercial standards:

- Size is smaller.
- Most commercial standard ratings can be shipped from stock.
- Pyranol is non-flammable.
- Like other G-E small capacitors, Pyranol commercial-standard capacitors are hermetically sealed in drawn cases—hot tinned for resistance to corrosion. They use the new silicone-gasketed bushing as insurance against leaks. They are all *individually* tested.

For specifications and details, ask for GEA-2621. Apparatus Department, General Electric Company, Schenectady 5, N. Y.

407-156E

# GENERAL ELECTRIC

## Section Communications Managers of the ARRL Communications Department

**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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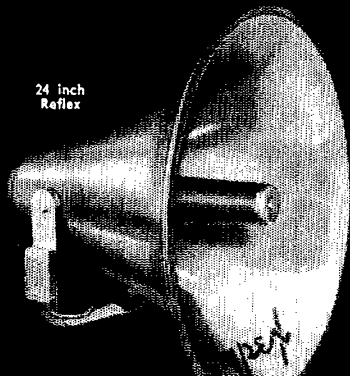
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projectors on your  
job are the best ...  
... 6 new designs

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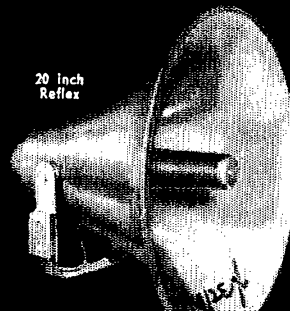
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*Designers and Manufacturers of Fine Acoustic Equipment*

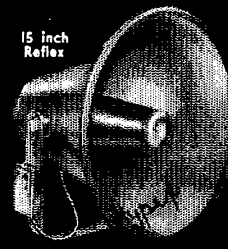
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Reflex



20 inch  
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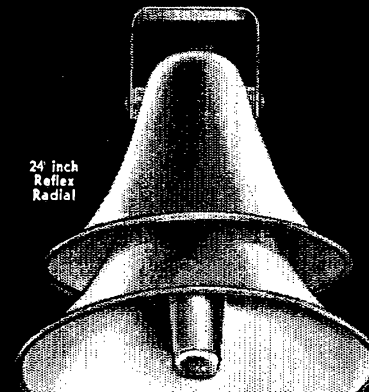
15 inch  
Reflex



9 inch  
Reflex



24 inch  
Reflex  
Radial



10 inch  
Reflex  
Radial



# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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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EUGENE C. WOODRUFF, W8CMP, 1936-1940

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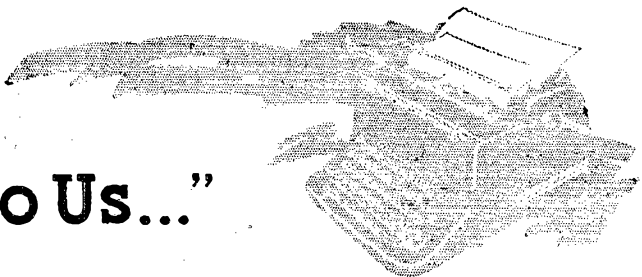
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# "It Seems to Us..."



## THE BOARD'S 'PHONE DECISIONS

The hardest problem in the amateur world -- what to recommend for 'phone frequencies in our lower bands -- again occupied the major part of the time and energies of the ARRL Board of Directors at this year's annual meeting. Preparatory study and surveying had been even more marked this year than usual, so that the examination was made against a very considerable background of data on operating conditions and problems, and on amateur opinion, both here and abroad. You will all remember that a year ago the Board asked its Planning Committee to study the subject as soon as the Atlantic City outcome was known, and to get up recommendations for its consideration. The committee's report was published in February *QST* and, briefly, recommended that the Board request a 50-kc. extension downward of 4-Mc. 'phone and an expansion up to the top of the band for 14-Mc. 'phone, and that there be no American 'phone in the 7-Mc. band. These three proposals were the focal point of the Board's discussion and the subject for decisions of wide amateur interest not only to us but to amateurs all over the world -- which we'll now tell you about in more detail than time permitted last issue. You fellows realize that the headquarters officers of the League do not participate in such matters -- for instance, they neither spoke nor were spoken to in the whole course of the frequency debates -- but we were present at the meeting and we can act as reporters and tell you the way it seemed to us that these matters appeared to the Board.

First, the Board decided to ask that the 75-meter Class A assignment be expanded to read 3800-4000 kc. Our occupancy surveys show that 'phone use of the 3.5 band has increased far more rapidly in recent years than c.w. use. More than half the activity in the band, in terms of operating hours, is now by telephony; and the density of occupancy, in point of number of stations engaged, is more than twice as great for 'phone as it is for

telegraphy. This has resulted in particularly intense congestion and interference in the 'phone assignment, which the League thinks can and should be relieved. Everybody knows the immense importance of the c.w. traffic and emergency networks in this band, and it is of course realized that the lower frequencies will have to absorb the nets and routine telegraph activity displaced from the 3800-3850 segment; but a careful study shows that the readjustment can be made without grave injury to c.w. telegraph operation and it is the directors' considered conclusion that it would be in the best interests of the amateur service to increase the 'phone authorization by this much.

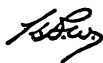
The Board very quickly decided against asking for the establishment of any 'phone facility in the 7-Mc. band, for the reasons so excellently stated in the Planning Committee's report and revolving chiefly around the disturbed and nonuniform allocation of this band in the international table. There was practically no sentiment anywhere favoring 40-meter 'phone.

That brought the Board to the question of 14-Mc. 'phone. The proposal here was to run Yank 'phone up to the top of the band. That proposal had been under study for many months. Every director was armed with facts and figures, knew thoroughly what the amateurs in his division thought, and had a clear opinion on how the matter should be settled. There had also been a national poll of sentiment, the responders being about three to one in favor of the proposed change, but the poll had been disappointingly small, only about one amateur in six in the country responding. This being a DX band, amateurs in foreign countries had expressed opinions, too, and formal representations on the proposal had been made to the Board by the amateur societies of Great Britain and France and informally by the VKs. The problem, of course, was on the reconciliation of the differing views of the directors, which diverged from one sec-

tion of the country to another just as the views of amateurs in general do. It was very complicated, with many different opposing forces, some of them probably in vectorial relationship — we'd hate to have to draw a vector diagram of the situation. We can identify several of the factors. One consideration was that most of the W gang who work chiefly domestically in this band, cooped up in 100 kc., of course wanted the expansion very badly and pointed at the 3:1 sentiment among the poll responders. Another factor was that the c.w. men of the country, generally alarmed at the prospect of foreign 'phones having to come down below W/VE 'phone, were opposed on the ground that there would be not more than 50 or 75 kc. of the band left for c.w. The Gs, VKs and Fs pointed out to the Board that 14 is the major worldwide DX band and that the extension of W 'phone to the top would ruin DX in the band for both 'phone and c.w. One of the most significant vectors in the whole diagram was the opposition to the plan on the part of 14-Mc. 'phone DX men in this country, who wanted that top space retained for DX 'phone and who similarly figured that DX would be ruined if the proposal went through. All these points of view were examined and sifted by the directors and debated for hours. When it finally came to the vote the Board found itself, considering all the factors, divided cleanly down the middle, 50:50. While the tie might have been resolved, it was felt to be very inadvisable to propose a change if closer agreement than that couldn't be had. You can't go to FCC with a world-shaking proposal adopted by a margin of one vote; nobody would pay attention to it. So, after further discussion, it was decided to be best to ask for no changes in the band, a conclusion reached by the parliamentary device of putting the subject on the table. While half of the directors believed that 'phone ought to be expanded and were not happy with the decision, the other half were equally opposed to expansion; but it is our impression that a very large majority of the whole Board is convinced, after a thorough test of strength, that the only desirable outcome under the circumstances was to leave matters in status quo. It was frequently cited around the table that we can't treat 14 Mc. as we do our domestic bands and whack it up to suit ourselves but must make provisions in it for long-range foreign DX and the rights of amateurs in other countries to work between themselves and not necessarily with us. It was pointed out that if W 'phone ran to the top of the band we'd have 200 kc. for that, with 50 kc. below it for VEs, followed by a minimum of an effective 75 kc. of foreign 'phones, leaving a maximum of only 75 effective kilocycles for the

c.w. of all the world. To leave the band in its present status permits foreign 'phones to operate in the top end, followed by our 100 kc. and the VEs' additional 50, which leaves a theoretical 150 kc. for worldwide c.w. — from which in practice must be subtracted the foreign 'phones, particularly Latin, which for one reason or another do not go to the high end. It's rugged all around but it certainly seemed the best solution.

Now how good and sound are those Board 'phone judgments, how willing should all of us be to accept and embrace them? As we've so often said, there isn't any solution to any of these matters that won't bring a substantial bunch of howls from some part of the gang. It's utterly impossible to satisfy everybody. Anybody can get up a proposal that suits him and his group but the fellows of other interests or in other parts of the country simply won't buy it. It's hard for us, sitting in our own shacks, to realize that, but it's simple truth. This Board of ours is made up of directors nominated and elected by the licensed amateurs themselves in each of our divisions. They're good amateurs who have made their marks in ham affairs, and they work awfully hard to get at the facts and do the best possible job for amateur radio. No one man or club or group of fellows of a particularized viewpoint is smart enough to get up a plan that is better or that can have wider acceptance than the decision that a national board of directors comes to after months of sincere preparatory work and two days of meetings. It is our belief that the ARRL Board of Directors is the best forum in the world for the collection and analysis of the data and the greatly divergent opinions on such a subject as this. When those directors come to a decision on a course of action, based on an honest search for the greatest good to the greatest number, it seems to us that we ought to put personal wishes and prejudices aside and agree that that is really the way it ought to be. We all know from bitter experience that while we want it one way, fellows in other parts of the country want it several other ways, and we just can't all have our ways. There has to be a compromise, to come as close as possible to keeping the greatest number happy and to follow the course that is wisest in the long-range interests of the game. We think it is demonstrable that that is the constant policy of the ARRL Board. We ask all hands to endeavor to adjust themselves to the point of view that the democratic processes of the ARRL mechanism unquestionably lead to the soundest possible conclusions for the good of our art.





# Practical Single-Sideband Reception

## A "Phasing" Method for Selectable-Sideband Reception

BY DONALD E. NORGAARD,\* W2KUJ

• Applying the "phasing" method described last month for the generation of an s.s.s.c. signal, a receiver can be built that will select one or the other sideband of a normal a.m. or p.m. signal. By using an automatic "lock-in," easy reception of an s.s.s.c. signal (with a small amount of pilot carrier) can be obtained. This article, the last in the series by W2KUJ, tells how the system works and gives pertinent information for its construction.

IN the course of work on a single-sideband communication system a new method of single-sideband reception was developed as a part of the system. The performance of receivers employing this method proved to be so much better on conventional transmissions than the performance of ordinary receiving methods that rather extensive tests were made in receiving signals in the amateur bands. The results obtained under these severe conditions were so encouraging that the desire to share this experience with fellow hams motivates the writing of this article.

The concept involved in this system is essentially the reverse of that described in a previous article dealing with generation of single-sideband signals.<sup>1</sup> It is hoped that the following presentation is sufficiently clear to enable those who want to improve their receivers by a significant amount to do so without difficulty. This is not a "nut-and-bolt" description; instead, it is a description of a receiving system of rather general application.

### Sidebands & Carriers

The fact that sidebands — and sidebands alone — provide transmission of intelligence makes single-sideband systems possible. In the case of amplitude modulation or phase modulation, the carrier (by definition of these modes of transmission) must be transmitted along with the sidebands that appear in symmetrical pairs about the carrier. The carrier plays no part in the transmission of intelligence, but it is used in normal reception to act as a "key" for the demodulation

(detection) process. Sometimes this key fails to work because of selective propagation or because of interfering signals that reach the detector along with the desired signal. The result is either partial or complete loss of the desired transmission.

Extreme selectivity ahead of the detector in a receiver can help prevent blanketing effects from strong adjacent-channel signals, but in itself is not a complete solution to the problem of amateur 'phone reception. To carry the analogy of the key a little further, it might be said that every transmission must be "unlocked" by a key — the right key — in order to be received. The transmission can be jammed by other keys that fail to work or prevent the right key from being used. The obvious solution to this situation is to keep the right key in the receiver all the time, so that other keys cannot jam the detector. This is basically the idea of "exalted-carrier" demodulation,<sup>2</sup> in which a strong "synthetic" carrier is supplied to the detector to demodulate the sidebands of the desired transmission and to make other signals subsidiary to this one key signal. Reception of c.w. signals has always employed this principle, but it can be applied to 'phone reception, too.

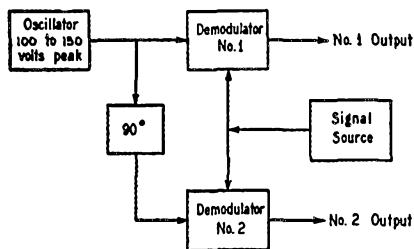


Fig. 1 — The elements of a dual exalted-carrier demodulator.

Single-sideband reception can be employed on either single-sideband transmissions (s.s.s.c. or c.w.) or on double-sideband transmissions (a.m. or p.m.), since in the latter the upper and lower sidebands contain identical information in duplicate. It has been found that the combination of exalted-carrier operation and single-sideband reception is of great benefit in overcoming the vast devastation caused by QRM and selective fading. Another feature of this mode of reception is that with a receiver so equipped one may listen to either of the two sidebands characteristic of a.m. or p.m. transmissions (and dodge some

\* Research Laboratory, General Electric Co., Schenectady, N. Y.

<sup>1</sup> D. E. Norgaard, "A New Approach to Single Sideband," *QST*, June, 1948.

<sup>2</sup> M. G. Crosby, "Exalted-Carrier Amplitude- and Phase-Modulation Reception," *Proc. I.R.E.*, Sept., 1945.

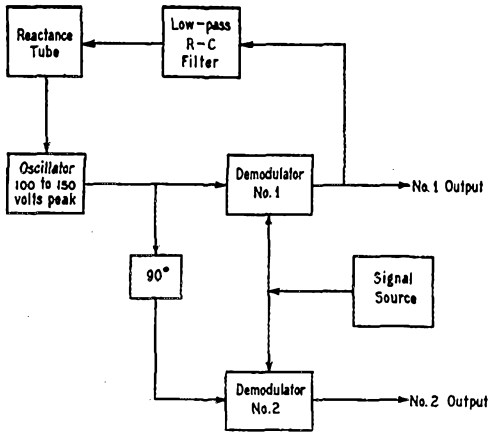


Fig. 2 — A block diagram of a dual exalted-carrier demodulator with automatic carrier synchronization. Such a system can be used to "lock in" on a small amount of carrier sent along with an s.s.s.c. signal, or it can be used for single-sideband (or double-sideband) reception of conventional a.m. or p.m. signals.

(QRM), receive s.s.s.c. 'phone transmissions of either upper or lower sideband, or receive c.w. signals in real single-signal fashion.

#### Dual Exalted-Carrier Demodulator

A brief explanation of Fig. 1 is in order, since an understanding of the characteristics of this

form of exalted-carrier demodulator will make it easy to follow the explanation of the single-sideband receiving system as a whole. Two relatively strong signals of the same frequency but having  $90^\circ$  phase relationship are supplied to the two demodulators by the oscillator and the  $90^\circ$  phase-shift circuit as indicated. These signals may have a peak voltage of 100 to 150 volts each. If a one-volt signal having a frequency, for example, 1000 cycles different from that of the oscillator, is applied to these demodulators, the output of each will be a heterodyne tone of 1000-cycle frequency at one-volt amplitude. The interesting and useful thing about this otherwise commonplace result is that the two output signals will have a  $90^\circ$  phase relationship, and this will hold true regardless of the heterodyne frequency. This phase relationship *reverses*, however, when the one-volt signal causing the heterodyne is on the reverse side of zero beat. In other words, if the small signal has a frequency lower than that of the oscillator, a plus- $90^\circ$  phase relationship is produced; if the frequency is higher, a minus- $90^\circ$  phase relationship results.

The phase relationship between the output signals of the two demodulators thus gives an indication of whether the frequency of the signal producing these two heterodynes is lower or higher than that of the oscillator. This is a point to remember a little later on. A related fact is that the voltage output of each demodulator at

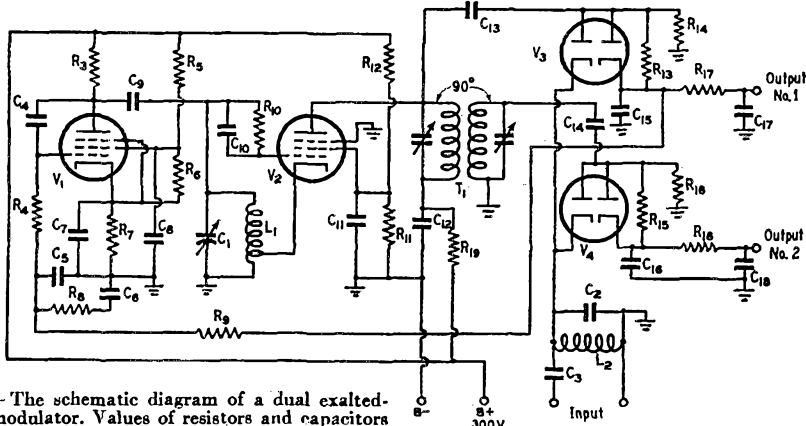


Fig. 3 — The schematic diagram of a dual exalted-carrier demodulator. Values of resistors and capacitors are  $\pm 20\%$  unless otherwise specified.

- C<sub>1</sub> — 5- to 25- $\mu$ fd. air trimmer.
- C<sub>2</sub> — 0.0022- $\mu$ fd. mica or ceramic.
- C<sub>3</sub>, C<sub>7</sub>, C<sub>8</sub>, C<sub>11</sub>, C<sub>12</sub> — 0.01- $\mu$ fd. paper.
- C<sub>4</sub> — Approx. 5- $\mu$ fd. mica or ceramic.
- C<sub>5</sub> — 0.1- $\mu$ fd. paper.
- C<sub>6</sub> — 1.0- $\mu$ fd. paper.
- C<sub>9</sub> — 0.001- $\mu$ fd. paper, mica or ceramic.
- C<sub>10</sub> — 100- $\mu$ fd. mica or ceramic.
- C<sub>13</sub>, C<sub>14</sub>, C<sub>17</sub>, C<sub>18</sub> — 47- $\mu$ fd. mica or ceramic,  $\pm 5\%$ .
- C<sub>15</sub>, C<sub>16</sub> — 470- $\mu$ fd. mica or ceramic,  $\pm 5\%$ .
- R<sub>3</sub>, R<sub>10</sub> — 0.1 megohm.
- R<sub>4</sub> — 470 ohms.
- R<sub>5</sub>, R<sub>12</sub> — 62,000 ohms, 2 watts.
- R<sub>6</sub>, R<sub>11</sub> — 33,000 ohms, 2 watts.
- R<sub>7</sub> — 820 ohms.

- R<sub>8</sub> — 10,000 ohms.
- R<sub>9</sub> — 2.2 megohms.
- R<sub>13</sub>, R<sub>14</sub>, R<sub>15</sub>, R<sub>16</sub> — 0.24 megohm,  $\pm 5\%$ .
- R<sub>17</sub>, R<sub>18</sub> — 56,000 ohms,  $\pm 5\%$ .
- R<sub>19</sub> — 3300 ohms.

- All resistors  $\frac{1}{2}$ -watt unless otherwise mentioned.
- L<sub>1</sub> — 2.3-millihenry choke. (National R-100 tapped between first and second sections.)
- L<sub>2</sub> — 50-microhenry coil, approx. (to resonate with C<sub>2</sub> at intermediate frequency).
- T<sub>1</sub> — i. f. transformer with coupling adjusted to provide equal primary and secondary voltages.
- V<sub>1</sub> — 6SJ7 reactance tube.
- V<sub>2</sub> — 6SJ7 oscillator.
- V<sub>3</sub> — 6H6 demodulator No. 1.
- V<sub>4</sub> — 6H6 demodulator No. 2.

any instant is equal to the product of the strength of the small signal and the cosine of the phase angle between it and the oscillator signal applied to the particular demodulator in question. Thus, when an applied signal is of the same frequency as the oscillator, a d.c. voltage output results. The magnitude of this voltage depends, of course, on the strength of the applied signal and its phase relationship with respect to the oscillator signal in the demodulator. Each of these effects described is produced independently of any other when the signal applied consists of several components of different frequency. In this respect, the circuit is linear.

Naturally, Fig. 1 has been simplified a little for purposes of explanation. The oscillator serves as a synthetic carrier that is so large compared to all other signals that it controls the action of each demodulator. The signal source may be the r.f. and i.f. portion of a receiver. The oscillator operates at intermediate frequency, replacing the b.f.o. of the conventional receiver set-up.

Use can be made of the d.c. output of one of the demodulators to control the frequency of the oscillator so that it will synchronize automatically with a selected component of the input signal. If this selected component is the carrier of a 'phone signal, the sidebands will be demodulated against the synthetic carrier acting as a substitute for the real carrier. The block diagram of Fig. 2 illustrates an exalted-carrier demodulator that has an automatic synchronizing arrangement in addition to the elements shown in Fig. 1. Fig. 3 is a schematic diagram of such a circuit.

### Single-Sideband Receiving System

The block diagram of Fig. 4 illustrates a single-sideband receiving system that employs the exalted-carrier demodulator of Figs. 2 and 3 driving phase-shift networks that have the property of  $90^\circ$  differential phase shift over a wide range of audio frequencies.<sup>1</sup> The operation of the system depends upon the transmission properties of the phase-shift networks to resolve the demodulator output signals into two groups, the upper- and lower-sideband responses. Fig. 5 will be helpful in understanding the action.

Suppose a single incoming signal has a fre-

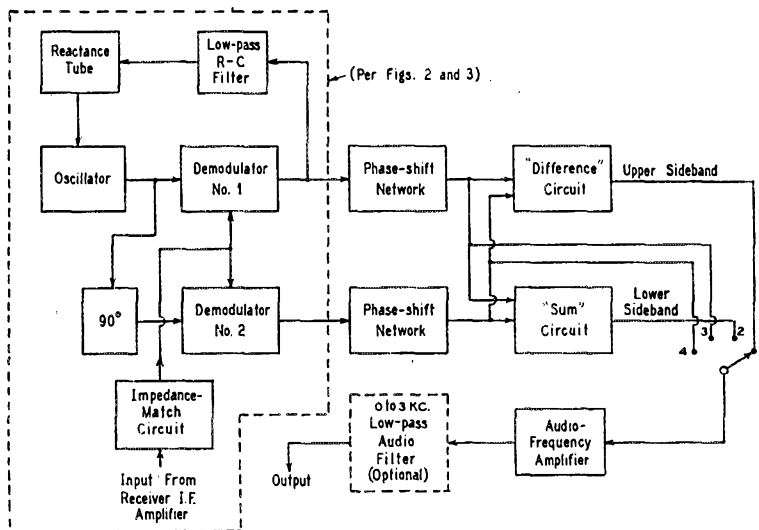


Fig. 4 — A block diagram of a single-sideband receiving system incorporating exalted-carrier demodulation.

quency lower than that of the synthetic-carrier oscillator. The output signals of the two demodulators are two audio tones of identical frequency and amplitude, but one signal (the one from the No. 1 demodulator, for example) leads the other by  $90^\circ$ . If the  $\alpha$  network has  $90^\circ$  more phase delay than the  $\beta$  network, the signals at the output terminals of these two networks are *in phase*, so that the vector sum of these two signals appears at the output of the "sum" network. If, however, the incoming signal had a frequency higher than that of the oscillator, the No. 1 demodulator output would lag the No. 2 demodulator output by  $90^\circ$ . The signals at the output terminals of the phase-shift networks would then be *out of phase*, and their vector sum would be zero. Thus, the sum circuit contains only signals created by incoming signals of frequency lower than that of the synthetic carrier, or lower sideband. In the same way, the "difference" circuit contains only upper-sideband signals. When both upper- and lower-sideband signals are applied to the demodulators at the same time, these actions take place independently, with the result that

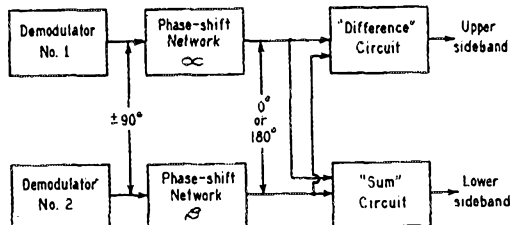


Fig. 5 — The single-sideband selection is obtained by cooperative action of two demodulators and phase-shift networks.

upper and lower sidebands are separated simultaneously. The dividing line between upper and lower sideband is the frequency of the synthetic-carrier oscillator. When this oscillator is synchronized with the carrier of an incoming signal, the sidebands thus defined coincide with the sidebands of that signal.

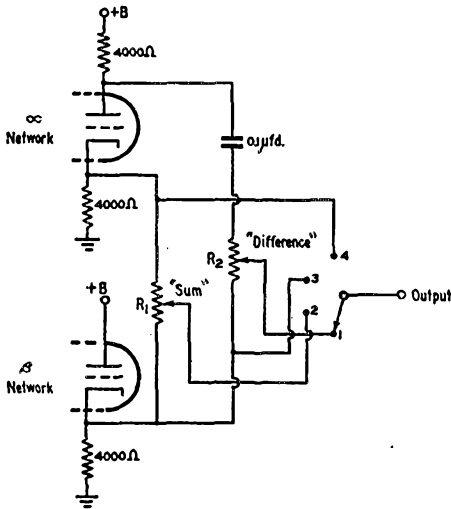


Fig. 6 — The method of connecting the "sum" and "difference" circuits to the phase-shift networks. In positions 1 and 2, the switch gives output from one sideband or the other, while positions 3 and 4 give demodulated double-sideband outputs.

The phase-shift networks,  $\alpha$  and  $\beta$ , have been described previously.<sup>1</sup> The sum and difference circuits are simply potentiometers which can be connected to the outputs of the phase-shift networks as shown in Fig. 6. These serve as balance controls that should be set for maximum attenuation of the unwanted sideband. The upper- and lower-sideband outputs from these sum and difference circuits can be used simultaneously to drive separate output channels if desired. A simple switching arrangement such as that indicated in Fig. 4 permits either sideband range to be used in a single channel. Positions 1 and 2 are the separate demodulated-sideband outputs, while positions 3 and 4 are demodulated double-sideband outputs. Since the signal level at these points will be only about  $\frac{1}{2}$  volt, an amplifier is required to bring the signal to a level suitable for further use. The use of the filter (indicated by dashed lines in Fig. 4) is optional. Its purpose will be explained later.

It is important to drive the demodulators of Fig. 4 from a source of low impedance. This is conveniently done by using a cathode follower acting as an impedance-reducing device to couple the signals from the i.f. amplifier of the receiver into the demodulators. Of course, any other means that accomplishes the same result should

be equally satisfactory. Care should be taken to insure that the last i.f. stage of the receiver is not operated in such a way that distortion occurs, since distortion can cross-modulate signals and impair the otherwise good performance of the system. A diode detector left in the receiver is quite likely to cause considerable distortion. A suitable input level for the demodulators is about 0.3 volt (r.m.s.) or 1 volt, peak-to-peak.

The attenuation of unwanted sidebands will be in the order of 30 db. or so from 60 to 7000 cycles per second. As in the case of generation of single-sideband signals using  $90^\circ$  phase-shift networks,<sup>1</sup> the attenuation of the undesired sideband depends in part on how nearly the phase-shift networks hold  $90^\circ$  phase shift over the band of audio frequencies. Similarly, there are other factors that can prevent realization of ideal operation. Distortion in the receiver ahead of the demodulators has already been mentioned as one cause for imperfect performance. Distortion occurring in the coupling tubes of the phase-shift networks because of operation at too high a signal level is another. Serious amounts of these effects can be avoided by the choice of operating conditions, so that the performance is not greatly poorer than the limit set by the phase-shift networks themselves.

#### Receiving-System Characteristics

The design of the phase-shift networks permits rather good attenuation of an undesired sideband in a sideband range from 60 to 7000 c.p.s. The characteristics of the networks are such that the response of the entire system of Fig. 4 in the non-rejected sideband range is usually limited only by the bandwidth of the intermediate-frequency amplifier of the receiver used as a source of signals. Thus, high-fidelity operation is inherently possible. An example of the type of operation that may be expected with the system described in this article is illustrated in Figs. 7-A and 7-B, which are plots of attenuation *versus* frequency. An overly-generous bandwidth of 12 kilocycles is assumed for the i.f. system of the receiver used as a signal source. The actual response is indicated as curve 1, which might be measured at the output of either demodulator of Fig. 4. When the synthetic carrier is set at the center of the band as indicated, the apparent i.f. response measured at switch position 1 would have the appearance of curve 1-U, while at switch position 2 the response would be as indicated by curve 1-L. This certainly is single-sideband performance, since curves 1-U and 1-L overlap one another only an extremely small amount near the carrier. With the i.f. bandwidth of 12 kc., each sideband is about an octave wider than is desirable for reliable 'phone communication. A narrower i.f. amplifier will reduce the bandwidth, but somewhat more satisfactory results can be obtained by using a 3-kc. low-pass audio filter to limit the *apparent* i.f. bandwidth to

the value desired. The response characteristic obtainable in this manner is shown in Fig. 7-B. The sideband-rejection performance near the carrier is unaffected, but the bandwidth is effectively limited to 3 kc. in each sideband position (curves 2-U and 2-L). Double-sideband reception in positions 3 and 4 doubles the apparent i.f. bandwidth for the same audio response.

It can be appreciated that single-sideband reception of double-sideband signals offers substantial opportunity to avoid interference by choice of a sideband region least contaminated by QRM. The signal-to-noise ratio suffers with this mode of operation because only one of the transmitted sidebands is heard. This is not the fault of the receiving system, however. The real fault is that double-sideband transmission uses twice as much bandwidth as is necessary and has only half of its initially small "communication" power in each sideband. In addition, carrier heterodynes are the greatest source of QRM. Single-sideband transmissions overcome most of the problems of operating in congested bands, even though there is no alternate choice of sideband possible at the receiver. Such transmissions reduce the carrier-heterodyne problem to the vanishing point.

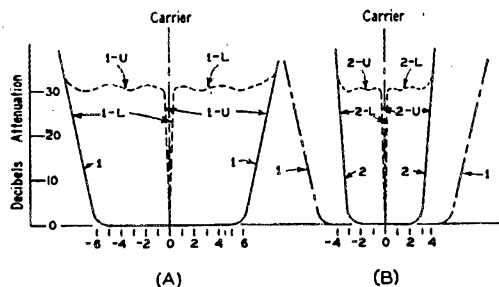


Fig. 7 — Over the range for which the audio phase-shift networks hold close to 90° difference, the apparent i.f. response of the system is determined (in combination) by the i.f. and audio bandwidths. The characteristic with no audio filter is shown at (A), and (B) demonstrates how greater effective selectivity is obtained with an audio filter.

Until s.s.s.c. 'phone transmission is the only type a receiver must battle, there will always be a lot more trouble from QRM than is really necessary. There are, however, several possible methods of improving reception under the present conditions. One of these methods—single-sideband reception with exalted carrier—has been described. Frequently (although not always) this type of reception will do the job. It fails when interference exists simultaneously in both sidebands. This reason for failure suggests a receiving technique that has been found to be so helpful that it bears explanation.

It is a fact that the separate sideband responses occur simultaneously and independently at the output points of the sum and difference circuits of Fig. 4. These are identical signals when a

double-sideband signal is being received without QRM. Interfering signals (except for the rare case of zero beat) will certainly make these two outputs very different although each still contains the desired signal. If a pair of headphones is connected through separate amplifiers so that each ear hears each sideband separately and in proper phase, the brain apparently combines the similar intelligible sounds and rejects interfering dissimilar sounds as being entirely counterfeit. At first thought this is unbelievable, but in many cases studied neither sideband was readable by itself, although when the double technique was used the combination definitely could be copied. The effect is difficult to describe, but it does exist and is a powerful aid in reading through QRM. It sounds a little like black magic. Maybe it is, but it does make good use of the fact that normal hearing is based on the use of *two ears* that enables us to separate undesired sounds from what we want to hear, by means of binaural hearing. Dual single-sideband reception of double-sideband transmissions adds another dimension to radio.

### Conclusion

In this series of articles an effort has been made to point out the advantages of single-sideband 'phone communication for amateur use. At the same time, practical methods for transmission and reception of this type of signal have been shown and explained. There are disadvantages in everything, and single-sideband is no exception. It is believed that most of the disadvantages of single sideband are those shared by most new developments of a technically-sound nature; namely, inexperience on the part of the user. As time goes on, more amateurs will use single-sideband transmission, and particular problems associated with its use will be solved. It has been gratifying thus far to find so many amateurs keenly interested in the subject and who have little difficulty in receiving single-sideband signals even without special receiving gear. It is this spirit—this desire to try new things with an open mind—that points the way to general adoption of single-sideband transmission for amateur 'phone work. It is a fact of long standing that amateurs are anxious to adopt techniques that improve their enjoyment of radio. The opportunity to do something really significant in this respect is ours again. We have the desire, the ambition, and the talent it takes. The reward is better communication and a chance to learn something new. It really is up to you.

**SWITCH  
TO SAFETY!**



# A Counterbalanced Tower

## Array Adjustments Made Easy

BY B. F. DAVIDSON,\* W6RW0

**A**DJUSTING a rotatable antenna, once it has been installed on top of the tower, is always a difficult if not hazardous undertaking. By the time one has climbed to the top of a 40- or 50-footer a half-dozen times, he usually loses his enthusiasm for an on-the-nose trim and is content to let it ride as it is. After six or seven years of this, we decided to see what could be done to improve the situation. One idea we had considered for some time was a scheme for tilting the tower to ground for antenna adjustments and repairs.

The tower, patterned after a *QST* design of several years ago, is a tapering 40-foot four-legged lattice structure. To determine the feasibility of a counterbalanced arrangement, the tower was lowered to the ground. A point 16 feet from the base was selected as the most convenient spot for the hinge or pivot. Accordingly the mast was propped up on a length of 2×4 which served as a fulcrum at this point. Known weights, such as buckets of water, sacks of cement and the author's own weight, were used to simulate actual conditions. A 50-pound weight, representing the antenna, was placed at the top end of the mast and then counterweights were added at the bottom end to balance. It was found that the tower could safely carry a counterweight of up to 200 pounds.

The cradle which supports the hinge consists principally of a pair of 4×4 uprights, spaced slightly more than the width of the tower. These are joined by 2×2 cross-members and held securely in place by angle-iron braces. To prevent rotting out at the base, the bottom ends of the

\*1665 Arcade Blvd., Sacramento 15, Calif.

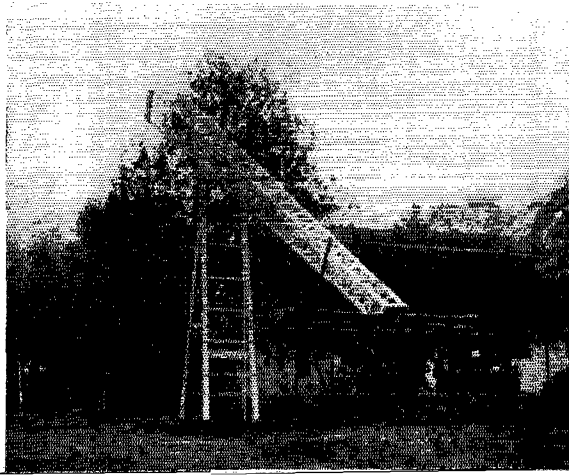
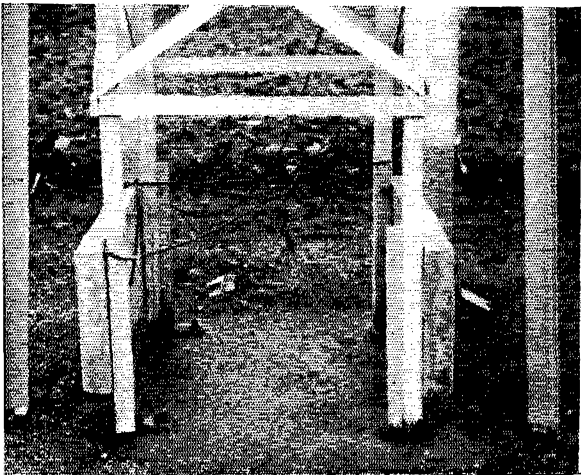
4×4s are not imbedded directly in the cement base, but are supported about 4 inches above the ground on 3-foot lengths of angle iron set in the concrete. The lower ends of the angle-iron braces are fastened to heavy bolts embedded in the cement.

The hinge consists of a pair of iron pipes, one rotating within the other. The outer pipe is fastened to a panel on the tower, while the inner pipe, which serves as the axle, is supported in holes at the tops of the 4×4s.

When the cradle is ready, the base of the tower can be hoisted up into position with the top end lying on the ground. When the pipe on the tower is lined up with the holes in the tops of the 4×4s, the inner pipe can be slid through the holes and the outer pipe. The tower can then be swung up into a vertical position by pulling downward on a rope attached to the base of the tower. The counterweight to be attached to the base of the tower can be chosen to suit any desired degree of unbalance, remembering that the weights at the ends to maintain balance are in inverse proportion to the lengths either side of the hinge. Thus, disregarding the weight of the mast itself, a pound added at the top end is compensated for by a counterweight of 1½ pounds at the base, when a 40-foot tower is hinged 16 feet up from the base. After the antenna has been mounted, different weights can be hung temporarily on the base to find the counterweight that makes raising and lowering easiest. The counterweights shown in the photographs are made of cement and are bolted to the legs of the tower. When the mast is up, the bottoms of the legs are fastened to anchorages molded in the cement base.

◆  
Anchorage for the tower legs and the base of the supporting cradle are set in cement. The counterweights are attached to the tower legs with bolts.

◆  
Antenna adjustments are made easily at the ground. Raising and lowering the antenna and mast top section take but a few minutes.



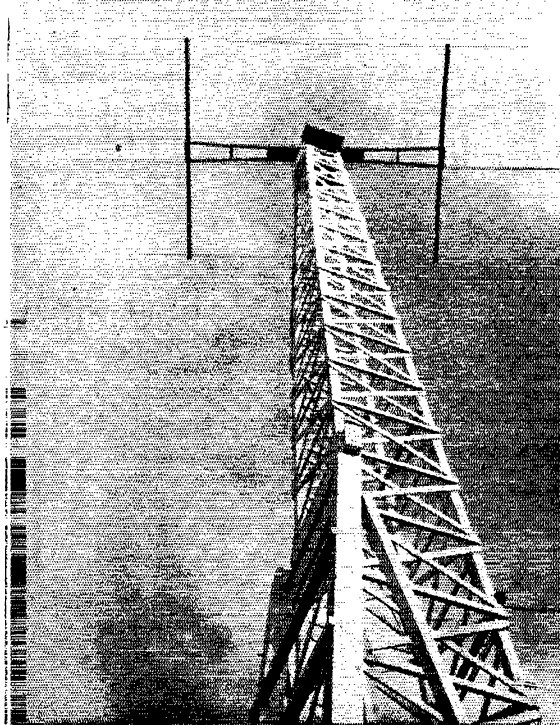
While a fair amount of work is required to construct a tower of this type, the resulting arrangement is well worth while. To lower the tower it is necessary only to remove the four bolts at the base and push the lower end free of the anchorages so that it swings on the hinge. A 20-pound pull of the rope from the top brings the antenna down where you can work on it.

The tower measures 29 inches between legs at the base, tapering to 11 inches at the top. The four corners are made from  $1 \times 2$  pine stock, laminated to make  $2 \times 2$ s. This makes it possible to keep the splices from occurring at the same height on all four corners. The various pieces are nailed together and glued with casein glue for additional strength and to keep the weather out. The cross-members are made of laths. The horizontal members are spaced every 21 inches with diagonal bracing in between. The cement base is 32 inches square and 30 inches deep with large bolts set 6 inches deep to hold the brackets for anchoring the mast and the cradle which provides additional support for the tower. Before mounting the tower, it should be given at least two coats of a good-grade house paint. The hinge arrangement makes it easy to repaint when this becomes necessary.

#### **About the Author**

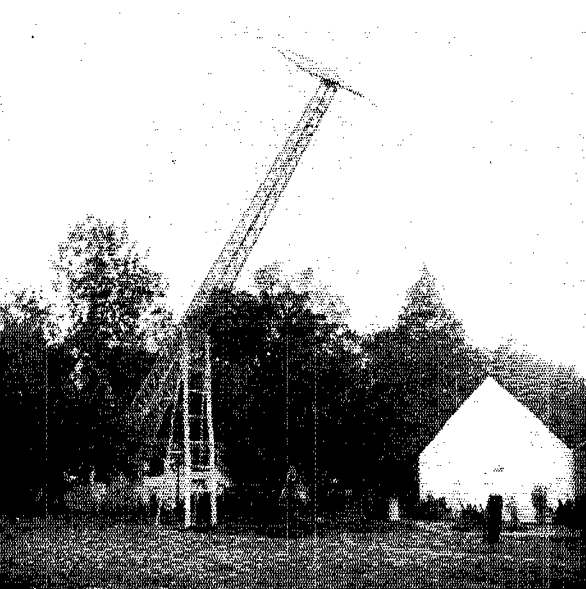
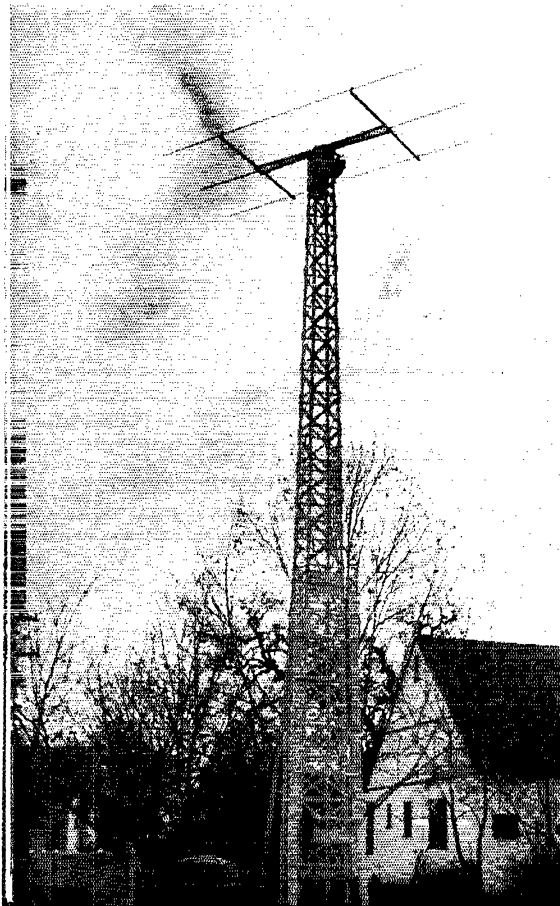
• The next time you hear W6RWO's husky signal on ten, you'll be quick to appreciate the painstaking handiwork Mr. Davidson has expended to make every antenna watt count. On occasion, he also takes a crack at low-power operation on 80, 75 and 40. First licensed in 1939, W6RWO holds amateur Class A and commercial radiophone first-class tickets.

◆  
Bringing the antenna down for adjustment. When the counterweight is properly adjusted, only a 20-pound pull on the rope attached to the top is required to tilt the tower to ground.



*Above:* Looking skyward. This view shows some of the details of construction of the tower and the supporting cradle. The  $2 \times 4$  bracing for the cradle was later replaced with angle iron.

*Below:* W6RWO's 40-foot tilting lattice tower with the 10-meter rotatable array in place.



# Low-Pass Audio Filters

## Filter Design for Speech Amplifiers

BY ROBERT W. BUCHHEIM,\* W9JTH

• Here is a simple description of how low-pass filters end up with the configuration they do. On the practical side, it gives the simple formula necessary for building a low-pass filter for that new speech amplifier of yours.

IT is the purpose of this article to discuss a systematic outline of low-pass-filter operation and design from the point of view of the radio amateur. Interest in such a problem has arisen largely through the excellent efforts being put forth to secure more efficient utilization of the 'phone bands allotted to amateur use, by means of speech clipping and limiting of modulation frequencies.

The intelligibility requirements are quite well

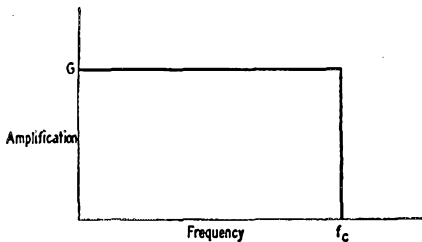


Fig. 1—A plot of amplification vs. frequency in an ideal low-pass filter. Such performance cannot be realized in practice.

satisfied if frequencies up to about 2500 cycles are amplified by the speech system and all others may be more or less rejected — preferably more. If an amplification  $G$  is required for a speech unit in the "passband," the plot of amplification with frequency should look like Fig. 1, in the ideal case. This means that the filter circuit would attenuate all frequencies above the cut-off frequency,  $f_c$ , and pass freely all lower frequencies. In the practical case these requirements must be changed to attenuate as much as possible all frequencies above cut-off, and as little as possible those below cut-off. So the actual plot of attenuation with frequency should look something like the curve of Fig. 2.

### Type of Filters

Two general types of filters are available: the

\*Department of Electrical Engineering, Yale University, 10 Hillhouse Ave., New Haven, Conn.

T and  $\pi$ . Only the  $\pi$  will be considered because it can be shown that it involves one less coil than the T for the results desired here. Also, it can be more easily made to develop an input impedance that is constant with frequency, thus yielding flat response from the speech amplifier. The  $\pi$  filter is of two kinds: the "prototype," or basic structure, and the "m-derived" type, which is a

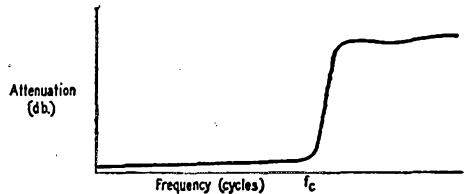


Fig. 2—A plot of attenuation vs. frequency in a practical low-pass filter. The attenuation of the filter is low within the "passband" and high beyond the cut-off frequency,  $f_c$ .

revised form of the prototype. See Fig. 3.

Both of these forms are generally used to secure the desired attenuation curve. To design the filter we shall be concerned with the individual characteristics of these forms, and also with

TABLE I  
Design Formulas for the Filter of Fig. 3.

$$C_1 = \frac{1}{3.14Rf_c}$$

$$C_2 = \frac{1}{3.49Rf_c}$$

$$C_3 = \frac{1}{27.9Rf_c}$$

$$C_4 = \frac{1}{4.48Rf_c}$$

$$C_5 = \frac{1}{5.90Rf_c}$$

$$L_1 = \frac{R}{3.14f_c}$$

$$L_2 = \frac{R}{3.92f_c}$$

$$L_3 = \frac{R}{10.5f_c}$$



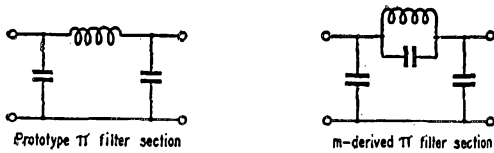


Fig. 3—The two basic configurations of low-pass  $\pi$ -filter sections.

impedance matching within the structure when combining sections. Mismatches tend to spoil the over-all filter characteristics, and needlessly, because rather good matches are obtainable with no increase in the complexity of design or construction.

The attenuation curves of the prototype and  $m$ -derived type are shown in Fig. 4. These show that the prototype attenuates better and better

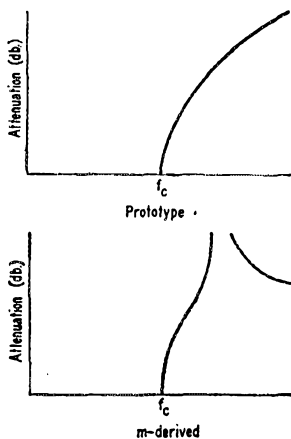


Fig. 4—Typical attenuation curves of prototype and  $m$ -derived low-pass filter sections.

as the frequency increases above cut-off, while the attenuation of the  $m$ -derived type goes up very sharply just above cut-off, but it then drops rapidly and attenuates less and less well as the frequency is raised. Apparently, then, if one of each of these could be incorporated in a filter, the total attenuation would be their sum, yielding a

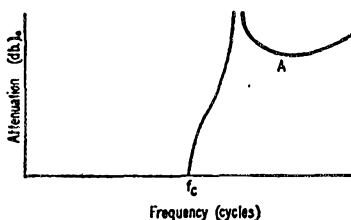


Fig. 5—Combining the two curves of Fig. 4 results in an over-all characteristic that closely approaches the ideal of Fig. 2.

TABLE II  
Design Formulas for the Filter of Fig. 8, for a Cut-Off of 3000 Cycles.

$$C_1 = \frac{1}{9.42 \times 10^3 R}$$

$$C_2 = \frac{1}{10.47 \times 10^3 R}$$

$$C_3 = \frac{1}{83.7 \times 10^3 R}$$

$$C_4 = \frac{1}{13.44 \times 10^3 R}$$

$$C_5 = \frac{1}{17.7 \times 10^3 R}$$

$$L_1 = \frac{R}{9.42 \times 10^3}$$

$$L_2 = \frac{R}{11.76 \times 10^3}$$

$$L_3 = \frac{R}{31.5 \times 10^3}$$

curve like Fig. 5, which is rather close to the ideal of Fig. 2.

Now it is well known in filter theory that, for proper operation, a filter must be terminated in its "characteristic resistance," but this resistance ordinarily varies widely in value over the pass-band and so cannot be represented by an ordi-

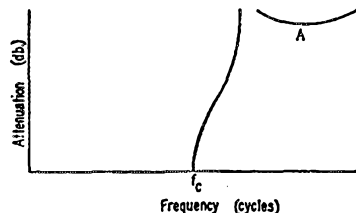


Fig. 6—By adding an additional  $m$ -derived section having its highest attenuation at point A in Fig. 5, the over-all characteristic approaches the ideal still more closely.

nary resistor. However, filter theory further shows that a satisfactory match between an ordinary resistor and a prototype filter section can be secured by placing between them a properly-proportioned  $m$ -derived structure. We have already decided that we need a prototype and an  $m$ -derived section for our required attenuation characteristic, so we can secure impedance matching within the filter with no added effort.

The curve of Fig. 5 has one discrepancy—the dip in attenuation at the region A. This minimum will likely come down to about 25 to 35 db.

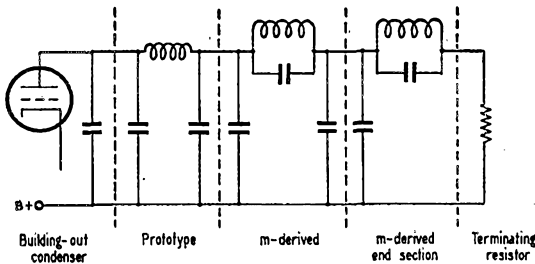


Fig. 7 — The circuit obtained by combining the various elements of the low-pass filter.

in a filter containing just the single prototype and single  $m$ -derived section considered so far, but a minimum attenuation of about 40 db. is desired. The remedy is simply to add into the filter another  $m$ -derived section whose frequency of maximum attenuation coincides with the point A. The total filter characteristic is then as shown in Fig. 6, and adequate suppression is secured at all the frequencies to be rejected. This additional section can be placed between the prototype and original  $m$ -derived section without disturbing the condition of matched impedances at all junctions.

A final consideration is the input impedance of the filter, since it is this impedance that acts as a plate load to the tube feeding the structure. To secure flat response from this tube it is necessary to "build out" the filter by adding an additional shunt condenser of proper size across its input terminals.<sup>1</sup>

Combining all these factors, the filter network is basically as shown in Fig. 7, and by lumping elements together, the composite filter of Fig. 8 results. This represents a practical form, and element values can be calculated from the formulas given in Table I. In Table I,  $f_c$  is the cut-off frequency and  $R$  is the size of the terminating resistor. For

<sup>1</sup> Wheeler, "Wide-Band Amplifiers for Television," *Proc. I.R.E.*, July, 1939. The added capacitance is equal to the capacitance of one condenser in the prototype section.

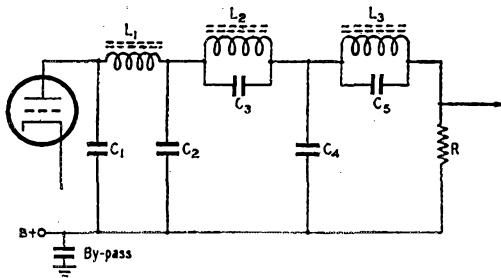


Fig. 8 — A practical low-pass filter results by combining the parallel condensers of Fig. 7. Component values can be found from the formulas given in Table I.

a specific cut-off frequency of 3000 cycles, element sizes can be found by reference to Table II.

A sample filter-network design was set up and tested. The element values calculated, and those actually used, are listed and compared in Table III.

The experimentally-determined attenuation curve of the filter structure is plotted in Fig. 9. Zero db. is taken as an input- to out-put-voltage ratio of unity.

In incorporating a section of this sort in a speech amplifier, it is best to use a pentode tube to insure flat response, because of the high plate resistance of pentodes. The gain  $G$  of such a stage is given by

$$G = g_m R$$

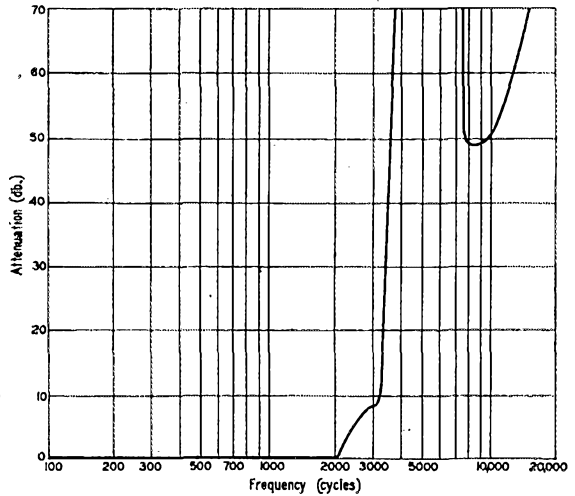


Fig. 9 — Measured performance of the low-pass filter using the actual values given in Table III.

where  $g_m$  is the transconductance of the amplifier tube and  $R$  is the value of the filter terminating resistor.

TABLE III

Calculated and Actual Values for the Filter of Figs. 8 and 9. The Cut-Off Frequency is 3000 Cycles.

Element	Calculated Size	Size Used
$C_1$	0.0433 $\mu$ fd.	0.043
$C_2$	0.039	0.039
$C_3$	0.00485	0.005
$C_4$	0.0304	0.03
$C_5$	0.0232	0.023
$L_1$	0.26 henry	0.26
$L_2$	0.208	0.185
$L_3$	0.0777	0.075
$R$	2450 ohms	2450

# Fun on 420 with the BC-788

## Getting on the Air with War-Surplus Altimeters

BY FRED D. CLAPP,\* W6DSZ

ACTIVITY on the 420-Mc. band in the Berkeley, Calif., area was started in the summer of 1947 with the use of converted BC-788 rigs by W6JLE, W6ZDJ and W6QT. A note in the "World Above 50 Mc." in November 1947 *QST* regarding the activity here and recounting a 176-mile two-way QSO made with two of the altimeters brought so many requests for information that this paper was prepared to prevent a serious case of writer's cramp from becoming permanent!

The BC-788 (or SCR-178) is a pulsed altimeter equipment used by the Air Forces during the war as a terrain-clearance indicator. Its principles of operation and complete schematics of the original circuits are given in the June 1946 issue of *Electronics*. Because of its compact construction and conveniently-valued components,

be used. In the receiver, the high-frequency oscillator must be equipped with a tuning control for convenience of operation. The pulse detector is replaced with an a.m. detector and an audio stage and loudspeaker are added. A modulator must be built for the transmitter, means provided for switching from send to receive, and (last but not least, as proved by bitter experience) the grid leak of the transmitting tube altered from 500 ohms to something like 10,000 ohms, causing the 6J6 life expectancy to increase from its previous value of about ten minutes!

### Power Supply

Most of the conversions have left the original 800-cycle filter intact for possible use with genemotors in portable applications. An external filter must still be provided, however, as the internal inductance of 5 henrys and the two condensers of 2  $\mu$ f. each are inadequate for 60-cycle operation. In some instances improved stability has resulted from the installation of an additional 20- $\mu$ f. condenser across

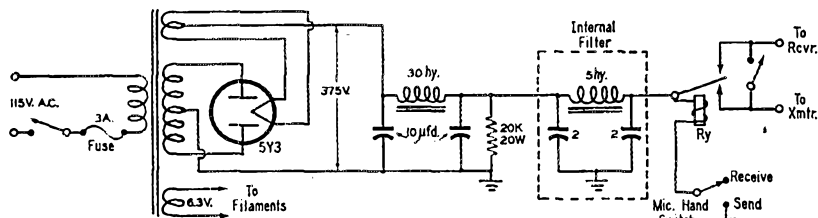


Fig. 1 — Schematic diagram of power supply and control circuits for use with the converted surplus BC-788 altimeter unit.

it lends itself peculiarly well to amateur work on the 420-Mc. band.

The gear as originally used consists of an 800-cycle power supply of conventional design, a superhet receiver with 5 stages of i.f. having a bandwidth of 5 Mc. centered at 30 Mc., a pulse modulator operating at a submultiple of a 98.356-kc. crystal frequency, and a small transmitter using a 6J6 tube as a push-pull TNT oscillator. Both transmitter and receiver are equipped with quarter-wave lines tunable from the front panel by means of screwdriver adjustments. The original frequency range sandwiches the amateur band of 420–450 Mc. very nicely without necessity for changes in the r.f. circuits of either transmitter or receiver.

In modifying the equipment for ham use, the following steps are necessary:

A well-filtered power supply capable of 250–300 volts at about 80 ma. must be supplied. Most of the components of the built-in supply will also

\*978 Grizzly Peak Road, Berkeley 6, Calif.

the output side of the internal filter.

The center line of equipment on the chassis which contains the pulse modulator, crystal oscillator and power-supply rectifier is all removed except for the rectifier tube socket, power transformer and filter components. Following Fig. 1, a change-over relay is provided to switch from send to receive and suitable chassis connectors and a microphone plug are mounted to bring out the external leads. A four-inch p.m. loudspeaker and its matching transformer are mounted on the panel near the left end of the chassis.

### Receiver

Experience has shown that it is not necessary to tune the mixer circuit for ordinary operation over the amateur band. Several ideas have been tried for tuning the oscillator from front-of-panel, ranging from a semicylindrical slug of brass rotated in the field close to the hot end of the tuning line (as used by W6JLE) to the use

of a small condenser similar to that on the mixer circuit, and finally to a mechanical extension of the line tuning screw to a knob (as used by W6DSZ, W6QT and others). The latter method gives the full range of tuning of which the unit is capable, but must be applied with care to prevent wearing out the lines. The use of some substance like Lubriplate is essential if noisy operation is to be avoided. A small dial with a geared-down indicator is convenient since about 15 turns of the screw are necessary to tune the receiver over the full range, 8 turns covering the amateur band, although this varies with some receivers. The middle of the band is found with the lines on both receiver and transmitter at about two-thirds of their full length.

Fig. 2 shows the detector and audio system used in several of the conversions. The audio output is taken from the cathode of the detector tube to avoid oscillation difficulties encountered when the load was placed in the plate circuit. The circuit operation is identical with a conventional plate detector in every way except that the phase of the audio output is reversed with respect to ground from that obtained with a plate load.

The audio output tube is a 6V6. If desired, the modulator tube may be used for receiver audio with suitable switching, but this has been thought inconvenient by most hams, and plenty of room is available for the extra tube. Also, the use of a separate output tube makes it possible to leave transmitter and receiver on simultaneously (by shorting the send-receive relay with the switch in Fig. 1) for alignment purposes, or for using feedback oscillation for m.c.w.

### Transmitter

The old rectifier tube socket is rewired for a 6V6 modulator tube which is driven directly by a single-button microphone as shown in Fig. 3

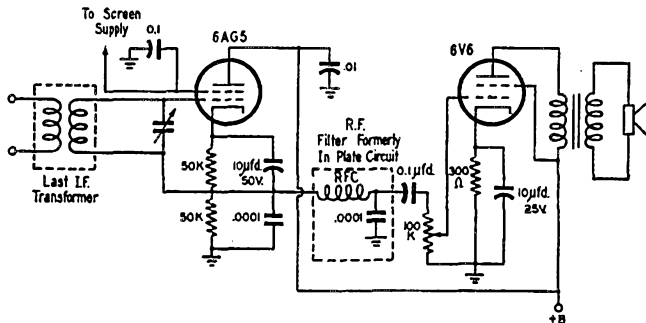


Fig. 2 — A simple detector-audio system for use in the receiver section of the converted altimeter.

A Heising modulation system is used in which the old power transformer serves admirably as a modulation choke. In order to reduce core saturation (because of the high d.c. plate current and

lack of an air gap in the core), a trick is used in which the high voltage is fed in at the center-tap and the modulator and transmitter fed from opposite ends of the winding.

The resistor,  $R$ , and condenser  $C$  (Fig. 3), are for the purpose of dropping the voltage on the oscillator tube somewhat below that of the modulator, so that the modulator plate voltage does not have to swing to zero for 100% modulation. A drop of 40 or 50 volts in  $R$  is ample and some units are operating without any drop at all.

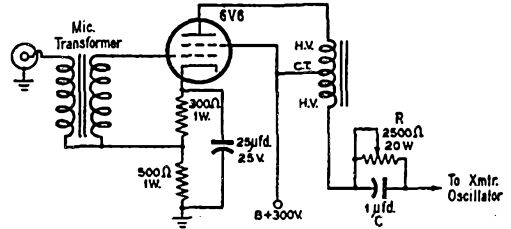


Fig. 3 — A suggested modulator circuit for the BC-788. The center-tapped modulation choke is the secondary of the power transformer removed from the unit's 800-cycle supply. Microphone current is obtained by running part of the cathode current through the microphone transformer.

Justification for this may be found in the fact that the oscillator cannot be operated at 100% modulation without distortion anyway since it stops oscillating with about 25 volts on the plates.

The microphone current may be supplied by a small battery, or as shown in Fig. 3, by the cathode current of the modulator tube. In spite of the by-passing shown, the latter circuit may oscillate if the microphone transformer is connected in the wrong polarity. In this event, the cure is of course to reverse *one* of the windings. Incidentally, very effective single-button microphone transformers have been made by merely winding 50 to 100 turns of small wire over the present windings of any small interstage transformer, using the new winding as the microphone winding.

As mentioned before, the oscillator grid leak (originally intended for pulse operation) is replaced by a 10,000-ohm unit.

### Antennas

Any ham contemplating 420-Mc. operation should plan carefully the antenna system to be used, since success or failure depends largely on this point. To those accustomed to tedious tuning

operations with ten- and twenty-meter beams, the joy of whiling away an evening tuning up a multielement array for 420 Mc. in the living room will be found a pleasant change. Also, the

understanding of antenna- and feeding-system operation obtained on these frequencies may be applied with profit to the outdoor operations required on the lower-frequency bands. Since a half-wave antenna for 420 Mc. is about 13 inches long, almost any type array is convenient to build and rotate. In the Berkeley area nearly every conceivable type of antenna has been used, including multiple parasitic arrays, both

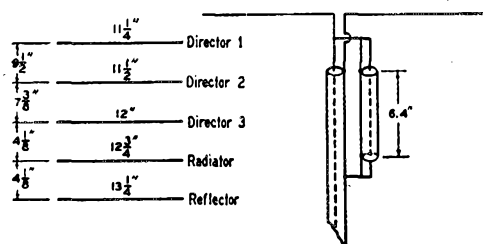


Fig. 4 — Antenna details for 420 Mc. Dimensions of a 5-element array used successfully by W6JLE are given at the left. At the right is shown the method of connecting a "bazooka" or line balancer for use with coaxial line. A suitable matching device ("T," delta, etc.) should be connected between the antenna and the line.

close- and wide-spaced; broadside and end-fire driven arrays, with and without curtains of driven or parasitic reflectors or directors; arrays of collinear elements; and square-corner, flat-sheet and cylindrical-paraboloid reflectors. The fact that a number of the hams most active on the band are employed on an antenna research project at the University of California has no doubt stimulated interest in this particular phase of the work. Practically all systems currently used here employ horizontal polarization.

A typical 5-element Yagi antenna, developed by W6JLE from a long series of systematic experiments, is shown in Fig. 4. It may be fed by RG8U or other similar cables, in which case the balancing transformer shown should be used. A "T," delta or any of the standard low-frequency matching systems should be connected between the antenna and the feedline. Only indifferent results have been obtained with Twin-Lead feedline systems and their use is not recommended.

While it is possible to use a coaxial-line switch to change the antenna from receiver to transmitter, it is usually handier to build two antennas. This has the added advantage that either break-in or duplex operation is possible for two stations working on frequencies at opposite ends of the band.

A good field-strength meter for antenna tests is shown in Fig. 5. With a 1-ma. meter, the transmitter and a good beam antenna will deflect the meter full scale at a distance of about 30 feet, which is many wavelengths at this frequency. It has been found that only moderate care is re-

quired in staying away from walls and conducting objects when tuning a 420-Mc. antenna inside the house. Remember that a wavelength is only 25 inches!

It is important in tuning the transmitter not to use too tight coupling to the antenna. Use of the field-strength indicator will show that the output actually drops if the coupling is too great, even though the plate current is still rising. The tiny series condensers provided in the equipment, in series with the inner conductor of the coaxial cable, are very important in tuning out the reactance of the hairpin coupling loop and must be left in the circuit. Without them it is practically impossible to load any kind of antenna other than a resonant system.

### Operation

Good line-of-sight paths are generally required except for very short distances or in the cases where a reflection can be obtained from some object in view of both stations. Occasionally, however, good work will be done over apparently poor paths. With good paths and good antennas at each end, the signal strengths are phenomenal. The rigs probably do not actually radiate more than a watt or so of energy, but S9 signals are the rule. From good locations in the Berkeley hills, stations in the Palo Alto area have been worked with S9 signals, a distance of about 40 miles airline. In the work previously reported between Mt. Diablo (W6JLE/6) and Mt. Lassen (W6DSZ/6), an airline distance of 176 miles, the signals were S9 one way and S7 the other, input to the oscillator in the S7 direction being about 175 volts at 24 ma. Yagi antennas similar to the one sketched in Fig. 4 were used at both ends.

A number of local hams have installed rigs in their cars, complete with directional arrays, and have achieved considerable success. It also has been found that excellent signals can be received from very unlikely places, such as inside the tunnel on the San Francisco-Oakland Bay Bridge.

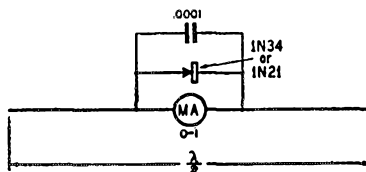


Fig. 5 — A field-strength indicator for 420 Mc.

Now that activity has been stimulated on the band, the gang is turning toward improved equipment including crystal control, lighthouse-tube r.f. stages with coaxial tank circuits, and the like. However, there's a lot of fun to be had by the newcomer with simple equipment like that described. See you on 420!

# A QRP Portable

'Phone and C.W. for Three Bands

BY G. L. COUNTRYMAN, \* W3HH, WIRBK

At one time or another almost every ham finds need for a low-power transmitter, complete with power supply in one compact unit, for use as a stand-by while rebuilding the big rig, for portable operation, or for occasional QSOs on a band other than that normally employed.

The QRP Portable was designed to give, in the smallest possible space, respectable output on 80-, 40- and 20-meter c.w. or 'phone. The result is a complete c.w. (32 watts)-'phone (25 watts) transmitter complete with a.c. power supply, oscillator, amplifier, antenna-coupling network and modulator on a 10 × 6-inch chassis with an over-all height of only 7 inches. It will load using any length of wire as an antenna. Obviously the rig can be modified to accommodate that spare chassis and other unused parts lying around the shack. It has a minimum of controls, and is practically foolproof in adjustment and operation.

## Circuit

The schematic diagram, circuit shown in Fig. 1, is simplicity itself. A 6V6GT Pierce oscillator drives a 6L6 output stage. Since the input circuit is not tuned, it is not necessary to neutralize the 6L6. There are only two controls — one for tuning the amplifier to resonance and the other for adjusting the antenna loading. The modulator likewise is simple. A carbon microphone drives a pair of 6V6GTs directly, without speech amplification. The power supply, which delivers about 400 volts, is a conventional condenser-input arrangement.

\*Commander, USN; Electronics Officer, U. S. Naval Shipyard, Boston, Mass.

• Even if the main transmitter is a 1-kw. powerhouse with bandswitching and remote control, most hams will find this little package a handy thing to have around the shack. It will serve for anything from a signal driver in transmitter testing to a full-blown rig for the QRP ham.

Referring to the photographs, the left-hand knob on the chassis controls the loading and the knob to the right controls the tuning. Above these knobs is the three-way jack into which both the key and microphone are plugged. In the center are two crystal sockets, the top one for  $\frac{3}{4}$ -inch holders and the bottom one for  $\frac{1}{2}$ -inch holders. Directly above them, on its own aluminum mounting plate secured to the chassis front by two bolts, is a two-inch milliammeter. Next comes the 'phone-c.w. switch and at the right the a.c. power switch.

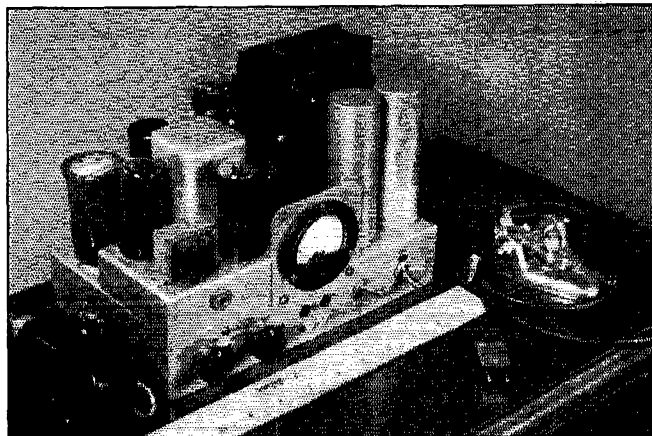
## Construction

The rear edge of the chassis contains only the feed-through-insulator antenna connection and the rubber-grommeted hole for the a.c. line cord.

The power transformer is at the right-hand rear of the chassis with two 4- $\mu$ f. 600-volt filter condensers in front (39 cents each, surplus). The 200-ma. 12-hy. choke is mounted underneath on the side of the chassis.

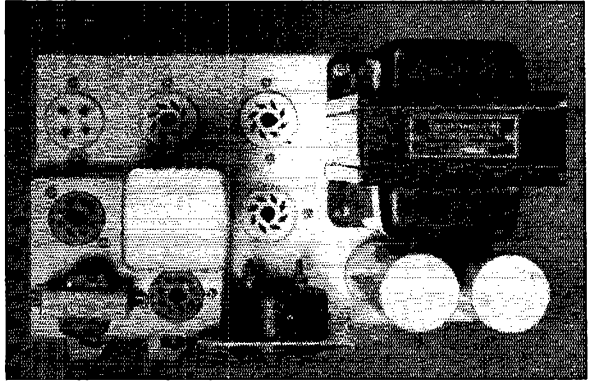
The 6V6GT oscillator tube is directly behind the milliammeter with the 5U4G rectifier tube behind that. To the left of the rectifier is the 6L6 amplifier adjoining the amplifier tank coil in the left-rear corner of the chassis. The coils are wound on  $1\frac{1}{2}$ -inch fluted forms but any of the small manufactured coils may be used.

The modulator is a separate subassembly. The small chassis on which the two modulator tubes and the microphone and



Front view of the compact 'phone-c.w. transmitter.

Plan view of the QRP Portable. On the modulator subchassis in the lower left are the sockets for the modulator tubes, and the microphone and modulation transformers. Across the back, from left to right, are the sockets for the single tank coil, the 6L6 and the rectifier tube. The oscillator-tube socket is directly behind the meter for which the subchassis has been notched out. Power-supply equipment is to the right.



### Wiring

modulation transformers are located was formed from  $\frac{1}{16}$ -inch aluminum. The front lip overhangs the front of the chassis by a half inch so that it can be secured with one machine screw. The rear lip is bent back a half inch and fastened with the two screws holding the sockets for the amplifier tube and tank coil, as shown in the photographs. All the modulator components, including the cathode bleeder resistor, which supplies microphone voltage, and the key-microphone jack, fit nicely within this modulator subchassis, which extends  $1\frac{1}{4}$  inches above the regular chassis. A little trimming with hack saw and file was necessary so that it would clear the millimeter.

In wiring the subassembly before mounting it on the chassis, four long leads should be left—two from the modulation-transformer output winding which go to the 'phone-c.w. switch, one to the oscillator cathode, and one to the "hot" side of the heater circuit. These leads go through four Millen feed-through insulators

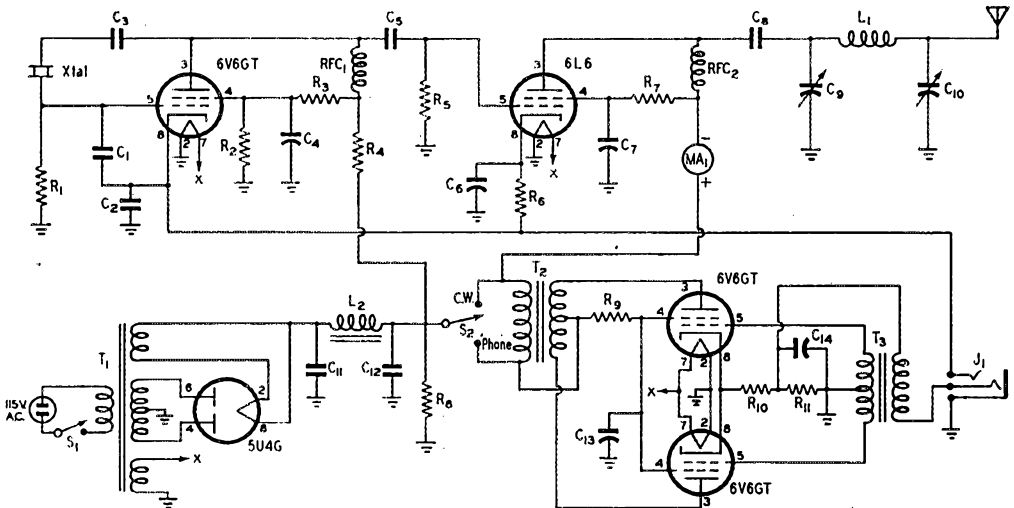


Fig. 1—Circuit diagram of the QRP Portable.

- C<sub>1</sub>, C<sub>5</sub>—100- $\mu$ fd. mica.
- C<sub>2</sub>, C<sub>8</sub>—0.001- $\mu$ fd. mica.
- C<sub>3</sub>—0.0022- $\mu$ fd. mica.
- C<sub>4</sub>, C<sub>6</sub>, C<sub>7</sub>—0.01- $\mu$ fd. paper.
- C<sub>9</sub>, C<sub>10</sub>—250- $\mu$ fd. midget variable (Hammarlund MC-250M).
- C<sub>11</sub>, C<sub>12</sub>—4- $\mu$ fd. 600-v. oil-filled.
- C<sub>13</sub>—4- $\mu$ fd. paper.
- C<sub>14</sub>—12- $\mu$ fd. 150-v. electrolytic.
- R<sub>1</sub>, R<sub>2</sub>—47,000 ohms, 2 watts.
- R<sub>3</sub>—0.1 megohm, 2 watts.
- R<sub>4</sub>, R<sub>7</sub>, R<sub>9</sub>—15,000 ohms, 2 watts.
- R<sub>5</sub>—22,000 ohms, 1 watt.
- R<sub>6</sub>—330 ohms, 1 watt.
- R<sub>8</sub>—25,000 ohms, 10 watts.

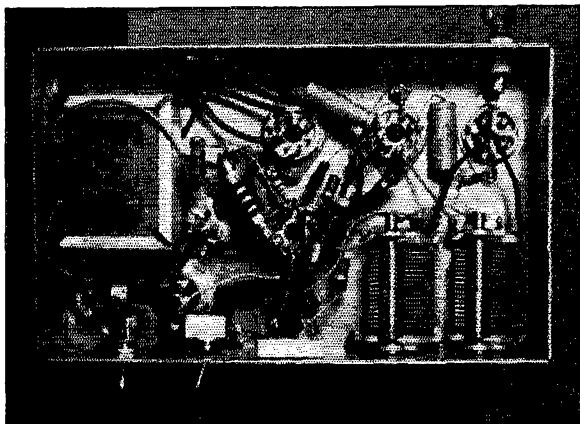
- R<sub>10</sub>—220 ohms, 2 watts.
- R<sub>11</sub>—150 ohms, 2 watts.
- L<sub>1</sub>—All coils No. 18 enameled wire, close-wound,  $1\frac{1}{2}$  inches diameter. 80 meters—32 turns; 40 meters—14 turns; 20 meters—8 turns.
- L<sub>2</sub>—12-hy. 200-ma. replacement choke.
- J<sub>1</sub>—3-way jack for PL68 plug.
- MA<sub>1</sub>—0-100 milliammeter.
- S<sub>1</sub>—S.p.s.t. toggle.
- S<sub>2</sub>—S.p.d.t. toggle.
- RFC<sub>1</sub>, RFC<sub>2</sub>—2.5-mh. r.f. choke.
- T<sub>1</sub>—Transformer, 760 volts c.t., 150 ma.; 5 v., 3 a.; 6.3 v., 3 a.
- T<sub>2</sub>—Modulation transformer (see text).
- T<sub>3</sub>—Microphone to p.p. grids.

in the main chassis, carefully located so as not to interfere with the operation of the two variable condensers. There was insufficient room on the subchassis to mount Millen sockets but a trip to the surplus store turned up suitable small-diameter octal sockets for a nickel each. In case voice is not required, this subchassis containing the modulator components may be eliminated and the key jack relocated on the rear of the chassis or on the front in the space occupied by the 'phone-c.w. switch.

Almost any available low-power modulation transformer may be used satisfactorily, provided it has a 4000- or 5000-ohm primary and a secondary impedance of about 7000 or 8000 ohms. The one shown came from an SCR-522 and it fills the bill admirably. It cost one buck at the surplus store. A cased microphone transformer would have been preferable, but the only one small enough to fit the allotted space was the strap-mounting type shown.

The microphone is a T-17-B (SW109) available at surplus for about 75 cents. The push-to-talk switch on the microphone is connected so that it will complete the oscillator and amplifier cathode circuits to ground when depressed and thus turn on the carrier. The two leads from the key connect through the plug to these same jack terminals, permitting one jack to be used for both key and microphone. An extra microphone cable with a PL68 plug attached was obtained from surplus. The red lead was clipped off short and the black-and-white leads connected to the key. The separate three-way PL68 plugs available on the surplus market seem to lack the cable-connecting machine screws within the plug, so it is best to get one with a length of cable attached. The three-way jack must be wired exactly as shown in Fig. 1 for use with the T-17-B microphone.

High-voltage connections are brought to a  $\frac{3}{4}$ -



Bottom view of the low-power rig. The amplifier tuning condensers are to the right and the filter choke to the left.

inch stand-off insulator underneath the chassis. The two variable condensers,  $C_9$  and  $C_{10}$ , are fastened to the chassis top, underneath. It is best to bend the chassis yourself, forming it to an over-all height of  $2\frac{1}{8}$  inches. The condensers require exactly two inches clearance, which you don't get with a commercial 2-inch chassis which is outside measurement. However, condensers with semicircular plates, rather than midline plates, will fit all right in a 2-inch chassis, or rubber bumper feet at the corners will elevate it enough for clearance.

#### Adjustment

6L6 or 6L6G tubes may be used equally well in the amplifier. Reports indicate no difference in signal strength when a 6V6GT was plugged in to replace the 6L6, although the input dropped from 32 to 27 watts. Type 6V6GT tubes are used in the oscillator and modulator. The larger glass- or metal-type 6V6 tubes function equally well. The oscillator circuit as shown in Fig. 1 develops much less crystal current than the triode Pierce circuit and keys better. Doubling of any crystal frequency is accomplished easily by the proper selection of coil for  $L_1$ .

The left-hand condenser,  $C_{10}$ , determines loading and the right-hand condenser,  $C_9$ , does the tuning. With the switch on c.w., set the plates of  $C_{10}$  about a quarter-way out and revolve the knob of  $C_9$  for the dip in plate current (with key depressed, of course). Then adjust  $C_9$ , relocating the plate-current for dip at each setting of  $C_{10}$  and continue until the meter shows about 80 ma. at the dip. This represents an input of 32 watts. The modulator tubes draw some current when  $S_2$  is in the c.w. position, with the key plugged in. Because of the low capacity of the power transformer, this load reduces the maximum c.w. input slightly. For extended periods of c.w. operation the modulator tubes may be removed from their sockets to take advantage of the increased power available.

The rig will load perfectly and has been operated on both 80 and 40 meters using everything from a two-foot length of bus wire to a 300-foot antenna. Obviously the best results will be obtained if the antenna is reasonably long and in the clear, but there is no critical length.

On 'phone, with the microphone push-to-talk switch depressed, the loading condenser should be adjusted so that there is no change in plate current with modulation, always readjusting the tuning condenser to resonance, of course. No gain control is necessary with the components shown. The microphone has ample output to drive the modulator tubes directly. With about 25 watts input, the carrier is modulated fully.

(Continued on page 118)



# A "Free" Bleeder Resistor for C.W. Transmitter Power Supplies

BY GEORGE L. DOWNS,\* W1CT

• Here is a good stunt that will enable you to squeeze a bit more out of your power supply. But don't expect to be able to use it if your final is working on the ragged edge of oscillation (fundamental or parasitic).

**I**F your r.f. amplifier stage is properly neutralized, you can allow it to draw plate current under key-up conditions and save in three ways:

- 1) Greatly reduce the size and cost of the bleeder resistor.
- 2) Reduce the key-down drain on the power supply, thereby allowing transformers and chokes of lower current rating to be used. (Or get more useful current out of your present supply.)
- 3) Reduce the power bill through greater power-supply efficiency.

## Bleeder Calculations

For good regulation, the bleeder resistor at the output of a choke-input filter is generally accepted to be about 1000 times the value of the inductance of the first choke.<sup>1</sup>

$$R = 1000L$$

Now suppose you have a 2000-volt power supply with a 20-henry input choke. The bleeder is  $1000 \times 20$  or 20,000 ohms. The bleeder current is  $E/R$  or 100 ma., and the bleeder power is  $I^2R$ , or about 200 watts! Two things are at once apparent:

- 1) Such a resistor is expensive.
- 2) The power supply is delivering 200 watts more than is necessary when the key is down, and this power serves no useful purpose other than to heat the shack.

If, for example, we connect this supply to a pair of RK-48s or 813s in push-pull, we know that with the key up, the supply delivers 100 ma. to the bleeder. With the key down the tubes draw 360 ma. The total load on the supply is 460 ma. with about 22 per cent of it wasted in the bleeder.

\* 19 Columbus St., Newton Highlands, Mass.

<sup>1</sup> Dellenbaugh and Quimby, "The Important First Choke in High-Voltage Rectifier Circuits," *QST*, February, 1932.

<sup>2</sup> They won't oscillate if properly neutralized. For a note on these particular tubes, see page 17 of May, 1947, *QST*.

<sup>3</sup> In this connection, a voltmeter makes a good low-current bleeder while providing an indication of the charge left in the condensers.

## Tubes as Bleeder Resistors

Now if we eliminate the bleeder (and connect a few-hundred-thousand ohms resistance in its place for safety), and adjust the bias on the amplifier tubes so they draw 100 ma. with the key up,<sup>2</sup> the following conditions will prevail:

With the key up:

- 1) The tubes act as the bleeder.
- 2) Rated plate dissipation is not exceeded, and tube life is not shortened.
- 3) The only bleeder required is a low-wattage fairly-high-resistance unit to discharge the capacitors when the power is off.

With the key down:

- 1) The power supply delivers 360 ma. to the tubes, and a negligible amount to the "safety" resistor.
- 2) Substantially all current delivered by the supply is used by the tubes for generating r.f. power.
- 3) The lights will blink less when the key is closed, because the *change* in current is now only 260 ma. (instead of 360 ma. as before).

## General Application

Following the idea outlined here, the bleeder-resistor current can be reduced or substantially eliminated under key-down conditions. The wattage rating of the resistor will be greatly reduced in any power supply feeding any r.f. amplifier. Be sure to remember these precautions:

- 1) Do not exceed the rated plate dissipation of the tube. (Plate dissipation with the tube acting as the bleeder is the power-supply voltage times the key-up plate current.)
- 2) Always have a few-hundred-thousand ohms connected across the filter, to discharge the condensers when the power is turned off.
- 3) Always make sure the condensers have discharged before you change coils or tubes.<sup>3</sup>

## About the Author

• George L. Downs started in ham radio in 1930 as W5CS. Now W1CT, he finds his greatest hobby enjoyment in designing and building gear — there's a de luxe all-band c.w. rig now under construction in the W1CT shack. George has earned degrees at Northeastern U. and Lincoln Technical Institute, and fraternally is a past president of the San Antonio Amateur Radio Club and an organizer of the El Ray (Raytheon) Radio Club.

# Happenings of the Month

## TV CHANNEL NO. 1 DELETED

In a long-awaited decision which reflects FCC's belief that the dangers of adjacent-channel interference to television are greater than harmonic troubles, the Commission has issued an order, effective June 14th, which deletes Television Channel No. 1 (44-50 Mc.) and turns it over to the non-Government fixed and mobile services. The order reaffirms our band 50-54 Mc. as exclusively amateur.

Readers of *QST* will recall that at the hearing called by FCC to study this matter last year the League's presentation (page 44, January, 1948, *QST*) proposed the deletion of Channel No. 2 (54-60 Mc.) instead of Channel No. 1, as our suggestion for the solution of TVI. While the current decision is not in accord with this proposal, the Commission goes to some length to explain why it did not feel it could go along with us, as follows:

In the Commission's Notice of Proposed Rule Making the television channel proposed for deletion was No. 1. At the hearing the American Radio Relay League recommended that Channel No. 2 be deleted. The League based this recommendation on the fact that the harmonics of an amateur band and of industrial, scientific and medical devices would fall in Channel No. 2 and largely destroy its usefulness. The League further pointed out that improvements in receiver design can obviate or minimize adjacent-channel problems but that no change in receiver design will eliminate the effects of harmonics; the harmonics must be suppressed. The arguments advanced by the League have considerable merit and have been carefully considered. The Commission has concluded that no perfect solution exists. On the whole, many of the problems in this portion of the spectrum are the result of the interspersed nature of the frequency allocations. If television channel No. 1 is deleted, channels 2 through 6 are substantially one block. If television channel No. 2 is deleted, and channel No. 1 is retained, there will be boundary problems for two channels; channel No. 1 will have adjacent channel interference on two sides and channel No. 3 will have it on one side. Viewing all factors, the Commission finds that a better allocation will result if television channel No. 1 is deleted. Representatives of the television industry were also of the same opinion.

The Commission is aware of the fact that this decision, meaning as it does that every effort will have to be made to suppress harmonics as much as possible, will cause some misgivings to the amateurs operating in the 28-29.7 Mc. band whose harmonics may cause interference to television channel 2. The Commission believes that harmonic interference problems are to be expected generally throughout the upper spectrum and Commission Rules requiring harmonic suppression will be equitable in their application to the several services. Moreover, a degree of harmonic suppression will not be required of amateurs which is unrealistic or not applicable to other services, considering the peculiarities of each such service.

Amateurs should understand that the FCC reference to general harmonic problems in the upper spectrum does not refer to amateurs alone but points to the necessity for attention to this problem by all services operating there. This has

## INCREASE IN DUES

Effective July 1st, ARRL membership dues in both the United States and Canada are increased one dollar a year, by action of the Board of Directors, and apply to both full and associate memberships. Dues, including subscription to *QST*, are now as follows: In United States & Possessions, \$1 a year. In the Dominion of Canada, \$4.50 a year. In all other countries, \$5 a year. In the special case of "family memberships" in the United States and Canada, without *QST*, as limited by By-Law 4, \$1 a year.

been a troublesome problem to the Commission's engineering staff for many months. The Commission now indicates its intention of tackling it in the future; we'll keep in close touch with respect to amateur angles.

Further on this whole television picture (pun?), the Commission is calling a hearing September 20th to get all the information it can on the possible use of the high-band television assignment between 475 and 890 Mc., it being apparent to everyone in the industry by this time that we simply can't have a nationwide television service on the basis of the limited number of channels now available between 54 and 216 Mc. At this hearing the Commission also wants to get all additional available information on interference to reception of television stations on Channels 2 through 13 resulting from adjacent-channel operation, harmonic radiations and manmade noise. The League will be present to represent amateur interests.

## MEMBERSHIP DUES

As announced in detail elsewhere on this page, ARRL dues have been raised effective July 1st. It is believed that League members generally, from their contacts with everyday life, will understand that such an increase at this time is a reasonable and inescapable thing. Last year the League spent approximately \$8.25 on behalf of each member for strictly organizational matters such as the preservation of our frequencies and operating rights, the production of *QST*, for our Communications Department and laboratory and Headquarters station and the Technical Information Service, for sending speakers to conventions and clubs, and for the holding of Board meetings and paying the administrative expenses of directors, SCMs, QSL Managers, etc. The costs of everything we do have continued to mount,

during these years of rising prices, far more than our income has increased, so that our margin from our non-QST publishing activities is insufficient to cover our activities. The Board of Directors made a careful examination of this matter at its recent meeting. The directors felt that the activities of the League are essential to the well-being of amateur radio and that amateurs would not wish these services and activities curtailed. The directors believe that amateurs will think that a modest increase of dues is well warranted at this time to permit the continuation, to the fullest possible extent, of all of the helpful activities of the League in maintaining, defending and promoting the work of amateur radio.

### ATLANTIC CITY DOCUMENTS

At the request of the International Telecommunication Union and the U.S. Department of State, ARRL has been acting as the distributor for ITU in the Western Hemisphere of the Final Acts of the Atlantic City conferences. Using the facilities and knowledge that distribute several hundred tons of "Handbooks" every year, many thousands of copies of the Atlantic City documents have been dispatched all over the Americas, as well as all around the world in the first distribution to conference delegates. The League has done this work on a cost basis, without profit

to itself, as a service to the governments and telecommunication interests.

Now the work is coming to an end and we should like to give notice, by this announcement, that after August 1st we shall not be able to supply copies and all orders must be sent to Berne. Meanwhile we have an ample supply: \$1.20 postpaid to government agencies, \$1.50 to all others.

### EXAMINATION SCHEDULE

The Federal Communications Commission will give amateur examinations during the second half of 1948 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified from the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9:00 A.M., local time, except as noted.

Albuquerque: Sept. 22.  
 Amarillo, Tex.: Sept. 17.  
 Anchorage, Alaska, 53 U.S.P.O. and Courthouse: By appointment.  
 Atlanta, 411 Federal Annex: Tuesday and Friday at 8:30 A.M.  
 Bakersfield, Calif.: Some time in August.  
 Baltimore, 508 Old Town Bank Bldg.: Monday through



The ARRL Board of Directors and League officials at the annual meeting of the Board in West Hartford on May 7th. Seated, l. to r., Director Groves, West Gulf Division; Dir. Canfield, Delta; Dir. Jepsen, Southwestern; Dir. Ladley, Pacific; Vice-President McCargar; Dir. Collett, Midwest; Communications Manager Handy; General Counsel Segal; President Bailey, chairman; Secretary & General Manager Warner; Asst. Secretary Huntoon; Treasurer Houghton; Canadian General Manager Reid; Dir. Noble, New England; Dir. Matejka, Rocky Mountain; Dir. Bird, Great Lakes; Dir. Richelieu, Central. Standing, l. to r., Dir. Dosland, Dakota; Sr. Asst. Secretary Budlong; Dir. Shelton, Southeastern; Dir. H. W. Johnston, Northwestern; Dir. J. M. Johnston, Hudson; Technical Director Grammer; Asst. Secretary Waggoner; Dir. Martin, Atlantic; Dir. Caveness, Roanoke.

Friday. When code test required, 8:30 A.M.  
 Bangor, Me.: Some time in October.  
 Beaumont, Tex., 329 P.O. Bldg.: Thursday, and by ap-  
 pointment.  
 Billings, Mont.: Sept. 27.  
 Birmingham: July 7, Oct. 6.  
 Bismarck, N. D.: Oct. 13.  
 Boise: Some time in October.  
 Boston, 1600 Customhouse: Monday through Friday.  
 Buffalo, 328 P.O. Bldg.: Thursday.  
 Butte, Mont.: Sept. 24.  
 Charleston, W. Va.: Some time in September and December.  
 Chicago, 248 U. S. Courthouse: Friday.  
 Cincinnati: Some time in August and November.  
 Cleveland, 541 Federal Bldg.: First and third Fridays each  
 month, also by appointment.  
 Columbus, Ohio: Some time in July and October.  
 Corpus Christi: Sept. 9, Dec. 9.  
 Cumberland, Md.: Oct. 14.  
 Dallas, 500 U. S. Terminal Annex: Monday through Friday.  
 Davenport: Some time in July and October.  
 Denver, 521 Customhouse: First and second Thursdays  
 each month, also by appointment.  
 Des Moines: July 15, Oct. 14.  
 Detroit, 1029 New Federal Bldg.: Wednesday and Friday.  
 El Paso: Sept. 27.  
 Ft. Wayne: Some time in August and November.  
 Fresno: About September 15 and December 15.  
 Grand Rapids: Some time in July and October.  
 Hartford, Conn.: Some time in September.  
 Hilo, T. H.: Oct. 19.  
 Honolulu, 119 Merchant St.: Mondays, 8 A.M.  
 Houston, Tex., 324 U. S. Appraisers Stores Bldg.: Tuesday  
 and Friday.  
 Indianapolis: Some time in August and November.  
 Jacksonville: Oct. 16.  
 Juneau, Alaska, 6 Shattuck Bldg.: By appointment only.  
 Kansas City, 338 U. S. Courthouse: Friday, also by ap-  
 pointment.  
 Kaunakakai, Molokai, T. H.: Oct. 28.  
 Klamath Falls, Ore.: Some time in November.  
 Knoxville, Tenn.: Sept. 8, Dec. 8.  
 Las Vegas, Nev.: Some time in October.  
 Lihue, T. H.: Oct. 12.  
 Little Rock: July 14, Oct. 13.  
 Los Angeles, 539 U.S.P.O. and Courthouse Bldg.: Wednes-  
 day at 9 A.M. and 1 P.M.  
 Memphis: Sept. 8, Dec. 8.  
 Miami, 312 Federal Bldg.: Monday and Thursday.  
 Milwaukee: Some time in July and October.  
 Mobile: Nov. 17.  
 Nashville: Aug. 11, Nov. 3.  
 New Orleans, 400 Audubon Bldg.: Monday through Friday;  
 when code test required, Monday, Tuesday, Wednesday  
 at 8:30 A.M.  
 New York, 748 Federal Bldg., 641 Washington St.: Monday  
 through Friday.  
 Norfolk, 402 Federal Bldg.: Monday through Friday;  
 when code test required, Friday only.  
 Oklahoma City: July 23-23, Oct. 26-27.  
 Omaha: July 22, Oct. 21.  
 Philadelphia, 1005 Customhouse: Monday through Friday,  
 9 A.M. and 1 P.M.  
 Phoenix, Ariz.: Some time in October.  
 Pittsburgh: Aug. 3-4-5, Nov. 2-3-4.  
 Portland, Me.: Some time in October.  
 Portland, Ore., 406 Central Bldg.: Friday at 8:30 A.M.  
 Reno: About Oct. 13.  
 Roanoke: Oct. 2.  
 St. Louis: Aug. 12, Nov. 18.  
 St. Paul, 208 Uptown P.O. Bldg.: Friday.  
 Salt Lake City.: Sept. 18, Dec. 18.  
 San Antonio: Aug. 12, Nov. 4.  
 San Diego, 230 U. S. Customhouse: By appointment.  
 San Francisco, 323-A Customhouse: Monday and Friday;  
 Class A, Monday through Friday.  
 San Juan, P. R., 323 Federal Bldg.: Thursday.  
 Savannah, 214 P. O. Bldg.: By appointment.  
 Schenectady: Sept. 8-9, Dec. 8-9.

Seattle, 801 Federal Office Bldg.: Friday, 8 to 10 A.M.  
 Sioux Falls, S. D.: Sept. 8, Dec. 8.  
 Spokane: Sept. 22.  
 Syracuse, N. Y.: July 8, Oct. 5.  
 Tampa, 410 Main P. O. Bldg.: By appointment.  
 Tucson, Ariz.: Some time in October.  
 Tulsa: July 26-27, Oct. 21-22.  
 Washington, D. C., 2711 Temporary L Building: Monday  
 through Friday, 8:30 A.M. to 5 P.M.  
 Wichita: Sept. 9.  
 Williamsport, Pa.: Sept. 9, Dec. 7.  
 Wilmington, N. C.: Dec. 4.  
 Winston-Salem: Aug. 7, Dec. 4.  
 Wailuku, Maui, T. H.: Oct. 26.

## BOARD MEETING MINUTES

Last month we reported the highlights of the recent annual meeting of the ARRL Board of Directors, and several items in this issue deal with some of these actions. Here, for your information, are the minutes themselves:

1) Pursuant to due notice and the requirements of the By-Laws, the Board of Directors of the American Radio Relay League, Inc., met in regular annual session at the Hartford Golf Club, West Hartford, Conn., on May 7, 1948. The meeting was called to order at 9:33 a.m., EDTST, with President George W. Bailey in the Chair and the following other directors present:

J. Lincoln McCargar, Vice-President  
 Alexander Reid, Canadian General Manager  
 Harold C. Bird, Great Lakes Division  
 Victor Canfield, Delta Division  
 Hugh L. Caveness, Roanoke Division  
 Leonard Collett, Midwest Division  
 Goodwin L. Dosland, Dakota Division  
 Wayland M. Groves, West Gulf Division  
 Hans R. Jepsen, Southwestern Division  
 Harold W. Johnston, Northwestern Division  
 William A. Ladley, Pacific Division  
 Walter Bradley Martin, Atlantic Division  
 Franklin K. Matejka, Rocky Mountain Division  
 Percy C. Noble, New England Division  
 Clyde C. Richelieu, Central Division  
 William C. Shelton, Southeastern Division

Absent: Joseph M. Johnston, Hudson Division. There were also present Senior Assistant Secretary Arthur L. Budlong, Technical Director George Grammer, Communications Manager Francis E. Handy, Treasurer David H. Houghton, Assistant Secretary John Huntoon, General Counsel Paul M. Segal, Assistant Secretary LeRoy T. Waggoner and Secretary & General Manager K. B. Warner. The meeting was welcomed and briefly addressed by the Chair.

2) The Chair presented the question of the eligibility of Director Richelieu, in view of a change of occupation, to continue as a member of the Board, as referred to the Board by the Executive Committee. After discussion, on motion of Mr. Dosland, unanimously VOTED that Mr. Richelieu is eligible to office under the by-laws.

3) On motion of Mr. H. W. Johnston, unanimously VOTED that the minutes of the 1947 annual meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) On motion of Mr. Caveness, unanimously VOTED that the annual reports of the officers to the Board of Directors are accepted and the same placed on file.

5) On motion of Mr. H. W. Johnston, after discussion, VOTED that the Board, having examined its mail action by which it directed the publication in QST of the proposals of the Planning Committee concerning 'phone frequencies and the taking of a poll of advisory amateur opinion thereon, now ratifies the action taken and decides to take this action as of December 22, 1947. Messrs. Canfield and Collett requested to be recorded as abstaining.

6) On motion of Mr. H. W. Johnston, VOTED that the Board, having examined its mail action by which it determined to hold its 1948 annual meeting in West Hartford, Conn., now ratifies the action taken and decides to take this

action as of December 29, 1947. Messrs. Richelieu and Shelton requested to be recorded as voting opposed and Mr. Collett as abstaining.

7) On motion of Mr. Shelton, unanimously VOTED that all acts performed and all things done by the Executive Committee since the last annual meeting of the Board, and by it reported to the Board, are ratified and confirmed by the Board as the actions of the Board.

8) On the reception of reports of committees: Upon the request of Mr. Reid, ORDERED, without objection, that the report of the Finance Committee goes over until immediately preceding the election of President and Vice-President. Mr. Caveness asked unanimous consent to the same action for the report of the Planning Committee, but Mr. Collett objected. After discussion, without objection, ORDERED that the report of the Planning Committee goes over until immediately preceding the consideration of frequency subassignments.

9) On motion of Mr. H. W. Johnston, unanimously VOTED that the annual reports of the directors to the Board of Directors are accepted and the same placed on file.

10) At this point, supplementary oral reports were rendered by the officers of the League. In connection with that of the Communications Manager, Mr. Shelton lodged with Mr. Handy a copy of the "Alabama Emergency Nets Rules & Regulations" and asked that the record so show. During the foregoing, Director J. M. Johnston, Hudson Division, joined the meeting, at 10:00 a.m.

11) Proceeding to a consideration of matters to be raised by directors on their individual initiative, unanimous consent was given Mr. Shelton to present at this time a proposal concerning the Canal Zone.

12) Moved, by Mr. Shelton, that By-Law 5(a) be so amended that the specification of the territory comprising the Southeastern Division read as follows: "the states of Georgia, Florida and Alabama, the United States Possessions in the Caribbean, and the Canal Zone." The yeas and nays being ordered, the said subject was decided in the affirmative: Whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. Every director voted in the affirmative except the President and Vice-President, who abstained as required. So the by-law was amended.

13) Moved, by Mr. Shelton, that the League request FCC to provide a distinctive call beginning with K for amateur stations that have held a call for 25 years. But, after discussion, the said motion was rejected, Mr. Shelton asking to be recorded as voting in favor.

14) On motion of Mr. Shelton, after discussion, unanimously VOTED that a suitable certificate be printed for directors, such certificate to contain space for the date of the director's assuming office and another space to be properly filled in at the expiration of the director's service to the League in this capacity. In response to inquiry, RULED by the Chair: that this provision shall apply to former directors upon their request.

15) Moved, by Mr. Jepsen, that the League request FCC to set up specifications for television and broadcast receivers as a guide in ascertaining the extent to which the radio amateur is responsible for interference to receivers in these other services. But, after discussion, unanimous consent being given, Mr. Jepsen withdrew the motion.

16) Moved, by Mr. Jepsen, that the League request FCC to apply the same stability regulations to the 144-148 Mc. band as are now in effect on lower frequencies, thus eliminating modulated oscillators on this band, the changeover to occur in not to exceed two years. But, after discussion, the said motion was rejected.

17) Moved, by Mr. Jepsen, that there be referred for study to a building committee of at least five members of the Board, to be appointed by the President on an equitable geographical basis, that a site geographically in the center of the United States be purchased and a station built and put in operation as soon as possible, and that the balance of buildings needed to house the Headquarters be completed as soon thereafter as possible but in any case during the slack period and before the next international telecommunications conference in 1952; and that \$5000 be appropriated from surplus for the committee's necessary expenses, any unexpended remainder to be restored to surplus. After ex-

## BOARD EXPRESSES GRATITUDE TO QSL MANAGERS

The Board of Directors, at its 1948 meeting, gave a resounding vote of thanks to the volunteer QSL Managers of the United States and Canada for the splendid work they are doing in distributing DX QSLs to the radio amateurs of America. With full knowledge of the countless hours spent by QSL Managers in performing this vital service with no recompense other than the satisfaction of an important task well done, the Board paid richly-deserved tribute to these men who take precious time and effort from the usual pursuit of amateur radio to render such excellent service to their fellow hams.

We as amateurs can also express our individual thanks by the simple procedure of sending our call-area QSL Manager a self-addressed, stamped, stationer's-size No. 10 envelope. Keep such an envelope always on file; when it comes back to you with cards, replace it by filing another with him immediately. It will make his work much easier. And if you can use a stamp of philatelic value on your letter to him, it's dollars to doughnuts he'll appreciate it.

tended discussion, on motion of Mr. Dosland, VOTED that the said motion shall lie on the table for later consideration. During the foregoing discussion the Board was in recess from 10:55 a.m. to 11:03 a.m.

18) On motion of Mr. Martin, after discussion, unanimously RESOLVED: that it is the sense of this Board that all matters concerning amateur regulations, on which recommendations to FCC are anticipated, shall be considered by a Committee of the Whole; and that such committee shall meet at a recess at this meeting, its recommendations to be actually voted upon at the end of said recess.

19) Moved, by Mr. Richelieu, that Article IV, §10, of the Constitution be amended to read in part, "There shall be an Executive Committee consisting of the five officers of the League, comprising the President, Vice-President, Secretary, Communications Manager and Treasurer, and three duly elected Directors. Directors serving on the Executive Committee shall serve in rotation of their respective division alphabetical order. Directors participating in Executive Meetings shall be duly notified of such meetings by the President as far in advance of said meeting as possible and an Executive Meeting shall not be considered official without the presence of at least one duly elected Director. Where any scheduled Director is unable to attend the proposed Executive Committee meeting for personal or business reasons, that Director may designate his Alternate from among the roster of the 16 duly elected Directors and/or Canadian General Manager. This committee shall act in the place and stead of the . . ." etc. After discussion, the yeas and nays being ordered, the said subject was as decided in the negative: Whole number of votes cast, 16; necessary for adoption, 11; yeas, 2; nays, 14. Messrs. Collett and Richelieu voted in the affirmative. Those who voted opposed are Messrs. Bird, Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Noble, Reid and Shelton. The President and Vice-President abstained as required. So the motion was rejected.

20) Mr. Richelieu moved the adoption of the following resolution: that the Planning Committee of the ARRL shall

make a thorough study of the possibilities of the formulation of an ARRL Scholarship Award to be given annually to a deservant licensed amateur; this study should be based upon a long-term plan for the development of outstanding talent with which to implement our business, administrative, technical and editorial departments. After extended discussion, the yeas and nays being ordered upon request, the said question was decided in the negative: Whole number of votes cast, 16; necessary for adoption, 9; yeas, 6; nays, 10. Those who voted in the affirmative are Messrs. Canfield, Collett, Dosland, Noble, Reid and Richelieu. Those who voted opposed are Messrs. Caveness, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Shelton and McCargar. Mr. Bird abstained, and the President abstained as required. So the motion was rejected.

21) Moved, by Mr. Richelieu, that the President of this League appoint a committee from the membership of this assembly for the purpose of conducting a complete canvass of all existing appointed offices in the League headquarters at West Hartford; this canvass to be made with the objective of analyzing each appointee's background, education, and adaptability to the position in question; upon completion of this canvass, a complete recommendation to be submitted to the Board through the office of the Secretary and approval or corrective steps be taken by the Secretary through direction of this same committee. But, after discussion, the said motion was rejected, Messrs. Collett and Richelieu asking to be recorded as voting in favor.

22) The Board was in recess for luncheon from 12:49 p.m. to 1:57 p.m., reassembling with all directors and other persons hereinbefore mentioned in attendance.

23) On motion of Mr. Richelieu, after extended discussion, VOTED that the advertising policies of this League shall be given thorough review by this Board assembled and any policies found to be obsolete or antiquated brought to light and revised to meet present business conditions and advertising principles. On the further motion of Mr. Richelieu, VOTED that the said review shall go over until Advertising Manager F. C. Beekley can join the meeting, and is made the subject of a Special Order at that time.

24) On motion of Mr. Collett, VOTED, 9 votes in favor to 7 opposed, that the Board shall now recess for 5 minutes. Whereupon the Board was in recess from 2:46 p.m. to 2:52 p.m.

25) Moved, by Mr. Richelieu, that a League branch office be established and maintained in Washington, D. C., and manned by capable personnel well versed and trained in amateur radio practices with regard to public relations and governmental contacts so essential in organizational welfare. After discussion, on motion of Mr. Dosland, unanimously VOTED that the pending resolution is amended by striking all particulars and substituting the following text: that the Board go on record at this meeting to appoint a committee of five members for the study of frequency allocation, to be known as the Committee for the Study of Frequency Allocations, and also to further study of the preservation of our Government contacts and strengthening them as much as possible. After further discussion, the yeas and nays being ordered upon request, the said question was decided in the negative: Whole number of votes cast, 16; necessary for adoption, 9; yeas, 5; nays, 11. Those who voted in the af-

firmative are Messrs. Bird, Canfield, Collett, Dosland and Richelieu. Those who voted opposed are Messrs. Caveness, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Noble, Shelton and McCargar. Mr. Reid abstained, and the President abstained as required. So the motion was rejected.

26) Mr. Beekley having joined the meeting, pursuant to Special Order and on motion of Mr. Collett, unanimously VOTED, at 3:19 p.m., that the Board does now resolve itself into a Committee of the Whole for the consideration of advertising policy. The Chair appointed himself chairman of the Committee of the Whole. The Committee rose at 4:02 p.m. and the Chair, as chairman of the Committee of the Whole, reported to the Board that the Committee had made a thorough review of the advertising policies of the League and that no policies were found obsolete or antiquated and in need of revision to meet present business conditions and advertising principles. On motion of Mr. Shelton, VOTED to accept the report of the Committee, Messrs. Collett and Richelieu asking to be recorded as voting opposed.

27) Moved, by Mr. Richelieu, that the position of advertising manager of the ARRL be made a salaried one and that the present commission arrangement will be terminated as soon as contractual arrangements will permit. But, after discussion, the said motion was rejected, Messrs. Collett and Richelieu asking to be recorded as voting in favor and Mr. Matejka as abstaining.

28) Moved, by Mr. Richelieu, that this League retain a nationally known firm of accountants to conduct a private, unbiased poll of all licensed radio amateurs, under the supervision of a five-man committee selected from the members of this Board; to conduct a poll by frequency bands, to determine the actual number of operators confining their operation to 'phone use a majority of their operating hours, as against those operators using c.w. during a major part of their operating hours; this poll to determine an equitable distribution of 'phone and c.w. frequencies for just allocations within each amateur band; no 'phone-c.w. recommendation to be made to the FCC until this poll has been successfully concluded. But, after discussion, the said motion was rejected, Messrs. Collett and Richelieu requesting to be recorded as voting in favor.

29) The Board was in recess from 4:31 p.m. to 4:38 p.m. After discussion, ORDERED: that the Board reassemble after its recess for dinner.

30) Moved, by Mr. Richelieu, that this Board authorize the travel and general board and room expenses of all division directors and the Canadian General Manager from their homes to the National ARRL Convention to be held in Milwaukee on September 4, 5, and 6, 1948, and that this Board authorize the expenditure of up to \$4000 to defray such expenses, the balance to be returned to League surplus. But, after discussion, the said motion was rejected, 5 votes in favor to 12 opposed.

31) Moved, by Mr. Canfield, that Article IV, §9, of the Constitution be amended to read as follows:

9. Special meetings of the Board of Directors may be called by the President and/or shall be called by the President on written request of a majority of the Directors exclusive of the President and Vice President, by written notice stating the specific object or objects thereof, mailed to each Director at least three weeks prior to the date of said meeting.

The yeas and nays being ordered, the said question was decided in the affirmative: Whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. Every director voted in the affirmative, except the President and Vice-President who abstained as required. So the Constitution was amended as proposed.

32) On motion of Mr. Bird, after discussion, unanimously VOTED that 51% of the voting club membership shall be required to be radio amateurs licensed by the U. S. or Canadian government, as a prerequisite to affiliation with ARRL; and that the Communications Manager in his annual review of affiliated club status shall recommend the disaffiliation of clubs not in compliance with such requirement, after giving the club officers appropriate time for

### OFFICERS' REPORTS AVAILABLE TO MEMBERS

• In April of each year the officers of the League make comprehensive written reports to the directors. The Board of Directors has made these reports available to the membership of the League. Interested members may obtain copies postpaid at the cost price of 75 cents per copy. Address the Secretary at West Hartford.

compliance with the above and with the existing ARRL membership (51%) requirement.

33) Moved, by Mr. J. M. Johnston, that, as an exception to the exclusion of magazines from exhibiting at the National Convention under Item 9 of the contract with the Milwaukee Radio Amateurs' Club, the magazine "CQ" be permitted to exhibit. After discussion, on motion of Mr. Richelieu, VOTED that the motion is amended to provide that if "Radio News" or any similar magazine of appreciable amateur content asks admission, they, too, may be admitted. The question being on the original motion as thus amended, the same was then ADOPTED.

34) Moved, by Mr. J. M. Johnston, that the present ARRL division boundaries be changed to conform to the boundaries of FCC amateur call areas. After discussion, moved, by Mr. Collett, to amend the motion to apply only to the Atlantic and Hudson Divisions. But, after further discussion, unanimous consent being given, Mr. Collett withdrew the proposal for amendment. After further discussion, the yeas and nays being ordered, the said question was decided in the negative: Whole number of votes cast, 15; necessary for adoption, 11; yeas, 3; nays, 12. Those who voted in the affirmative are Messrs. J. M. Johnston, Martin and Noble; those who voted opposed are Messrs. Bird, Canfield, Caveness, Collett, Dosland, Groves, Jepsen, H. W. Johnston, Ladley, Matejka, Richelieu and Shelton. Mr. Reid abstained, and the President and Vice-President abstained as required. So the motion was rejected.

35) Moved, by Mr. J. M. Johnston, that the Board give a vote of thanks to the QSL Managers, expressing its deep appreciation for their excellent work; that this action be reported in *QST* and that a letter, expressing the thanks of the Board, be sent to each QSL Manager. Moved, by Mr. Matejka, that the QSL Managers who are located within the continental United States be invited to attend the National Convention at Milwaukee with traveling expenses and hotel costs allowed by the League as a gesture of good will. RULED, by the Chair, that the said motion is out of order as an amendment. Whereupon Mr. Johnston's motion was unanimously ADOPTED.

36) Moved, by Mr. J. M. Johnston, that, to avoid commercialism on the Board or the possible competition of commercialism, Paragraph (e) of By-Law 12 be amended to read as follows:

(e) Any person commercially engaged as an owner, a principal or a manager of a broadcasting station or a group of such stations, or associated as a principal or a manager with an enterprise controlling a broadcasting station.

After extended discussion, moved, by Mr. Collett, that the motion lie on the table; but the proposal was rejected, 7 votes in favor to 9 opposed. After further discussion, the yeas and nays being ordered, the question of amending the by-law was decided in the negative: Whole number of votes cast, 12; necessary for adoption, 11; yeas, 9; nays, 3. Those who voted in the affirmative are Messrs. Caveness, Dosland, Groves, Jepsen, J. M. Johnston, Ladley, Martin, Reid and Shelton. Those who voted opposed are Messrs. Canfield, Collett and Noble. Messrs. Bird, H. W. Johnston, Matejka and Richelieu abstained, and the President and Vice-President abstained as required. So the motion was rejected.

37) On motion of Mr. Collett, the Board recessed for dinner at 5:52 p.m., reassembling at 7:43 p.m. with all directors and other persons hereinbefore mentioned in attendance.

38) On motion of Mr. Ladley, unanimously VOTED that the Board shall now reconsider its action on the proposal to amend Paragraph (e) of By-Law 12. Moved, by Mr. Ladley, that Paragraph (e) of By-Law 12 be amended to read as follows:

(e) Any person commercially engaged as an owner, a principal or a manager of a broadcasting station or a group of such stations, or associated as a principal or a manager with an enterprise controlling a broadcasting station.

The yeas and nays being ordered, the said question was decided in the affirmative: Whole number of votes cast, 15; necessary for adoption, 11; yeas, 11; nays, 4. Those who

voted in the affirmative are Messrs. Bird, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Reid and Shelton. Those who voted opposed are Messrs. Canfield, Collett, Noble and Richelieu. Mr. Matejka abstained, and the President and Vice-President abstained as required. So the by-law was amended.

39) Moved, by Mr. Collett, that Article IV, §8, of the Constitution be amended to read as follows: "The Board of Directors shall convene on a Monday, selected by the President, during the month of May of each calendar year, and they do meet in regular session for the purpose of conducting business of the League. That the hour of the meeting shall be that hour normally observed by the League Headquarters as the beginning of the business day. And, further that this Board remain assembled in regular session until each of the following conditions have been satisfactorily met. A. That an inspection be made of all League properties and records. B. That the standing rules of order be modified by the enactment of this amendment whereby the Privileged Question relative to adjournment shall only be considered by this Board assembled after the conditions described within this amendment have been complied with. C. That this Board assembled shall remain in executive session for a minimum of twenty four (24) hours to be spaced over a period not to exceed three normal business days, but in no event, shall this Board consider adjournment prior to the hour of normal business cessation as is normally observed by the League Headquarters on the day following the Monday this Board does formally meet." After discussion, the yeas and nays being ordered, the question was decided in the negative: Whole number of votes cast, 18; necessary for adoption, 11; yeas, 3; nays, 13. Those who voted in the affirmative are Messrs. Bird, Collett and Richelieu. Those who voted opposed are Messrs. Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Noble, Reid and Shelton. The President and Vice-President abstained as required. So the motion was rejected.

40) Moved, by Mr. Collett, that there be appointed, in the customary manner, a Committee of 3 to study all labor relations between League employees, at all levels, and the American Radio Relay League, Inc., and that, further, there be submitted to this Board, in advance of its regular meeting in 1949, but in no case later than 90 days prior to such meeting, a report containing that Committee's recommendations; further, that the Committee be charged with the responsibility of patterning a form of civil service, applicable to the needs of this League, and with the purpose of making all nonappointive positions with that organization subject to a status as defined under the Articles and amendments, thereto, that shall result from the Board's enactment of all, or any part of the above-named Committee's recommendations; that for the proper functions of this Committee \$2000 be appropriated from the League's surplus, and any unused portion shall be returned to that surplus. But, after discussion, the said motion was rejected, Messrs. Collett and Richelieu asking to be recorded as voting in the affirmative.

41) At the request of Mr. Collett, ORDERED by the Chair: that it be recorded that Mr. Collett withdraws his proposals previously published to the directors, relating to advertising policy and the position of advertising manager, in view of the action already taken on similar proposals.

42) Moved, by Mr. Collett, that Article IV, §5, of the Constitution be amended to read in part as follows: ". . . He shall attend all meetings of the Board and through the employment of a certified public stenographer with suitable stenographic aids shall cause to be recorded all minutes, verbatim, of the business and discussion of this Board assembled. That, further, he shall in no case recording the minutes of the annual Board meeting in his own handwriting or cause any assistant to so similarly do. That a complete record of all minutes, verbatim, shall be made available for *QST* publication, where the majority of this Board so votes, and, in any event, copies are to be supplied of this report to each Director and alternate, and a master file be maintained of such transcriptions, recordings, verbatim discussion and other notes with in the League's archives." After discussion, the yeas and nays being ordered, the question was decided in the negative: Whole number of

votes cast, 16; necessary for adoption, 11; yeas, 2; nays, 14. Messrs. Collett and Richelieu voted in the affirmative. Those who voted opposed are Messrs. Bird, Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Noble, Reid and Shelton. The President and Vice-President abstained as required. So the proposal was rejected.

43) Moved, by Mr. Collett, that this Board of Directors here assembled, under authority given in Article V, shall direct and instruct the manager of the League's official publication, *QST*, to provide adequate space in the publication, *QST*, for a monthly report from each director to his divisional membership if he so desires to use such. Moved, by Mr. Canfield, that the motion be amended to provide that space be made available quarterly, not to exceed one-quarter page to each director. But, after discussion, the said amendment was rejected, 7 votes in favor to 10 opposed. The question then being on the original motion, the same was rejected. Messrs. Collett and Richelieu asking to be recorded as voting in favor.

44) Moved, by Mr. Collett, that this Board assembled do cause the appointment of a Committee, to be appointed in the customary manner, to begin immediate study and investigation into the frequency band as described on page (144) Chapter III, art 5 RR) 28-E, within the Final Acts of the International Telecommunication and Radio Conferences, Atlantic City, 1947; on the frequencies within Region 2, a band 200 kilocycles wide, 1800 to 2000, and designated in the Allocation of Amateur Service; that this Committee be delegated with the authority of the Board of Directors to request use of the frequencies—referred to herein above—in accordance with subparagraph 33) in which it is defined that . . . "any of the authorized services may employ whichever of these two bands is not required for Loran on condition that they do not cause harmful interference to Loran"; that the Committee so appointed shall request the Federal Communications Commission that use of these frequencies shall be permitted the Amateur Service on reduced power/or on a regional basis while the Loran services occupy this band, or under reduced power and with a regional assignment; that, further, the Federal Communications Commission be requested by this Board assembled that upon the reallocation of the Loran services the frequencies described herein and above, shall be returned to the Amateur Service. After extended discussion, on motion of Mr. J. M. Johnston, VOTED that the motion is amended by striking all particulars and substituting the following: that the League continue its policy, through its representatives before the Commission, as they are doing at this time, for the return of any portion of the 160-meter band in any manner possible. Mr. Collett requested to be recorded as voting opposed to the amendment. The question then being on Mr. Collett's motion as thus amended, the same was ADOPTED, Mr. Bird requesting to be recorded as voting in the affirmative and Mr. Collett as abstaining.

45) Moved, by Mr. Collett, that this Board assembled instruct and direct the League's Communication Manager to request from the various affiliated clubs, a resume of the matters these clubs desire to have reviewed by the Board at its regular business meetings, and, further he publish and circulate to the Directors these desires as contributed by the various clubs; that each Director submit to the Communications Manager selected questions not to exceed the number of twenty-five (25) by December 10th of each year, and that a final list of ten (10) questions most frequently occurring within the Directors selection so rendered shall be published with appropriate ballot in the February issue of the following year; that the present Planning Committee shall formulate a plan of operation for this poll and report to the Board via mail not later than Nov. 1, 1948. But, after discussion, the said motion was rejected. Messrs. Canfield, Collett and Richelieu requesting to be recorded as voting in the affirmative.

46) Moved, by Mr. Collett, that a permanent committee be formed to be known as the Committee of Frequency Allocations and that it be composed of two members of the Executive Committee and five members of the Board of Directors, appointed in the customary manner, and, further, that this Committee be charged with the preparation of the

amateur's defense for retention of his present frequency assignments and, further, that study be devoted towards the acquirement of additional frequencies; further, that this Committee be revolving in nature in that upon the resignation or replacement of any member of the Board or upon the resignation, dismissal or retirement of any member of the Executive Committee that the member to be appointed to fill the existing vacancy shall be either from the same League Division or employed in the same position or office as the retiring member; that sufficient funds be appropriated for this Committee's functions. The Chair observing that such a motion had already been considered by the assembly, and unanimous consent being given, Mr. Collett withdrew the motion.

47) Moved, by Mr. Collett, that a permanent Committee be formed to study and recommend all possible means of solidify the amateur's position with the general public and the Government of the United States; that it shall be the duty of this Committee to investigate all possible means of furthering the amateur's position in whatever way possible, compatible with the concepts of the League's avowed purpose and Constitution; that sufficient funds be appropriated for this Committee's functions. But, after discussion, the said motion was rejected. Mr. Collett asking to be recorded as voting in the affirmative.

48) Moved, by Mr. Collett, that a Committee be formed from this Board assembled to study a plan for the formation of permanent Committees whose duties shall be confined to a closer supervision of all departments of the League; that these Committees shall function after the manner of our National Congress; that they shall number five and, further, shall be tentatively known by the following titles: Finance, Frequency Allocations and International Telecommunications Conference preparation; Advertising and Editorial; Public and Government relations and Emergency Co-ordination and Communication. But, after discussion, the said motion was rejected. Messrs. Collett and Richelieu asking to be recorded as voting in the affirmative.

49) On motion of Mr. Collett, VOTED that there is hereby appropriated from the surplus of the League, as of this date, the additional sum of two hundred and fifty dollars (\$250) for the legitimate administrative expenses of the director of the Midwest Division for the calendar year 1948, any unexpended remainder at the end of the year to be restored to surplus.

50) Moved, by Mr. Collett, that this Board assembled do recommend to FCC the requirement that all communication during the first year's operation be confined to c.w. RULED, by the Chair, that, in view of the Special Order entered by the Board, the proposal must await the meeting of the Committee of the Whole. Moved, by Mr. Collett, that this Board assembled do recommend to FCC a code examination at 16 w.p.m. for all applicants for Class A. RULED, by the Chair, that in view of the Special Order entered by the Board, the proposal must await the meeting of the Committee of the Whole.

51) At the suggestion of Mr. Collett, and by spontaneous assent, the Board stood in silence for one minute in tribute to the memory of former Midwest Division Director Harry W. Kerr, W8GP (ex-W9GP-W9DZW), this week deceased.

52) Moved, by Mr. Noble, that By-Law 21 be amended by inserting, after the word "Director" in the first sentence, the words "or Alternate Director." The yeas and nays being ordered, the said question was decided in the affirmative: Whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. Every director voted in the affirmative except the President and Vice-President, who abstained as required. So the by-law was amended.

53) Moved, by Mr. Noble, that the annual appropriation for each director's administrative expenses within his division be limited to the sum of \$700 per year. After discussion, moved, by Mr. Matejka, that the motion be amended to provide whatever sum is decided upon be made available on a term basis covering two years. But, after discussion, the proposed amendment was rejected. The question then being on the original motion, the same was also rejected.

54) On motion of Mr. Noble, unanimously ORDERED: That the subject of ARRL assistance to authorized conven-



tions shall now be discussed. The Board thereupon examined and discussed the said question.

55) Moved, by Mr. Noble, that By-Law 12(f) be amended by striking all its text after the word "enterprise." After discussion, the yeas and nays being ordered, the said question was decided in the negative: Whole number of votes cast, 14; necessary for adoption 11; yeas, 2; nays, 12. Messrs. Collett and Noble voted in the affirmative. Those who voted opposed are Messrs. Bird, Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Reid and Shelton. Messrs. Matejka and Richelieu abstained, and the President and Vice-President abstained as required. So the motion was rejected.

56) Moved, by Mr. Noble, that By-Law 12(f) be amended by striking the words "by a public-service communications company or by any other agency making use of radio frequencies which" and substituting the words "if it". After discussion, the yeas and nays being ordered, the said question was decided in the negative: Whole number of votes cast, 12; necessary for adoption, 11; yeas, 2; nays, 10. Messrs. Noble and Reid voted in favor. Those voting opposed are Messrs. Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin and Shelton. Messrs. Bird, Collett, Matejka and Richelieu abstained, and the President and Vice-President abstained as required. So the motion was rejected.

57) The Board was in recess from 10:09 p.m. to 10:17 p.m.

58) On motion of Mr. H. W. Johnston, unanimously RESOLVED: that the President shall appoint a committee of three to study the problem of increasing the effectiveness of amateur self-policing of the amateur frequency bands and make recommendations to the Board as to what may be done.

59) On motion of Mr. H. W. Johnston, after extended discussion, unanimously VOTED that the Section Emergency Co-ordinators shall be allowed an annual allowance of ten trips throughout their respective sections for the purposes of organizing Emergency Co-ordinators, selling clubs and individuals on the necessity for Emergency Corps work and contacting relief agencies and civil authorities, the SEC to be allowed an allowance of 10 cents per mile for the use of his personal car on such travel. Moved, by Mr. H. W. Johnston, that there be appropriated from the surplus of the League, as of this date, the sum of ten thousand dollars (\$10,000) for defraying the traveling expenses of the Section Emergency Co-ordinators, as authorized by the Board, in the coming year, any unexpended remainder of this sum on the date of the next annual meeting of the Board to be restored to surplus. On motion of Mr. McCargar, unanimously VOTED that the figure is amended to read five thousand dollars (\$5,000), Mr. Collett requesting to be recorded as abstaining. The question being on the original motion as thus amended, and the yeas and nays being ordered upon request, the said question was decided in the affirmative: Whole number of votes cast, 18; necessary for adoption, 9; yeas, 18; nays, 0. Every director voted in the affirmative except Mr. Matejka, who abstained, and the President who abstained as required. So \$5,000 was appropriated for this purpose. Upon the inquiry of Mr. Handy, it was the sense of the meeting that the usual reports should be required of appointees availing themselves of this arrangement.

60) On motion of Mr. Jepsen, unanimously VOTED that the matter of appointing a building committee is taken from the table. Unanimous consent being given, Mr. Jepsen withdrew the pending motion. On his further motion, after discussion, VOTED:

1) That there be created a building committee of five members, to hold office from the close of the present meeting until the conclusion of the next annual meeting of the Board.

2) The members of this committee shall be appointed by the President at the present meeting and the membership shall represent an equitable distribution, geographically, amongst the divisions of the League. The President shall designate the chairman of the committee.

3) The committee shall meet at the call of its chairman at times and places to be designated by him.

4) The officers and employees of the League are directed to furnish the committee with such legal, clerical, statistical and similar assistance as the committee may desire.

5) The committee is directed to study in detail the following questions:

a) The desirability and feasibility of the League acquiring (and whether by purchase or construction) a permanent headquarters building or buildings

b) The most desirable geographical location of such headquarters

c) All appropriate considerations of cost, legality, morale, and other relevant factors involved in the foregoing

d) The suitability of the present corporate structure of the League with its domicile in Connecticut

e) The suitability of West Hartford or Hartford as the location of the headquarters office of the League

f) The suitability of WIAW to accomplish the purposes of dissemination of information from its present site and the desirability and feasibility of altering, moving or supplementing those facilities.

6) The committee shall submit its final and detailed report at least 45 days before the next annual meeting of the Board.

7) The report shall include the final recommendations of the committee as to any action of the Board it deems desirable together with detailed plans for the implementation of those recommendations and the detailed factual basis for them.

8) The sum of five thousand dollars (\$5,000) is appropriated from the surplus funds of the League, as of this date, to defray the expenses of the committee, and disbursements shall be made only in payment of written voucher approved by the chairman of the committee.

61) Moved, by Mr. Collett, that directors be allowed the same mileage rate expense basis on shortest route to annual meeting and return as now permitted within Division. But, after discussion, unanimous consent being given, Mr. Collett withdrew the motion.

62) On motion of Mr. Caveness, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of this date, the sum of four thousand five hundred dollars (\$4,500) for the purpose of defraying the expenses of holding this meeting of the Board of Directors, any unexpended remainder of same to be restored to surplus.

63) On motion of Mr. H. W. Johnston, after discussion, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of January 1, 1949, the sum of eight thousand eight hundred dollars (\$8,800) for the legitimate administrative expenses of the directors in the calendar year 1949, the said amount allocated as follows:

Canadian General Manager.....	\$350
Atlantic Division Director.....	500
Central Division Director.....	750
Dakota Division Director.....	600
Delta Division Director.....	700
Great Lakes Division Director.....	400
Hudson Division Director.....	700
Midwest Division Director.....	750
New England Division Director.....	400
Northwestern Division Director.....	600
Pacific Division Director.....	500
Roanoke Division Director.....	300
Rocky Mountain Division Director.....	500
Southeastern Division Director.....	450
Southwestern Division Director.....	500
West Gulf Division Director.....	800

any unexpended remainders of these funds at the end of the year 1949 to be restored to surplus.

64) On motion of Mr. H. W. Johnston, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of this date, the sum of five hundred dollars (\$500) for the purpose of defraying the expenses of the Finance Committee, and the sum of two thousand dollars (\$2,000) for the purpose of defraying the expenses of the Planning Committee, any unexpended remainder of either on the date of the next annual meeting of the Board to be restored to surplus.

65) Moved, by Mr. H. W. Johnston, that the sum of two thousand dollars (\$2,000) be hereby appropriated from the surplus of the League, as of this date, for the purpose of defraying the traveling expenses of the Section Communica-

tions Managers and QSL Managers of the League, in the period between this date and the date of the next annual meeting of the Board, as follows: (1) Within the continental limits of the United States and Canada, SCMs to attend one official ARRL convention within their respective divisions. (2) Within ARRL sections in the continental limits of the United States and Canada, SCMs to attend in their own section, in addition to the above, no more than five major ARRL organizational meetings per year, to include hamfests only if sponsors schedule an ARRL organization meeting. (3) Within the continental limits of the United States and Canada, QSL Managers of the League to attend one official ARRL convention within their respective call areas, providing such convention be held within 500 miles of the QSL Manager's residence. And it is further moved that reimbursement be made in all the above at the rate of 10 cents a mile via the shortest commonly-traveled route if personal transportation be used or in the exact amount of the fare if railroad or bus be used. In (1) and (3) expenses may include one night's hotel accommodation at actual cost but not to exceed four dollars and the convention registration fee. All allowances for expenses shall be subject to approval by the Communications Manager in the case of the SCMs, and by the Secretary in the case of QSL Managers, of a report submitted with the itemized request for reimbursement, covering the representation of ARRL accomplished, the attendance at an organization meeting discussion, questions, recommendations, or QSLs distributed, etc., by the individual attending the meeting. At the end of the designated period, any unexpended remainder of this appropriation shall be restored to surplus. On motion of Mr. Groves, unanimously VOTED that the motion is amended by striking the words "one night's" and the words "not to exceed four dollars". After further discussion, moved, by Mr. Collett, that consideration of the matter be exclusive of Canada; but there was no second, so the motion was lost. After further discussion, on motion of Mr. Martin, unanimously VOTED that the motion is amended to provide that where travel is requested outside of the area indicated, the Communications Manager shall be permitted to use his discretion to the good of the League. The question then being on the original motion as amended, the same was unanimously ADOPTED.

(67) After a discussion of matters concerning the Bogotá conference, on motion of Mr. Shelton, unanimously VOTED that there is appropriated from the surplus of the League, as of January 1, 1949, the sum of five thousand dollars (\$5,000) for the purpose of defraying the expenses of representation at and participation in the Inter-American regional conference at Bogotá, Colombia, now scheduled for early 1949, any unexpended remainder of same to be restored to surplus.

(68) On motion of Mr. Caveness, the Board recessed at 11:20 p.m., under order to reassemble at 9:00 a.m. on the morrow. The Board reassembled at the same place on May 8, 1948, and was called to order by the Chair at 9:00 a.m., with all directors and other persons hereinbefore mentioned in attendance.

(69) Pursuant to order, Mr. Caveness, reporting for the Planning Committee, stated that the committee relied upon its written report already transmitted to the Board. On motion of Mr. H. W. Johnston, unanimously VOTED that the report of the Planning Committee is accepted and the same placed on file.

(70) On motion of Mr. Martin, unanimously VOTED, at 9:12 a.m., that the Board does now resolve itself into a Committee of the Whole for the consideration of matters concerning amateur regulations on which recommendations to FCC are anticipated. The Chair appointed himself chairman of the Committee of the Whole. The Committee rose at 2:46 p.m. and Mr. Bailey, as chairman of the Committee, laid before the Board the report and recommendations of the Committee, from which the following actions ensued:

a) On motion of Mr. Richelieu, VOTED, without dissent, 15 votes in favor to none opposed, with two abstentions, that the Secretary is directed to request the Federal Communications Commission, in the name of the League, to make the frequencies 3800 to 4000 kc. available for Class A radiotelephone operation.

b) On motion of Mr. Caveness, RESOLVED, 15 votes in favor to 1 opposed, with 1 abstention: that the 7-Mc. band should be retained as it now is, exclusively c.w.

c) Moved, by Mr. Richelieu, that the Secretary be directed to request FCC, in the name of the League, to make available for Class A amateur radiotelephone operation the frequencies 14,200-14,400 kc. until the effective date of the Atlantic City allocations, reverting then to 14,200-14,350 kc. The yeas and nays being ordered upon request, the result was a tie: Whole number of votes cast, 16; necessary for adoption, 9; yeas, 8; nays, 8. Those who voted in the affirmative are Messrs. Canfield, Caveness, Collett, Dosland, Groves, Martin, Matejka and Richelieu. Those who voted opposed are Messrs. Jepsen, H. W. Johnston, J. M. Johnston, Ludley, Noble, Reid, Shelton and McCargar. Mr. Bird and the President abstained. On motion of Mr. Matejka, VOTED, 12 votes in favor to 5 opposed, that the matter shall lie on the table. Messrs. Collett, Dosland, Groves and Richelieu requested to be recorded as voting opposed to tabling. So the Board decided to make no request concerning this band.

d) On motion of Mr. Bird, VOTED without dissent, 14 votes in favor to none opposed, that the Secretary is directed to request the Federal Communications Commission, in the name of the League, to amend the regulations governing the band 50-54 Mc. to provide for the following subdivisions by types of emission:

- 50.0 to 54.0 Mc. — A1
- 50.1 to 54.0 Mc. — A2, A3, A4, n.f.m. 'phone
- 51.0 to 54.0 Mc. — A8
- 52.5 to 54.0 Mc. — F.m. 'phone and telegraphy, wide-band included

e) On motion of Mr. H. W. Johnston, RESOLVED without dissent, 15 votes in favor to none opposed; that the Board of Directors recommends to amateurs that, in amplitude-modulated, frequency-modulated and phase-modulated transmitters operating on frequencies below 14.4 Mc., sideband components more than 3000 cycles from the carrier be reduced at least 20 db. below the unmodulated carrier amplitude.

f) On motion of Mr. Richelieu, VOTED without dissent, 12 votes in favor to none opposed, that the Secretary is directed to request the Federal Communications Commission, in the name of the League, to maintain and put on a permanent basis the present temporary authorization of narrow-band frequency- and phase-modulated telephony, in frequency ranges in the 75-meter and 20-meter bands which the Board shall now determine. On motion of Mr. Groves, VOTED without dissent, 16 votes in favor to none opposed, that the Board desires the authorization for narrow-band f.m. and p.m. telephony to be the lowest 50 kilocycles which FCC authorizes for 'phone operation within the bands 3500-4000 kc. and 14,000-14,400 kc.

g) On motion of Mr. Collett, unanimously VOTED, 17 votes in favor to none opposed, that the Secretary is directed to request the Federal Communications Commission, in the name of the League, to require all applicants for Class A privileges to pass a code examination at sixteen words per minute.

h) Moved, by Mr. Dosland, that a regulation be sought requiring new licensees to operate one year on c.w. before having 'phone privileges on frequencies below 30 Mc. On motion of Mr. McCargar, RESOLVED, at 3:10 p.m.: that the Board does now again resolve itself into a Committee of the Whole for the clarification of the intent of this proposal. At 3:27 p.m. the Committee rose and Mr. Bailey, as its chairman, reported to the Board its amended recommendation in this matter. Pursuant thereto, on motion of Mr. Dosland, VOTED, 13 votes in favor to 3 opposed, that the Secretary is directed to request the Federal Communications Commission, in the name of the League, to amend the amateur regulations to provide that a new licensee be denied, during his first year, the right to operate radiotelephony on frequencies below 30 Mc.

i) Moved, by Mr. Richelieu, that the subject of recommendations to FCC concerning telephony authorizations in the 14-Mc. band be taken from the table. But the said mo-

(Continued on page 118)

# An Inexpensive and Compact 2-Meter Mobile Transmitter

BY EVERETT D. GIBBS,\* W2FI

WITH the practically universal change to superhet receivers on the 2-meter band in the New York area last season, the writer found that his former mobile rig was no longer an acceptable means of communication. It was decided, therefore, to build a mobile unit sufficiently stable for the "new order," and at the same time include such other features as moderate cost, low over-all battery drain, neat-and-compact design, and reasonable power output.

The standard 300-volt 150-ma. dynamotor was judged to be about all the battery and generator system of a 1941 Chevrolet would handle, so the design of the unit was attacked with this limitation in mind. An 832, running at about 50 ma. plate-and-screen current, would give us the output we wanted, and a pair of 6V6s would furnish the necessary audio with an additional drain of about 50 ma. Then began the search for an r.f. driver that would furnish that "0.15 watt" of driving power which the tube books say is required for an 832.

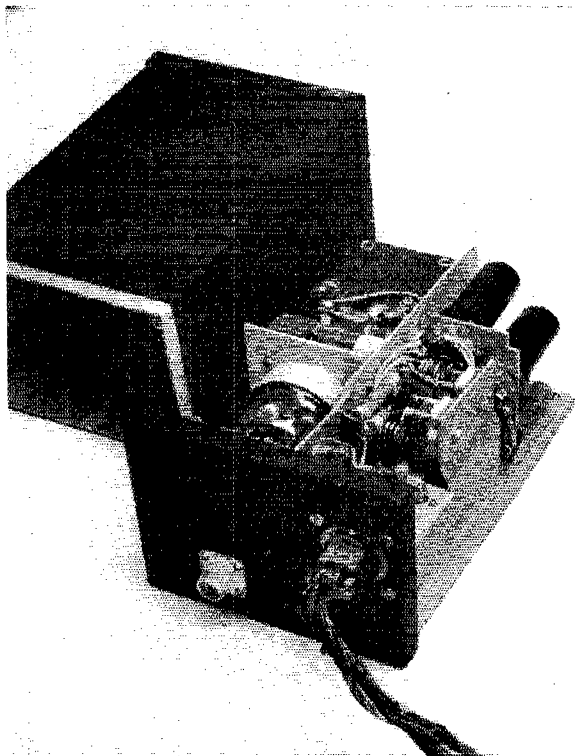
The original intent was to employ crystal control, but after many combinations were tried and found wanting, from the standpoint of excessive plate current, it was decided to use a stable oscillator at half the output frequency and double in a 6AQ5 to 144 Mc. The 6AQ5 had already been found to provide about 2.5 ma. of grid current in the 832 when used in this way, leaving only the problem of achieving a sufficiently stable oscillator.

This oscillator would have to have more than sufficient output capability to drive the 6AQ5, for the weak point in

most MOPA designs is that the oscillator is too heavily loaded, resulting in poor stability. A pair of 6J6s in push-pull parallel, operated as a tuned-plate oscillator, did the trick very nicely. When the number of turns on the grid coil is adjusted so that the oscillator plate current rises with increasing load, both the long- and short-term stability are excellent. A frequency setting of 146 Mc. made several months ago was checked recently at 146.15 Mc.

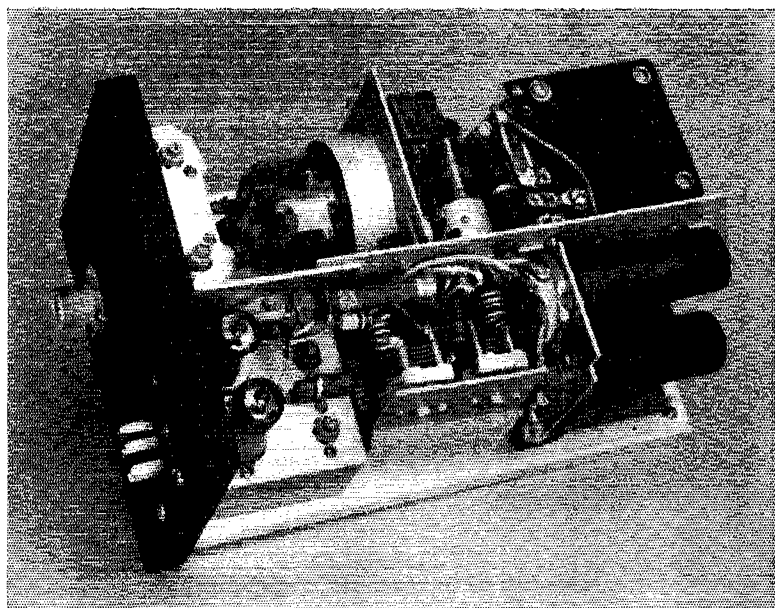
## A Few Precautions

Don't make the oscillator coils self-supporting; wind them on solid forms and cement the windings in place. With the self-supporting coils originally used, an annoying 400-cycle tone was heard in sharp receivers when the car was in motion, the result of mechanical resonance in the plate tank coil.



\* 18 Devon St., Malverne, L. I., N. Y.

◆  
The complete W2FI mobile transmitter is housed in an aluminum box only 4½ by 5¾ by 9½ inches in size. This case is mounted in the car permanently, but the unit is readily removed for servicing or adjustment.  
◆



Top view of the 144-Mc. mobile transmitter. At the lower left is the push-pull-parallel 6J6 oscillator, with the doubler circuits at the center and the 6V6 modulator tubes at the right. Across the top are the 832, 6AQ5 and modulation transformer.

Don't overcouple the doubler to the oscillator. In this unit, the optimum spacing turned out to be one inch between the oscillator plate and doubler grid coils. Greater coupling resulted in pulling of the oscillator frequency when the following stages were tuned.

Don't try to get along with one 6J6. It will work, but the plate current will not be substantially less, and the stability will suffer.

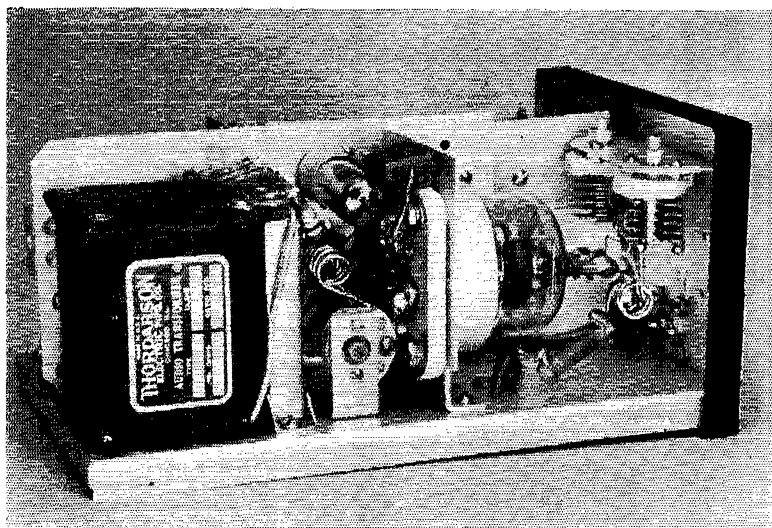
Don't try to run the audio tubes in push-pull. As the microphone drives the audio grids directly, the audio voltage is limited. Only half as much

voltage is required at the audio grids with the tubes in parallel as would be needed if push-pull were employed. Check the polarity of the primary and secondary windings of the modulation transformer by a listening test. Use a large by-pass condenser across the microphone supply. As much as 200  $\mu$ fd. is fine; motorboating will be experienced if the value is too low.

#### *Mechanical Features*

The unit measures only  $4\frac{1}{2}$  by  $5\frac{3}{4}$  by  $9\frac{1}{2}$  inches, and is removable from its box, which is

Side view of the 2-meter mobile rig, showing the arrangement of the 832 tank circuits. Note the use of the compact and inexpensive trimmers, in place of the split-stator types which would normally be used in such applications.



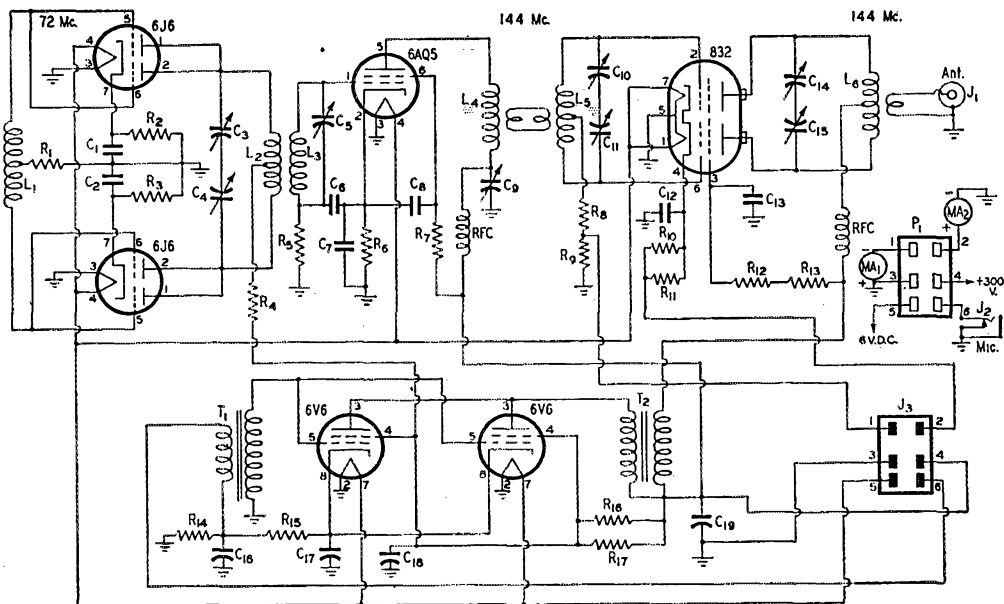


Fig. 1 — Schematic diagram of the 2-meter mobile transmitter.

- C<sub>1</sub>, C<sub>2</sub>, C<sub>6</sub>, C<sub>18</sub> — 470- $\mu$ fd. mica.
- C<sub>3</sub>, C<sub>4</sub>, C<sub>8</sub>, C<sub>9</sub> — 25- $\mu$ fd. air trimmer.
- C<sub>7</sub>, C<sub>8</sub> — 150- $\mu$ fd. mica.
- C<sub>10</sub>, C<sub>11</sub> — 15- $\mu$ fd. air trimmer.
- C<sub>14</sub>, C<sub>15</sub> — 15- $\mu$ fd. air trimmer, double-spaced.
- C<sub>12</sub> — 0.001- $\mu$ fd. mica.
- C<sub>16</sub> — 200- $\mu$ fd. 10-volt electrolytic.
- C<sub>17</sub> — 10- $\mu$ fd. 50-volt electrolytic.
- C<sub>18</sub> — 0.1- $\mu$ fd. 400-volt paper.
- C<sub>19</sub> — 1.0- $\mu$ fd. 400-volt paper.
- R<sub>1</sub> — 4700 ohms.
- R<sub>2</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>14</sub> — 100 ohms.
- R<sub>4</sub> — 1500 ohms.
- R<sub>5</sub> — 68,000 ohms.
- R<sub>7</sub>, R<sub>8</sub> — 22,000 ohms.
- R<sub>9</sub> — 2200 ohms.
- R<sub>10</sub>, R<sub>11</sub> — 220 ohms, 1 watt.
- R<sub>12</sub>, R<sub>13</sub> — 3300 ohms, 2 watts.
- R<sub>15</sub> — 220 ohms.
- R<sub>16</sub> — 3500 ohms, 2 watts.
- R<sub>17</sub> — 3000 ohms, 2 watts.

All resistors 1-watt type unless otherwise specified.

- L<sub>1</sub> — 14 turns No. 24 enamel,  $\frac{1}{4}$ -inch diameter,  $\frac{3}{4}$  inch long, center-tapped.
- L<sub>2</sub> — 10 turns No. 16 tinned,  $\frac{3}{8}$ -inch diameter,  $\frac{3}{4}$  inch long, center-tapped.
- L<sub>3</sub> — 8 turns No. 16,  $\frac{3}{8}$ -inch diam.,  $\frac{3}{4}$  inch long.
- L<sub>4</sub> — 5 turns No. 16,  $\frac{3}{8}$ -inch diameter,  $\frac{1}{2}$  inch long.
- L<sub>5</sub> — 5 turns No. 16,  $\frac{3}{8}$ -inch diam.,  $\frac{5}{8}$  inch long, center-tapped. Link between L<sub>4</sub> and L<sub>5</sub> has one turn each of push-back wire at the cold end of L<sub>4</sub> and the center of L<sub>5</sub>.
- L<sub>6</sub> — 4 turns No. 16,  $\frac{3}{8}$ -inch diam.,  $\frac{5}{8}$  inch long, center-tapped. Antenna coupling: one turn of push-back wire, at the center of L<sub>6</sub>.
- J<sub>1</sub> — Coaxial connector.
- J<sub>2</sub> — Closed-circuit jack.
- J<sub>3</sub> — 6-prong male connector.
- MA<sub>1</sub> — 0-10-ma. grid meter.
- MA<sub>2</sub> — 0-100-ma. cathode meter.
- P<sub>1</sub> — 6-prong female connector.
- RFC — V.h.f. r.f. choke.
- T<sub>1</sub> — Single-button microphone transformer.
- T<sub>2</sub> — Modulation transformer, 4000-ohm plate impedance to 5000-ohm load.

permanently mounted in the car. To save the expense of the more-costly standard-split-stator tank condensers, two simple screwdriver-adjustment trimmers were employed where split-stator types would normally be used. The unit was constructed by the subassembly method, as may be seen from the photographs, this being the only satisfactory way to achieve really compact construction.

Power for the unit is brought in on a standard plug, a duplicate of which may be used to connect the rig to an a.c. supply for bench testing or operation at the fixed station. This feature is a life-saver, in case trouble develops in the automobile installation.

### About the Author

• Everett D. Gibbs, W2FI, has held that call since 1929, having been active in amateur radio since 1919, when he was first licensed as 1ADN. A graduate of Worcester Polytechnic Institute in 1928, he is president of the Nassau Radio Club, EC for Nassau County, and OBS. His principal interest in amateur radio is the construction of v.h.f. gear. W2FI is employed by Erco Radio Lab, Garden City, L. I., in the capacity of production manager.

# An S.S.S.C. Transmitter Adapter

## An Exciter Using the "Phasing" Principle

BY RAY L. DAWLEY,\* W6DHG

THE use of single-sideband suppressed-carrier transmission for amateur radiophone operation offers many advantages,<sup>1</sup> both to the station using this method of transmission and to the amateur fraternity as a whole. The fact that an s.s.s.c. station requires slightly less than one-half the spectrum in kilocycles as compared to a conventional a.m. station transmitting the same audio-frequency range is of basic importance. Further, the absence of a carrier in an s.s.s.c. signal means that the bedlam of heterodynes between carriers on the amateur 'phone bands can be eliminated. True, the carrier heterodynes would be replaced on a band loaded with s.s.s.c. signals by heterodynes between sidebands. It is difficult to visualize how such a band might sound. But certainly the duty cycle of interference under such conditions with the same number of stations operating would be greatly reduced. Each station would be transmitting a signal only at the particular instant when the operator was talking. The amplitude of signal transmitted could be, particularly when duplex operation was in use, only that amount necessary to sustain communication. Since the power output of an s.s.s.c. transmitter is proportional to the signal level, it is only necessary to reduce the gain setting on a kilowatt station to cut the peak power output down to perhaps 20 to 50 watts, if this amount is all that is required to sustain good communication. There would be neither need nor justification for an "S9-plus-40-db." signal when the level of interference was far below this value.

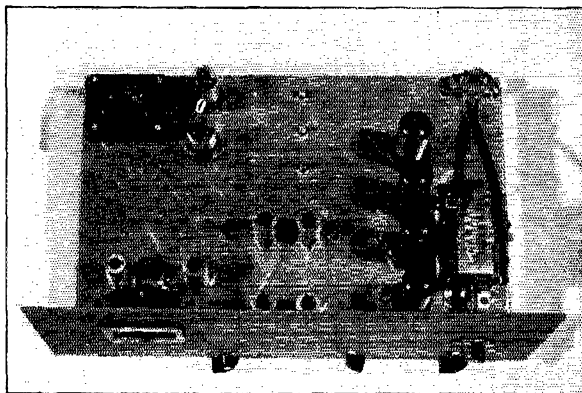
From the point of view of the station operator,

\*Editor, *Radio Handbook*, Santa Barbara, Calif.

<sup>1</sup> Donald E. Norgaard, "What About Single Sideband?" *QST*, May, 1948.

• S.s.s.c. operation can be added to an existing c.w. or 'phone transmitter by inserting an adapter unit between the present exciter portion and the final amplifier stage. The adapter described in this article has output power to spare when driving a beam-tetrode final amplifier to one-kilowatt input. No expensive or unduly critical components are required; circuit-adjustment procedure is within the capabilities of the average amateur who "builds his own." The circuit details were derived and the adapter unit was constructed in the *Radio Handbook* laboratory.

the s.s.s.c. system offers many additional advantages. In the first place, the additional investment required to convert a c.w. station to s.s.s.c. is modest. An adapter unit such as described later on may in many cases be constructed almost in entirety from components found around the average ham shack. Second, the use of s.s.s.c. gives a very marked increase in the maximum effectiveness of a particular transmitter, even when that transmitter is already running a kilowatt with high-level plate modulation. And third, s.s.s.c. is very easy on the power bill. The average power taken by the final plate supply even of a kilowatt (peak) transmitter during a period of transmission will probably be found to be less than that required by filaments and low-voltage power supplies. Of course, the use of speech clipping in connection with s.s.s.c. transmission would alter this picture somewhat, but the total power requirement would still be materially less than that



The s.s.s.c. exciter unit used at W6DHG will drive a pair of beam tetrodes to 1-kw. peak input at 14 Mc. The exciter shown is complete except for the frequency-control unit and a power supply for the four 6L6s.

required for high-level plate modulation of the same transmitter.

An additional advantage of s.s.s.c. transmission, and this must be chalked up as tentative until proven, is that BCI seems to be reduced when changing from conventional a.m. to s.s.s.c. with a comparable peak power level. If this is found to be fact, it will be because the effective modulation percentage of the signal emitted by an s.s.s.c. transmitter is somewhat lower than that of a 100%-modulated conventional a.m. transmitter. Also, the BCL will be unable to understand what is being said!

There are at least two basic methods of generating an s.s.s.c. signal. The first might be called the "brute-force" method or the "classic" method. This consists of generating a double-sideband suppressed-carrier signal at a frequency low enough so that one sideband may be removed by filters. This method has been in use by the telephone company for many years, and was first

reported in use by amateur station W6DEI in 1933.<sup>2</sup> A modernized and improved system has recently been described by WØTQK.<sup>3</sup>

The second system might be called the "phasing" method (or the system with finesse). It consists essentially of two balanced modulators whose outputs are combined, operating 90 degrees out of phase both with respect to r.f. and a.f. It has long been known as a mathematical exercise but has not been completely practicable as a method for the transmission of a speech or music signal because a simple method was not known for the introduction of a constant phase shift of 90° into a band of audio frequencies. This situation was rectified by Dome in 1946<sup>4</sup> with his disclosure of a method for obtaining such a phase shift over an audio-frequency band. A detailed discussion of this system has been given in *QST*.<sup>5</sup>

lators whose outputs are combined. The r.f. signal fed to the balanced modulators can be at the actual frequency upon which it is desired to operate the transmitter. Theory teaches us that a quadrature relationship may be obtained by the use of two coupled circuits, both resonant at the operating frequency. Such a system is adequate, and has been used in several s.s.s.c. transmitters, but it has the disadvantage that both circuits must be carefully tuned to obtain the proper 90° phase shift. Then, with VFO operation, if an appreciable change in the frequency of operation is desired the two circuits must be retuned to obtain the proper phase shift again.

The circuit arrangement diagrammed in Fig. 1 uses a low-Q arrangement to obtain the phase shift, and once properly adjusted for either the 4- or 14-Mc. 'phone band it will stay sufficiently close over the entire band. As can be seen from Fig. 1, two RC networks and two RL networks are used to obtain the "four-phase" r.f. signal

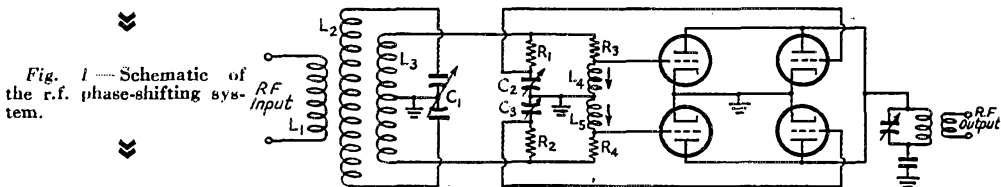


Fig. 1 — Schematic of the r.f. phase-shifting system.

needed to excite the grids of the two balanced modulators. The center-tapped coil,  $L_3$ , provides two signals with a 180° phase difference. The two RC networks are then used to obtain a 45° voltage phase lag from the 180° signals, and the RL networks are used to obtain a 45° voltage phase lead. The 45° phase shift in each case is obtained by making the resistance equal in value to the reactance with which it is in series. Or rather, as a practical matter, the four series resistors are made all the same value and then the net reactances in each of the four branches are made equal to the resistance value. Other broadband methods of obtaining the polyphase r.f. signal may suggest themselves, but the method described has proven to be the most satisfactory of those tried.

### Obtaining the R.F. Phase Shift

The phase-shift method of obtaining an s.s.s.c. signal requires in essence that quadrature audio and quadrature r.f. be fed to two balanced modu-

Since the RC combinations introduce a voltage phase lag of 45° from each end of the coupling coil  $L_3$ , the two grids being fed by the RC networks ( $R_1C_2$  and  $R_2C_3$ ) are being fed 180 degrees apart with respect to each other. Then, the RL networks ( $R_3L_4$  and  $R_4L_5$ ) introduce a phase lead of 45°, but again the two grids being fed by these networks have a 180° phase relation with respect to each other. Hence, the net phase difference between the pair of grids being fed by RC networks and the pair being fed by the RL networks is 90°. In this way we meet the requirement of having two balanced modulators operating with an r.f. phase difference of 90 degrees.

<sup>2</sup> Robert M. Moore, "Single-Sideband Transmission," *R/E*, Sept.-Oct., Dec., 1933, Jan.-Feb., 1934.

<sup>3</sup> Arthur H. Nichols, "A Single-Sideband Transmitter for Amateur Operation," *QST*, Jan., 1948.

<sup>4</sup> R. B. Dome, "Wideband Phase-Shift Networks," *Electronics*, Dec., 1946.

<sup>5</sup> Donald E. Norgaard, "A New Approach to Single Sideband," *QST*, June, 1948.

### Obtaining the Proper Reactance for the Networks

Fig. 2 shows the actual manner in which the proper value of shunt reactance is obtained from grid to ground on each of the four grids of the balanced modulators. The 6L6 tubes used have an effective value of input capacitance of approximately 11  $\mu\text{mf}$ . This value of capacitance is indicated by  $C_i$  in Fig. 2. The reactance of this

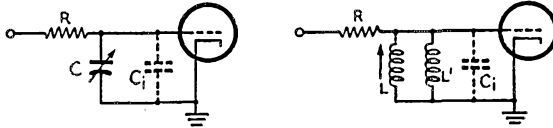


Fig. 2—Detail of the resistance-reactance networks used to feed the grids of the balanced-modulator tubes.  $C_i$  represents the input capacitance of the tube plus distributed capacitance.  $C$  adds to this capacitance in the case of the  $RC$  networks. In the case of the  $RL$  networks  $C_i$  must be neutralized by equivalent inductance  $L'$ , which is a portion of the inductance,  $L$ , from grid to ground.

amount of capacitance is low enough at amateur-band frequencies so that it must be taken into account in the calculation of the values of reactance that will be included in the circuit from each grid to ground. In the case of the  $RC$  networks, additional capacitance is simply added to the existing input capacitance of the tubes until the proper total value is obtained. However, in the case of the  $RL$  networks the input capacitance,  $C_i$ , of the tubes must first be neutralized by placing the proper amount of inductance from grid to ground, and then an additional amount of inductance is included in parallel with the resulting combination so that the net input reactance of the tubes is inductive and has a value of reactance equal in magnitude to the resistance from which the combination is being fed. In practice the two values of inductance  $L$  and  $L'$  from grid to ground are lumped into a single inductor which uses a tuning slug to allow adjustment of the net value of inductance.

### Obtaining the Proper Audio Phase Shift

As was mentioned before, it is necessary that one balanced modulator be fed with an audio signal having a phase difference of 90 degrees with respect to the audio signal fed to the other balanced modulator. In the case of a system for the transmission of speech, such as is the transmitter unit to be described, this means that the audio signals fed to the two balanced modulators must have a constant phase difference of 90 degrees over the entire speech range to be transmitted.

In the equipment to be described this requirement is met through the use of the audio phase-shift method of Dome,<sup>4</sup> which has been men-

tioned. Fig. 3 is a schematic drawing of the audio phase-shifting stage in the s.s.s.c. adapter unit. Single-phase audio from the speech pre-amplifier is fed to the grid of the "hot-cathode" phase inverter. The plate and cathode of the phase inverter are coupled to the two audio phase-shifting networks. The signals obtained from the output terminals of the phase-shift networks have a constant phase difference quite close to 90 degrees over the speech frequency range of approximately 125 to 3000 cycles.

### Block Layout of the S. S. S. C. Adapter Unit

Fig. 4 is a block diagram of the complete s.s.s.c. adapter unit. The r.f. circuit of the unit is quite simple, but a total of 11 tube elements in 6 tube envelopes is required to generate the proper audio signal and to impress this signal on the control grids of the r.f. balanced-modulator stage. Included in Fig. 4 is a group of numbers that represent the approximate peak audio-signal level at each stage when the volume control is at maximum and an input peak voltage of 10 millivolts is fed to the microphone jack. In practice the crystal microphone used with such a unit will have an output voltage several times this value with normal talking; hence it will be possible to reduce the setting of the volume control and still have adequate signal gain.

The input stage of the speech amplifier is quite conventional and uses a 6AU6 tube. All the other stages of the speech amplifier use sections of the Type 12AU7 tube. This tube type actually is a pair of 6C4s in a single miniature envelope having the new 9-pin base. Three leads are brought out so that the heater may be run from either a 6.3- or 12.6-volt source. Type 6SN7GT tubes could just as well have been used in each of the circuit positions where a 12AU7 is shown, but a 6SN7GT requires twice the heater power of a 12AU7.

The second stage of the audio system is a voltage amplifier that feeds through a simple low-pass audio filter having a cut-off of about 2800 cycles. The output of this filter is connected directly to the grid of the phase inverter that

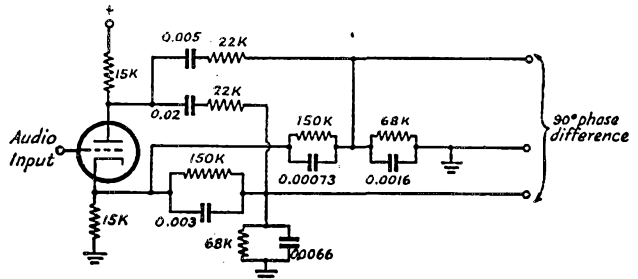


Fig. 3—The audio phase-shifting network, showing  $R$  and  $C$  values.



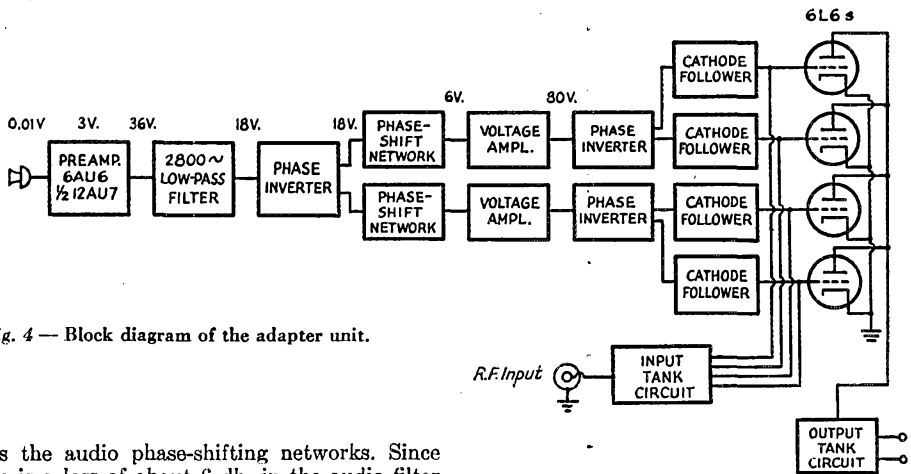


Fig. 4 — Block diagram of the adapter unit.

feeds the audio phase-shifting networks. Since there is a loss of about 6 db. in the audio filter and 10 db. more in the audio phase-shifting networks, it is necessary to add a voltage-amplifier stage in each of the audio channels. These two stages again are directly coupled to the preceding stage so that a minimum of components will be required. Since the grids run positive with respect to ground, a high value of bias resistor is used in each of these voltage-amplifier stages, so that the proper value of operating grid-to-cathode voltage will be obtained on the tubes.

The two balanced modulators require that push-pull audio voltage be fed to their grids, and it is necessary to add a phase-inverter stage in each audio channel. Since the "hot-cathode" type of phase inverter requires that a positive voltage with respect to ground be applied to the grid, this voltage is obtained through a high value of isolating resistance from the most convenient spot having an average potential of positive 60 volts — the output of the low-pass audio filter.

#### The Grid-Bias Modulation System

The four elements of the last two 12AU7s act as grid-bias modulators for the four 6L6s in the r.f. stage. Each of the four tube elements feeds the grid of one of the four 6L6s in the r.f. stage. The tube sections serve as bias regulators and in addition act as cathode followers, to supply audio voltage with relatively good regulation superimposed upon the average value of d.c. bias voltage. With appropriate tubes used as cathode followers, this system of grid-bias modulation is, incidentally, quite effective for use with any type of r.f. amplifier stage up to quite sizable power levels.

It is necessary to have some means for balancing each of the balanced modulators and, in addition, to have some means for balancing the output of one balanced modulator with respect to the other. In the unit shown these functions are accomplished through the use of potentiometers

$R_2$ ,  $R_3$  and  $R_4$  in Fig. 5.  $R_2$  and  $R_3$  act as balancing potentiometers for each of the balanced modulators and  $R_4$  provides the adjustment between the relative outputs of the two balanced modulators. Each of these potentiometers acts by varying the average bias on the grids of the elements of the 12AU7 modulators. Variation in the grid bias on these tubes results in a proportional change in the cathode voltage on the tube and hence in the grid bias on the 6L6 tube to which the cathode is connected.

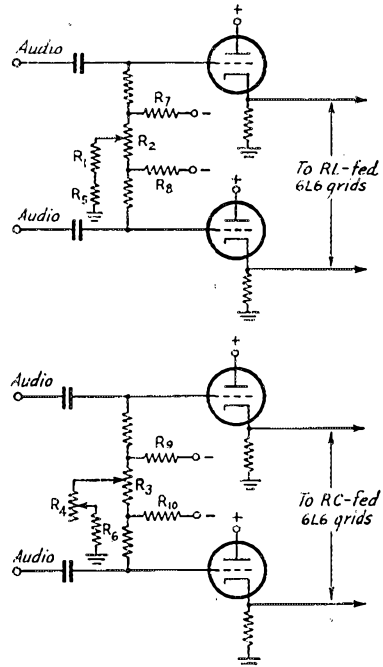


Fig. 5 — Showing the balancing system for the r.f. portion of the adapter.

### Operating Conditions for the Balanced-Modulator Stage

Fig. 6 shows two basic circuit arrangements for the double balanced-modulator stage that generates the s.s.s.c. signal. Fig. 6-A shows the push-pull input and single-ended output system used in the adapter unit to be described. Fig. 6-B shows an analogous circuit arrangement with single-ended input and push-pull output circuits

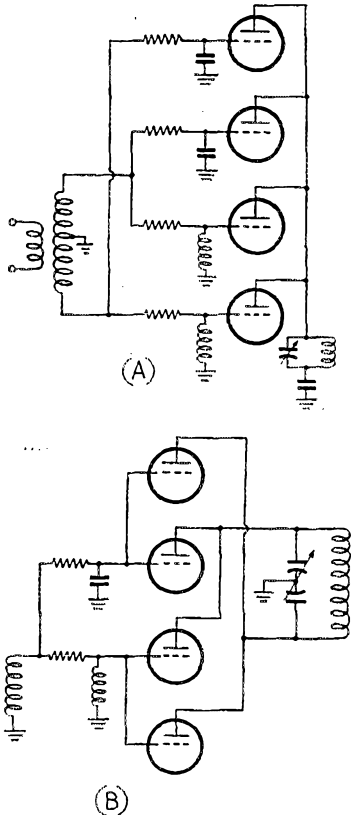


Fig. 6—Alternative circuits for double balanced modulators.

that might give improved circuit balance in the higher frequency range.

Both circuit arrangements are suitable for use at low level or for the generation of moderate amounts of power. Since the individual tubes in the stage operate into a load circuit whose voltage swing is not at all times in phase with the grid-exciting voltage, the plate-circuit efficiency is not as high as would be attained if the same tubes were operating as a conventional Class C amplifier. Approximate measurements of the unit to be described have shown that the plate efficiency is of the order of 40%. Such a stage may be used as the output stage in a high-power transmitter,

but higher over-all transmitter efficiency can be obtained by operating the s.s.s.c. stage at a moderate power level and following it with a Class B linear amplifier. Plate-circuit efficiency of the order of 65 to 70% may be obtained from the Class B final amplifier.

### Operating Conditions for the Adapter Unit

Fig. 7 shows the complete schematic diagram of the s.s.s.c. adapter unit shown in the photographs. Since the r.f. stage operates at relatively high plate current at low plate voltage under peak modulation conditions, a high-*C* plate tank circuit has been used. Actually a plate tank coil of standard manufacture for the 23-Mc. band has been used with approximately 140  $\mu\text{mfd.}$  of tuning capacitance, in order to give high-*C* operation on the 14-Mc. band.

The approximate unmodulated operating conditions for the four 6L6 tubes are as follows: plate voltage, 500; screen voltage, 300; d.c. grid bias at the tubes, 60 volts; peak value of r.f. exciting voltage per grid, 40. Under these conditions the static plate current on the four 6L6 tubes is approximately 125 ma. and the r.f. output is substantially zero, with proper adjustment of the elements. With 600-cycle audio input to the speech system and with the gain control adjusted such that about 25 volts peak is being applied to each of the 6L6 grids, the plate current will rise to approximately 225 ma. Under these conditions, a power output in the vicinity of 40 watts will be obtained. With a voice signal fed to the speech system, the plate current on the 6L6 tubes will rise on peaks to about 175 ma. A greater audio input will cause the plate current of the 6L6 tubes to rise to higher values, but distortion will result through overloading in the audio system.

Approximately 8 watts of r.f. driving power is required for the adapter unit to attain the operating conditions specified (40 volts peak to each of the four 6L6 grids). Substantially all of this driving power is dissipated in the four 470-ohm 2-watt composition resistors used in the r.f. phase-shifting network.

### Tuning & Adjustment

The tuning procedure for an s.s.s.c. generator unit of this type is not something to be taken lightly. However, the procedure is not difficult if it is done in an orderly manner and with proper test equipment. Three pieces of test equipment are required, in addition to the obvious accessories of an adequate exciter unit of good stability and a plate- and screen-power supply for the four 6L6s. These items of test equipment are: (1) either a vacuum-tube r.f. voltmeter or a high-sensitivity d.c. voltmeter. The sensitive d.c. voltmeter is actually to be preferred, since its use will introduce the least change into the operating conditions of the stage. (2) An audio oscillator capable of covering the range, or selected fre-

quencies within the range, from 125 to 3000 cycles. (3) A simple cathode-ray oscilloscope. Only the simplest type of oscilloscope is required since the requirements placed upon the time base are not stringent. Simple sine-wave a.c. sweep may be used, although an oscilloscope using a recently-described<sup>6</sup> simple modification of the a.c. sweep that gives a single-stroke time base 60 times per second has proven to be very satisfactory.

### Checking the Audio System

The d.c. voltages present within the speech portion should first be checked with a high-resistance voltmeter, to insure that the unit has been wired properly and that the tubes are operating at normal potentials. The 6L6 tubes should not be in their sockets for these audio checks. Then, with low-level sine-wave audio input at a frequency between 300 and 800 cycles, the amplifier should be checked in the normal manner to make sure that overloading does not take place in the audio system until a peak potential of at least 50 volts is available at the 6L6 grids. When these conditions have been attained, the operation of the audio phase-shifting networks may be checked.

The first procedure in checking the operation of the audio phase-shifting networks is to pad the cathode-ray oscilloscope so that equal deflection sensitivity will be obtained on both the horizontal and vertical sets of deflection plates. This procedure is quite simple and is as follows: (1) Turn down the "Intensity" control on the oscilloscope so that the screen will not be burned by allowing the spot to remain in one place for a period of time. (2) With no horizontal time base, apply the voltage from the secondary of a 6.3- or 10-volt filament transformer directly to the vertical deflection plates of the oscilloscope; measure the length of the line in inches or centimeters. (3) Apply exactly the same voltage directly to the horizontal deflection plates with no vertical signal; again measure the length of the line obtained

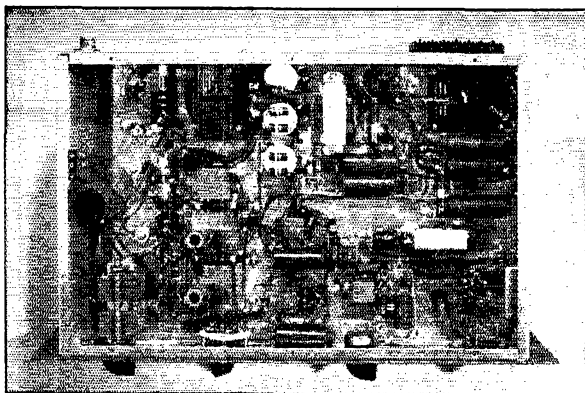
<sup>6</sup> *Radio Handbook*, 11th edition, p. 427.

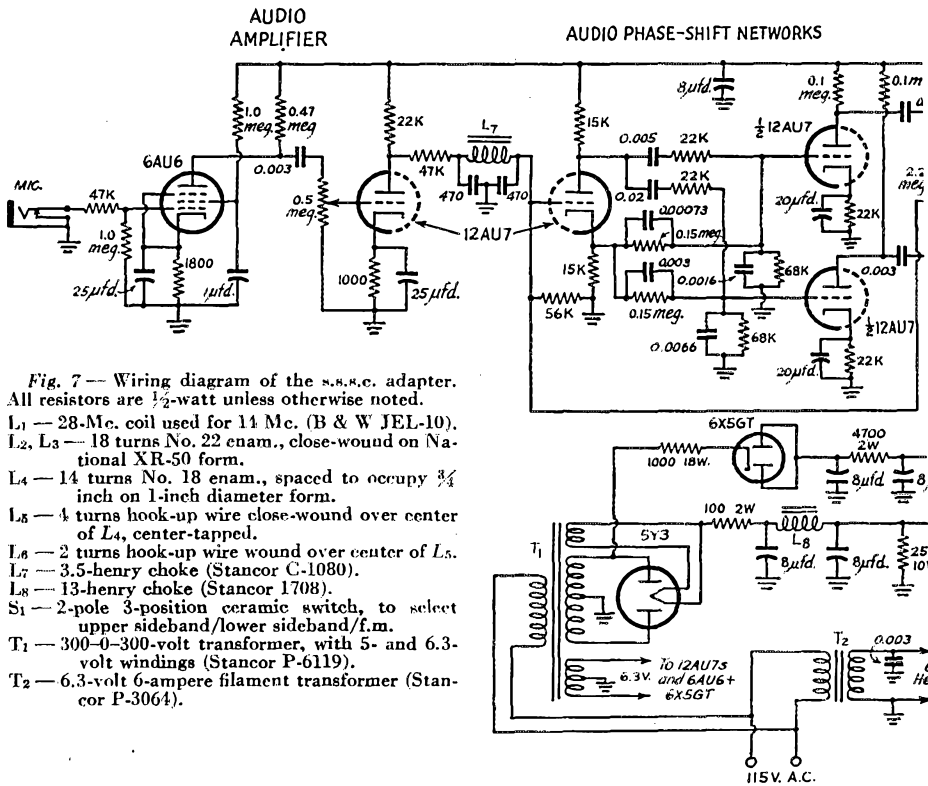
in the same units as used before. In all normal cases it will be found that the vertical deflection will be somewhat greater than the horizontal deflection.

The problem now is simply to use a very-high-impedance voltage divider of proper value in the circuit leads to the more sensitive set of deflection plates so that the net sensitivity to both sets of plates will be the same. As an example, suppose that the vertical plates give 1.3 times as much deflection for the same voltage as the horizontal plates. We then need  $1/1.3$  or 0.77 times as much sensitivity on the vertical plates. Since nearly all oscilloscopes already have a resistor from each deflection plate to ground, it is merely necessary to connect an external resistor of correct value in series with the lead to the most sensitive plate to obtain the sensitivity reduction. The value of this series resistor should be: [(ratio of deflection sensitivity) - 1] times the value of resistor from deflection plate to ground. In the case cited above, and assuming that there is a 5-megohm resistor from deflection plate to ground,  $1.3 - 1 = 0.3$ ,  $0.3 \times 5,000,000 = 1.5$  megohms. Hence a 1.5-megohm resistor should be connected in series with the external lead to the more sensitive deflection plate. The sensitivity-padding arrangement should now be checked again with the a.c. voltage source used before to insure that equal sensitivity is obtained on both the horizontal and vertical sets of plates.

The ground terminal of the oscilloscope should now be connected to the chassis ground of the adapter unit. Then, with all 6L6 tubes still removed from their sockets, and with no r.f. excitation to the unit, one deflecting plate should be connected to the grid terminal of the first 6L6 tube. Audio signal in the vicinity of 600 cycles should be applied to the microphone terminal of such amplitude that about one-inch deflection is obtained on the oscilloscope. Then the other deflection plate of the oscilloscope should be connected to the grid terminal of the next 6L6 tube in the line. A straight line should now be obtained on the oscilloscope. It will be 1.4 times as long

A view under the chassis of the s.b.a.c. exciter. The input tuning condenser for the r.f. excitation can be seen at the lower left, with its companion coil just above. The other panel controls are upper sideband/lower sideband/f.m. switch and audio gain control. The three balancing potentiometers can be seen at the top center, and the small ceramic phasing condensers can be found near the r.f. input coil.





as the original line and will be displaced  $45^\circ$  in direction from the first line. The second of the deflection plates should now be connected to the grid terminal of the third 6L6 tube. A circle should now be obtained on the face of the oscilloscope tube. The lead from the second deflection plate should now be moved to the grid of the fourth 6L6 tube. A circle again should be obtained. Now if the lead from the first deflection plate is moved to the grid of the third 6L6 a straight line again should be obtained, the same as is the case where the two 'scope leads were connected to the grids of the first pair of 6L6s.

Through the above procedure we have checked to make sure that the grids of both pairs of 6L6s are operating  $180^\circ$  out of phase as they should be for a balanced modulator (straight line at  $45^\circ$ ). In addition we have checked by means of the circles to make sure that the two pairs of 6L6s (balanced modulators) are operating  $90^\circ$  out of phase. If the values of the components in the audio phase-shifting networks have been checked carefully, and if all the other circuits are operating properly, the circles should be quite clean throughout the range from 125 to 3000 cycles. As the audio oscillator feeding the unit is tuned over the frequency range the circle should appear

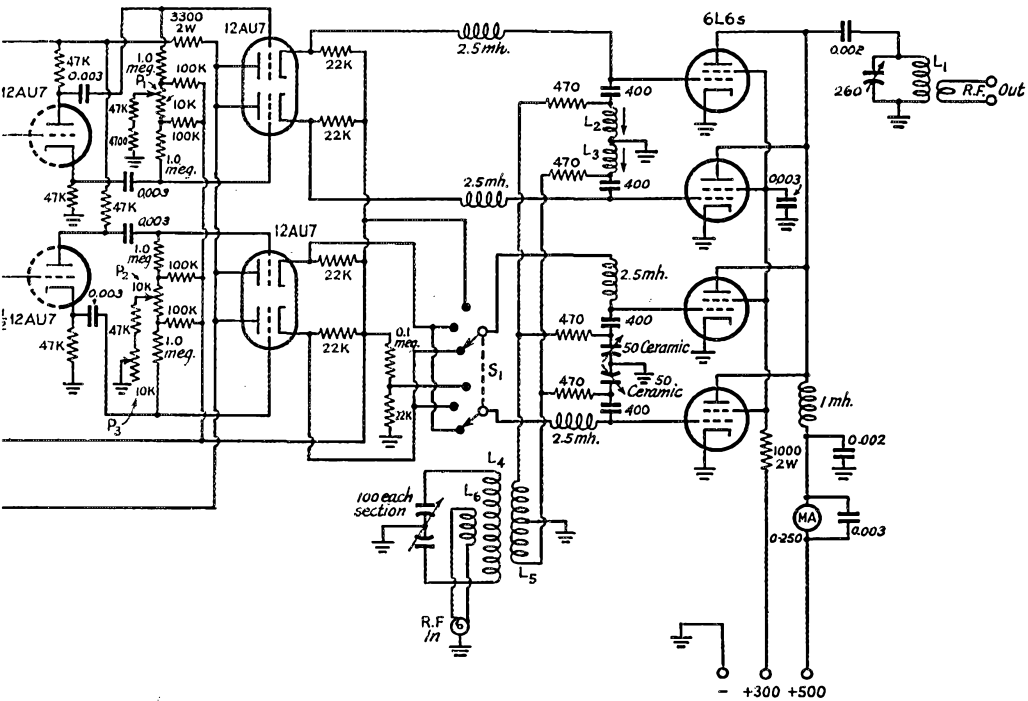
quite satisfactory, with only a moderate tendency toward looking like an ellipse near the extremes of the frequency range.

If the circles obtained are not quite good, the condition may be caused by overload, or the values of the components in the audio phase-shift networks may not be those values which have been quoted. Overload in the audio system is quite easily detected by the appearance of one or more flat sides on the "circle." However, the use of improper values in the phase-shifting networks will cause the "circle" to be elliptical and to "lean" either to the right or to the left. If overloading is being obtained, merely turn down the gain of the audio system until the overload condition disappears. However, if a leaning ellipse is obtained on the face of the 'scope it probably will be best to check the values of all the components in the phase-shift networks to make sure that their values are as listed in Figs. 3 and 7.

#### Alignment of the R.F. System

Probably the most satisfactory method for initially aligning the excitation to the grids of the 6L6s is first to remove the "audio" ends of the four r.f. chokes (which attach to the 6L6 grids) from any circuit connection. Then adjust the

## BALANCED MODULATORS



tuning slugs in the r.f. phasing coils to the point where the adjusting screw is about halfway along its travel. (6-32 nuts were soldered to the ends of the tuning-slug screws in the unit shown so that the slugs could be adjusted by means of a standard neutralizing wrench.) The variable ceramic capacitors on the other pair of 6L6 grids are now adjusted to the point where the rotors are about 20° from the position of minimum capacitance.

Now about 6 to 8 watts of excitation power should be applied, the split-stator capacitor that tunes the grid coil should be resonated, and the peak r.f. voltage appearing on each 6L6 grid should be determined by measuring with a high-sensitivity voltmeter (1000 to 20,000 ohms per volt) the d.c. voltage from the "open" end of each of the four r.f. chokes to ground. This voltage should be from 35 to 40 volts and should be within one-half volt of the same value on all four grids. A moderate touching-up of the slugs in the phase-shifting coils, and trimming of the rotor of the phase-shifting capacitors, should bring all four voltages to the same value.

In addition to the obvious requirements that proper d.c. potentials must exist on the electrodes and the fact that the audio-signal phase must be as mentioned previously, five conditions must exist in the 6L6 stage before completely satisfactory operation may be obtained. These conditions are: (1) The amplitude of the r.f. excitation

voltage on each 6L6 grid must be the same. (2) The phase of the r.f. signal on each grid must be proper (180° within each balanced modulator and 90° between the two balanced modulators). (3) The relative output from each balanced modulator circuit must be the same. (4) Loading on the plate circuit of the stage must be proper. (5) The balancing adjustments must have been made with sufficient accuracy so that carrier output is negligible. The procedure for making each of these adjustments will be described in turn.

The previous series of adjustments will insure that condition (1) has been met, but condition (2) has not necessarily been met by the adjustment. The procedure for meeting condition (2) is the most difficult but it will hold indefinitely over a complete amateur 'phone band when it has once been attained. The set-up is as follows: Excitation, plate and screen voltages, and audio signal at about 600 cycles are applied to the adapter unit. The audio gain control initially is turned down to zero gain. One set of deflecting plates of the oscilloscope is connected to the "R.F. Out" terminals of the unit while sawtooth or other sweep is applied to the horizontal deflection plates. A 5000-ohm 10-watt noninductive resistor is connected across the output tank circuit as a load. A small carrier deflection probably will now appear on the oscilloscope as the output tank circuit is tuned to resonance, through lack of balance in the balanced modulators. This small carrier can

be eliminated by adjustment of the balancing potentiometers  $P_1$  and  $P_2$  of Fig. 7. Now slowly turn up the audio gain of the unit. If you are very lucky and all the five conditions have been met accidentally, a pure carrier wave will appear on the oscilloscope, as shown in Fig. 8-A. The frequency of this wave will be equal to the excitation frequency for the unit plus or minus the frequency of the audio signal. In most cases, however, the signal appearing on the oscilloscope will appear something like Fig. 8-B. In this sketch conditions (2) and (3) are not being met. The adjustment for condition (3) is potentiometer  $P_3$  of Fig. 7, so  $P_3$  should be varied to make the picture appear more like Fig. 8-C, in which only condition (2) is not satisfied.

The adjustments to meet condition (2) are time-consuming at best, since the procedure is almost entirely a cut-and-try process. The procedure involves making small adjustments in  $L_2$  and  $L_3$  of Fig. 7, then making small adjustments in the two variable ceramic capacitors, following up with adjustments to the three balancing potentiometers  $P_1$ ,  $P_2$  and  $P_3$ , always in an effort to make the picture with modulation look like Fig. 8-A rather than any of the other examples. After a little experiment it will be found that any condition of adjustment of the r.f. phase-shift components which does not give balance with all three potentiometers near the midposition is

predestined to failure. When  $P_1$  is at midscale for balance it means that the voltages across the two variable inductors are the same. In the same way the adjustment of  $P_2$  gives a good idea of balance between the voltages across the two variable capacitors, and  $P_3$  shows by its adjustment for balance whether or not the r.f. voltage exciting the two balanced modulators is approximately the same.

After a series of adjustments has resulted in a reasonably satisfactory picture on the oscilloscope, the signal should be checked on a well-shielded receiver. With the audio gain at zero, a weak carrier wave only should be heard at the excitation frequency. Then as the audio gain is brought up with an audio signal being fed to the microphone jack, a strong carrier should be audible on one side of the carrier. When the gain is turned up to the point where distortion begins to take place in the audio channel, additional sidebands will be heard in the receiver on both sides of the carrier frequency. However, up to the point of audio distortion no spurious sidebands should be apparent. The "rejected" sideband on the other side of the carrier from the desired signal probably will become audible at relatively-high gain settings. But up to the overload point the other sideband should be at least 20 db. down from the desired sideband.

#### The Final Amplifier

The 6L6 stage is capable of delivering 20 to 25 watts of power output with a minimum of distortion. However, when the adapter unit is used to feed a Class B r.f. power amplifier approximately one-half of this available power should be dissipated in a swamping resistor. This procedure is necessary to maintain good r.f. voltage regulation from the adapter unit when feeding the variable load impedance imposed by the grids of the r.f. power amplifier. The placing of a bank of 2-watt carbon resistors (total resistance about 5000 ohms and total dissipation about 12 watts) directly across the output tank of the 6L6s has given adequate swamping.

The adapter unit may be used to feed a triode power amplifier, within the excitation capabilities of the 10 to 15 watts available after swamping, but most satisfactory results probably will be obtained when feeding a beam-tetrode power stage. The adapter unit has been used to excite a push-pull power amplifier in which both 4-125A and 4-250A tubes have been used. In either case it was easy to excite the final-amplifier stage to one-kilowatt input. The pair of 4-125As took the kilowatt of s.s.s.c. with slight coloring on sustained modulation, while the 4-250As operate even more conservatively. A pair of 813s would make a satisfactory alternative power amplifier for one kilowatt, while smaller beam tetrodes could be used for less peak power input.

It probably is wise at this point to insert a

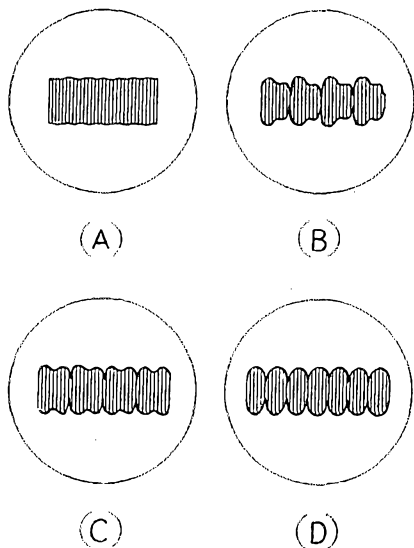


Fig. 8 — Sketches of the oscilloscope face showing different conditions of adjustment of the adapter unit. (A) shows the substantially clean carrier obtained when all adjustments are at optimum and a sine-wave signal is fed to the audio input. (B) shows improper r.f. phase and unbalance between the outputs of the two balanced modulators. (C) shows improper r.f. phasing but outputs of the two balanced modulators equal. (D) shows proper r.f. phasing but unbalance between outputs of two balanced modulators.

note of warning regarding the stability of the power amplifier. The normal operating conditions for a Class B r.f. power amplifier are frequently given in the tube handbooks. In any event, the best operating conditions for the tubes will be approximately as follows: normal rated plate voltage, screen voltage at the maximum rating for c.w. operation or slightly above (to improve the power sensitivity of the stage), and grid bias at such a value that with no excitation the static input is approximately one-half normal plate dissipation. This last condition is the one which frequently will give trouble. The final-amplifier stage must operate with a reasonable value of plate current in the absence of signal if severe transient distortion (resembling the splatter of an overmodulated a.m. transmitter) is to be eliminated. This requirement for standing plate current in the absence of excitation imposes a stringent requirement upon the stability of a stage used to amplify an s.s.s.c. signal. There must be no tendency toward parasitic oscillation in the stage. If even the slightest tendency toward parasitics exists in the stage following the adapter, that tendency must be eliminated through the normal parasitic-suppression procedures.

#### *Adjustment of Final-Amplifier Loading*

The adjustment of the antenna coupling to a stage amplifying an s.s.s.c. signal is important. The loading adjustment is not as critical as would be the case if a conventional a.m.-signal-with-carrier were being amplified, but the loading must be approximately correct. The following procedure has been found to be satisfactory. Apply a sine-wave signal to the adapter unit and adjust the gain until approximately the rated value of grid current is being obtained on the final amplifier. Vary the coupling between the adapter and the grid circuit of the final amplifier until this amount of grid current is obtained with not more than about 180 ma. of plate current on the 6L6s. Then adjust the antenna coupling to the final amplifier until a point is reached where the plate current to the final stage is about 25% greater than the normal value which will be used. Then with speech input to the adapter the plate current to the final stage will kick up to about the normal value.

If less antenna coupling than that determined by the method given in the previous paragraph is used, limiting action will take place in the final amplifier before its full power-handling capabilities are reached. If greater antenna coupling is used, the final-amplifier stage will not operate at good plate-circuit efficiency with the normal power input.

#### *Suggested Alternatives*

The adapter unit may be operated on the 3.9-Mc. or the 21-Mc. band by substituting appropri-

ate coils for those shown in the grid and plate circuits. It will be necessary also to change the values of capacitance-to-ground and inductance-to-ground from the grids of the 6L6s when going to another frequency range. The net capacitance-to-ground and inductance-to-ground, respectively, from each of these grids should present 470 ohms reactance at the frequency of operation.

Experience in operating and testing the adapter unit has shown that its power output is limited by the four 12AU7 sections used as grid-bias modulators. If somewhat larger tubes, such as triode-connected 6AQ5s, were substituted it would be possible to drive the 6L6s to greater plate current and power output before audio-channel distortion became important.

Tubes such as the 807 or the 2E22 could be substituted for the 6L6s in the adapter unit if greater power output were desired. If either of these tube types were substituted, the unit could be operated as an effective medium-power s.s.s.c. transmitter in its own right. Or, if desired, the scheme of operation of the adapter unit could be applied to four of any type beam-tetrode tubes, provided appropriate r.f. and audio phase and r.f. and audio signal levels were applied to the grids. It is quite practicable to generate the s.s.s.c. signal by this method at any power between the milliwatt and the kilowatt level.

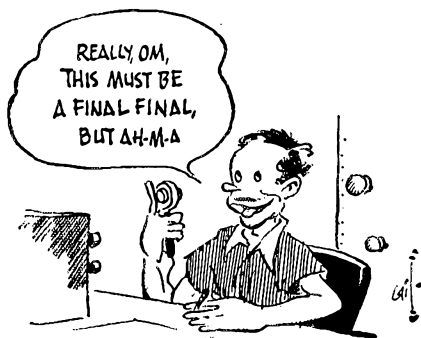
#### *Calling Technique*

As any person using s.s.s.c. without a schedule will soon discover, it is difficult to raise a station under QRM conditions when calling with s.s.s.c. If a separate band or portion of a band were set aside for s.s.s.c. operation, this difficulty would be eliminated. But for the present it would appear desirable that a calling station who desires later to use s.s.s.c. make the initial call using either f.m. or p.m. of a c.w. carrier. Then as soon as contact is made it will be possible for the receiving station to change over to receive s.s.s.c., on instruction from the calling station — probably with much improved results.

An alternative to the above is for the calling station to call with conventional a.m., using the final amplifier as a linear amplifier. This facility may be obtained, if desired, in the adapter unit described by biasing off and removing the audio from one pair of 6L6 balanced modulators. The remaining balanced modulator is then unbalanced so that a carrier of proper level is transmitted. The third position of the sideband switch in the adapter unit provides as shown for straight transmission of an incoming carrier through the unit, so that f.m. in the exciter will pass unaltered through the adapter unit to the final amplifier. A fourth position of this switch might be added to provide for medium-power a.m. transmission, as discussed above, for a calling system. Such dodges appear to be necessary until more operators learn to recognize s.s.s.c. signals.

# 'Phone-Band Phunnies

"The Doorknob Polisher"



THIS fellow is never at a loss for words, with but one single exception: He simply cannot say "Good-by."

The funny thing is that he seems to want to sign off. "Old Man," he will tell you, "I'm sorry to run out on you, but I simply have to get busy around here. The XYL has a list of things for me to do around here as long as a New Look skirt; so I'll say 73 on this transmission and stand by for your final, but I simply can't come back."

Impressed by all this, you make your transmission very brief and sign clear; but as you cut off the filament switch, there he is back with several comments and a couple of questions that require answering. He turns it over to you with another "off and clear"; and so you go back and answer the questions, being very careful not to say anything that would require further comment. It does no good. Your "leaving the air" has not stopped echoing before he pops back on for a "final final."

This goes on and on for at least a half-dozen times. The worst part is that he manages to make you seem an accessory to the silly performance, for he keeps forcing you to come back on again after you have said "off and clear." To add to your discomfiture, you are often able to hear his wife muttering in the background, "Are you going to let that long-winded bird keep you all day, or are you going to get busy?"

You would like to send him a motto for his wall: "Those who part without kisses should part with haste."

— John T. Frye, W9EGV

(Thanks to a suggestion from F. D. Bornman, W8QDU)

## SWITCH TO SAFETY!



## BOOK REVIEW

**Elementary Manual of Radio Propagation**, by Donald H. Menzel. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York City, 1948. 208 pages + 12 preface pages + 12 appendix pages + 2 index pages. 171 illustrations. Price \$5.75.

If you want to reduce the time lost listening on a "dead" DX band, you can find out how to do it within the covers of Dr. Menzel's excellent treatise on propagation. The author, a licensed amateur (W1JEX), discusses a complicated and difficult subject in very readable and pleasing style. By the extensive use of nomograms he has reduced tedious and complicated calculations to nothing more difficult than reading a chart.

The book opens with a description of what happens to radio energy after it leaves the antenna. The complex structure of the ionosphere is discussed in terms of sieves of different meshes, the different frequencies being considered as balls of varying sizes. Such things as absorption, noise and the weakening of the field because of spreading, are discussed and defined. There then follows a step-by-step treatment of the types and uses of maps, charts and nomograms, the problem of time and how it ties in with propagation via the ionosphere, further consideration of the structure of the ionosphere, world m.u.f. (maximum usable frequency) maps, the preparation of great-circle maps, the determination of great-circle distances, and the notion of m.u.f. The determination of the l.u.h.f. (lowest usable high frequency) follows; the problems centering around absorption and noise are dealt with in detail before the important but rather involved and somewhat-laborious solution of the l.u.h.f. is considered. The initial 120 pages of the manual discuss with clarity and authority the propagation problem for communication on frequencies from about 2 to 30 Mc.

The second section deals with ground-wave transmissions, one chapter being given over to the broadcast and lower frequencies. While the amateur is not too much concerned with these frequencies, it is felt that the rather brief treatment will leave the reader wishing that Dr. Menzel had written more on this absorbing phase.

The third portion is just about exclusively given over to v.h.f., u.h.f. and s.h.f. transmission peculiarities. Coverage diagrams for standard atmospheric conditions on frequencies above 30 Mc. are followed by considering how atmospheric conditions cause large variations and what kinds of weather conditions will cause unusual transmission effects at v.h.f. and higher. Dr. Menzel points out how, even with very simple meteorological equipment (a barometer, a wet/dry-bulb thermometer, an eye to the sky and an attentive ear to a comprehensive Weather Bureau broadcast), the v.h.f. experimenter can anticipate the arrival of these unusual propagation conditions. The text concludes with some operational applications in tropospheric propagation.

Appendices I and II treat mathematically the theory of ionospheric propagation and tropospheric propagation. Appendix III is devoted to definitions of the more important terms and phases which may be unfamiliar to the reader.

This book is a "must" for the experimenter, be he amateur or professional. The ability to predict what bands or frequencies most likely to be open for DX will conserve operating time. The communications officer or operator will know in advance the o.w.f. (optimum working frequency) for long- and short-haul traffic. V.h.f. men will find the third part of the book of vital usefulness. It will also appeal to technical schools and colleges as an excellent text for use in laying the foundation for a good, working knowledge of the peculiarities of propagation. Dr. Menzel is to be congratulated on a real contribution to technical radio literature.

— E. B. Redington, W1AM



# 1948 ARRL-Member Party Results

## QSO Contest Climax to Observance of ARRL Week

**A**RRL WEEK, January 17th-24th, was climaxed by the Sixth Annual ARRL-Member Party. Productive of higher scores and better operating performances than any of its predecessors, this activity was as usual thoroughly enjoyed by those who took part and allowed many League members to test their skill in competition with the best contest operators in the field. Activity was more widespread than ever with reports received from 70 ARRL sections (all except P. I.). Many members who were unable to participate fully enough to make large scores indicated that they felt amply repaid for their efforts by the opportunity to pick up new states for WAS. Entries were received from 476 members.

A special feature of the Party was a fixed credit of 50 points before multiplier for radio reception and copy of President Bailey's ARRL Week Message, transmitted over WIAW and stations of the ARRL Official Broadcasting System. Few participants passed up this opportunity to add to their scores.

### Winners

A membership pin with attached call-letter bar has been awarded to each member who led his section in the Party. We extend the hand of congratulation to these winners: W1AQE, W1BFT, W1GKJ, W1JYH, W1KRV, W1KYK, W1ORP, W2BBK, W2DIJ, W2MEL, W2PGT, W2PWP, W3BES, W3FQZ, W3MOT, W4BAQ, W4BGO, W4BRB, W4FIJ, W4FNS, W4GGD, W4KFC, W4KJS, W4KVX, W5ACL, W5AQE, W5AWT, W5KC, W5LUY, W5NXE, W5WZ, W6AOA, W6EPZ, W6IPH, W6MHF, W6PIV, W6SRU, W6WNI, W7BE, W7BSU, W7GPP, W7LE, W7ONG, W7QAP, W7ZN, W8JJA, W8SCW, W8WZ, W9CYU, W9RQM, W9WFS, W0BQJ, W0CDP, W0GKS, W0HKM, W0IGN, W0JRI, W0PHR, W0QNP, VE1PA, VE2OL, VE3EF, VE4RX, VE5QZ, VE6EE, VE7AEU, VE8NN, KH6IJ, KL7NA, KS4AI. Those winners listed in italics were also recipients of section awards in at least one previous member party. Of particular note are the records of W8WZ and W9RQM. These gents have won section awards in each of the ARRL Parties held to date.

The announcement of this activity also offered an additional ARRL call-pin award to the leading 'phone participant in each section. With some re-

ports participants did not break down their scores to indicate separate entry for this or otherwise show interest in this feature of the activity. In every instance where the checking committee could ascertain that 'phone work was submitted as such an entry, it was given consideration for this award. The following member operators who led in such work are likewise receiving ARRL call-pin awards in recognition of their 'phone standing for their section: W1BFT, N. H., 30,420 points, 35 contacts, 20 sections; W3AER, W. Penna., 102, 1, 1; W5SMA, N. Mex., 4266, 54, 27; W6LVQ, L. A., 1062, 14, 13; W7KKI, Washington, 1292, 38, 17; W9NDA, Ill., 1116, 12, 9; W0IFR, Kans., 12 QSOs, 'phone sections not identified.

### Vital Statistics

Outstanding performance in the Party was that of W4KFC. Vic topped all other contestants with a total of 503 members worked, 68 sections and a score of 75,208. W3BES was a close second with 73,372 points, 490 QSOs and 69 sections. W8WZ scored 71,829 (472 contacts and 69 sections) for the third-place position. Among the other high scorers are: W9RQM 70,108, W1ORP 61,203, W0BQJ 60,166, W6EPZ 58,926, W0JRI 58,888, W3FQZ 57,486, W8ROX 57,270, W7ONG 56,232, W9LVR 55,677, W6AOA 53,584, W2BBK 53,516, W5LUY 53,440, VE3EF 53,300, W5KC 52,000, W4KVX 51,272, W4BRB 50,987.

The members-worked total of W4KFC set an all-time record, topping by a substantial margin the previous high of 442 set by W9FS in the 1941 Party. Other leaders in number of members worked: W3BES 490, W8WZ 472, W9RQM 466, W0JRI 408, W0BQJ 399, W1ORP 395, W4KVX 377, W6EPZ 377, W7ONG 376, W8ROX 375, W5LUY 368, W9LVR 366, VE3EF 360, W8RSP 354, W5KC 350.

Leaders in number of sections worked: W1ORP, W6EPZ, W8ROX, W8WZ 69; W1BFT, W2BBK, W3BES, W4IA, W4KFC, W4KVX, W6AOA, W9RQM, W0CMH, W0JRI 68; W2PWP, W3FQZ, W4BRB, W9LVR, W0BQJ 67; W1EOB, W1VG, W3NCJ, W6WNI, W7ONG, W9WFS, W0GKS, W0IGN 66; W2MEL,

♦  
W4KFC, Annandale, Va., top scorer. L. to r. on desk: BC-348 and Gon-Set 28-Mc. converter, NC-100X, VFO. Racks at right contain 807 driver, p.p. 257 final, p.p. 4-125A final. Antenna tuner on shelf is controlled by Selaysn.

July 1948



W4GOG, W5KC, W7BE, W7GPP, W8AQ, W9TH, VE3EF 65.

The highest score in each call area: W1ORP 61,203, W2BBK 53,516, W3BES 73,372, W4KFC 75,208, W5LUI 53,440, W6EPZ 58,926, W7ONG 56,232, W8WZ 71,829, W9RQM 70,108, W0BQJ 60,166, VE1PA 26,892, VE2OL 18,984, VE3EF 53,300, VE4RX 17,808, VE5QZ 30,856, VE6EE 21,175, VE7AEU 29,184.

Another ARRL-Member Party is of course scheduled for next January. If you haven't yet tried your hand in this annual activity, set aside the week-end of January 22, 1949, and see for yourself what you've been missing.

**SCORES**

**1948 A.R.R.L.-Member Party**

(Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . Asterisks denote stations not entered in contest, reporting to assure that stations they worked get credit. . . . Listings show score, number of Sections worked, number of ARRL members worked. . . .)

**ATLANTIC DIVISION**

*E. Pennsylvania*

W3BES 73,372-68-490  
W3FUF 42,588-63-313  
W3ADE 25,584-61-184  
W3AIZ 24,592-58-187  
W3KXA 33,622-62-166  
W3HRD 18,360-54-145  
W3DZ 9,112-34-84  
W3OML 8,384-32-81  
W3HCT 7,590-27-90  
W3JBC 7,980-30-96  
W3HBS 4,292-21-76  
W3QV 2,600-26-50  
W3EU 2,448-17-22  
W3CGS 2,304-16-22  
W3QS 1,140-15-38  
W3ID 448-7-7

*Md.-Del.-D. C.*

W3FQZ 57,488-67-315  
W3EIS 44,268-62-308  
W3MZT 25,080-57-195  
W3HUM 24,348-47-209  
W3HTK 23,868-54-171  
W3JZY 20,144-56-130  
W3LUL 19,264-56-122  
W3NHA 16,652-46-131  
W3GBB 15,800-50-158  
W3MCG 15,618-38-156  
W3JFW 12,032-32-76  
W3MSR 7,280-28-30  
W3IEF 6,356-28-64  
W3IL 4,234-29-48  
W3ECP 3,864-23-34  
W3JVV 2,400-20-35  
W3HBT 836-19-22  
W3JVG 644-14-23

*So. New Jersey*

W2PWP 46,096-67-319  
W2NF2 32,025-61-238  
W2RPH 26,104-52-201  
W2TNN 20,575-47-175  
W2ZI 11,310-29-145  
W2QUH 7,474-37-102  
W2BEI 1,680-21-40  
W2VIS 172-6-6

*Western New York*

W2PGT 41,416-62-284  
W2CLO 22,248-54-181  
W2EYT 19,698-46-151  
W2WFU 17,530-45-145  
W2KEL 15,900-37-159  
W2ZJ 14,100-37-100  
W2DOD 10,860-39-70  
W2TMI 10,640-40-83  
W2EY 7,474-37-102  
W2BSY 7,938-34-104  
W2DVT 3,744-26-47  
W2WQZ 507-13-21  
W2AOR\* 168-3-3  
W2PYC 70-7-5

*W. Pennsylvania*

W3MOT 41,391-63-279  
W3NCJ 38,544-66-242  
W3KWL 33,920-64-215  
W3W 30,028-62-242  
W3KSR 28,614-57-201  
W3LIW 21,840-52-185  
W3GJY 17,180-52-140  
W3KEW 15,950-55-120  
W3AVY 11,768-37-109  
W3SRI\* 8,010-45-39  
W3RIK 2,668-29-46  
W3AER 102-1-1

**CENTRAL DIVISION**

*Illinois*

W0WFS 43,956-66-283  
W0WEN 40,176-62-324  
W0TH 38,220-65-244  
W0IPT 30,622-61-226  
W0CMZ 27,494-59-183  
W0TTV 19,926-54-180  
W0CTZ 14,362-43-117  
W0PEK 12,960-40-112  
W0AQJ 6,916-38-66  
W0IFM 6,224-33-64  
W0AYH 3,784-22-36  
W0MRQ 2,546-18-47  
W0TAL 1,800-18-25  
W0SKL 1,344-14-50  
W0EBX 1,144-13-19  
W0NDA 1,116-9-12  
W0RQT 1,007-19-27  
W0ANY 210-7-15  
W0FKI 132-6-11

*Indiana*

W0CYU 47,124-63-324  
W0NH 33,960-60-233  
W0HUV 30,317-61-200  
W0EGQ 25,514-54-197  
W0ATS 22,308-52-190  
W0UC 15,762-53-177  
W0UKT 15,975-45-128  
W0QLW 5,846-37-54  
W0T 4,758-29-56  
W0SFR 3,136-28-56

*Wisconsin*

W0RQM 70,108-68-468  
W0LVR 55,677-67-368  
W0KXK 19,580-55-153  
W0DKH 15,400-44-150  
W0LUL 12,580-40-132  
W0LFK 10,761-51-111  
W0STE 8,400-42-76  
W0RRA 2,340-15-28

**DAKOTA DIVISION**

*North Dakota*

W0HKM 22,440-60-187  
W0SWC 6,480-40-56

**A.R.R.L. WEEK MESSAGE**

Greetings to all members and amateurs. This week is ARRL Week. A V.H.F. Sweepstakes is in progress and our Annual ARRL-Member Radio Party is being held the week-end of January 24th and 25th. I hope to work some of you from W2KH. Among the fundamental principles of the ARRL are the advancement of the radio art and the public welfare. During the past year we radio amateurs have made notable advances in equipment and operational techniques and in public service. We cannot afford to rest on our record. We must progress. During this ARRL Week let us consider the part each of us may take in the future of ARRL. Let us maintain our radio gear at maximum efficiency and strive to improve our operating procedures. Let us give careful consideration to our fellow amateurs. We should also have due regard for otherwise public relations begins with our next-door neighbors. Each of us should join the Emergency Corps and receive the latest information on public-service work. I know that with your confidence and participation in its activities the ARRL will continue to grow in strength and prestige.

G. W. BAILEY, W2KH  
President, ARRL

*South Dakota*

W0PBR 20,570-55-162  
W0SVR 2,520-20-38  
W0WUU 2,482-17-23

*Minnesota*

W0JRI 58,888-68-408  
W0ULP 26,680-62-190  
W0LTF 21,276-54-147  
W0FAH 19,864-52-166  
W0RMN 5,780-36-56  
W0FID 3,780-35-54

*Ohio*

W8WZ 71,829-69-472  
W8ROX 57,270-69-375  
W8RSP 47,754-63-354  
W8MQR 47,488-64-323  
W8IZ 43,276-69-299  
W8PZA 42,012-64-286  
W8DAE 36,580-62-245  
W8TZO 33,000-60-225  
W8AQ 31,590-65-193  
W8ELU 27,216-64-202  
W8AVS 23,768-51-185  
W8VTF 20,520-57-180  
W8OPG 19,440-48-163  
W8EBJ 18,604-38-129  
W8PHH 12,510-46-89  
W8TAQ 12,418-38-37  
W8SUZ 10,580-48-110  
W8AL 10,492-43-72  
W8ZRD 9,030-35-79  
W8WAB 8,613-33-82  
W8ZJM 8,580-44-98  
W8BKE 7,808-32-72  
W8WE 7,260-32-65  
W8NPF 7,289-37-49  
W8LFE 6,916-38-91  
W8PBX 4,672-32-71  
W8EFP 2,180-20-30  
W8EHW 1,820-13-30  
W8BIF 1,212-12-13  
W8BJM 738-7-17

**DELTA DIVISION**

*Arkansas*

W5LUI 53,440-64-368  
W5DRW 16,016-56-143  
W5MRD 520-13-20

*Louisiana*

W5KC 52,000-65-350  
W5G 33,852-62-248  
W5EGK 12,480-52-120  
W5TY 9,438-39-71  
W5JWX 3,850-22-37

*Mississippi*

W5WZ 5,550-37-50

*Tennessee*

W4BAQ 18,424-47-146  
W4BOR 9,576-36-83  
W4FCF 3,484-26-67

**GREAT LAKES DIVISION**

*Kentucky*

W4KVX 51,272-68-377  
W4OMV 15,141-49-130  
W4FCQ 6,384-38-84  
W4MWM 4,790-26-64  
W4BAZ 3,250-25-40

*Michigan*

W8SCW 42,496-64-282  
W8TRN 27,922-59-179  
W8GP 26,790-57-210  
W8TTF 26,220-57-180  
W8GSJ 25,546-53-181  
W8YDR 23,828-57-209  
W8ARJ 19,296-48-151  
W8ZWM 11,070-41-110  
W8GSP 7,954-41-72  
W8VKU 6,200-31-50  
W8EJ 5,608-32-64  
W8RYP 3,840-20-46  
W8MTE 3,640-28-87  
W8SH 3,276-13-101  
W8FX 3,078-19-31  
W8UQR 1,516-16-23

**HUDSON DIVISION**

*Eastern New York*

W2DIJ 22,110-55-151  
W2TER 13,674-43-109  
W2WPO 11,316-41-113  
W2USH 9,636-33-121  
W2TDT 4,368-26-59

*N. Y. C. & L. I.*

W2MEI 49,010-65-327  
W2PZE 35,105-59-273  
W2TUK 28,416-48-246  
W2JBP 26,790-57-185  
W2BRV 17,460-45-169  
W2RPZ 12,505-45-128  
W2GTL 12,320-40-104  
W2VDT 10,880-32-145  
W2NGC 10,212-46-86  
W2IOG 9,288-43-83  
W2CRJ 9,072-28-112  
W2BGO 8,720-40-84  
W2GP 8,316-33-101  
W2KTF 7,616-28-86  
KV4AF/2 6,670-29-90  
W2BJC 5,474-23-89  
W2ERK 5,312-32-80  
W2RBA 4,948-24-83  
W2BLJ 4,472-24-82  
W2EC 4,140-23-65  
W2KKR 3,200-40-40  
W2UAL 3,160-20-29  
W2CUQ\* 2,640-22-35

\* Hq. staff member; not eligible for awards.

W2KIV	1,736-31- 56
W2DUN	1,281-21- 31
W2IFA	1,089-17- 32
W2DOV	297-11- 14
<i>No. New Jersey</i>	
W2BBK	53,516-68-344
W2OCC	45,584-58-221
W2EBS	4,474-56-291
W2GFG	35,760-40-248
W2CWK	34,998-57-257
W2DRV	20,859-51-205
W2KHT	18,100-50-156
W2NTY	12,308-34-131
W2DJT	7,900-39- 75
W2UWV	5,200-29- 90
W2BZJ	1,404- 9- 28
W2CJX	264-11- 12

**MIDWEST DIVISION**

<i>Iowa</i>	
W9GKS	42,438-66-297
W9QVA	30,024-54-228
W9PUD	13,986-54-130
W9OPK	6,732-33- 52
W9FGW	1,392-36- 61

<i>Kansas</i>	
W9HQJ	60,168-67-399
W9VBQ	31,464-59-208
W9AWP	26,100-58-175
W9IFR	5,016-33- 51
W9CC	4,524-26- 37
W9KEI	2,200-23- 37
W9DDU	820-16- 17
W9DEB	780-10- 14
W9APH	102- 1- 1
W9ESL	48- 4- 6

<i>Missouri</i>	
W9IGN	45,012-66-291
W9CMH	42,298-68-245
W9DU	27,664-56-197
W9IAP	18,116-52-111
W9DPO	2,184-28- 39
W9NNH	1,216-19- 32
W9KIC	880-11- 15
W9GCL	32- 4- 4

<i>Nebraska</i>	
W9QNP	16,920-47-130
W9KMY	10,836-43-126
W9UHT	5,742-33- 62

**NEW ENGLAND DIVISION**

<i>Connecticut</i>	
W1ORF	61,203-69-395
W1IKE	45,506-61-323
W1BIH	44,764-62-311
W1LHE	32,248-58-228
W1GVK	18,116-52-111
W1RY	16,104-61-107
W1LKF	11,692-37-133
W1MTR	10,880-32-120
W1TID	6,250-25- 75
W1CA	4,247- 3- 46
W1EFW	3,690-30- 62
W1CTI	2,400-15- 30
W1BIH	2,162-23- 47
W1APA	1,638-13- 13
W1DXT	1,496-11- 18
W1QMP	23,700-50-187
W1V48	17,648-68-114
W1BDP	17,640-56-108
W1BUD	8,256-32-104
W1PEK	5,390-35- 78
W1NJM	4,760-35- 43
W1LVQ	3,400-20- 35
W1FWH	2,692-22- 37
W1IIN	384-12- 16

<i>Maine</i>	
W1GKJ	41,540-62-285
W1NXX	37,376-64-242
W1KMM	17,784-52-123
W1MDF	17,128-42-183
W1CRP	7,200-45- 55

<i>E. Massachusetts</i>	
W1AQE	33,097-61-254
W1OJM	32,738-62-254
W1RS	20,384-49-158
W1LYL	19,886-51-168
W1NXY	15,480-45-120
W1HA	12,144-46-108
W1FTH	11,890-41- 95
W1QMJ	5,568-24- 68
W1PYM	4,662-21- 61
W1WMD	4,500-30- 50
W1BB	4,080-24- 56
W1GDY	2,050-25- 41
W1JNX	1,270-10- 14
W1PLJ	944- 8- 9

W1ALP	448- 7- 7
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<i>W. Massachusetts</i>	
W1LYH	40,950-63-275
W1EOB	40,194-66-255
W1BKQ	8,856-41- 83
W1BVR	3,160-20- 29
W1JFE	1,904-14- 18
W1JGJ	1,691-19- 45
W1OJP	338-13- 26

<i>New Hampshire</i>	
W1BFT	49,640-68-315
W1IP	16,014-51-107
W1CRW	10,944-36-153
W1AOY	9,072-36- 76
W1LYA	240- 3- 15

<i>Rhode Island</i>	
W1KYK	41,168-62-282
W1CJH	35,490-65-275

<i>Vermont</i>	
W1KRV	14,749-49-151
W1PSD	12,078-33-133

**NORTHWESTERN DIVISION**

<i>Alaska</i>	
KL7NA	22,848-56-204

<i>Idaho</i>	
W7ZLN	44,928-64-301
W7EMT	18,600-50-138

<i>Montana</i>	
W7BSU	26,474-62-187
W7EQN	16,308-54-126
W7JGU	12,495-49-127
W7BWR	5,624-38- 74
W7COH	960-20- 24

<i>Oregon</i>	
W7GPP	41,730-65-271
W7DIS	34,099-61-231
W7BOJ	15,808-52-152
W7GNJ	15,168-48-108
W7JMZ	13,000-50-104
W7AFF	3,864-28- 44

<i>Washington</i>	
W7BE	40,560-65-262
W7GHB	24,242-62-146
W7KWC	22,528-54-176
W7JJC	18,280-55-116
W7KIL	16,830-55-103
W7ZU	14,382-51-118
W7FWD	8,640-36- 70
W7GP	6,072-44- 69
W7FRU	4,350-25- 37
W7EAU	3,258-41- 85
W7EKL	1,694-17- 38
W7EJL	1,684-15- 15
W7ETO	756-18- 21
W7HGC	494-13- 19
W7CWN*	16- 2- 4

**PACIFIC DIVISION**

<i>Hawaii</i>	
KH6IJ	1,776-24- 38

<i>Neada</i>	
W7ONG	56,232-66-376

<i>Santa Clara Valley</i>	
W6WNI	48,972-66-321

<i>East Bay</i>	
W6IPH	26,400-60-220
W6TV	8,575-49- 64
W6EY	6,532-36- 66
W6EJA	2,289-21- 30
W6EJL	1,664-32- 52
W6RRH	330-11- 15

<i>San Francisco</i>	
W6MHF	31,354-61-207
W6RBQ	24,304-56-165
W6CIS	22,736-56-203
W6GSP	7,622-37- 78

<i>Sacramento Valley</i>	
W6PIV	12,169-43- 92
W6OJW	6,386-31- 55

<i>San Joaquin Valley</i>	
W6SRU	18,078-61-149
W6ARI	2,240-28- 40
W6PLJ	476-14- 17

(Continued on page 124)



JULY 1923 QST provided refreshing relief from midsummer traffic slumps, 200-meter static and sweltering ham shacks. Frosty icebergs and polar blizzards were in the news, combining to set the scene for amateur radio's newest cooperative undertaking — the task of maintaining communications for Dr. Donald B. MacMillan's Arctic Expedition. Serving both as ARRL representative and crew member of the *Bowdoin* is an accomplished amateur, Donald H. Mix, better known as the "sleepless wonder" of ITS, who will handle the controls of the schooner's Zenith-built station during the 14-month journey to the Northland and back.

The technical development of our "static-free" short waves has not been neglected this summer, this issue indicates. Emphasizing the need for receivers especially designed for the lower part of the spectrum, A. L. Budlong writes of his experiments with "Some Tuners That Work Below 200 Meters." The Bureau of Standards has been doing extensive research in the vicinity of 100 meters too, we learn, as Francis W. Dunmore of the Radio Section details the new transmitting and receiving circuits that have been developed. As a further service to amateurs and experimenters, the Bureau has acceded to the League's request for "standard-wave" broadcasts on the low waves.

F. S. Dellenbaugh, jr., of MIT, is responsible for a masterful article explaining electric-filter design and application. Filters seem to be a sure cure for interfering key clicks and thumps, we learn from the timely paper of Technical Editor Kruse. And The Old Man himself comes up from his latest tirade, "Rotten Rectifiers," with weighty arguments for the use of filters to overcome the shortcomings of chemical rectifiers.

For the ham of practical bent, the switchable wavemeter-wavetrap device of A. F. Evens and the remote-control transmitter hook-up of C. C. Whysall are expected to find wide application.

In step with the times, our operating practices are to receive healthy revision. Trafficwise, the campaign for eliminating rubber-stamp messages is bearing fruit. DX-wise, a new world's record is being celebrated, the 5-watter of 5IM having been copied off the coast of India. (Special Note: Hereafter "Calls Heard" will list only those stations heard over 1000 miles!)

Three prominent c.w. stations are in the spotlight this month. Described are O. W. Lummis's 3OE, Philadelphia, Felix Thompson's 7ZV, Douglas, Wyoming, and 1CMK, Holyoke, Mass., station of P. H. Bloom and V. A. Luce.

(Continued on page 124)

## • Surplus Corner —

### A Modification of the BC-610 Exciter Unit

A GREAT many of the famous BC-610 transmitters, used extensively by the services in the war, have found their way into ham shacks via the surplus market. While these rigs performed ably, they have certain shortcomings that can be corrected with a minimum of effort. The principal objection is to the crystal oscillator—"MO" circuit. The crystal-oscillator circuits do not provide much in the way of operating flexibility, and the chirp of a BC-610 operating on "MO" was a distinguishing feature of our wartime radio circuits.

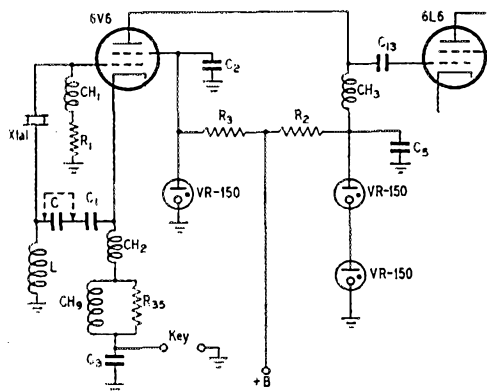


Fig. 1 — The original circuit of the oscillator and doubler portions of the BC-610 exciter unit.

$C_1, C_2, C_3, C_5$  — 0.006- $\mu$ fd. mica.

$C_{13}$  — 150- $\mu$ fd. mica.

$R_1$  — 33,000 ohms, 1 watt.

$R_2$  — 5600 ohms, 20 watts, wire-wound.

$R_3$  — 15,000 ohms, 20 watts, wire-wound.

$CH_1, CH_2$  — 1- $\mu$ h. r.f. choke.

$CH_3$  — 2.5-mh. r.f. choke.

$CH_0$  — 10-mh. r.f. choke.

The modifications described here involve complete elimination of the "MO" circuits, and revision of the crystal oscillator to the highly-flexible Tri-tet circuit, arranged so that it may also be driven as a doubler by a VFO of suitable stability. In addition, one of the tuning units is modified to provide output from the exciter in the 28-Mc. range.

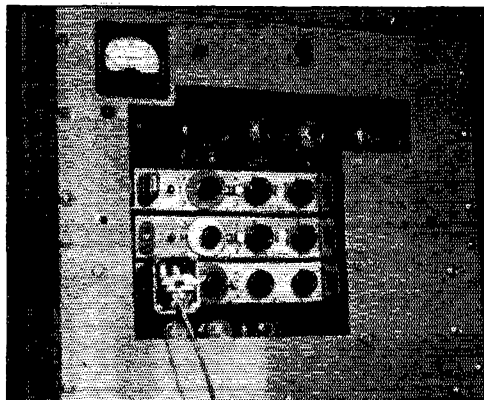
At W4CT only the exciter portions of the BC-610 are used. These were obtained in the surplus market at reasonable prices, and were used as the foundation for a 100-watt unit that is used to drive a push-pull 100TH kilowatt final operating in the 7-, 14- and 28-Mc. bands. The original circuits of the 610 were retained wherever possible. Thus, the modifications described here apply equally to complete BC-610 units.

The physical arrangement is shown in the photograph. The exciter deck (\$11.95) was mounted on a 17 × 13 × 1-inch chassis. An aluminum panel was then made with a cut-out through which the tubes and the three plug-in tuning units (\$1.25 each) could be removed. A 200-volt bias pack and a 600-volt 200-ma. plate supply were built on the rear of the exciter chassis. Metering was accomplished through a 0–200 ma. panel meter, arranged so that it could be switched to the desired circuits. Advantage was taken of the fact that the exciter deck was already wired for reading current in the 6L6 and 807 stages. A closed-circuit jack was installed on the panel for keying.

In the original 610 circuit, the parallel 807s are operated as doublers whenever used to obtain output at 14 Mc. and above. We desired to avoid this wherever possible to take advantage of the additional output obtainable when they are operated straight through. With the revised oscillator circuit, this is possible except when output at 28 Mc. or higher is required. Tuning Unit TU-52 (original range 6.35 to 8 Mc.) was selected for 7-Mc. output. For 14-Mc. output, TU-54 (12 to 18 Mc.) was selected. Another TU-54 was revamped for 28-Mc. output.

The original circuit diagram is shown in Fig. 1, and the revised circuit in Fig. 2. The modifications are simple to perform.

After removal of the covers of the tuning units, all of the master-oscillator and crystal-oscillator circuit components were removed except the crystal socket, the d.p.d.t. toggle switch and the 140- $\mu$ fd. variable condenscr. The units were



Front-panel view of the revamped BC-610 exciter unit in use at W4CT.

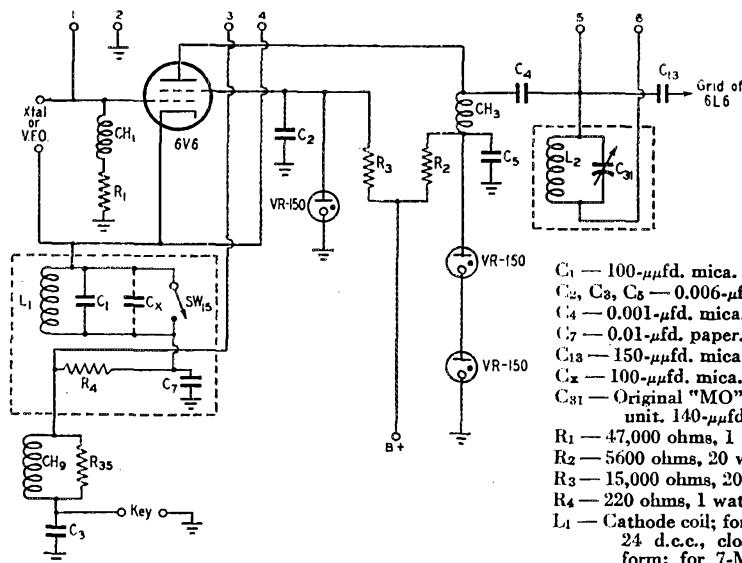


Fig. 2 — Schematic diagram of the revised oscillator circuit for the BC-610 exciter unit. A Tri-tet circuit is used, with provisions for connection of an external VFO. The components enclosed in dotted lines are mounted within the individual tuning units. All others are on the exciter deck. Terminal connections at the top of the diagram represent the pins on the tuning units through which the individual connections are made, and are included for reference only. See Figs. 3 and 4 for actual connections.

- C<sub>1</sub> — 100- $\mu$ fd. mica.
- C<sub>2</sub>, C<sub>3</sub>, C<sub>5</sub> — 0.006- $\mu$ fd. mica.
- C<sub>4</sub> — 0.001- $\mu$ fd. mica.
- C<sub>7</sub> — 0.01- $\mu$ fd. paper.
- C<sub>13</sub> — 150- $\mu$ fd. mica.
- C<sub>x</sub> — 100- $\mu$ fd. mica.
- C<sub>31</sub> — Original "MO" tuning condenser from tuning unit. 140- $\mu$ fd. variable.
- R<sub>1</sub> — 47,000 ohms, 1 watt.
- R<sub>2</sub> — 5600 ohms, 20 watts, wire-wound.
- R<sub>3</sub> — 15,000 ohms, 20 watts, wire-wound.
- R<sub>4</sub> — 220 ohms, 1 watt.
- L<sub>1</sub> — Cathode coil; for 3.5-Mc. crystals: 9 turns No. 24 d.c.c., close-wound on 1½-inch diam. form; for 7-Mc. crystals: 6 turns No. 22 d.c.c., ½ inch long on 1½-inch diam. form.
- L<sub>2</sub> — Oscillator plate coil — 3.5-Mc.: 85 turns No. 26 d.c.c. close-wound; 7 Mc.: 40 turns No. 24 d.c.c. close-wound; 14-Mc.: 25 turns No. 18 d.c.c. close-wound. (All wound on 1-inch diam. forms from tuning units.)
- CH<sub>1</sub> — 1- $\mu$ h. r.f. choke.
- CH<sub>2</sub> — 2.5-mh. r.f. choke.
- CH<sub>3</sub> — 10-mh. r.f. choke.
- SW<sub>15</sub> — D.p.d.t. toggle switch (one section unused).

then rewired as shown in Fig. 3, suitable coils, as specified below Fig. 2, being used to produce output in the desired range.

The changes required in the exciter-deck wiring are few. Sections 1 and 2 of band-selector switch SW<sub>11</sub> were rewired as shown in Fig. 4. In addition, C<sub>1</sub>, the 0.006- $\mu$ fd. condenser in the original cathode circuit, was removed and the cathode of the 6V6 oscillator was tied directly to the rotor arm of SW<sub>11-2</sub>. Choke CH<sub>2</sub> was also removed from the cathode circuit, and although this is not essential, its removal results in crisper keying. A 0.001- $\mu$ fd. mica condenser, C<sub>4</sub> in Fig. 2, was connected from the plate of the 6V6 so that it would be in series with C<sub>13</sub>. The junction of these condensers serves as the "hot" end of L<sub>2</sub>.

In this particular application, as mentioned above, the exciter deck was used to drive a separate final amplifier, instead of being capacity-coupled to the single-tube amplifier built into complete 610 units. To accomplish this, it was necessary to wind output links on the 807 plate coils, and then to switch the links through an added double-pole three-position ceramic switch, as shown in the diagram. In cases where the original capacitive coupling is to be retained, this switch will not be needed, and the link windings on the plate coils may be omitted.

Millen 1½-inch diameter coil forms were used for the 6V6 cathode coils, although they might well be wound on the ceramic form that was removed from the tuning units during modification. Plate coils for the 6V6 stage were wound on the ceramic forms that were originally used as the master-oscillator coils. These are about 1 inch in diameter, and are identified as L<sub>13</sub> in TU-52, and as L<sub>35</sub> in TU-54. Winding details are listed below Fig. 2. The original "MO" tuning condenser is used in the 6V6 plate circuit, the rotor being grounded to the metal shield can. One section of the d.p.d.t. switch SW<sub>15</sub> is used to short the cathode coil when operation at the crystal fundamental is desired. C<sub>x</sub> is an additional capacitor required only when 3.5-Mc. crystals are used.

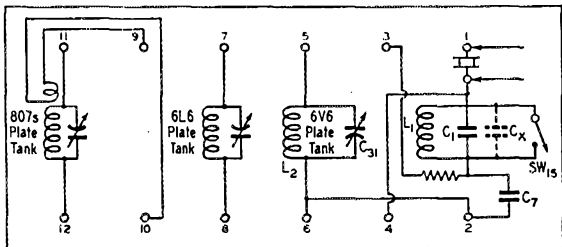


Fig. 3 — Connections to the terminals within the revised tuning units. All grounds are consolidated at Terminal 2.

## WWV Schedule

STANDARD-FREQUENCY transmissions are made continuously, day and night, as a public service by the National Bureau of Standards over its standard-frequency station, WWV, on the following frequencies:

Mc.	Power (kw.)	Audio Freq. (cycles)
2.5	0.7	1 and 440
5.0	8.0	1 and 440
10.0	9.0	1, 440 and 4000
15.0	9.0	1, 440 and 4000
20.0	8.5	1, 440 and 4000
25.0	0.1	1, 440 and 4000
30.0	0.1	1 and 440
35.0	0.1	1

A 0.005-second pulse may be heard as a faint tick every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted at precisely one minute before each hour and each five minutes thereafter (59th minute; 4 minutes past hour, 9 minutes past hour, etc.), resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric-disturbance warnings applicable to the North Atlantic path are given at 19 and 49 minutes past each hour. If a disturbance is in progress or is anticipated within 12 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcement of the station's services and of the station's call (WWV) is given by voice at the hour and half hour.

The accuracy of all the frequencies, radio and audio, as transmitted, is now better than a part in 50,000,000. Transmission effects in the medium may result in slight fluctuations in the audio frequencies as received at a particular place; the average frequency received, however, is as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.000001 second. The beginnings of the periods when the audio frequencies are resumed are synchronized with the basic time service of the U. S. Naval Observatory.

**SWITCH  
TO SAFETY!**



**QST for**

To modify TU-54 for 28-Mc. output, it is necessary, in addition to the changes described above, to rewind the 807 plate coil so that the desired range may be tuned with the existing tuning condenser. Half the number of turns, wound in exactly the same space occupied by the original coil, does the trick nicely.

Results with these changes have been very satisfactory. TU-52 is used for 7-Mc. output with either 3.5- or 7-Mc. crystals, or with a 3.5-Mc. VFO. TU-54 is used for 14-Mc. output with either 7- or 14-Mc. crystals, or a 7-Mc. VFO. The 6L6 stage and the 807s are operated straight through in some conditions, yet no self-oscillation has occurred, even though neither stage is neutralized. For 28-Mc. operation, the revamped TU-54 is used with 7- or 14-Mc. crystals, or a 7-Mc. VFO. In this unit, it was found better to operate the 6L6 straight through, doubling in the 807 stage.

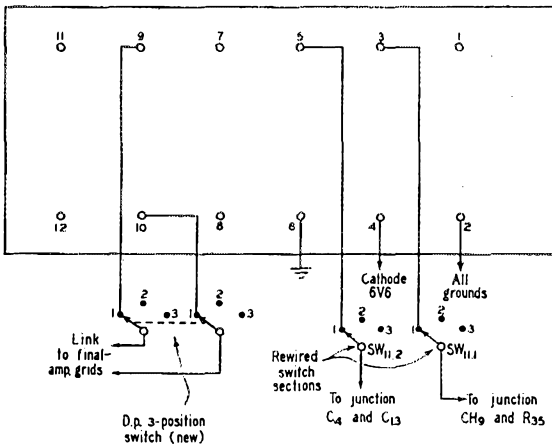


Fig. 4 — Revisions required in the wiring at the sockets for the tuning units. Only those connections which are changed from the original circuit are shown.

If desired, the 3.2- to 4-Mc. tuning unit (TU-49) may be modified along similar lines to obtain 3.5-Mc. output from 1.75- or 3.5-Mc. crystals, or a 1.75-Mc. VFO, although this was not attempted.

Adequate drive for either c.w. or a.m. 'phone operation of a pair of 100THs running at 900 watts input is obtained on all bands with the modified exciter. Keying, when using crystal control, is perfect, and equally satisfactory results have been obtained using a Millen VFO, connected to the 6V6 grid by means of an old crystal holder plugged into the crystal socket.

Owners of complete BC-610 units can benefit from these modifications, and the result will be a rig with considerably greater flexibility than the original. Any of the other tuning units may be modified along the same lines. — Lt. Col. C. R. O'fringa, USAF, W4CT.

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## Harry W. Kerr

WE are saddened to have to report the passing of Harry W. Kerr, WØGP, former Midwest Division ARRL director, on April 14th at the age of 71, after a long and fruitful career as a country editor and a radio amateur.

Affectionately known through the central states as Grandpa, Hal Kerr in prewar days was W9DZW-W9GP. While serving as Iowa SCM in the period 1928-'31, he got a good grip on the hearts of the boys through his free publication of the Midwest's unofficial ham sheet, "Grandpa's Regret." Elected director in late 1930 to fill a vacancy, he was twice returned to office and served as a member of the ARRL Board until the end of 1935. In the prewar period he was also AARS radio aide for the VII Corps Area.

Apprenticed at a tender age to learn the printing business, he also learned Morse telegraphy, becoming a WU operator at the age of 14 and a C&NW station agent at 19. The latter year he married, he and his wife celebrating their golden anniversary a couple of years back. In 1901 Hal moved to Little Sioux, Iowa, and with his wife's aid established *The Little Sioux Hustler*, a weekly newspaper devoted to the affairs of Harrison County. For nearly half a century to come he was to be its publisher, editor, business manager, reporter, compositor and pressman; and he died as he would have wished, still in harness, getting out the weekly edition. A typical American and a typical country editor, he loved his work and his people, recording the comings and goings and the births, marriages, and deaths of his community. He was equally active in civic affairs.

The amateur fraternity salutes a pioneer and a friend, mourns his passing.

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### COMING CONVENTIONS

- August 21st-22nd — West Gulf Division, Houston
- Sept. 4th-5th-6th — NATIONAL CONVENTION, Milwaukee
- Sept. 17th-19th — Delta Division, Biloxi, Miss.
- Sept. 19th — New Hampshire State, Concord
- October 2nd-3rd — Hudson Division, Albany
- October 2nd-3rd — Southwestern Division, Los Angeles
- October 8th-9th — E. Canada, Montreal
- October 16th-17th — Midwest Division, Wichita



One of the questions asked most frequently about the s.s.s.c. stations is, "When are they on the air? I want to hear what the stuff sounds like." This column will report schedules and operating times of active s.s.s.c. stations, describe operating experiences and sometimes the gear in use, and possibly discuss some of the practical operating problems and suggested solutions. Contributions from active s.s.s.c. stations will be welcomed.

THE transmitter at W6YX (Palo Alto) has been rebuilt in the usual bigger-and-better fashion, and is on 20 nearly every day from 5-6 and 7-9 p.m. PDST, with occasional forays into the 75-meter band. Operators at the Stanford station include W6QYT, W6VUW, W6AUW, W6YWV, W7FXI/6, W6MHX and W6WCT. Their best DX so far is VK and ZS. Mike, W6QYT, emphasizes the point all s.s.s.c. men know but can't seem to get across to others: that the r.f. gain must be reduced and the audio run up when listening to s.s.s.c., since there is no a.v.c. in operation to prevent receiver overload in the i.f. amplifier. Another point he brings out is that, when listening to an s.s.s.c. signal, you don't dodge QRM by tuning the receiver if the carrier is being reinserted by the b.f.o. — don't touch the tuning, and take out the QRM with the crystal-filter phasing control.

W1SZ (Boston) is a Johnny-Come-Lately to s.s.s.c. but he got a beautiful introduction. One of his first tries raised W8LJ, who knew how to tune in the stuff, and Rod didn't have the trials and tribulations some of the others have experienced. A filter-type rig is in use on 14,227, with a 6D22 in the final. Rod suggests a general schedule for the s.s.s.c. gang, so that they can get on with some assurance that other s.s.s.c. signals will be there too. Sounds like a swell idea — for a start let's try Saturdays and Sundays from 1600-2000 GCT on 14 Mc., and 9-11 p.m. local standard time Saturdays and Sundays on 75 'phone. If anyone wants to suggest any particular spot or spots in the bands, drop a line to this column and we'll pass the word along.

Don at W2KUJ (Schenectady) confines his 20-meter s.s.s.c. operation to wherever the QRM is worst, or at least that's how it strikes him. But look out for him — he can sneak up on you by reinserting the carrier when he calls, or by using p.m., and after he raises you he'll explain how to tune in s.s.s.c. and then yank out the carrier. The rig runs 500 watts peak input, and the operation is evenings after 9 p.m. and on rainy Saturday and Sunday afternoons. Biggest problems are a

(Continued on page 128)

# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD/1

## How:

After last month's blast at the more porcine members of our DX fraternity, it somewhat behooves us to take stock in our own department here. Question, to wit: Is this space adequately justifying its existence by the proper presentation of the DX game's problems as well as the swapping of info donated mainly by you readers? And, if not, why not?

We have certainly been gratified by the response of DX-chasers throughout the world since our quite unknown flag arose on the masthead. We have attempted to scrape up all the available items of DX interest and to present same in as readable a manner possible. If we've met with any measure of success it's been because you fellows have been good enough to take time out once in a while to jot down something for us to go to work on.

Among the correspondence received have been a few constructive criticisms which have been much appreciated and which we do not intend to ignore. We'll take up one for discussion in the following paragraphs.

Do you remember the lists of "Calls Heard" that used to appear in prewar *QST*'s? Those were the days when DX was pretty scarce and, because of the lower-caliber equipment in use, not nearly as easily worked. Hence, these lists, often sent in by shipboard operators on distant seas, were quite closely scanned by anyone who had a rig

\* DX Editor, *QST*.

on the air. Now some of the gang feel that the set-up of our "What" section is becoming similarly outmoded and that such space would better be used for more news along the "Tidbits" line. They are undoubtedly correct when they comment that anyone with a few hundred watts and a half-wave wire can accumulate a fancy list of DX on almost any h.f. band nowadays. Therefore, it appears that the only intrinsic value of "What" is in its presentation of a general idea of what variety of DX has been inhabiting the various bands during the previous months and this limited usefulness doesn't quite justify the use of all the space we have, up until now, been giving it.

On the other hand, pertinent information concerning really juicy catches such as frequency, note, operating times, etc., goes well here and we intend to dwell more and more on this specific-data viewpoint while going lightly on routine lists of worked DX. Thus we'll have more room for items of greater general interest along the "Tidbits" and policy-operating-ethics fronts.

The DXing phase of amateur radio has grown into quite a snowball and is certainly here to stay. It has progressed through the years from the status of an unusual radio side show to that of a powerful promoter and practical exponent of international good will between the Mr. Average Citizens of almost every country in the world. We trust you'll all continue to pitch in to make these pages do their part toward keeping the snowball under way.

Well, Jeeves, what's the good word? Let's see what the boys have been up to. . . .

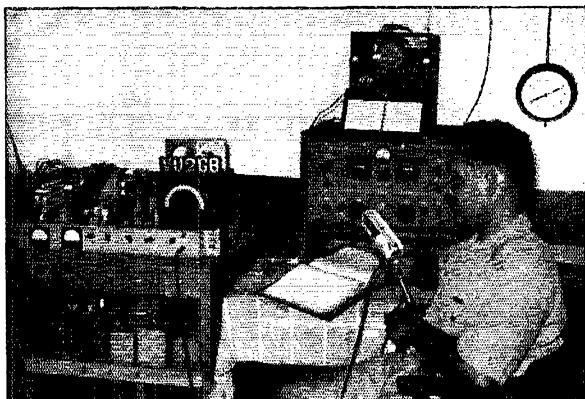
## What:

*Eighty:* W4BRB is really serious about shooting for DXCC on 3.5 Mc. and has a heap of cards to prove it. Furthermore, Gene ripped off the first postwar WAC that we know of although W9BMV notified us of his first. He figures that, with a little popularizing of the band, 80 could be every bit as good as 40 during the wee hours . . . . . OK1XU nabbed four continents and piles of W/VE stations this season with a tiny 2-tube receiver and a midget 25-watt rig . . . . . KL7KU reports the band very quiet up in his vicinity but has contacted ZL1DI and ZL1HM near 3515 kc. . . . . VE3QD, who does the DX stint for XTAL, notifies us of a 75-meter round table which included G8VB, CO7CX, HH2CW, VP6CDI and VEs 1EI, 2AL, 3MB and 3QB. G8VB, by the way, has now worked all W/VE call areas on that band! VE3QD is one





G. A. W. Ballantine, shown here in the hot seat at his Bombay station, VU2GB, has been keeping a daily schedule with AC4YN for some time and is heard exceedingly well on 14- and 28-Mc. 'phone.

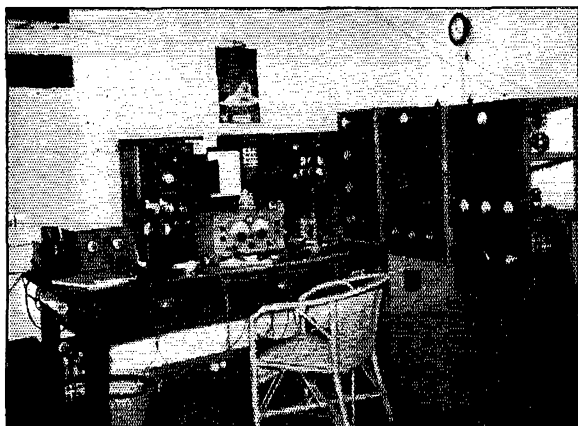


DX editor who not only writes about it but can work it, too — 160 countries postwar. [Shame on you, boss. — *Jeeves*]

*Forty:* The spectrum around 7150 kc. has been taking a beating because of ZD1LQ (t7). He was VE7CE's first African in 11 long years . . . . . W7WVZ has been passing out Nevada QSOs to UA3AM, ON4QF, J9AAQ and ZL41E, using QRP . . . . . W2RDK (ex-W8JSU) has squeezed over 50 countries from 7 Mc. postwar and has his eye on a few new ones . . . . . A nice WAC at W1ZL received the cooperation of MD7AZ (7050), KH6DQ (7100), PY7WS (7200), VQ5JTW (7005), VP6SJ (7015) and IIBRO (7010). Carl also snared HE1GJ (7001) . . . . . WØVDC speared CN8MI (7003), HK3CC (7005), ZS2CR (7130) and ZS1GV (7091) through the coastal QRM . . . . . It's 120 postwar now at VE1EA. New ones: ZE2JV, XAFQ Trieste, MD5KW, VP4TO, ZB1AI and a VQ5 . . . . . W9LVR has rolled up 52 countries on this band postwar, late good ones like ZD1LQ, FF8QX (7090), EK1AA (7100), VP6SJ (7050), J2SCS (7050), KP6AA (7080), YN1AA (7010), FA3WW (7095) and CE4AD (7035).

*Twenty:* Big news from W6VFR concerning ZD9AA (14,017 t8c QRH). Goodman will have to pick a juicier one for his next Elmer epic! . . . . . W2QHH came up with F8NE (14,040) in Corsica as did W3LOE. The latter gentleman also unwrapped VS9GT in Oman (14,130 t9c QRH) and the following choice ones: AP2A (14,020), ZD1LQ (14,080 t5), MD5LD (14,060), CR7MB (14,060), ZK2AA (14,120), ET3AJ (14,050), YS1V (14,040), ZC1CL (14,035), MI3FG (14,020), C8YR (14,110 t6), VS2AL (14,030), UF6KAB (14,030), CZ2AC (13,990), PX1V (14,090) and HE1EO (14,115). W3LOE also is wondering about YB8A (14,005) who was in the direction of Afghanistan or Pakistan and who beats out c.w. in some fancy lingo unknown to Bob. ZD9AA told W3LOE that theirs was the first W/ZD9 QSO in history! . . . . . W4BPD heard VE7AAD working AC4YN and almost broke his eardrums

but could not hear the AC4. Nevertheless, Gus kept the birds off his rhombics by hooking CR6AR (14,095 t9x), AP4A (14,120 t9x), ZC6AC (14,020 t9), ZC6AB (14,025 t9), RV2 (14VFO t4 QRH), LZ1K, HE1GJ (13,990), TA1BB (14,040 t8), HS1SS (14,080 t9), VQ4MHA (14,065 t7), I1BCB Trieste (14,015 t7), UAØLD (14,060 t9x), GD3AGC (14,120 t9) and AP4B (14,150 t9x) . . . . . A vertical folded dipole is doing well at W5FQG: J3AAD (14,108), KA6FA (14,070), VK9GW (14,050), J6DKV (14,050), KG6DG (14,055), UA1NR (14,120) and VQ8AY (14,090) . . . . . KG6DG runs 900 watts to a Vee and in a little over a month has collected quite an assortment of DX plus gobs of Ws. A few: C3LT, KM6AE, W8LZK/KP4, UAØKSA, UA1KBB, VS6AC and LU7AZ. You may QSL KD6DG through W4QT . . . . . W6MX didn't stand in line too long for AP5A, UJ8AE, FM8AD, CR6AQ, XZ2EM, UC2CB, FE8AB, VK9BI, and HMV, Trieste . . . . . At W4MZ we find YR5I, VQ3HJP, VQ4EHG, ET1IR, UG6AB, UQ2BA, OE5RA, CT3AB and ZC6AA on a folded dipole . . . . . W7GPP has the "Hong Kong Blues" or something, having worked VS6AC, AE, AJ, AL, AR and BC, plus VR2AZ/VR1, UL7BS, UH8KAA, YU7AF and sundry other rarities . . . . . W4CYY latched on to EA7AV, ZE2JN, MD1D, OH6NZ, PK3MR, HE1CE, GC2CNC, GD2DF/A and VP9D . . . . . WØAIW would like to see an all-band award issued to people who worked a certain quota of countries on each band. While thinking up such ways to keep Hq. busy, Lee collected OQ5BR, OQ5CH, MF2AA, CN8EJ, HA4AB and YS1RM on 'phone . . . . . Another zero that Johnny didn't get is WØFWW who submits a whopping list of late successes: VR5PL (14,012), EL3A (14,015), SV1RX (14,049), ZK1AE (14,010), EK1GM (14,016), FA8CF (14,030), PZ1L (14,064), PZ1M (14,004), VQ3HGE (14,045), XSV1KE (14,018), J2BNR (14,031), FM8AC (14,040), TI8RB (14,068), KA1AK (14,066), VQ8AF (14,060), SV1VS/MM (14,024), YV5AE (14,006), W6ANX/C6 (14,110)



CT3AB, the station of J. A. Ferraz, Funchal, Madeira. This equipment has been kept quite warm of late providing many of the boys with a brand-new postwar country on 7 and 14 Mc. (Photo via W1FH)

and some 50 others to be envied . . . . W6ZZ finally went up over the hundred mark with UC2CB and also has accumulated 1183 G QSOs! Bet he's beginning to drop a few Hs here and there . . . . W6FZH/4 is now W4JFE and has been fooling around with ninety-one 1948 countries. Some: OY3IGO, CP1AQ, EA1A, EA300, YR5B, YR5T, HA5EX, YU7KX, UI8AA, W9OZW/KS6, KP6AA plus some Js. . . . . W9KOK put six days work into C8YR, C6YZ, C7FD, C7OK, HL1BA, EA7AV, XZ2JB, VS1BG, ZD1LQ, OH5OA, UO5AC, and an additional pile of Russians.

Ten: Frequencies are scarce but we have a few juicy lists to quote. W5OJH shoved 55 watts into 1614s with a 4-element whirlingig to the tune of VP9F, VP9P, TG9AD, HR1MB, HR1KV, ZS4L, VP5AW, VP5RS, VP3LF, VP4TAJ, CE1AH, HH2LD, W4MCI/KG6, J2SCS, HL1AN, OH2SE, ZB1AH, VQ3HGE, CT1PJ, VE8AO and OA4BG. . . . . A 'phone report from W4IYI pins down OA4BQ, J2IMR, J5LQK, ZL3KA, W1IPR/KL7 and UA1KBB (28,400) . . . . . W6SHW's new location and beam cooked up ZS6MD, HL1MH, ZE2JT, ZE2JV, KA1ACF, ST2CH, MI3ZJ, CR9AG, VU2BG, Js and Europeans. . . . . W4LZX was pleased with KG6AW/VK9, VQ3HGE, VQ4EHG, VQ5PBD, MF2AA, ZB2A, HL1AZ, C1CH, SU1HF, VQ2DH, ST2AM and FA8IH. . . . . Eleven-meter reports are still rare but W4IYI caught up with VK2AFE and 11AY on this band.

#### Where:

This section is getting pretty fancy -- we even have an airplane (X4BHL) listed this month as well as new addresses for C'Z2AC and VR3A. Help yourself, OM:

AP2A Police Training School, Karachi, Pakistan  
 C6HH Hanson Le Wis, Box 2, Hanchung, Shensi, China  
 C7TK % CARL, Box 52, Peiping, China  
 C7TN % CARL, Box 52, Peiping, China  
 CN8EH Navy 214, FPO, New York City

C'Z2AC Rosetta Monsini, Vicolo Teatro Ristori 10, Verona, Italy  
 EA9AA (via ARRL)  
 EK1CW Glen Ward, % Mackay Radio, Tangier Zone  
 EK1TF Herb Plummer, B. P. O. Box 57, Tangier Zone  
 ET3AJ P. O. Box 90, Addis Ababa, Ethiopia  
 F8NE Jean Periquoi, % Duret, 27 Cours Napoleon, Ajaccio, Corsica  
 G5YM-ex-VQ3EDD (via RSGB)  
 HP2X (via W4LUV)  
 HP5R (via ARRL)  
 I1BCB Carl Galeasi, Guardiella 18, Trieste  
 J2AWA Base Comm. Tachikawa, APO 704, % PM, San Francisco  
 J9ATT APO 239, % PM, San Francisco  
 LZ1K LZ Section, Box 83, Moscow, USSR  
 MF2AA Civil Police, Trieste  
 MI3FG (via ARI)  
 OE7KL (via G2DDM)  
 PX1A Box 273, Chihuahua, Mexico  
 PZ1FB Gloria van Bek, Box 109, Paramaribo, Surinam  
 PZ1WX Gerard, P. O. Box 448, Paramaribo, Surinam  
 ST2CH RAF Section, Khartoum, Anglo-Egyptian Sudan



Probably caught in the act of snagging a new country, judging by his beaming countenance, we have here XE1AC, first Mexican applicant for DXCC. Al spends most of his time on voice, usually on 14 and 28 Mc.

ST2JF RAF Section, Khartoum, Anglo-Egyptian Sudan  
 TG9RD P. O. Box 46, Guatemala City, Guatemala  
 T12AFC P. O. Box 517, San Jose, Costa Rica  
 T12ES Edgar Solano, Box 30, San Jose, Costa Rica  
 T18RB Rafael Beeck, Puntarenas, Costa Rica  
 T18SM Santiago Moya R., Parrita, Costa Rica  
 VK8FO C. Gibson, 424 Centre Road, Bentleigh, SE14, Melbourne, Australia  
 VO2BN APO 883, % PM, New York City  
 VP3XY B. G. Airways, Ltd., Ruimveldt East Bank, Georgetown, British Guiana  
 VP5AW Sixth Radio Section, APO 861, % PM, Miami, Florida  
 VR3A Geodetical Survey, Tojuto, Fanning Island Group  
 VS9GT RAF Station, Sharjah, British Forces in Iraq  
 W1LJM/KG6 Box 100, Guam, Marianas  
 W6ANX/C6 Box 895, Auburn, California  
 EL7A-ex-W6RHE/EL: Grant E. Lindgren, Firestone Plantations, Harbel, Liberia  
 X4BHL Reinaldo Nuncio, Ave. Colon 314 Poniente, Montarrey, Mexico  
 YM4VO Box 99, Danzig (Germany)  
 YR5VV (via ARRL)  
 YR5W (via RSGB)  
 YV5ADC Emilio, Box 1247, Caracas, Venezuela  
 ZC1CL % RAF, Amman, Trans Jordan  
 ZC6AB Box 4090, Tel Aviv, Palestine  
 ZC6AC (via ARRL)  
 ZD1LQ Lungi Airport, Freetown, Sierre Leone  
 ZD4AU Box 1119, Accra, Gold Coast  
 ZD9AA Met. Stn., Tristan da Cunha, via Union of South Africa  
 ZK2AA Niue Island, via New Zealand

Above through courtesy of W1s AB, EH, MRQ, PEF, QMI; W2CJX; W3s DPA, EVW, LOE, NOH; W4s BPD, IIB; W5s DTJ, GKB; W6s AY, ETJ, VFR; W7s BE, JHS/5, LCK; GM3CXE; Fred Berman (no call). Come again, please.

#### Tidbits:

Good words from W4BYF are that he has received a valid card from PJ3X who is good as gold for Curacao. The previously-listed QTH, P.O. Box 81, Curacao, is correct . . . . . Cards from ZD8B are coming through, according to W1QMI. ZD8B can be reached via RSGB . . . . . If you need a VO6N card for a previous unconfirmed contact, try VE3EZ at 110 Waverly, Ottawa, Ontario. Same guy . . . . . J9AAX wants all to know he faithfully QSLs and anyone not taken care of because of faulty mails should try his listed QTH. He is W3CLS and is willing to roll up as many contacts as possible with all comers on 14 Mc. — "I rather imagine that everyone has worked a J9 by now so perhaps I shall be wasting my time going back on the air." [He doesn't know you very well, does he, boss? — *Jeves*] . . . . . VO3X contacted W2KH for the first time postwar. Horace had a regular schedule with W1KH for eleven years running in the good old days. Horace's dad is VO3R . . . . . HC1KP keeps receiving cards from stations he has never worked and although he swaps 100% with valid contacts, he would like to pin down this funny business. Possibly some rat borrowing the call . . . . . GM3CXE is hot after WAS with his

50-watter and would like to correspond with League members whose code speed is up over 50 w.p.m.! . . . . . A dubious QSO with EAXXX left W1PKL with a wry face. But the mailman showed up with a nice QSL from the Canaries a few weeks later. Don't pass up EAXXX; however, he will insist upon sending his card first . . . . . G2MI told W1NLM who told W1CH who told us that ZC1AN was a pirate operating in G-land. Art says that he was properly handled, too . . . . . VP9E is fed up with Ws squawking about receiving no QSLs from him after his answering every card received. So let's check the bureaus before jumping up and down, huh? . . . . . A line from W0SO (of TA3SO fame) encloses a line from G6ZO. Jim took a trip to Turkey and stopped off for personal chats with



CR9AN (left) and CR9AG, the only legitimate Macau amateurs now active. They also hold the calls VS6AN and VS6AG and are very much at home on 14-Mc. c.w.

F8EX, FA9ED, EP3D, CN8MZ, CN8BA, EK1AA. That wasn't all, either. On the way back Jim was waylaid by a hamfest which included CN8s MZ, BA, BI, BT and FA8CC. Then a stop at Oran brought about a meeting with that all-band character, FA8BG. A last return stop in Paris resulted in a nice luncheon with F8EO and F8EX. Finally, back home to G6ZO! . . . . . Some of you won't be sorry to learn that W6YDP's /KA1, /VS6, /J2, /J3 and /J9 contacts were not shipboard contacts as his QSLs stated. Write to 1019 E. 33rd St., Oakland 10, California, for a corrected card and give full QSO particulars . . . . . J. A. Lynott (no call) of New York City has been notified by VK3KS that someone has been swiping her call on 20 'phone of late. Fine thing. . . . . Via W1EH, PX1A says he is positively the only legitimate Andorra ham. (QTH listed) . . . . . According to W4FVR, VP8AD (28,050f) will answer a c.w. call. Al also quotes W0ZW/KS6 as requesting

stamps for prompt QSL and mentions that his card to FF8RV via REF got through okay and produced results. . . . . FF8FP is sorry that some of his cards bounced for DXCC because of QSO data omitted and is willing to correct this discrepancy with another card. QTH: Box 583, Dakar, French West Africa, % PAA. . . . . XA calls in Trieste have been switched to MF2 in some reported cases. Good, a ham call seems to sound better with a number in it, anyway! . . . . . Looks like we won't have to look up every VK4 we hear to see if he's in Papua from now on. Reminds us of the days when every G we heard was liable to have been in the Channel Islands! VK9BI says via W3MWP that there are no more VK4s operating in Papua. . . . . W1FH has it that VR5AF is QRT but that a new one, VR5GA, is now active (QTH listed) as well as the old stand-bys, VR5s IP and PL. . . . . LU2DM is gunning for W contacts with 200 watts, an 18-tube homebuilt super and a 4-element rotary on 28-Mc. phone. W2PRG has QSOed LU2DM 159 times postwar! . . . . . Tired of reading claims for fast WACs, W1BIF comes up with what may be the longest WAC in the books. The man worked his first continent in 1927 and finally nailed Asia late last year. [There's

a record you can top, boss — you should live so long! — *Jeaves*]. . . . . This issue's IARU News section lists a number of new QSL bureaus. . . . . W3DKT recently returned from a visit to Holland and reports a cordial reception at the shacks of PA0EP, PA0IN, PA0OO and PA0UN. Despite the shortage of decent radio matériel, Charles says that the Dutch boys could show the Ws a trick or two regarding the assembling of a shack. . . . . J9AAK is back in the U. S. but reports receiving cards lately for contacts he did not make. Someone is using his old call beyond a doubt. If you worked the genuine J9AAK you should have your card by now. . . . . Apologies to the following crack DX men whose whopping scores in the DX Test were inadvertently omitted from the c.w. scores round-up in a recent issue! W4KFC, 245,000; W4BPD, 243,000; W2BXA, 212,000; W3LOE, 211,000; W6RM, 140,415; W9FJB, 123,000; W2FBA, 120,000; W6MEK, 107,036; W6TT, 100,962; W7VY, 92,000. . . . . HP5R is in Panama all right, as is HP2X. W4LVV will handle HP2X QSLs. . . . . From W2MRO, via D4AXS, we hear that AR3CP (14,305f) is okay for Syria. QSL to the listed address. . . . . Through W5ALA we hear that C1MCC is now QRT.

### HAMFEST CALENDAR

**CALIFORNIA** — The San Mateo County Amateur Radio Club will hold its Annual Hamfest & Field Day on Sunday, July 11th, at Creek Park Picnic Grove, Portola Road, five miles from Menlo Park (turn west at Santa Cruz Ave., Menlo Park). Transmitter hunts, contests and awards are programed, starting at 10 A.M. and ending at 4 P.M. Pack a picnic lunch and bring the family. Tickets \$1.50 a person plus 50¢ for automobiles. Further information may be obtained from Bill Peck, W6SBE, 19 Serra Ct., San Mateo, Calif.

**ILLINOIS** — Society Radio Operators, Chicago, are staging their Eighth Annual Hamfest & Picnic on Sunday, July 25th, at Orchard Grove, Maine Township, Illinois, 15 miles from Chicago's Loop. Plans have been completed for making this year's affair the best ever. Contact Charles Palinski, Society Radio Operators, 5454 North Octavia Ave., Chicago, Ill., for details.

**MISSOURI** — Swansee Park, 1½ miles north of Belleville on Route 159, will be the site of the Annual Hamfest of the St. Louis Area Radio Club Council, to be held Sunday, August 1st. A good time is assured all who attend, with contests and prizes being featured. Tickets are \$1.00 and may be obtained from Leta Bush, W0BDB, 3329 Abner Place, St. Louis, Mo.

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**ALBERTA** — The Alberta Hamfest, sponsored by the Calgary Amateur Radio Association, is being planned for Saturday and Sunday, July 31st and August 1st. The affair will be held in Calgary, with registration fee \$2.50. Included on the program are a historical display, portions of the G.E. House of Magic, banquet, competitions and prizes, trip to a local broadcast station, and a tea and movies for the ladies.

**ONTARIO** — The Thousand Island Amateur Radio Association, Brockville, has completed plans for its Annual Hamfest, to be held this year on July 4th at Brown's Bay, six miles west of Brockville. A gala program has been arranged, including many special attractions for YLs and XYLs. Over 300 amateurs and their friends are expected to attend. For further information contact Secretary William Morris, VE3UO, Box 117, Cardinal, Ontario.

### Silent Keys

It is with deep regret that we record the passing of these amateurs:

W2LYX, Joseph F. Harding, Poughkeepsie, N. Y.

W2NOF, Llewellyn L. B. Summers, Poughkeepsie, N. Y.

W3ADG, ex-W6ADG, Comdr. Willard Colbert, USNR, Norfolk, Va.

W4AKH, Edward Connell, Jacksonville, Fla.

Ex-W5AHB, Victor Gallagher, San Antonio, Texas

W5QA, Rufus V. Hargrove, sr., Abilene, Texas

W6AGF, J. B. Fewkes, jr., Los Angeles, Calif.

W8AIZ, Lewis H. Schmidt, Comstock, Mich.

W8BBM, Tesla W. Barker, Grand Rapids, Mich.

Ex-8FYA, H. Howard Willson, Jamestown, N. Y.

Ex-W8HOO, M. D. Romaine, Detroit, Mich.

W8OGT, G. J. Minsel, Lewiston, Mich.

W9BZT, Joseph F. Farneti, Oak Park, Ill.

W0GP, Harry W. Kerr, Little Sioux, Iowa

# Results, First V.H.F. Sweepstakes

THE First ARRL V.H.F. Sweepstakes, held last January, was well received indeed. Open only to stations working on frequencies above 50 Mc., it provided an excellent opportunity to demonstrate what may be expected of the v.h.f. bands under conditions of large-scale activity and without benefit of unusual propagation conditions. As reported by W1HDQ in March *QST*, the week-end of the V.H.F. SS was, in fact, one of the poorest, from a propagation standpoint, that could have been selected. The unfavorable DX conditions that prevailed were actually what was anticipated. The dates were chosen in order to determine whether a period of mediocre conditions would attract enough participation to prove that ideal conditions are not necessary for a lively v.h.f. contest. After all, we can always expect average or bad conditions above 50 Mc., but periods of maximum DX are much less prevalent.

Indicative of the success of this SS is the observation that participation was much higher than that of any previous v.h.f. contest. Reports were received from 347 entrants in 40 ARRL sections. Considering the occupancy of the v.h.f. bands compared with that of the lower frequencies, this represented an exceedingly high degree of activity.

## Winners — High Scores

This SS was run along lines similar to the regular all-band Sweepstakes scheduled each November. Scoring was the same except for elimination of the power multiplier. As in all other section-wide activities, competition was considered to be among participants in each section. The leader in each section has been awarded a distinctive certificate recognizing his performance.

Contestants in the metropolitan areas, of course, submitted the highest scores. Some of these will be of interest since they show what can be done in places of high activity. W3DFV

of Fords, N. J. (about 20 miles southwest of New York City), rolled up the highest score, 1547 points, through contacts with 117 different stations in 7 sections. Operation was exclusively on 144 Mc.; the transmitter used was a crystal-controlled 3E29 job running 85 watts and the receiver a surplus BC-624M. A six-element beam helped considerably in running up the sizable section multiplier. Second-highest score was that of W1HDQ who, using 50, 144 and 235 Mc., had 61 contacts with 11 sections. Third-place position went to W2RH, Port Chester, N. Y.; 60 watts to an 829B amplifier on 144 Mc. gave him contacts with 124 different stations in 5 sections; antennas were two 8-element beams. Other participants who scored more than 600 points: W2OHE 1155, W2LKN 1135, W3BES 1116, W1PEA 1110, W1MON 1068, W1ATP 1056, W2FQW 995, W2WPH 890, W2PIX 865, W2PFX 840, W1OOP 832, W2COT 830, W3EKK/2 800, W2AOD 768, W2CDS 740, W3PAU 740, W2GQP 736, W1RO 714, W1AAR 680, W2CET 680, W2TZU 670, W2LPJ 640, W1AQE 600.

A veteran of the regular SS, W3BES invaded the v.h.f. field to make the greatest number of contacts. Jerry had 141 QSOs on 50 and 144 Mc. He was followed by W2OHE and W2RH, each with 124, and W2DFV with 117. The following had contact totals of 75 or better: W2LKN 115, W3NAH 108, W1OOP 104, W2FQW 100, W3EKK/2 100, W3NSI 97, W2AOD 96, W1PEA 93, W2GQP 92, W3FXG 90, W2PIX 89, W2WPH 89, W1ATP 88, W1MON 88, W2CET 85, W6ZRN 85, W2PFX 84, W2COT 83, W1AQE 75, W2PAU 75.

Leading in the sections-worked category was W1HDQ's total of 11, followed by W2AMJ with 10 and W2DFV 7. The following each worked 6 sections: W1ATP, W1DJ, W1IDZ, W1NF, W1PEA, W1RO, W2BYM. Thirty-three other contestants managed contacts with 5 sections.

It's not very often that a v.h.f. enthusiast can operate from a C-47 flying at 14,000 feet,

but W6YHI/6 did just that. He was fortunate in being able to accompany an air crew that circled over San Francisco piling up flying time. From such an ideal v.h.f. location he worked 5 sections in 2 hours and 7 minutes. Other West Coast stations that worked 5 sections were W6GFW, W6DIX, W6UYK/6, W6YLO, W6EXH and W6FYM.

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## CLUB SCORES

Club	Score	Winner
Frankford Radio Club (Phila.)	7384	W3BES
Amateur V.H.F. Institute of New York	7007	W2RH
Union County Amateur Radio Ass'n (New Jersey)	5963	W2DFV
El-Ray Amateur Radio Club (Mass.)	2503	W1AQE
Philadelphia High-Frequency Radio Club	2353	W3NSI
Astoria Radio Club (New York)	1714	W2WPH
Washington Radio Club	1503	W2GKP
South Jersey Radio Ass'n	1244	W2PAU
Mercer County Radio Ass'n (Penna.)	1142	W8SFG
Hamilton Field Amateur Radio Club (Calif.)	1129	W6YHI/6
Midwest V.H.F. Club (Illinois)	1084	W9WFC
York Road Radio Club (Penna.)	650	W3MQU
Hamilton Amateur Radio Club (Ont.)	391	VE3KM
Potomac Valley Radio Club (Va.)	386	W4KFT
Schenectady Amateur Radio Ass'n	329	W2GYV
Amateur Radio Transmitting Society (Ky.)	14	W4BPE



# The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,\* W1HDQ

**A**NOTHER V.H.F. Party has come and gone. Despite generally poor tropospheric propagation and only the most meager DX openings on 50 Mc. in a few scattered parts of the country, a fine time was had by nearly everyone, and participation (and scores) reached an all-time high. Once again, it was shown that a v.h.f. contest can succeed in spite of adverse conditions, and participants were surprised at the large number of contacts which could be made with bands closed -- when everybody is in there trying!

At this writing, only a week after the contest, it is impossible to present any kind of summary of the event, but reports are piling in at a gratifying rate, so here are a few of the highlights. Heroes of the occasion, for the gang in W1 and W2, at least, were Hank Cross, W1OOP, and Gordon Pettingill, W1OUN, who conducted a carefully-planned de luxe expedition to Hogback Mountain, near Marlboro, Vermont, operating W1OOP-1 from that superb location throughout the entire contest period. Arrangements were made for the use of a.c. power, and the array of gear used would have done credit to any home station.

The 50-Mc. set-up consisted of an 80-watt rig with an 829 final, feeding a 3-element rotary. The receiver was a 6AK5-7F8 converter working into a BC-348. An 829 at 80 watts served in the final of the 2-meter rig also, with a 4-element vertical array. The receiver was a homebuilt job with two r.f. stages and a total of 11 tubes. On 1 1/4 the rig line-up was 6AG7-6AG7-2E26-829-829, at 80 watts input, with a 7G8-6J6-9002 converter into the i.f. of a 522. The boys had crystal control even on 420 Mc., using the 220-Mc. rig to drive an 8012 doubler!

This combination provided more Vermont v.h.f. contacts, very likely, than any single station has ever done before. On 50 Mc. 32 stations were worked in 8 sections; on 144 Mc. they made 69 contacts in 8 sections; on 220 Mc. 2 in 2; on 420 no results! Their net score of 1998 points is the highest received at this writing,<sup>1</sup> and if it remains so when all reports are in, v.h.f. enthusiasts from Maine to Northern New Jersey, at least, will agree that they deserve it! Had your conductor been able to hear their 220-Mc. signal their score would have been 116 points higher,

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

<sup>1</sup> A recent report shows W1OOP/1 topped by W1CTW, Arlington, Mass., with 2044 points.

## LATE 50-MC. DX REPORTS

**W4FBJ works LU6DO;  
XE1KE contacts W2s!**

In an 18-minute QSO complicated by mutual non-comprehension of the other's language, W4FBJ, Shepherdsville, Ky., worked LU6DO, Temperley, Argentina, on 50 Mc. at 4:22 p.m. CST on May 25th.

On May 31st, after being open for normal E<sub>s</sub> distances for several hours, the 50-Mc. band opened for double-hop. XE1KE, Mexico City, worked W2BYM, W2RLV, W2RGV, and possibly others, and was heard by several W1s. The band was also open to Southern California, and numerous W2-W6 contacts were made. The W2 contacts made by XE1KE were the first made in the northeastern part of the United States by any station south of the Rio Grande.

as they were hearing W1HDQ S3 on 224.7 Mc. Sunday morning!

There was a mild aurora during the afternoon and early evening on Saturday, and the boys on 6 added to their section totals thereby. Tops in this department, in the reports received thus far, is W2AMJ, Bergenfield, N. J., who managed to knock off 15 sections on 50 Mc., despite "time off for good behavior; i.e., TVI!"

A brief sporadic-E opening in the far west helped to make things interesting, as the reports of W7BQX and W7DYD show. Their sections worked on 50 Mc. include Colorado, Utah-Wyoming, San Francisco, East Bay, Santa Clara Valley, Los Angeles, British Columbia and Washington.

The largest number of stations worked, thus far reported, is 144 on 2 meters by W2OHE, Brooklyn, N. Y. With a few contacts on other bands, Pres could have had a more impressive total, though his 1152 points is not to be sneezed at. Versatility pays off, however -- plan to be on all v.h.f. bands in the next one!

Here are a few of the early claimed scores:

Call	Contacts on				Multiplier	Total
	50	144	220	420		
W1OOP/1	32	69	2	0	18	1998
W1PEA	29	73	-	-	16	1632
W1IQZ	15	89	-	-	13	1352
W1PIV	-	115	-	-	8	920
W1PBB	11	52	-	1	13	884
W1HIL	27	55	-	-	10	829
W1DEX	18	69	-	-	9	783
W1HDQ	43	-	1	-	12	576
W1IID/1	0	34	3	-	7	350
W1BAQ	-	78	-	-	4	312
W1QXE	-	55	-	-	5	275
W2OHE	-	144	-	-	8	1152
W2WAI	-	137	-	-	7	959

W2QVH	19	55	-	-	12	888
W2COT	21	52	-	-	10	730
W2DZA	8	37	4	-	11	715
W2AMJ	39	-	-	-	15	585
W2RXZ	-	72	-	-	8	576
W2AOD	-	70	-	-	6	420
W2TJW	-	65	-	-	6	325
W2RLV	17	-	-	-	10	170
W3RUE	6	44	-	-	6	264
W3GKP	7	21	-	-	7	198
W6VZA	-	88	-	-	3	264
W6ZDO/6	-	71	-	-	3	213
W7DYD	19	3	-	-	8	176
W7BQX	19	1	-	-	8	160
W8NQD	18	1	-	-	7	126
W9PK	16	36	-	-	7	364
W9OBW	2	48	-	-	3	200

Other than the contest, there was little of headline character in the news of the month. Openings on 50 Mc. were frequent, and a large number of skip contacts were made throughout the country, but the best part of the season was still ahead. On 144 Mc. the good nights were showing up more often, and the distances being covered were already equaling the best of previous years. The change to 220 Mc., effective April 28th, had the effect of stimulating interest and stepping up activity on that band. On 420 Mc. there was sufficient activity in a number of our populous areas so that it was occasionally possible to make contacts on that band without making previous arrangements on the telephone, or on some lower band. Out in California, the 2300-Mc. band record was extended to 150 miles.

The skip season on 50 Mc. was beginning to swell the states-worked totals, and only South Carolina seemed to be lacking resident activity this spring. A good opening on May 25th provided the long-awaited Mississippi contacts for a number of West Coast stations, among them W6UXN, Inglewood, California, who now leads the pack, lacking only Vermont for 50-Mc. WAS!

There was plenty of E. in Europe, too, but not many contacts to prove it, according to G6DH, who worked W1PPH/MM on May 11th, and FA8IH on the 15th. There were many other days when commercial harmonics were heard well above 50 Mc. from various parts of Europe, and on the 13th OK3ID was heard from 1310 to 1325 GCT, S9 on automatic m.c.w.

### Two-Meter Record Equaled

How far have we come on 144 Mc. in the past two years? A glance at the July issues of *QST* for 1946 and '47 provides the answer — in '46 we were talking of the extension, during May, of the 2-meter record from 145 to 200 miles. A year later we hailed the 425-mile record of W3KUX and W1MNF, set on May 16th. Admittedly, the best 2-meter weather of the year is yet to come, but May, 1948, saw at least one contact made over a distance equaling the best previously worked on 144 Mc. at last season's peak. On the morning of May 9th, W2TDW/4, operating from Clingman's Dome, near the Tennessee-

North Carolina border, worked W2RH, Port Chester, N. Y., a distance which is so close to the W3GV-W0WGZ record of last year that it is difficult to determine whether the record has been broken.

With the help of the University of Tennessee Amateur Club, a modified 522 transmitter, running 40 watts input, a VHF-152A converter and an HQ-129 receiver, and a 4-element array were taken to the Dome, a 6660-foot elevation in the Great Smoky Mountains. Power was supplied by a 2.5-kw. generator. W2TDW and three others remained at the summit from Saturday afternoon until Sunday afternoon, though the temperature dropped to about 25 degrees, from a high of 65, during the night.

W2RH, hearing of the expedition, spread the news through W2. W2PCQ/2 set up at High Point, N. J., Saturday night, and both he and W2RH heard W2TDW/4 at 9:10 P.M. The signal was extremely weak, however, and no satisfactory contact was established that night, though the signal was heard intermittently until 12:30 A.M. W2RH was on the job again at 5:30 A.M., but heard nothing on the band until 7:15, when W1SF came on. Both W2RH and W1SF then worked W3ASD at 7:30, and at 8:13 W2TDW/4 was heard calling. Contact was established, with signals about S3, and two transmissions were exchanged before the signal faded out.

The transmitter at W2RH ends with an 829 at 70 to 80 watts input, feeding an 8-element array which consists of two 4-elements in phase, side by side, vertically polarized. His receiver is a hot homebuilt job with four 6AK5 r.f. stages, 6AK5 mixer, 6AK5 oscillator, two 30-Mc. i.f. stages, a mixer and oscillator, the latter crystal-controlled on 9133 kc., with its plate on three times this frequency, and two stages of i.f. at 2.5 Mc.

## RECORDS

### Two-Way Work

50 Mc.: CE1AH — J9AAO
10,500 Miles — October 17, 1947
144 Mc.: W3GV — W0WGZ
660 Miles — September 18, 1947
235 Mc.: W1CTW — W2HWX
210 Miles — October 12, 1947
420 Mc.: W6VIX/6 — W6ZRN/6
186 Miles — July 27, 1947
1215 Mc.: W3MLN/3 — W3HFV/3
12.5 Miles — September 24, 1947
2300 Mc.: W6IFE/6 — W6ET/6
150 Miles — April 25, 1948
3300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947
5250 Mc.: W2LGF/2 — W7FOF/2
31 Miles — December 2, 1945
10,000 Mc.: W4HPJ/3 — W6IFE/3
7.65 Miles — July 11, 1946
21,000 Mc.: W1NVL/2 — W9SAD/2
800 Feet — May 18, 1946

# 50 WAS Mc.

## Standings as of May 31st

W1CLS	44	W5VY	40	W9DWU	46
W3CIR/1	42	W5ML	38.	W9PK	43
W1LL	40	W5AJG	38	W9ZHL	43
W1HDQ	39	W5JLY	38	W9JMS	36
W1CGY	38	W5FRD	38	W9ALU	34
W1HMS	36	W5ZFF	34	W9QKM	33
W1JLK	35	W5PSC	34	W9UIA	31
W1NF	35	W5DXB	32	W9AB	23
W1LSN	33	W5IOP	30		
W1KHL	33	W5LIU	24	W0USI	45
W1CLH	32			W0QIN	43
W1CJL	30	W6UXN	47	W0ZJB	43
W1AF	27	W6OVK	38	W0DZM	42
W1EIO	24	W6ANN	38	W0TQK	42
W1HIL	21	W6BPT	34	W0SV	42
		W6IWS	32	W0BJF	42
W2BYM	39	W6FPV	31	W0HXY	41
W2AMJ	38	W6WNN	24	W0INI	41
W2IDZ	37	W6EUL	22	W0YUQ	39
W2QVH	37	W6HZ	13	W0JHS	38
W2RLV	37	W6BWG	13	W0PKD	36
W3OR	35	W7BQX	43	VE1QY	28
W1KMZ/3	33	W7ERA	43	VE3ANY	27
W3MKL	33	W7HEA	40	VE1QZ	24
W3RUE	32	W7DYD	37	G5BY	24
W3MQU	19	W7FDJ	36	VE2KH	19
W3GKP	12	W7FFE	35	VE2GT	14
		W7KAD	35	XE1KE	13
W4GJO	46	W7JPA	34		
W4QN	40	W7QAP	30		
W4GIY	40	W7ACD	27		
W4EQM	40	W7JPN	19		
W4EID	38	W7OWX	15		
W4DRZ	38				
W4WMI	33	W8QYD	39		
W4FBH	31	W8RFW	25		
W4HVV	29	W8TDJ	22		
W4FJ	26				
W4FNR	25				
W4EMM	25				
W4JML	20				
W4LNG	19				

Note: This list covers states worked since March 1, 1946. Send in monthly reports of states worked in 1948 on 50, 144, 220 Mc. and higher, for entry in the 1948 Most-States-Worked Contest. See January QST, page 150, for details. Standings will be published when sufficient entries have been received.

Here's another contact, as yet unconfirmed, that would appear to be pushing the 660-mile record. At 12:16 A.M. May 23rd, W3KWF, Washington, D. C., worked a station signing W4TT, reported to be in Alabama. If this was on the level, and if W4TT was at Notasulga, the location given for him in the older *Call Books*, that's around 700 miles. There are a couple of "ifs" involved, however, and W3KWF is taking no chances. Recent *Call Books* list W4TT as Madison, Georgia, still a nice hop, but no record.

## Commercials Steal Our Thunder — Airlines Ops Work 1000 Miles on 130.7 Mc.

The region around the Gulf of Mexico has always looked like a fine place for v.h.f. DX, but until recently there has been almost no interest in such matters in W4 and W5, except for a few die-hards who could not stir up enough cooperation to assure that there would be activity at times when fortunate propagation conditions happened to develop. Recent months have seen 144-Mc. activity growing rapidly along the Texas side of the Gulf Coast, and some mighty interesting distances are being covered, as reported elsewhere. But the surface has hardly been scratched, as the experiences of Eastern Airlines personnel in early May indicate.

Manned mostly by hams, EAL ground stations in Florida, Alabama, Georgia, Louisiana and Texas, working with the simple ground-plane antennas used in airlines communications, had contacts over distances up to 1000 miles on May 1st, 2nd and 3rd. At Jacksonville, Fla., things began to open up during the evening of May 1st, and New Orleans, some 500 miles distant, was worked at 10:05 P.M. At 2:43 A.M. the following morning, Houston, Texas, came through, an 825-mile hop, and was immediately followed by San Antonio, more than 1000 miles away. This path was open again at 4:22 and 4:29 A.M., at which time New Orleans was not audible, though the latter is almost exactly at the midpoint of the path between San Antonio and Jacksonville.

Normally, the distance between the ground stations is too great for v.h.f. communication, work on the 130.7-Mc. channel being confined mainly to plane-to-ground traffic, but during the above period Jacksonville made contacts with Tallahassee, 150 miles, Tampa, 165 miles, Atlanta, 285 miles, Montgomery, Ala., 300 miles, Charleston, S. C., 250 miles, and Mobile, 365 miles. All this occurred between 10 P.M. and 6 A.M., so it may be seen that W4 and W5 DX-record aspirants will have to stay up late or get up early. The above information was supplied by W5IRJ and W4FPK.

W4KQS, an EAL operator at Tampa, worked Montgomery, Mobile, Jacksonville, Albany, Ga., West Palm Beach, Miami, Daytona Beach, and Columbus, Ga., on May 1st and 2nd. On a flight between Memphis and Atlanta, J. S. Betts, an EAL pilot, worked Jacksonville, Miami, Tampa and West Palm Beach, all more than three times the normal distance for plane-to-ground communication on the v.h.f. channel.

What say, two-meter men in W4 and W5 — when do we get that new record? W4GJO, who has been in there trying, was away at this time, but he says that WHOO/FM, at Orlando, received numerous reception reports from Texas, Alabama, Tennessee, Georgia and North and South Carolina for the first few days of May. Their frequency is 96.5 Mc.



### Here and There

*Dallas, Texas* — W5AJG, for years a leading light in 5-meter DX work, is getting a bang out of 2-meter DX now, having had his first taste on April 28th, when he worked W5DAA and W5JKB of Kingsville, a distance of some 370 miles. W5s ABN and CAE of Dallas, and CZZ in Terrell and AQS in Palmer were also in on the fun. During the morning of May 2nd Leroy worked W5s EAL, FSC, IYF, BHO and GLS, all of Houston, about 230 miles to the southeast; W5JYG in LaPorte and W5KFB in Baytown, about 240 miles; W5VY and W5LIV in San Antonio, 250 miles; W5SM and W5AVW of Beaumont, 240 miles; W5DDJ, Galveston, 270 miles; and W5DAA, Kingsville, 370 miles. During the contact with W5FSC both stations shifted to 50 Mc., and made the first two-way 50-Mc. contact between the two cities. As has been found in many other places, the signals on 144 Mc. were stronger, though the power used on the lower frequency was greater. These contacts are particularly interesting because Dallas is some 265 miles inland, demonstrating that the stations close to the Gulf Coast do not necessarily have a monopoly on the 2-meter DX.

W5AJG caught the first real 6-meter opening of the 1948 season on May 1st, with the Assistant QSL Manager for W5, W5JKM, working a flock of W9s, one W8 and one W0 between 5:47 and 8:28 P.M. Two W6s were worked on the 2nd, after the 2-meter DX listed above, between 11:30 and 11:45 A.M.

*Monterrey, Mexico* — Contacts with Mexico on 50 Mc. are in prospect for many W stations as the result of the efforts of XE2C, whose location is about 175 miles west of Brownsville, Texas, and within single-hop range of a good part of the United States. On double-hop openings he should be able to reach us all. He worked W0KYF and heard W0UEL and several unidentified 'phones on May 10th. On the 18th, between 6 and 7 P.M. CST, he worked W4EQM, W4EQR and W4CNK. The rig at XE2C runs 120 watts to an 829 final, and higher power with a 4-250A will be ready soon. His receivers include an HRO with a Lester converter and an NC-183. A word of warning, gang — when the South Texas W5s are coming through put that b.f.o. on now and then — XE2C likes to use c.w.

In the Mexico City area the representation on 6 includes XE1KE, XE1FE, XE1QE, XE1GE and XE1A. XE1KE and XE1QE are also on 144 Mc., and XE1QE has facilities for simultaneous transmission on 50 and 144 Mc.

*Downers Grove, Ill.* — Prescription for a simple easily-adjusted array: Make half-wave dipole, fed in the center with RGSU coaxial cable. Add a quarter-wave-spaced reflector. Make provisions for adjusting the position of a director, and vary its spacing until a satisfactory balance between

forward gain and standing-wave ratio is obtained, which position turns out to be somewhere between 0.12 and 0.15 wavelength. Be sure to use a "bazooka" at the feedpoint, for maximum effectiveness.

*Sequim, Washington* — W7BQX says that horizontal has it in the 144-Mc. polarization controversy as far as he is concerned, though the picture in that area is complicated by multipath effects. In working W7DF at Everett, 55 miles to the east, his 6-element array is much more effective when used horizontal, with W7DF shifting his 4-element job correspondingly. Most of Ernie's contacts appear to be made by reflection of some sort. Located on the north side of the Olympic Range, W7BQX has to point his array northeast to work Seattle, which is about 50 miles to the southeast. He is able to hear W7KSE in Olympia, 75 miles to the south, only by pointing his array east. This contact is made with horizontal polarization at W7BQX and vertical at W7KSE, yet when W7BQX tries a vertical he is unable to hear W7KSE.

A sharp high-gain beam is not always the answer on such paths. On the 100-mile hop from W7DF to Vancouver, B. C., a combination land and water path, there are times when the 4-element array at W7DF outperforms his 16-element, but most of the time the big job is two to three S-units better. Both are horizontal. The seeming paradox probably results from variations in tropospheric bending along the route. We can guess, at least, that scattered reflections, more numerous with the broader array, aid the signal at times when tropospheric characteristics over the straight-line path are not at their most favorable condition. It is in such vagaries that much of the basic appeal of v.h.f. operation lies. There can be so much more to it than mere gassing with one another night after night!

*Houston, Texas* — Here's a story that will just not die, but we positively do not guarantee its authenticity: Braniff Airways operators claim to have heard a plane of the Chinese National Airways working the Shanghai control tower on 129.9 Mc. W4FPK, of EAL, who passes this tidbit along, says he doesn't believe it either!

And while we're on the subject of international DX, we might as well pass along the dope on the change to 144 Mc. in Australia (from their former band at 166 Mc.), effective May 1st. A VK contact on 2 meters? Is anyone ready to say that it *can't* happen?

*Chester, Nova Scotia* — Add to peculiar calls heard on 50 Mc.: HLI calling HEW on c.w., S5 to 6, heard on 50.5 Mc. on April 23rd by VE1TR, who also adds that VE1 representation on 50 Mc. now includes V1, TF, QZ, JK, SF and TR, with more stations about ready to come on.

*Tucson, Ariz.* — Stations on 6 now include W7UPF, 51.1 Mc., W7FGG, 50.4, W7OWX,

50.7, W7UPR, 50.05 and W7QAP, who, in addition to his home station, also has a portable job to operate from his 500-watt generator. This combination will be "Jeep"-ed to the mountain tops at every opportunity to escape the heat.

*Brattleboro, Vt.* — Vermont contacts on 50 Mc. coming up! W1CGX and W1AZV are watching 6 for openings and getting on at every opportunity. Now it's up to you Vermont-hungry guys to find 'em! CGX has missed a lot of calls because he was operating on 51,016 kc. Let's not hear that old song-and-dance about the band only being open at the low end; tune the band, state-chasers! Ray has some low-end crystals, too, but would much prefer the QR&M-free spot at 51 Mc. There are too many W1s and 2s in the first 100 kc. already. Brattleboro is really down in a hole, and all winter long these two fellows stuck with the band though they heard only a few stations in the Connecticut Valley ordinarily. Also in a deep hole but getting out of it on occasion is W1MEP, of Bennington, Vt. Look for him on 50.8. W1AZV usually operates around 50.3 Mc.

*Pekin, Ill.* — Looking for something different in the way of a directive array, W9LJP decided to try the Marconi-Franklin series-phase array, details of which appeared in this department in December, 1945, *QST*. Revising the dimensions for 50 Mc., Warren put up a three-section job in haywire form, and has been getting good results on both local and skip contacts. The array gives a worth-while gain over a dipole, yet its frequency characteristics seem considerably better than the conventional parasitic array. The pattern is broad across the nose, but attenuation directly off the sides is extremely high.

*Lancaster, Cal.* — Sauce for the goose may not be so hot for the gander. W6MFK, who is over the mountains from the Los Angeles area, notes that on evenings after warm days, when the I.A. boys are having a big time on 144 Mc., conditions are at their poorest on his side of the mountains, probably the result of the fact that practically all of MFK's contacts are made by reflections from various mountains, rather than by air-mass boundary bending over direct routes. W6MFK is running tests with W6VSF on the effectiveness of vertical rhombic antennas, with results quite encouraging to date.

*Grand Rapids, Mich.* — W8NOH says that Michigan has had little representation in these pages, so he sends in the following: Stations on 144 Mc. in this city include W8NCB (100 watts to 829, 16-element array), W8ZCH (522 and 5-element beam), W8PCG (522 and 4-element), W8KWF/8 mobile, and W8VCG and W8ALA coming on. W8NOH has 100 watts, a 4-element array and a converter à la W2BFD in March *QST*. The Muskegon Area Radio Club holds an emergency net meeting each Monday night at 10 P.M. The horizontally-polarized W9s have been

heard frequently of late, and W3GV of Erie and W3NMJ of Emporium, Pa., have been copied on the better nights. Antennas in the Grand Rapids area are horizontal.

*Saginaw, Mich.* — W8HAN lists W8s COW, LNE, LPQ, IHF, MYZ, WZC and HAN as the 2-meter stations of this area. Consistent communication is maintained with W8VIIB in Fenton, but better results would be forthcoming if the stations in Detroit, Lansing, Grand Rapids and Kalamazoo would turn their beams north more often. The first DX worked from the Saginaw area broke on April 25th, when W8HAN hooked W8WJC at Everett, Ohio. W8HAN is also using the W2BFD-type converter, working into the i.f. section of a 522. Antennas are all horizontal.

*Portland, Ore.* — The first signals from the Olympia (Wash.) area were heard in Portland on April 13th by W7IIA, who alerted the rest of the Portland gang. First two-way contact was made by W7KSE at Olympia, and W7JRZ of Portland, who has 90 watts and a 16-element vertical array. W7s DIS/ENU, AVV, DNB and others heard KSE, but only JRZ made the grade. The "Snake-eyes" turned out in force for the first Pacific Northwest 2-Meter Field Day on May 2nd. This event, which is scheduled to be repeated monthly throughout the summer months, is for the express purpose of getting everyone out and on 2 at one time, in the hope of breaking the 2-meter record. May 2nd was a bit early for hitting the highest spots, and some tough going was encountered by the more adventurous teams, but a grand time was had by all. The best DX of the day was worked by W7KJV/IIA who was operating from a high spot on the Coast Range near Vernonia, Oregon. They worked W7KFM/7 on Goat Mountain, near Yakima, Wash., about 140 miles distant. Their reward for this feat was to be stuck in the mud on the return trip. Everyone having called it a day, an SOS brought no response, and the boys had to hitchhike to Portland, where they finally arrived at 4 A.M., only to return the following day to dig their car out. Next time there will be an SOS watch after festivities are concluded!

*Louisville, Ky.* — The path to Indianapolis, 100 miles to the north, has been good for 50-Mc. work recently, according to W4FBJ, who has been working W9s VPN, GYX, AQQ and EON regularly. W8QYD, Dayton, Ohio, 140 miles, is also worked on 6. W4FBJ has also worked W9ASM of Indianapolis on 144 Mc.

*Beaumont, Texas* — W5SM, who has been working some nice 2-meter DX along the Gulf Coast, wants the fellows in Oklahoma, Louisiana, Alabama and Florida to know that activity in Texas is predominantly vertical at present. He also has a 5-element horizontal array, but checks to date with stations similarly equipped have

(Continued on page 132)

# I.A.R.U. News



## UNITED NATIONS

Amateur station K2UN, operated by the *United Nations Amateur Radio Club*, and illustrated on the cover of April 1948 *QST*, was officially opened with a dedication ceremony on May 17th. George W. Bailey, W2KH, president of I.A.R.U. and A.R.R.L., made the first transmission from the station, and Maj. General Frank E. Stoner and Benjamin A. Cohen, chief communications engineer and assistant secretary-general, respectively, of United Nations, participated in a series of QSOs with hams in Italy, France, Germany and Latin America. Mr. Cohen's ability to converse fluently in several languages provided K2UN with a facility enjoyed by few other 14-Mc. 'phone installations. With many high officials of the United Nations in attendance, the opening of the station was a gala affair.

Transmitters capable of 1-kw. input on the 3.5-, 7-, 14- and 28-Mc. amateur bands, an HRO receiver with Panadaptor, and a "ten-over-twenty" rotary beam remotely controlled from the operating position comprise the equipment of the station. Its location behind plate-glass windows on the main corridor through which both UN personnel and visitors pass serves to arouse the interest of most UN visitors. Several delegates, some from countries in which amateur radio is not authorized, have expressed interest both in the station itself and in the institution of amateur radio. It is quite possible that some new countries may appear on the ham bands as a result of the operations of K2UN.

Although primarily intended for DX QSOs, K2UN is always ready for a call from any amateur.

## PANAMA

The *Liga Panamena de Radio Aficionados*, eager to obtain amateur radio operating privileges for its members, impertuned the Panamanian government to make provisions for amateur licensing in the Republic of Panama. A resolution by L.P.R.A. was brought to the attention of

the President of the Republic and, as a result, nine provisional licenses were issued April 30, 1948. The *Liga Panamena de Radio Aficionados* has been commissioned to draft the regulations that will govern all amateur radio activities in Panama.

## TRIESTE

Radio amateurs in Trieste have formed the *Associazione Radio Amatori-Trieste*. The constitution of A.R.A.T. has been approved by the Allied Military Government of the Free Territory of Trieste. The Allied authorities have under consideration a request for the establishment of a system of amateur radio licensing. Meanwhile, some amateurs have received permission, upon request, to operate stations under old calls previously issued by the Italian government. To identify themselves as Trieste stations, these stations sign /Trieste.

Mr. Giovanni M. Chenda is president and treasurer of the newly-formed society and Mr. Giuseppe E. Bampi is vice-president and secretary.

## AUSTRALIA

Effective May 1, 1948, VK amateurs have been given the band 144-148 Mc., with AØ, A1, A2, A3, f.m. and pulse emission permitted. This band is in lieu of the previous assignment of 166-170 Mc. The Postmaster-General's Department in Australia has been requested to make 235-240 Mc. and 420-460 Mc. immediately available for amateur operation. However, preliminary indications are that the requests will not be granted. In lieu thereof, the authorities are considering the allocation of 288-296 Mc. and 576-585 Mc. for amateur use.

W.I.A. has announced the acceptance by all divisions of a Federal Constitution for the society. The Headquarters is now faced with the task of drafting a uniform divisional constitution, a huge undertaking in view of the diversity of state corporation laws.

(Continued on page 154)

◆  
George W. Bailey, W2KH, president of I.A.R.U. and A.R.R.L., makes the opening contact for UN's amateur station while Benjamin A. Cohen of UN looks on.  
◆



July 1948

# Your QSL Manager

**I**MMEDIATELY after the announcement of the inauguration of the QSL bureau system in one of the W districts, Canadian amateurs wanted to know when such services would be made available to them. More than that, many of them immediately volunteered to aid in the important task of forwarding foreign QSLs to their brother hams.

The dean of those first public-spirited applicants for sometimes thankless jobs is W. Bert Knowles, VE3QB, who has been providing excellent service in distributing cards to VE3 amateurs since early in 1933. During his nearly a score of years as QSL manager for VE3, Bert has handled countless thousands of cards for DX-minded VE3s, his monthly totals now averaging more than 1100 cards.



W. Bert Knowles, VE3QB, QSL manager for Ontario, "works" more DX than a hundred hams, but he does it "by proxy." With thousands of cards flowing through his hands, a lot of his spare time is spent in making his fellow amateurs happy by forwarding cards to them.

Bert was born June 20, 1909, on a farm at Lanark, Ontario, and has lived there continuously since. As a lad of 17, he built his first radio receiver, of the then-familiar crystal-cat-whisker slide-tuner variety, but received only a blank silence for his pains. A one-tube WX12 blooper was more successful, but a few months of broadcast reception made the short-waves seem a greener pasture, so an adapter was added ahead of his receiver and Bert was well on his way to becoming a ham.

In January, 1931, he received his first ama-

teur ticket, got on the air with his 201-B as a Hartley oscillator powered by "B" batteries, and promptly worked W1CNE for his initial amateur contact. After a few years with only battery power available, Bert blossomed out with a rig ending in an 807 when hydroelectric power became available in 1937. Since then, with 'phone added in 1941, he has made WAC and WBE on 28 Mc., and lacks only Nevada for WAS. (Nevada readers please note.)

When the arduous duties of a QSL manager permit, Bert is putting the finishing touches on a new transmitter ending up in push-pull T740s and modulated by a pair of 811s. His operating specialty is working British Empire DX stations on the four major amateur bands, both c.w. and 'phone. However, it seems safe to say that the lion's share of his *amateur radio* time is devoted to making it possible for hams in VE3-land to receive promptly those precious bits of pasteboard.

## OUR COVER

July being the month for fireworks, this issue's cover is a shot of the "standing arc" that can be developed on the 28-Mc. antenna tuning condenser at W1AW. This phenomenon is old stuff to those of the gang who run high power on the higher frequencies, but the average fellow doesn't get much of a chance to observe the effect. It is caused by high voltage at a high frequency generating corona that starts the arc. Once started, the base of the arc can be made to jump from one part of the condenser to another by passing air currents. Such arcs will occasionally start spontaneously in high-voltage high-frequency circuits, but in most amateur stations they have to be started with a pencil or other device that is in vogue for testing antenna (*not final-plate!*) voltage.

## ~~W~~ Strays

While cast for the Board meeting, W5NW had the heavy task of reporting the untimely passing of Northern Texas SEC, Rufus V. (Vol) Hargrove, W5QA. An active amateur since the early '20s, it was W5QA's Northern Texas AEC organization which functioned so effectively during the 1947 Texas-Oklahoma and Texas City disasters. Indicative of the high esteem in which Mr. Hargrove was held was the action of the statewide Texas nets and clubs in raising the Vol Hargrove Fund, totaling over \$800, which was presented to Mr. Hargrove's family.

**SWITCH  
TO SAFETY!**





# Hints and Kinks

## For the Experimenter



### POWER SUPPLY FOR 24-VOLT SURPLUS GEAR

MUCH of the gear that has been offered on the surplus market was originally designed for operation from a 24-volt source. This has proved to be a headache in many respects, because hams in general have set up their stations for operation from 115 volts a.c., using 6.3-volt tubes almost exclusively. Shown in Fig. 1 is a small power supply that will do a very satisfactory job in furnishing plate and heater power to many of the small receivers such as the ARC-5 (SCR 274N) series, in which 12-volt tubes are used with a 24-volt supply.

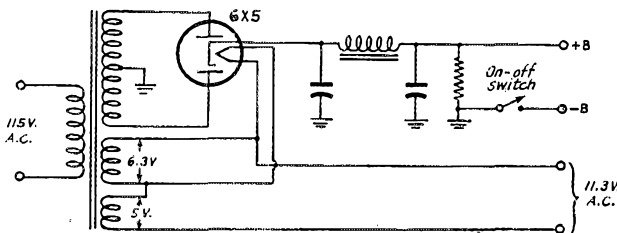


Fig. 1 — A simple power supply designed to be used with receivers requiring 12-volt heater supply. The filter components are standard, the only unusual feature being the use of a cathode-type rectifier to permit series connection of the two filament windings.

A standard replacement-type transformer is used with a cathode-type rectifier to permit series connection of the 5-volt rectifier filament winding and the normal 6.3-volt winding. When the voltage required is low, of the order of 200 or 300 volts, the arrangement shown in the diagram will be usable. It is not safe for higher voltages, however, because the cathode-to-heater potential-difference rating of the 6X5 is only 400 volts. If an on-off switch is used, it should be installed in the negative lead to the receiver rather than in the high-voltage center-tap to avoid breakdown from cathode to heater in the 6X5.

The series-connected filament windings add to 11.3 volts (when the windings are properly phased), and it is usually a simple matter to rearrange the heater wiring within the receivers to operate from the lower voltage. If rewiring is impossible, or undesirable, the 6-volt equivalent of the 12-volt tubes supplied with the receivers may be used. — J. Richard Kearns

### SIMPLIFIED DESIGN OF LOW-FREQUENCY DISCRIMINATOR TRANSFORMERS

THE action of FCC in permitting n.f.m. on some of the lower-frequency bands has stimulated interested amateurs to build limiter-discriminator units to be added to their 455-kc. receiver i.f. amplifiers. At present, 455-kc. discriminator transformers are not available on the market, and the design of such a transformer without a great deal of laboratory equipment is quite difficult. Most standard 455-kc. i.f. transformers are not adaptable. The coupling between the primary and secondary windings is quite critical

for correct bandwidth, and can be adjusted only by sliding the coils up and down the form, a difficult operation. It is possible, however, to couple the primary and secondary windings capacitively, which makes the bandwidth adjustment merely a small trimmer condenser.

The circuit is shown in Fig. 2. Inductances  $L_1$  and  $L_2$  are pies from any replacement 455-kc. i.f. transformer.  $C$ , the bandwidth control, is a 3-30  $\mu$ fd. mica compression trimmer. The two coils have no magnetic coupling between them and are preferably

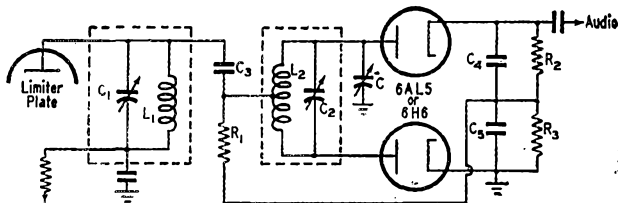


Fig. 2 — A method of overcoming the lack of low-frequency discriminator transformers. Two separate tuned circuits are coupled through a fixed capacitance. Bandwidth is then adjusted by means of a small mica trimmer,  $C$ .

- $C$  — 3-30  $\mu$ fd. trimmer.
- $C_1, C_2$  — 100- $\mu$ fd. mica.
- $C_3$  — 47- $\mu$ fd. mica.
- $C_4, C_5$  — 100- $\mu$ fd. mica.
- $R_1, R_2, R_3$  — 0.1 megohm,  $\frac{1}{2}$  watt.
- $L_1$  — 1.5-mh. pie from 455-kc. i.f. transformer.
- $L_2$  — Same as  $L_1$ , but center-tapped.

mounted in separate shield cans. The unbalance provided by  $C$  causes current to flow in the secondary of the same phase which would be supplied by straight magnetic coupling. Thus, to change the bandwidth, merely adjust  $C$ , tune  $C_1$  for maximum a.m. output, tune  $C_2$  for minimum a.m. output, and the job is done. A few trials should give the desired bandwidth. — Harry R. Hyder, W3NVL, ex-W2LIW



# Correspondence From Members -

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

## "... IF WE KNOW A BETTER WAY ..."

Powder Springs, Ga.

Editor, *QST*:

After reading W4IA's letter in January *QST* I just have to put in my two bits' worth.

When I first found out about losing some of our frequencies I sat down and wrote ARRL a very hot letter telling you what I thought — and it wasn't good. But after re-reading my letter several times I decided I had to be fair and first tell you what to do to help and better our ARRL.

Two months have passed now and I still have the letter, but I don't have that answer. But I am still gunning for it and when I get it you guys at Headquarters will get both barrels. Until then, 73 and good luck.

— Phil N. McKay, W4FFC

## "KNOW-HOW"

Malden Street, Everett, Mass.

Editor, *QST*:

Many old-timers must be struck by the approach to ham radio made by the novice today.

I happen to be one of the minority who use home-constructed equipment. Snooping on the 10-meter band recently, I heard the radio instructor for a boys' club describe the set-up there, consisting of a commercial receiver and transmitter. What instruction comes from putting ready-to-operate equipment on the air? And where is the know-how to come from unless the novice constructs his own and makes it work with a presentable signal on the air, and a receiver that brings in the signals he intends to work?

A QSO with a snooty young squirt. Just after the band reopened, sticks in my mind. He was using a commercial job running 700 watts, and one of the highest-priced receivers. When he heard my equipment was of the home-grown variety he immediately assumed a superior attitude, talked down to me, and was offensively high-hat. Needless to say, he didn't get away with it. After a little leading questioning which showed he didn't know his way around, can you blame me if I poured it on and let him know he was still only a lid and a jerk besides? Any ham who grew up under The Old Man with his Wcuff-Hong and Rettysnitch couldn't go that stuff.

I like to listen to a brother ham who describes a successful project, or the victory over some bug in his sender or receiver. He can boast to no end on how he licked the problem and it is music to my ears. But boasting over the ownership of an expensive transmitter or receiver of commercial ready-to-operate variety like it was the work of his own hands — well, I just can't stand it. . . .

And as for the guy who says he hasn't the time, he hasn't the time to be on the air, either.

— H. V. MacMillan, W1HWB

## HONEST REPORTS

1427 East 252nd Street, Euclid 17, Ohio

Editor, *QST*:

I recently converted a BC-457A for 80-meter c.w. and had good reports of T9x for many QSOs. Suddenly, some honest fellow gave me a T7. Nothing had been changed — the signal apparently had always been a T7. To confirm my suspicions and his report I contacted many other stations who gave me an automatic T9x. When I told them that I was especially interested in an honest report and that my feelings were not easily hurt, many of them confessed that I was T7 or T8. One W3 gave me RST' 579x, then followed, with-

out prompting, a long discussion on my rough note and what to do about it. How come the obvious contradiction? This sort of reporting occurs too frequently to be accidental. Either these fellows are not even vaguely familiar with the RST system or don't bother to decide whether a signal is T9x or T7. In either case, may I suggest they reacquaint themselves with one of the basic tools of the c.w. man — the RST system — and perhaps go to the trouble of obtaining an Operating Aid chart from ARRL, then sticking to the system. Or does someone have a better, simpler system?

— C. Wesley Stull, W8ZTA

## CONFIDENCE

431 North Beaver Street, York, Pa.

Editor, *QST*:

Thanks for that editorial in March *QST*. I, too, have heard the squawks on the bands and marvel that amateurs do not know their organization as they should. Ours is a democratic organization, which is, to paraphrase Lincoln, "of the amateur, by the amateur and for the amateur." It is my studied observation that the League has done and is still doing an admirable job for us, and is demonstrating democratic principles to all when it promulgates a poll to find the attitude of the members as a guide for actions of the Directorate. I cannot say that I can recall a single instance that a step was taken by the organization governing body that was deleterious to the amateur in the prosecution of his hobby. As a member of ARRL, I feel the utmost confidence in the Board of Directors and the officials appointed by the Board to carry out its policies. I feel I can leave it up to Hq. to protect my interests in a manner beyond my ability or the ability of any other individual amateur. So, keep up the good work, take cognizance of the "gripes," give a satisfactory explanation to those who do not understand, and you'll have the blessings of us older amateurs who have lived long enough to know the work ARRL has done for the American amateur.

— Wilbur E. Gemmill, W3AAO

712 Fifth Street, S.W., Rochester, Minn.

Editor, *QST*:

... We of the Rochester Radio Club have watched with interest the proceedings of the past few months and feel that ARRL Hq. has done an outstanding job in preserving amateur radio as an international institution. Though the human element is always present, whatever the undertaking, the important thing is that the job was done!

— James C. Thompson, W0TRT,  
President, R.R.C.

The Alden Hotel, 4526 N. Sheridan Rd., Chicago, Ill.

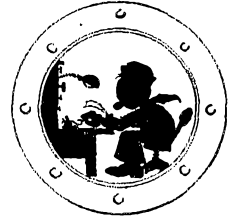
Editor, *QST*:

For quite some time now, I have been reading *QST* and in general find the articles contained therein most interesting and constructive. However, some of the more informative pieces of literature come under the heading, "Correspondence From Members." These letters show very well the feelings of amateur radio men toward a hobby in which a great number are participating. It's a hobby where you've got to get along with the next fellow or the fun is lost. One of the main troubles with our world today is that people haven't tried much to understand the other guy. The person that beefs and gripes about everything that goes on in an

(Continued on page 136)



# United States Naval Reserve



**T**HE Ninth Naval District, largest in existence, has now activated the radio stations at all of its 88 Naval Reserve Training Centers. This record follows closely that of the Eighth Naval District, which was first to activate all its Naval Reserve Training Center radio stations. Congratulations are in order for W9RKV and W0FED, who are responsible for speedy completion of this big job!

death is a loss to the amateur radio fraternity as well as to the Navy.

The Electronic Warfare Company recently activated in Bloomington, Illinois, promises to be a very lively organization. Lt. Charles Holforty, USNR, is the commanding officer of this unit, which has its radio station installed in Science Hall at Illinois Wesleyan University.

The following special Naval Reserve amateur calls have been issued since the list last appearing on this page:

K1NAD	Brunswick, Maine	K6NAC	Coyote Pt., Calif.
K1NAE	Waltham, Mass.	K6NRF	Hollister, Calif.
K1NRZ	Kittery, Maine	K6NRG	Sausalito, Calif.
K2NAE	Gloversville, N. Y.	K6NRI	Santa Monica, Calif.
K2NRQ	Scotia, N. Y.	K7NAA	Pasco, Wash.
K4NAP	Gainesville, Fla.	K7NRL	Casper, Wyo.
K4NAQ	Danville, Va.	K7NRM	Tucson, Ariz.
K4NAS	Catlettsburg, Ky.	K8NAE	Wellington, Ohio
K4NAV	Savannah, Ga.	K9NAG	Downers Grove, Ill.
K5NAH	Gulfport, Miss.	K9NRB	Aurora, Ill.
K5NAI	Cisco, Tex.	K9NRP	Kenosha, Wisc.
K5NAJ	Bryan, Tex.	K9NRR	Milwaukee, Wisc.
K5NAL	New Braunfels, Tex.	K9NRV	Gary, Ind.
K5NRD	Dallas, Tex.	K0NAO	Warrensburg, Mo.
K5NRG	Corpus Christi, Tex.	K0NAP	Virginia, Minn.
K5NRH	Houston, Tex.	K0NAQ	Hastings, Nebr.
K5NRU	Helena, Ark.	K0NRF	Waterloo, Iowa
K5NRW	Natches, Miss.	K0NRO	Omaha, Nebr.
K5NRY	Enid, Okla.	K3NRS	Springfield, Mo.

It is with the deepest regret that we note the passing of W3ADG, ex-W6ADG, Comdr. Willard Colbert, USNR. Commander Colbert had been on active duty for the last 18 months as Reserve communications officer for the Fifth Naval District, with headquarters in Norfolk, Va. He was a very active and enthusiastic amateur and his

W7JWE, Lt. Comdr. Lockwood, USNR, has taken over as Reserve communications officer of the 13th Naval District at Seattle, Washington, replacing W7EKW, Lt. Comdr. Tatro, who recently requested release from active duty.

W1BIG, Comdr. Fred Best, USNR, is very busy these days forming several Electronic Warfare units in Maine. Fred was active in the prewar NCR in that state and is a former ARRL director, New England Division.

Interior of Naval Reserve emergency communications trailer, showing BC-610 transmitter, power control panel, and operating position. Seventy-five of these mobile units have been distributed to NR training centers throughout the country.





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
I. A. MOSKEY, WJIMY, Asst. Comm. Mgr.  
ALBERT HAYES, WIIIN, Natl. Emerg. Coordinator

GEORGE HART, WINJM, Communications Asst.  
A. F. HILL, JR., WIQMI, Communications Asst.  
LILLIAN M. SALTER, Communications Asst.

**Welcome, C.Z.!** The Communications Department welcomes the action taken by the Board at its May meeting to make the Canal Zone part of our Southeastern Division. In consideration of the fact that there are now 103 active KZ5s licensed, further action now has been taken to make the Canal Zone an independent ARRL section for CD purposes. Another multiplier for the November "SS" and similar activities!

Station Activity reports have been forwarded from C.Z. and presented in recent *QST*'s as "special" reports in the knowledge that the above action was pending. Regular reports now will be welcomed. ARRL members in the Canal Zone may now file nominations for an administrative official of their own, as provided in League by-laws, this to be sent to Headquarters to arrive on or before September 15, 1948, naming a Section Communications Manager in accordance with the legal notice scheduled for August *QST*.

**Organization Progress.** ARRL appointment groups emphasize particular objectives, require activity for continuance, and provide service value to brother amateurs. For example: ORS and section nets provide a traffic service available to amateurs and others; OES appointments are held by active experimenters, exchanging and contributing information valued by all amateurs; OPS appointment is identified with voice-operated stations that maintain top transmitter adjustment and performance; Official Observers provide fellow amateurs a friendly self-policing service, helping hundreds of amateurs to avoid FCC trouble through the mailing of cooperative mail notices; and OBS address Official Bulletins on regulatory changes to brother amateurs ahead of mimeographed and printed-word releases. The Official Relay Station appointment showed the greatest growth in the past year, up 52.5%, while OES and OPS appointments expanded in numbers by 37.2% and 37.5% respectively.

**Activities in Review.** The last Simulated Emergency Test was the biggest activity of its kind in the history of amateur emergency communications. Some 2000 messages were delivered via radio to ARRL headquarters during the course of one week! This event enabled us to improve the liaison between emergency groups and the traffic nets — and plans are afoot for a further test this coming October 16th and 17th.

The '47 Field Day was the biggest activity in

League history, up 28% in individual attendance and 35% in the number of active portables. We shall soon be evaluating the '48 FD results! The DX Competition approached prewar levels and the Sweepstakes, as well as the FD, represented new highs in amateur interest.

In traffic handling it should be noted with pride that at the end of the year's activities, 88 nets and 7 ARRL trunk lines were functioning with three other TEs in the process of organization. In all, 28 'phone and 67 c.w. sectional and regional networks are listed in the latest ARRL Directory. The number of stations reporting traffic each month nearly doubled between the fall of '46 and the similar period in '47. Two slow-speed networks met with great success during the past season, and we expect to see this idea carried much further and extended on 7 Mc. in the coming months.

**Clubs.** There were more new ARRL-club affiliations (106) in the year 1947 than in any year since 1933. Correspondence continues to reflect a high degree of interest in the organization of clubs and in meeting the requirements for licensed-amateur and ARRL membership established by the Board. At this writing, a special survey of clubs is in progress to determine their support of the ARRL Emergency Corps. Sixty per cent of the clubs have ARRL emergency coordinators in their club groups. While no significant change in the number of vibrator-type power supplies is to be noted in the year-end club report (4.4-per-club average), the number of dynamotors reported held by individuals has increased from 3.8 per club (last year) to 5.5 per club, indicating a greater degree of individual-emergency-readiness from the power-supply standpoint.

**Getting Accuracy in Traffic Work.** A most important principle for accuracy in radio communications is that operators must make absolutely no changes in the messages they handle without the consent or authority of the originator. *Complete addresses* are an important responsibility of originators. The "service" message takes care of situations that arise where garbled messages occur and it is necessary to advise the addressee of such technical difficulties or to ask the originator for authority for changes or for improved address, etc. Strict checking for accuracy in each stage of a relay before any receipt is passed be-



tween stations will prevent misspellings and misunderstandings. In originating messages we recommend that address numerals be spelled out as well as street, boulevard, and building indications, to insure accuracy. In voice work the use of phonetics (see Operating Aid No. 1) to put through difficult letters or words — *f, s, d, r, b,* or like-sounding phrases — becomes quite important.

One of the tools to aid the communicator is the check or group count to insure that no words are lost from a written communication. A message check is not really complicated. It is the word or group count for the *text only* with a few exceptions. By copying five word or numeral groups at a time, which takes only a little regular practice, one can almost count a message text at a glance before receipting (R) for the message. This insures that the full number of words has been received and none accidentally dropped. The ARRL booklet *Operating an Amateur Radio Station* gives examples of counting special expressions that may be put in a text as well as "extra" words when added to a signature. Most simple checking does not involve such technicalities, but reference to the examples given will assist when a question does arise.

Aim to handle some record messages to make yourself a true communicator! Let's all abide by these and other sound procedural principles in all our amateur communication work.

**Secrecy of Communications.** Sec. 605 of the Communications Act provides for secrecy of interstate or foreign communications by wire or radio, the provisions applying to *all persons*, including licensed operators. Here is an excerpt of the significant portions:

Except in case of broadcasts or information for the general public or relating to ships in distress, no person receiving or assisting in receiving or sending radio information shall divulge, publish or use such, to any person other than the addressee, his agent, or attorney, or one employed to forward such communication to its destination . . . etc. . . . Also, no person not authorized by the sender shall divulge the existence, substance or meaning of such intercepted communication to any person . . . or use the same for his own benefit or the benefit of another not entitled thereto. . . .

All information specifically addressed, whether

◆  
A "retired" police transmitter is the latest acquisition of the Genesee County Radio Club. We see it here being tuned up on 3.5 Mc. while (l. to r.) W8RTN, W8AMT, W8YLI and EC W8WXO were holding down the fort. The station, located on the third floor of the Red Cross Building in Flint, Mich., is intended to form the nucleus of a well-integrated AEC organization for complete county coverage. The group has been cited by the Red Cross for their excellent assistance during a flood at Flint on March 19th and 20th. For those who have hopes of obtaining similar quarters and equipment for their AEC control stations, we recommend a long program of active liaison with the Red Cross chapter in their community.  
◆

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in messages (record communications) or transmitted *following a definite sequence of radio call-signal identifications* (confining transmissions by addressing them to individuals or groups) may be deemed to be covered by the all-inclusive wording of this important section of the Act, points as just outlined. The provisions of the law with respect to secrecy apply to all persons. All amateurs of course are required to know and observe the provisions to the letter, the meaning and application of this section very often being included as an FCC examination question. The subject is discussed here as relevant to all casual amateur communications (addressed by identifying call signals) as well as to traffic made a matter of record in written-down form.

**CL.** Let's get it straight that CL is used on the air only when a station is through until the next operating period. It is used when pulling switches. That there is some misunderstanding of the implications of CL is indicated in a note from W1AW (W2MHW, operator) who advises that he received a card addressed "C/O opr CL"! Increased general use of CL when going off the air and *closing station* will reduce QRM and save others time wasted calling you when you have left your operating position for other pursuits. When W1AW sends a bulletin concerning latest FCC regulations, using a transmitter on each frequency band, and then looks for calls from amateurs who want a contact, the operator can listen *only to one band*. CL is used on the frequencies where the operator is *not* prepared to continue operations in order to save the time and trouble of calls on several bands, while attention is focused on the band for which the plate switch was thrown to "off" before sending CL. To give hams on different bands equal opportunity for contacts on voice or c.w., W1AW closely follows the general operating periods specified for particular bands in our published schedule. With traffic schedules, CP, FMTs and summer visitors making for a busy W1AW schedule, the *general periods* are the best time to make personal radio contact with your Hq. station.

Now that we think about it, we're down to the point where we must close this month's stint. 73, BCNU and CL.

— F.E.H.



## TRAFFIC TOPICS

A great part of the pleasure to be derived from traffic-handling activity comes from the satisfaction of a job well done. — W1JE

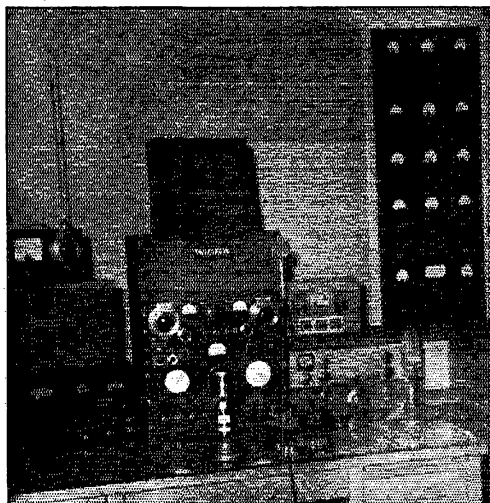
WØHMM has formed a cross-country group called the Federated Net System, operating on 7275 kc. A monitoring period will be maintained each evening on 3565 kc. from 7:30 to 8:00 P.M. CST, to provide access to this net for those stations not equipped to operate on 40 meters. Anyone interested in joining FNS is invited to contact WØHMM.

The Interstate Utility Net (Colo.) has shifted to 7080 kc. for the summer months, now meeting at 6:30 P.M. MST, Monday through Friday.

The Beaver Net of Ontario will operate on a curtailed schedule during the summer on 3535 kc. The Ontario 'Phone Net has ceased operation for the summer and will resume activity in the early fall.

QPO, the Police Officers Net, is growing steadily. All you "cops" are cordially invited to meet the boys on 7260 kc. or 3715 kc. on Monday evenings at 8:30 P.M. CST.

The 144-Mc. band has joined 3.5 and 7 Mc. as a formal traffic facility, now that Trunk X has been formed on 146 Mc. This net offers outlets in Rhode Island, Connecticut, New York, New Jersey and Delaware. If you are interested in joining, contact W2RH.



W1CRW, Salem Depot, N. H., ORS, OPS. Operator Clifton R. "Cliff" Wilkinson is a member of Trunk Line "C" and National Trunk Line, Route Manager of the New Hampshire C.W. Net and holder of an A-1 Operator certificate. The transmitter is a homebuilt 500-watt job and the receivers an NC-200 and S-27.

## BRASS POUNDERS LEAGUE

(April Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W5LSN	12	56	834	50	952
W7CKT	10	25	865	20	920
WØHMM	18	29	850	20	917
W6REB	14	S42	6	2	864
W4CFL	355	27	394	9	785
W2UZK	6	9	698	1	714
W4PL	9	10	634	6	659
W2OEC	19	63	467	104	653
W2LRW	23	35	520	17	595

The following make the BPL with over 100 "deliveries plus extra delivery credits":

W2SUG	175	WØDPO	110	W9SYZ	104
W5AST	117	W2FCG	106	W1AW	101
W1INF	111	W5NMM	104		

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

The Swing Shift Net has been expanded to cover the Atlantic Seaboard states. On its new frequency, 7280 kc., SSN meets at 12:30 P.M. EST, Monday through Saturday. Net Manager W1JE cordially invites you to check in during any operating period.

## A-1 OPERATOR CLUB

We are pleased to announce the following additions to the ARRL A-1 Operator Club roster: W1CH FTX KQY LDE PLQ QVF. W2BLS EQD FLD GFW HAZ ITX LWB OBU QUJ RIG RME. W3AKB BLN BWT CDQ EIV EOP IEM JTC KWL LVJ MTQ NNS OP. W4CFL CXY FV LJW IPC IRZ JDL JHK KDE KEH KFC KFT KJT KXN KYD LBM LRI LUE MKM RQR SU TWI. W5ACL CPB HHT IGW IKP LAK. W6DOT FDR MU PG TNZ. W7UTM. W8BBA BTV DNM EBJ EGI GL PVB. W9ALI BRD/1 EVJ JTX NN NWX RCB WEA. WØTQD ZVS. VE1PA 3ATR AWE DU. PAØXE. KP4CL. VK5KO. G2FSR. ZLAGA. This list, together with those published in the January, June and December 1947 issues of QST, comprises a complete roster of members. If you were the prewar holder of an A-1 certificate and your call has not appeared in any of the postwar listings, please drop a line to Headquarters and your call will be added to the active list.

The A-1 Operator Club is designed to recognize and promote good operating in the amateur bands. To become a member, one must be nominated by at least two operators who already belong. An attractive certificate is awarded to each amateur who qualifies for membership. Every amateur should strive to make his operating merit nomination. Those who already are members should nominate every deserving amateur after careful observation of his operating.

## F.C.C. CLOSES UNLICENSED STATIONS

On April 17th engineers of the FCC in Los Angeles and Portland, Oregon, closed down three unlicensed radio stations operating in the 7-Mc. amateur band. FCC monitors heard the stations using amateur calls which have not been licensed by the Commission. Long-range direction-finder bearings obtained at Commission offices in more than ten different states indicated that two of the stations were located in the Los Angeles area and the other was located in the Portland area. Specially-equipped direction-finding cars were dispatched to the areas in question and located the unlicensed stations. When the locations were determined, watches were synchronized and one of the stations in Los Angeles and the Portland station, located more than a thousand miles apart, were closed simultaneously. The third station was closed a few minutes later. The Oregon station, using the call W7MIL, was operated by William Miller, 1305 S. E. Lombard St., Beaverton, Oregon. The second station was operated by a brother of Miller and used the call W6DHX at 4204 Folsom St., East Los Angeles. The operator of the third station, using the call W6EER, was John Moreno, 4111 Folsom St., East Los Angeles.

The three illegal operators were informed that the penalty for violation of the Communications Act, as amended, is a fine of \$10,000 and two years in prison, or both. The case is receiving further attention.

Each licensed amateur operator should be on the alert to report any transmissions believed to originate from an unlicensed source. There should be no feeling of tolerance toward those who would steal the use of our precious frequencies. Report all cases of illegal operation to the nearest FCC office.

## Q.C.E.N. GOES INTO ACTION

Cincinnati and neighboring towns have always suffered from floods. The one of April, 1948, proved to be exceedingly spectacular. Cincinnati proper has the Mill Creek Barrier Dam which did a fine job this time, keeping the river from the valley and the Cincinnati Reds Ball Park, but Newport's flood wall on the Kentucky side of the Ohio River was only completed to a stage of 56

feet. When it was learned from the Weather Bureau on Thursday, April 15th, that the river would go to at least 60 feet, it seemed certain the Queen City Emergency Net would see action.

Wm. Meurer, W4NRA, ARRL emergency coordinator for Metropolitan Cincinnati, was called at work Friday afternoon, April 16th, and asked to supply the Red Cross and Police Dept. of Newport, Ky. with communication from the uncompleted flood wall. The city had called the U. S. Engineers for aid in helping to sandbag the dam to hold out 62 feet of water. Later the same day, the Weather Bureau announced the river would reach 65 feet. This caused some speculation as to whether sandbagging could be accomplished, but when the U. S. Engineers start a job they never give up, so QCEN didn't either, although the dike slipped two nights in a row. With the help of thousands of citizens, the dam was held.

The first request was for radio service at the point where the sandbags would be the highest, and this proved to be the point where the dam slipped. Altogether, QCEN used 10 mobile units on 29,650 kc. They were W4s HAV, KFV, NRA, and W8s YHG, CNV, VAZ, IDA, AQV, TCO. Two fixed stations were set up, one in the Red Cross Headquarters, W4NRA, and one in Police Headquarters, W8CNV. Twenty-four-hour service was maintained from 2:00 P.M. Friday until 6:00 P.M. Monday, when the river had crested for approximately 12 hours.

Some very important traffic was handled in 101 messages for supplies and medical attention together with the call for civilian help.

Most all mobiles were at the danger point transmitting important traffic back to Red Cross and Police Headquarters. Several people were rescued and help obtained quickly for injured people through QCEN equipment. Some of the operators put in as many as 36 to 40 hours with very little sleep. The operators who manned the two fixed stations were W4IYH (who, by the way, was run out by the flood), W8s BNZ, SDJ, TQS, UPB, ZZY, YGH, SDC, CDY, YHJ, ATK, ZMO, VAV, BSQ, and W4s ZQR, KZF, KKB. W4NRL, who came all the way from Warsaw, Ky. with his father, a State Highway sand-truck driver, also helped man the stations. — William G. Meurer, W4NRA

◆  
W4NRA/4, with W8ZZY at the controls and W8YGH keeping the log. This station was set up at the Red Cross Headquarters in Newport, Ky., and provided an important link in the QCEN's communications circuits during the period of high water.  
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## DX CENTURY CLUB AWARDS

### HONOR ROLL

W1FH.....	188	W3BES.....	168
G2PL.....	178	W2BXA.....	166
W8HGW.....	174	G6ZO.....	168
W6VFR.....	172	W3GAU.....	162
W4BPD.....	169	W1CH.....	160

### NEW MEMBERS

W2AOW.....	139	W6LDJ.....	104
W6RBO.....	119	J2AHI.....	104
W9UIG.....	116	W8UAS.....	103
W6RDR.....	116	W1BLO.....	103
W7GUI.....	112	CM2SW.....	103
W1ZL.....	111	W8AIW.....	103
W1FJN.....	110	E19J.....	102
W6CEM.....	109	PA6GN.....	102
W2CWE.....	109	W1ILT.....	102
W6PUZ.....	108	W1KFV.....	101
W1WK.....	108	W8DAE.....	101
ON4MS.....	105	W2BLS.....	100
W1LOP.....	105	W8WZ.....	100
W6NNV.....	104	W6TZD.....	100
W6EBG.....	104		

### ENDORSEMENTS

W6SAI.....	160	W8FNA.....	126
W2HHF.....	158	G5OO.....	122
W2GWE.....	150	CE3AG.....	121
GW3ZV.....	144	W2AFU.....	121
W3RT.....	142	W2PWP.....	121
W8YXO.....	141	W2ALO.....	120
W3GHD.....	136	W3DKT.....	120
W8KC.....	135	W8LGG.....	120
W6VKU.....	134	W6ANN.....	113
VE3OD.....	131	W2RGV.....	113
W4PN.....	130	W6KUT.....	113
G2AJ.....	128	W2QHH.....	110
W2HZY.....	128	W2GNQ.....	110

### RADIOTELEPHONE

#### HONOR ROLL

W1FH.....	151	W2BXA.....	114
W4CYU.....	132	VO4ERR.....	114
W1JCK.....	130	WINWO.....	113
W1HKK.....	124	W2AFO.....	111
G2PL.....	124	W2ZW.....	110

#### NEW MEMBERS

W1FJN.....	109	W8BF.....	101
W1ADM.....	108	W4RGV.....	101
W1MCW.....	103	W4EWY.....	100

## TRAINING AIDS

ARRL Training Aids quizzes are receiving widespread use by many affiliated and a few nonaffiliated clubs. Our policy with respect to this part of the Training Aids Program is not quite so strict as it has been with other items. Affiliated clubs come first, but we find that in the case of quizzes we can serve a few nonaffiliated clubs as well when supply permits. So far we have shipped out 1200 copies of quizzes Nos. 1 through 5 and additional requests are coming in daily, resulting in our having extra batches of 500 copies each run off.

There is no limit to the potentialities of the quiz program. If your club has not yet tried them you are missing an opportunity to test yourselves to determine in what phases of amateur radio operation and technique you are weak or strong. You will find that the quizzes will provoke much discussion and general revelation of things that you *should* know and that you thought you *did* know, but that you *don't* know. One quiz, taking only about ten minutes of mental gymnastics on

the part of your members, can supply you with a beneficial and entertaining evening's program if followed up by a proper discussion period.

ARRL Training Aids has prepared a short mimeograph entitled "Suggestions for Use of ARRL Training Aids Quizzes." Clubs who feel that they might use one or more of the quizzes to good advantage would do well to write in and get themselves a copy of this sheet before they make definite plans. Quiz subjects available were announced in March *QST* (p. 77). Additional subjects will be added as required.

## MEET THE SCMs

Ward Buhrman, W4QT, newly-elected Tennessee SCM, was granted his first amateur license in September, 1925, and since then has held the calls W4CBS, W4CIN and W4QT.

An energetic ham, Ward formerly held ORS, PAM and EC appointments, is now OPS and OBS, holds WAC and WAS Certificates, is a member of the Rag Chewers and Old Timers Clubs, and has worked 60 countries, postwar, on 14-Mc. 'phone with 350 watts and a half-wave doublet. He is the proud possessor of two Public Service Certificates, the first of which was issued to him under the call W4CBS for his assistance in providing emergency communication during the 1937 Mississippi River Valley flood and the second for his fine work during the September 1947 Florida Peninsula-Gulf Coast hurricane. He is treasurer and past-president of the Chattanooga Amateur Radio Club.



A room located in the basement is reserved exclusively for W4QT operations. Two transmitters are in use, one a VFO-crystal exciter driving an 811 buffer and p.p. 810s final running 1-kw. input; the other a VFO-crystal-811 buffer-812s p.p. final, 350 watts. Modulators for the larger rig are 810s Class B and for the smaller, 811s Class B. Both rigs work 3.5, 3.85, 14 and 28 Mc. Several low-power rigs are available for stand-by use. Receiver is a Hammarlund 120X. Antennas are half-wave doublets and a 14-Mc. three-element rotary beam is in the process of construction. For emergency equipment, Buhrman is planning the installation of u.h.f. equip-

ment in his car. At present, 3.85- and 14-Mc. phone are his favorite bands.

Ward's hobbies, besides radio, include stamp collecting and amateur photography; he has won several prizes in the latter. Since 1933 he has been employed by the Tennessee Valley Authority and is now Administrative Officer II in the Power Construction Branch.

### CODE PROFICIENCY AWARDS

The next Code Proficiency Qualifying Run will be made on July 14th at 10:00 P.M. EST. Identical texts will be transmitted simultaneously from W1AW, W6OWP and W0CO. Frequencies of transmission from W0CO will be 3534, 7053 and 14,040 kc., from W6OWP 7248 kc. W1AW will use the frequencies listed in the schedule elsewhere on this page. Any one of the three stations may be copied. Mail your copies of the qualifying run to Headquarters no later than July 24th. Please indicate the call of the station whose transmissions you copied. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers indicating progress above the first certified speed.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 10:00 P.M. EST. References to texts used on several of the practice transmissions are given below. These make it possible to check your copy.

*Date:* Subject of Practice Text from May QST:  
 July 1st: *What About Single Sideband?*, p. 13  
 July 6th: *Crystal Control on 20 Mc.*, p. 20  
 July 9th: *A Beginner's C.W. Transmitter*, p. 25  
 July 12th: *TVI Can Be Reduced*, p. 31  
 July 14th: Qualifying Run, 10:00 P.M. EST  
 July 15th: *Technical Topics*, p. 42  
 July 20th: *They Always Come Back*, p. 44  
 July 23rd: *Thirty Watts—Mobile*, p. 60  
 July 26th: *Nuts & Bolts*, p. 66  
 July 28th: *A Peak-Indicating Modulation Monitor*, p. 70

### A.R.R.L. ACTIVITIES CALENDAR

July 14th: CP Qualifying Run  
 July 24th-25th: CD QSO Party  
 Aug. 19th: CP Qualifying Run  
 Sept. 14th: CP Qualifying Run  
 Sept. 25th: V.H.F. Party  
 Oct. 16th-17th: Simulated Emergency Test  
 Oct. 18th: CP Qualifying Run  
 Oct. 23rd-24th: CD QSO Party  
 Nov. 13th-14th: Sweepstakes Contest (phone)  
 Nov. 17th: CP Qualifying Run  
 Nov. 20th-21st: Sweepstakes Contest (c.w.)

— . . . —  
 Jan. 1st-Dec. 31st: Most-States V.H.F. Contest

First Saturday night each month: ARRL Officials Nite (Get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

### W1AW OPERATING SCHEDULE

#### Operating-Visiting Hours

Monday through Friday, 8:30 A.M.-1:00 A.M.  
 Saturday, 7:00 P.M.-2:30 A.M.  
 Sunday, 3:00 P.M.-9:00 P.M.

A mimeographed local map showing how to get from main state highways (or from Hq. office) to W1AW will be sent to amateurs advising their intention to visit the station.

**Official ARRL Bulletins** containing latest information on matters of general amateur interest are transmitted on regular schedules:

*Frequencies:* 3555, 7215, 14,150, 28,060 and 52,000 kc. (voice — 3950, 14,280, 52,000, 146,000 kc.)  
*Times:* Monday through Friday, 8:00 and 11:30 P.M. EST (0100 and 0430 GCT, Tuesday through Saturday)  
 Sunday 1:00 A.M. and 8:00 P.M. EST (0600 Sun. and 0100 Mon., GCT)

Bulletins are sent simultaneously, first at 25 w.p.m. and then repeated at 15 w.p.m., on all frequencies during the early schedule to facilitate code practice. Telegraph bulletins are followed, in turn, by voice transmissions on 3950 kc. and 52,000 kc. simultaneously, and then on 14,280 and 146,000 kc. simultaneously. Any changes from this schedule will be announced.

**Code Proficiency Program:** Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. are made Tuesday and Thursday on the above-listed frequencies, starting at 10:00 P.M. EST, and on Monday, Wednesday and Friday at 9, 12, 18, 25 and 35 w.p.m. Approximately ten minutes practice is given at each speed. Next certificate qualification run is scheduled for Wednesday, July 14th.

**General Operation:** In addition to performing the services already mentioned, W1AW engages in two-way work with amateurs on the various bands. You are always welcome to call the Headquarters station, especially during the periods listed below, whether to relay a message or just to rag-chew with the operator on duty at the time.

*Monday through Friday, all times EST —*

10:00 A.M.-10:30 A.M.	14,150-kc. c.w.
10:30 A.M.-11:00 A.M.	14,280-kc. voice
11:00 A.M.-11:30 A.M.	28,060-kc. c.w.
11:30 A.M.-12 noon	29,150-kc. voice
3:00 P.M.-3:30 P.M.	14,280-kc. voice
3:30 P.M.-4:00 P.M.	14,150-kc. c.w.
5:30 P.M.-6:00 P.M.	3850-4000-kc. voice
6:00 P.M.-7:00 P.M.	7215-kc. c.w.
11:00 P.M.-11:30 P.M.	3555-kc. c.w.
12:15 A.M.-1:00 A.M. (Tues. through Sat.)	7215-kc. c.w.

*Saturday and Sunday (excepting dates of official ARRL activities).*

Saturday: Midnight-1:00 A.M. (Sun.)	3555-kc. c.w.
Sunday: 1:45 A.M.-2:30 A.M.	7215-kc. c.w.
6:00 P.M.-7:00 P.M.	3850-4000-kc. voice
7:00 P.M.-8:00 P.M.	7215-kc. c.w.

W1AW is not open on national holidays.

The station staff:

T. F. McMullen, jr., W1QVF, "fm"  
 Richard N. Eidel, W2MHW, "re"

# Expedition "Gon-Waki"

or *The Saga of VP7NG*

BY ROBERT W. DENNISTON,\* W4NNN

**H**AVE you ever wanted to be rare DX for a day? Have you wondered what it feels like to have the pack after you instead of being one of the wolves? Have you hoped against hope to hear the rare one straighten out a few of the known gentlemen who use their rock-crushers in an ungentlemanly fashion? Have you wished that that hard-to-get station would work them faster and give away more new countries with less heartaches? You have? Fine business, OM; ours are kindred spirits.

It was during long hours of DX-chasing from a poor location to the extent of wearing one arm down to the elbow that the idea of Expedition "Gon-Waki"<sup>1</sup> was born. Discussing the possibilities with fellow workers at Station WAR aroused enthusiasm on all sides and subsequently plans were made to go to the Bahama Islands for the second c.w. week-end of the 14th ARRL DX Competition. Those who decided to make the jaunt were Buddy Buttizoni, W3GRP, Charley Orr, W4NND, and myself.

We (not the 'phone-band "we" but here used in an outdated meaning indicating plural) drove straight through from Washington, D. C. to Miami, where we caught a few hours sleep while QRX for Pan American. With us was equipment borrowed from W4KCX, W4IRZ, W4JUY, W4LUE, W4LUV and W4RH, all piled up into Buddy's new "Chevy." A short flight then brought VP7 in all its glory into view. The water at Nassau is a beautiful bright blue-green which defies description and when viewed against the white-sand beaches is a sight to behold.

On landing, we were met by our friends Harry

Albury and Bill McKenna, two of the local gentry who hope to receive licenses soon. They had an ideal spot picked out for us and shortly antennas began to sprout. We were located in a three-story mansion, vintage 1800, with a knob conveniently located on the highest peak of the roof, so it was a simple matter to string up 138 feet just a few yards from the ocean. A palm tree supported the 68-foot receiving antenna. The transmitter consisted of a bandswitching Meissner Signal Shifter, driving push-pull 8005s in the final at 100 watts input. This was link coupled to an antenna tuner end-feeding the long wire. Receivers were an HQ-129X and SX-28.

The next day the Telecommunications Commission issued a license to me as agreed previously and we were on the air. (Warning — Don't go to the Bahamas hoping to get a license as they are issued only to British subjects.) The first CQ brought a reply from our friend W3LVJ in Washington and we were in business. Our transmitter on this QSO was the Signal Shifter with a lamp cord hooked onto it and thrown out the window (the lamp cord, that is; not the Shifter). It was dark when this super antenna was erected. The next day we looked out the window to find the lamp cord all in a heap on the porch roof just below the window. This is just another incident which proves the old adage that "DX hounds can hear two wires scratched together in Tibet."

After the big antenna was hooked onto the final we got very good reports and were kept very busy on and off the air. The evening before the Contest we closed down to go out and see the sights of Nassau, and it was heart rending to hear the boys pleading after the QRT. We left with guilty consciences.

\* Box 2003, Arlington, Va.

<sup>1</sup> With apologies to Expedition Kon-Tiki.

"VP7 in all its glory" — Fort Montagu Beach, Nassau, Bahamas.



DX-chasers on holiday. L. to r., Charley Orr, W4NND, Buddy Buttizoni, W3GRP, and Bob Denniston, W4NND, in action in the VP7NG shack.

It's almost time, boys . . . get set . . . eye on that second hand . . . GO!! W3EIV first customer . . . 579000 . . . &\$\$%#% this typewriter won't spell! Next? . . . bedlam . . . W3JTC . . . more bedlam. Where's the back space on this mill? . . . What was that guy's call? . . . What QRM! . . . What's good for twitching fingers? . . . How loud can they get? . . . What a rat race! . . . WOW! what fun.

After our blood pressures relaxed and things shaped up into somewhat of a routine, operating went a bit more smoothly and it never ceased to be fun. W3GRP and I took turns for the next forty-eight hours, keeping the station on the air constantly except for short interruptions. There was plenty of time for eating and sleeping with two operators alternating. W4NND, the maintenance chief, didn't want to operate for fear of slowing things down so he stood by, watching the meters and anticipating the troubles, leaving his operating to the time before and after, the Contest. The final and the antenna tuner used plug-in coils and it was quite a circus when all hands went into action for a fast band-change.

The operator did his own logging on a continuous piece of teletype paper in a typewriter. We had thought that 15 feet would be enough but during the second day we came to the end and had to turn it around and start back up the other side. The VP7NG log was 25 feet of single-spaced typewriting at the Contest's end.

A try at 11 meters revealed that the long wire wouldn't load on that band. An 18-foot piece of wire from the shack on the third floor down the side of the house set us up for another try at that band of diathermies, so with quite a following on hand on 10 meters, we advertised that we were going to attempt to get on eleven. After trying for several minutes to figure out for sure where the band was, I found a fellow calling VP7NG. I zeroed on him, broke him, and asked if we were in the band. He said, "Yes, right in the middle. . . . HR NR 579 . . ." and we were off again.

In the wee small hours things got a little slow at times. Once, after two CQs failed to net an answer, a kindly W2 who had already worked us said, "QRX, I'll stir up for U." Whereupon he proceeded to call us for about a minute. When he stood by we called "CQ DE VP7NG" and a swarm descended on us.

There were some instances when stations called us when they were not hearing us. Some called when they knew we were trying to work someone else but became very silent after a few words from us. However, on the whole the boys kept it



pretty clean. A few of the signals sounded like ten kw. when compared with others known to be a gallon.

About 1700 contacts were made during the 48-hour Contest week-end and 344 before and after the brawl. Contacts with stations other than W/VE accounted for about 50 of these. Several times right in the Contest we were amazed to hear foreign stations break through a hole in the QRM and call us. We were very happy to take time out and give them a new one. Anybody who could sneak through that mess deserved it.

The following is a little off the subject but in the interest of "more countries for everybody." We would like to offer the following suggestions based on experience at VP7NG:

#### To rare DX stations:

Don't let the Ws get the best of you. The only reason they act the way they do is because they are so anxious to work you. They will do anything you tell them to if you are forceful enough. If you are trying to work a schedule or some particular station and the Ws persist in bothering you, call the station you want and then before standing by say, "Any other station who calls me I will never work." The silence will be deafening. It will amaze you what power you have if you will only use it.

You also have the power to make many fellows very happy by giving them a new country. When you finish a QSO and hear a bunch of stations calling, that is the signal to shorten your contacts to the bare minimum, which is "W1AAA DE AC4ZZ 579 BK" followed by one transmission by the W. You then say "R 73 SK" and you are off on the next one. Using this method you can work one station a minute or better, and if you realize how happy it makes us when we work a new country, you will get as much of a kick out of it as

(Continued on page 116)



SCM AEC ORS CP SEC OBS TLS CO  
 OBS A10PR EC DXCG CLUBS RM OPS RCG

# Station Activities

• 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—Radio clubs of the section half-heartedly prepared for Field Day this year mostly with the idea of having an outdoor party. The insertion of the battery provision did not meet with general favor since most clubs have quite an investment in generator supplies. There will be a large representation at the Atlantic Division Convention from this area. Keen interest in the scheduled talk by QV relative to ARRL board matters is in evidence. Major emphasis will be placed upon emergency communication and public relations in the future. The Eastern Pennsylvania (disaster communications set-up leaves plenty to be desired. There have been sporadic efforts by scattered groups but they have not had the required support by the rest of the section. NAH, EC for Philadelphia and Delaware Counties, will have left the section for New York by the time this is in print. We need new ECs for these Counties. Radio clubs are expected to provide the material and contacts for our drive to establish us favorably in the eye of the public. The T.V.I. situation is causing profound distress to many of our section's amateurs. Some radio clubs have committees on T.V.I. and B.C.I. and are making noteworthy contributions to peace between the ham and T.V.L. Details on such activity are requested for this column. Individual reports were few this month. So much for the sermon. KBY has had 3000 QSOs since April, 1946. The Delco Club station is off the air because of a blown plate transformer. VMF lost his antenna in the April breeze. EU is busy catching up on his QSLing. The VE 'phones are giving our EPA net a rough time on 3785 kc. They need some boys up there with large gallons to clear the traffic. GHD is waiting for the Zone 19 card for his WAZ. HFD rebuilt his u.h.f. resonator Christmas tree to attempt to stem the rain of aluminum every time the wind blows. FUF tied the fatal knot. The Frankford Club delegation visited the York Road and Wilmington Clubs. See you at the Convention. Traffic: W3KFA 202, VMF 152, DZ 63, QEW 42, AQN 22, ELI 20, CAU 4, QP 2.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA**—SCM, Eppa W. Darne, W3BWT—The Capitol Suburban Radio Club has resumed publication of its club bulletin, *NUZLTR*. At a recent meeting its rewritten constitution was voted in by the membership. An activity committee has been appointed, with MJU as chairman and KHM and FYB as associates. At the first April meeting of the Washington Radio Club speakers were 3GA and 4IQR, of F.C.C., who gave interesting talks and answered all the members' questions. The club membership also voted in the new constitution, recently submitted by the constitution committee. At the second April meeting the membership discussed business and the coming June Convention. Two members of the YLRL talked on their organization, and several Old Timers spun yarns of bygone days. On April 11th the Washington Mobile Radio Club made its second monthly excursion. The purpose was to determine distances in all directions from Washington that two fixed control stations, KBE and MLM, could work the mobile units, which numbered 14 stations. The test, as reported by Traffic Manager EWH, was very successful, and the area bounded in the test was approximately 2142 square miles. The Delaware Amateur Radio Club was active in Field Day operations. The Industrial Home School Amateur Radio Club has received its Charter from the League and now is an affiliated club. VT was committee chairman for the Baltimore Amateur Radio Communications Society's Field

Day activity. The Section Net marked the end of its season April 30th. The SCM wishes to express his sincere thanks to all who took part in making our net one of the best. Regular operations will be resumed September 15th, and all section ORS will be duly notified prior to opening date. CDZ puts out nice signal on 3.5 Mc. and works in Section Net. ADQ operates on all 'phone bands nicely, especially 28 Mc., and has more different types of antennas on his roof than any other ham shack we've ever seen. AJZ is on 3.5, 7, and 14 Mc., c.w. and 'phone, with power up to 1 kw.; he has a 100-watt emergency rig and is a member of Naval Reserve Net. MCA is back in the DX business after eliminating trouble in feed line to his beam. KHM has made "all continents" ten times during the past winter despite considerable receiver trouble. AHQ is back on 28 Mc. after rebuilding the rig. LYV is working on a single sideband transmitter. IZL is installing a four-element beam. BDU is installing a 28-Mc. rig in the car, with 50 watts input. AKR schedules 5NNE. PV is active on 144 Mc. AKB, BWT, ECP, JZY, MJQ, 2NDL/3, and QL have been awarded Section Net Certificates. JZY gets out well on 7 Mc. with 25 watts. NHT has increased power. ISF worked three new countries on 14 Mc. JJD has rebuilt for all-band operation. LVJ has worked 115 countries with 60 watts, and recently received WAS Certificate. CJS gets out nicely on 7 Mc. with indoor antenna. CDQ is on 7 Mc. and recently heard from F8HE, whom she met in Paris in 1928. QL reinstalled equipment in the shack. LUE has a new Collins rig. DKT visited PA8EP in Holland. EQK, back on 14- and 28-Mc. 'phone from new QTH and with rebuilt rig, has contacted 57 countries on 14-Mc. 'phone. Traffic: W3ECP 231, AKB 174, BWT 89, AKR 27, QL 23, JZY 17, CDZ 12, LVJ 5, CJS 4, JJD 3, ADQ 2, KBE 2, ISF 1.

**SOUTHERN NEW JERSEY**—SCM, G. W. (Bill) Tunnell, W20XX—The traffic honors go to SUG this month. OSV is now the Emergency Coördinator for Gloucester County. Give him a hand, fellows. ZI is setting down to normal again after another successful Old Timers Night. ORS has his postwar WAS Certificate and a transmitter on 420 Mc. We take off our hats to RG for leading the 3700-kc. net through another successful season. RPH is restricting his activities because of B.C.I. problems. BAY has a c.w. note that is "Sweet as Honey." CFB is inactive while working on his new shack. SXK is active in the Swing Shift Net on 7280 kc. GCU has been working 3.5-Mc. DX when not hunting pipe for his new antenna mast. HAZ is trying hard to win the DVRA WAS Contest. The Cumberland Radio Club proposes an inter-club committee for the purpose of actively participating in the solution of problems relative to B.C.I., T.V.I. and poor operating practices. HEH is moving to a new location which is a beauty. OEW is the first from Morris County to join the Emergency Corps. PWM is now on 144 Mc. with an FB SCR-522. VX has an agreement with his XYL to let visiting hams sign their names on the wallpaper in his shack. PAU is new OES. Keep your reports coming and be sure to say something about your activities. Traffic: W2SUG 204, ZI 53, ORS 36, RG 26, RPH 20, BAY 15, CFB 8, BEI 7, SXK 7, GCU 4.

**WESTERN NEW YORK**—SCM, Harding A. Clark, W2PGT—SEC: SJV. RM: FCG. The Rochester 144-Mc. gang is looking for out-of-town schedules. Contact RARA, P. O. Box 1388. VTR has new Shifter. SEN is Class A and is on 14-Mc. 'phone. SFA and RDG are trying n.f.m. QEW had 19 for dinner to help put up 70-ft. tower! QY won the John Long Trophy for WAS on c.w. Good to hear PHT back on the air after an illness in the hospital. PUD lost his beam and is using PUN's. KP4FV now is WXD and is on 28 Mc. with new beam. KFU is sporting new beam and 500 watts. NES is back on the air after a long layoff. QCF operated portable W4 and worked the hometown gang on 14-Mc. c.w. OTW and SCI soon will have the same QTH. OXK also is 30IC and is looking for the gang on 3.85 Mc. QJT is manager of Tompkins County AEC Net with most stations equipped with 144- and 3.5-Mc. rigs. QBZ, QJT, VZL, RKR, TTU, TGU, TGZ, VMS, and VEN keep things humming on 144 Mc. down Ithaca way. VZL can't get his 807 to perk on 7 Mc. HQB, TGU, VZL, TTU, and VEN are working for Rural FM Network in Ithaca. Ex-8QRB now is KL7PB and is looking for the gang on 7050 and 14,100 kc. QNA has new 144-Mc. beam. BLP worked the Aleutians on 3.85 Mc. QHH handles WX traffic with most northerly ham in North America—VE8MA



PKL's license plate is GB 731 RUG and QNA are on 50 Mc. New ECs are SXR and WQL for Otsego and Oneida Counties respectively. GFD is using sixteen-element vertical beam on 144 Mc. More than 100 attended joint meeting of KBT and RAWNY, at which District Radio Engineer Saunders was speaker. RUC is on 7 Mc. UHI is v.h.f. specialist but sneaks up on 7 Mc. when nobody is listening. WEN is working an enviable amount of 14-Mc. DX with 25 watts. QCP has 107 confirmations for DXCC. Syracuse held a dinner meeting in preparation for Field Day. UYG contacted VQ3HGE, thus permitting VQ3HGE's mother to contact him. SD, KZ, ROQ, and RZP are on 144 Mc. Niagara Frontier Emergency Two-Meter Net held simulated drill during recent storm. Some of the mobile boys got an idea of an actual emergency when it was necessary to drive through two feet of water, fallen trees, and broken power lines. 144-Mc. communications were established between Red Cross Headquarters in Buffalo, Depew, Tonawanda, and Niagara Falls. Traffic: W2NAI 381, RUF 261, WFU 247, PGT 184, FCG 182, VIQ 149, SJV 126, BLO 105, WOE 49, QHH 25, BLP 16, QNA 12, WZQ 12, WEN 6, GWY 2.

**WESTERN PENNSYLVANIA** — SCM, Ernest J. Hlinsky, W3KWL — SEC: UST. Ye Ole Polecat Net had its last directed net until Sept. 12th. NUG is eager to move to new QTH and take over R.M. duties in earnest. LOE is the envy of plenty of hams, with his "Paradise" location and high gain sky-wires. KKA and YA maintain traffic schedules in spite of net shutdown. MIZ finds ordinary "bug" too strenuous, so has Mon-Key. IWH has complete Command set to toy with. SWX is installing fixed and mobile rigs for Mfgs., Gas and Elec. Co. USM is reported designing new automatic bugs. KUZ insists on building VFO. NGW hopes his new 75THs will help competition. SWR's adjustments to his 8JK beam worked wonders. UST is making a great effort to reorganize the emergency nets in W. Pa. Those interested contact him. 144-Mc. activity in the Pittsburgh, Erie, Altoona, Johnstown, and Sharon areas is excellent. On open nights DX from Michigan, New York, Canada, and as far west as Wisconsin can be heard and worked. Let's hear from the Altoona and Dubois gang on their 144-Mc. activity. NCJ reports poor line voltage regulation hampers the big rig. QN says the Lake Erie Network now is on 29,664 kc. with 8 stations reporting. LWN is the proud possessor of a 35-w.p.m. Code Proficiency Certificate. TTX, in Erie, sends in his usual big share of news. Here's a few highlights. The Naval Reserve up there now is under K3NRE. DXN's latest bit of choice DX is LB10A and M16TK. The RAE meetings in Erie are tops with many interesting speakers. LJF claims his 28-Mc. mobile receiver is "hot as a pistol." TTX's weekly Amateur Radio News in a local paper carries all news items of Erie gang. Mercer County 144-Mc. gang is going strong. OAJ is using 144-Mc. rotary rhombic antenna. KWL has new NC-240D receiver. LNA finds 144 Mc. so competitive he is building 829-B final. NCD uses VFO on 144 Mc. GEG is QRL at WPIC-f.m. As a reminder, don't forget the South Hills Brass Pounders & Modulators Annual Hamfest in Pittsburgh this August. Traffic: W3KKA 103, MJK 99, KWL 38, NCJ 21, AER 18, NUG 8, LWN 6, LIW 3, VNE 3.

### CENTRAL DIVISION

**ILLINOIS** — SCM, Wesley E. Marriner, W9AND — Chief RM: EVJ. RM: SXL. PAM: UQT. State Net frequencies: "ILN" (c.w.) 3765 kc. "IEN" (phone) 3940 kc. SECs: Northern — EWH, Southern — FIN. Special Coördinator: FXB. KOK has 40 zones worked and confirmed and worked such DX as UL7, UD6, UC2, UB5, UI8, UH8, and UO5. His kw. blew up and he runs 150 watts now. Evanston hams have Red Cross-Amateur Club station going with the call, DUA, now ORS and OBS. MVU is the trustee. BUK sent in the above information. The Amateur Radio Club of the U. of Ill. has the call CRM and is in College Net, 7105 kc., 1 p.m. Saturdays. The station is located at Galesburg. FXB reports that Greater Chicago 28-Mc. Nets, North, South, West, Summit, and Fox River Valley, are drilling on Monday and Thursday nights with control stations for all nets on 28,900 kc. In addition, twenty 28-Mc. mobile units are available via Mobile Radio Club. A mass meeting is planned to interlock 3.5-, 3.85-, 7-, and 28-Mc. operations. WUB is back on the air with converted Navy ARC-5 and T19 on 3.85 Mc. with 50 watts input to a 20-ft. antenna. 2WTQ/9 is operating at Scott Field on 7 Mc. with a BC-459 and 60 watts output. At a recent meeting of the Illinois Valley Radio Assn. KZO and Carl Jahn of James Knights Crystal Co. gave a talk and demonstrations on cutting and using quartz crystals. Club members JVC, QKL, KSZ, and PBY are on 144 Mc. JVC intends to make 144 and 50 Mc. his favorite bands. IQC has rebuilt and remodeled his whole shack. OLM is now Class A. The club participated in Field Day

operations. CMC, new ORS, reports from Evanston and is interested in traffic work. He is treasurer of the North Suburban Radio Club. ZQS, of Chicagoland, has 75 watts to an 807 frequency shift c.w. in enclosed rack panel job. With only 6 watts to a 6L6 ZIW, Chicago, worked all districts on 7 Mc. The Amateur Radio Club of the U. of Ill., Division of Undergraduate Studies, at Galesburg, is operating under the call CRM on all bands using a Supreme Model AF-100 transmitter, HQ-129X receiver, McElroy automatic code transmitter/doublet antenna on all but 28 Mc. where a ground plane antenna is used. Meetings are held every other week during the school semester and feature technical programs. President BDF is constructing a 60-watt modulator using a 3E29. Vice-President TLY has 329-B on 3.85-Mc. phone. BUL is after WAS on 7 Mc. and is working on carrier current for campus broadcast station. XE1MA has had encouraging news from Mexican Consul that he may be able to operate club station while in U.S.A. He just received his ticket — DRY. After a stretch in Germany with the State Dept. as DA4QH, W9AQH is new ORS. BJN, of Chicago, is on the air from Lima, Peru, signing OA4CJ on 14 Mc. His address is John W. Spack, Panama, Lima, Peru. CMC received 20 w.p.m. Code Proficiency and RCC Certificates. EBX is new OO. BRY has push pull 813s and 838 modulator going. Via Starved Rock Club way; YNE has new 7-ft. rack. TLC and QLZ have SCR-522 rigs. IDA works the DX that is headed for ZEN's house, being in between. 8TBP is vice-president of Muskegon, Mich., club. ATA worked J9ACD and has 50-ft. tower about ready for beam. IFM built a converter and then rebuilt it. BRX gives information on new Wheaton Community Radio Amateurs. Officers are MYK, pres.; K9AAM, vice-pres.; IHT, secy.; QMS, treas. LNI and APK built a grounded grid 28-Mc. converter which works FBI BON is experimenting on 50 Mc. Traffic: W9SYZ 147, KQL 51, CMC 45, FKI 45, CTZ 32, LQP 24, ZPC 22, ASN 20, SXL 20, VOA 11, BUK 10, CRM 8, YTV 8, AND 7, KMN 6, NIU 2.

**INDIANA** — SCM, Charles H. Conway, W9FSG — RM: RCB. PAMS: BKJ and UGH. SEC: WNM. AZU is new EC of Evansville and vicinity. The Tri-State Radio Society elected AIN, pres.; WNM, vice-pres.; and BBC, secy. The Michigan City Amateur Radio Club chose LJI as president; NKB, vice-president; and OCP, as secretary. CQH and ZJO are new OES. AB haunts the ultra highs along with WDV, LRM, LMX, DDZ, and CMW. LNH has 70 countries confirmed out of 80 worked. CAW lost his equipment in the April storm. The Michigan City Club members got together enough parts to put him back on the air. BHC schedules 1PEK. SWH renewed ORS appointment. CSF is new at Michigan City. NGS has rebuilt and is on 7 Mc. The B batteries at TT gave out and have been replaced by a tube rectifier. Harry says his family objected to the chemical rectifier he intended to use. The Indiana Radio Club Council met in Indianapolis April 11th with MVZ presiding. All clubs are urged to affiliate with the Council. A picnic sponsored by the Council will be held at Mounds State Park, Anderson, on August 8, 1948. Bring the YF and kids. Lots of prizes. Write SWH for further details. ANG and KMI are working mobile from their cars. Do you have a rig that is portable? MDX built low-power rig for 28 Mc. for local chews. CWL moved to his farm where the antennas are already sprouting. Traffic: W9TT 68, ENB 43, NH 17, PMT 10.

**WISCONSIN** — SCM, Reno W. Goetsch, W9RQM — IQW built portable and emergency equipment and initiated it in Field Day operation. Marshfield amateurs organized the Dairyland Amateur Radio Club on Apr. 22nd, and elected the following officers: LGX, pres.; W. Roddis, vice-pres.; QJW, secy.; T. Hald, treas. UFX is a regular on the BEN. E8J is building mobile equipment for 28 and 144 Mc. SIZ is 2nd lieutenant, and communications officer for the Waukesha Squadron of the CAP. BDJ worked ZL for his first DX with 80 watts to an 807. JBF and RQM are haunting 50 Mc. this summer. The Mancorad club provided communication from Point Beach State Park for the National Archery Meet. LBC, GAJ, DDG, EWC, EVL, KQM, HAH, and NJT are providing 50-Mc. activity in that part of the State. JAW is getting boat and equipment ready for maritime-mobile operation. QFC is rebuilding and will have n.f.m. KQB and GI have been active on 7-Mc. c.w. RKT is working on 28-Mc. mobile for aircraft operation. Summer finds CYN on 28 Mc. LZU, our SEC, has made arrangements for a display of Emergency Corps gear at the National Convention. Newly-appointed ECs are: GLX, Kenosha; CWZ, Stevens Point; LBC, Manitowoc-Two Rivers. AFT is using SCR-522 for 144-Mc. mobile. RRA provides Wausau outlet on the Wisconsin C.W. Net. RUF reports 26 active in Milwaukee AEC Net on 145,998 Mc. The Wausau club annual picnic will be held at Marathon Park, July 25th. Don't forget the ARRL National Convention in Milwaukee to be held Labor Day week end, Sept. 4, 5,

and 8. Write GPI for details or registration blanks. New officers of Wisconsin Valley Radio Assn. at VHA, pres.; RQM, vice-pres.; CG, secy.; ESY, treas.; EFC, custodian. Traffic: (Mar.) W9DND 30, DKL 23, MUM 18, (Apr.) W9LFX 159, ESJ 154, IQW 82, SZL 46, RQM 20, JFX 17, CIH 14, CWZ 14, CBE 13, DND 9, SIZ 7, MUM 2.

## DAKOTA DIVISION

**NORTH DAKOTA** — SCM, Paul M. Bossoletti, W0GZD — About 70 hams attended the joint meeting of the Red River Radio Amateurs and the Fox Radio Amateur Club in Grand Forks. Director Dosland, TSN, was guest speaker. LHS now is with the U. of Calif. expedition. SSW and ZCM are active on LO Nites. OYM built new all-band exciter. The Fargo club call is ILO. 7KKT is back in home town of Fargo. HSR is back on the air on 3.5 Mc. HIV got new Globe-Trotter transmitter. VAZ and GZD were flooded out during Red River flood. JNP's first QSO with new rig was KL7. GWU is back out with a BC-896. SWC reports into North Dakota Net. RRW and WZQ are sporting mobile rigs. YSJ runs 850 watts and has four-element beam on 50 Mc. ZXT has FB station on Grand Forks. GJR worked ZDI, KS4, and T7Y with his BC-458 on 7 Mc. OUH worked C8YR for zone 23. What's new in Western North Dakota? Sure would like to hear from you, OBI. Traffic: W0GHN 16, ZCM 9, LHB 7, OBL 7.

**SOUTH DAKOTA** — SCM, J. S. Fosberg, W0NGM — FAX/KL7 sent a fine letter from Nenana, Alaska, saying that he is with the CAA there and listens for South Dakota signals on 3720 kc. and would like to contact some of his old net buddies. He now uses the call KL7/L. YOB passed through town recently and during his brief stay many things concerning ham radio were discussed. GCP has a new VHF-152. He is busy with the net, and says that SDE is on n.f.m., FJS is on 28 Mc. and will be on 7 and 3.5 Mc. soon. N.f.m. seems to be very strong in Mitchell. The club there conducts classes in code and theory. It is the hope of your SCM that all hams will listen to the Dakota Division Council of the Air and that all clubs in South Dakota will enter into the discussions held on it. The frequency is 3894 kc., time is 1:00 p.m. Sunday every two weeks. It is held by and for the amateur. Traffic: W0GCP 6.

**MINNESOTA** — SCM, Walter G. Hasskamp, W0CWB — TSN, our Director, met with the Arrowhead Radio Amateurs at its regular meeting in Duluth. IFS has been appointed EC for the Minneapolis Radio Club. KYE is working on a 3.5-Mc. antenna. New hams in Duluth are HRY on 7 Mc. with an 807; and HZQ on 28 Mc. with the same tube. Ex-82EW now is 0FWE and works 14-Mc. DX from Duluth. NRV has been appointed Assistant Director. QVU and GKP tried a 144-Mc. test across Lake Superior but got rained out. The Minneapolis gang reports hearing 144-Mc. signals from Duluth. GHN works the North Dakota Net. TUO's new QTH is Walpatoon, No. Dak. AGO completed an f.m. mobile rig. KPQ and IFW are on 50 Mc. with 30 watts and 500 watts n.f.m., respectively. BPK is on 144 Mc. with 832-A and 20 watts. BOL put up a horizontal loop for 3.5 Mc. JSN has worked 51 countries with a battery-operated transmitter and receiver. The receiver is his own design — 13 tubes, 1½/90 volts, double conversion 144 Mc. for 1st i.f. and 455 kc. for the 2nd i.f. After more than 16 years of ham radio CWB raised his first DX — VK3VJ on 14-Mc. c.w. SIZ was home from the Aleutians for a visit. Look for ICM, a new call at Clarkfield. He's on 3.5 and 7 Mc. with an exact duplicate of the rig in *How To Become a Radio Amateur*. JZP is aiming at 48 states in '48 with ten watts. Ex-9EFO, ex-9E2M, is back on the air with the new call IJQ. YBM has moved to an antenna farm. RPT is rightly proud of an SWL's card from Liverpool. He was heard there April 10th on 3795-kc. c.w. OYM has a new exciter for all bands down to and including 50 Mc. ZOB and YUN were visitors at the SCM's shack. Traffic: W0RJF 133, ITQ 79, EPJ 67, VJH 52, CWB 44, GHN 38, BGY 22, JIE 21, BHY 18, RPT 17, HEO 15, GKC 10, FAH 8, CCF 7, JZP 6, YBM 6, ORJ 5, PSD 3, KPQ 2, BOL 1.

## DELTA DIVISION

**ARKANSAS** — SCM, Marshall Riggs, W5JIC — LUX has the kw. running phase modulation n.f.m. Sounds OK for 813s. JXO is rebuilding the entire rig. JIC has brand-new QTH with lots of line voltage troubles. MRD is off temporarily while building new shack for rig. The 'phone and c.w. net will meet all summer. EA is busy in rice fields so is not on much. The Conway and Harrison Clubs are now affiliated with ARRL. NCL is on 3.5-Mc. c.w. with 50-watt 807. OCY is building new rig for 28 Mc. DSW is burning up 28 Mc. mostly. FPD and ITW have new 32V rigs and nice note. How about some news, boys? Traffic: W5FMF 157, JIC 41, LUX 27, DSW 2.

**LOUISIANA** — SCM, W. J. Wilkinson, jr., W5VT — KTE is SEC and CEW is PAM. The 'phone nets are going strong. Again may I say thanks to the gang for the nice showing of interest in this section and I hope we may continue the upward trend in amateur activity in the future. BSR attended the May 7-8 Board Meeting in Hartford. DU was a recent visitor to the Caddo Amateur Radio Club of Shreveport. DU is the R.I. for this district.

LET, IOP, CEW, QH, and JFF led a discussion of 50-Mc. activity during the last meeting. BFX recently explained the operation and use of oscilloscopes to the membership. TXO is active. MOQ, Lake Charles EC, is studying for his Class A ticket. FJW is keeping things going in Monroe. AEN is on 28 Mc. MJT will be on with a 100-watt soon. BPL is 1st Sgt. in Air Force Reserves. KRS and HOU are now OOs and both made a swell showing in ARRL FMT. The Naval Reserve is increasing activity and can use plenty of ham operators. Contact your nearest Naval Reserve Headquarters for information. IUW, new ORS, has been going strong on 7 and 14 Mc. The Delta Radio Club of New Orleans is planning much activity. BAF has been overhauled and the Barksdale club now has its own set-up. JHY has a new antenna. Our sincere sympathy to CEW on the death of his father. The Southwest Louisiana Radio Club of Lake Charles has quite a few promising "hams-to-be" on its membership roll. AVU commutes between Shreveport and Marshall, Tex., for his ham activity. Traffic: W5VT 8.

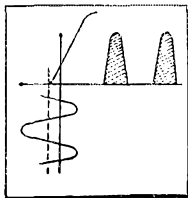
**TENNESSEE** — SCM, Ward Buhrman, W4QT — BBT and JIH travel around the State and visit hams. ZZ does the same and carries portable with him; he covered the State from temporary QTH in Wayne County. PL manages to make BPL although mainly occupied with promoting crops of beans and watermelons on the farm. MZK made WAC on 28-Mc. 'phone. FLS completed conversion of Marine rig. LBQ is missing some DX while QRT for special study. EBQ and KMH are making a valiant effort to keep the 'phone net active (3980 kc.) throughout the summer. The c.w. net is officially closed until September, but 3737 kc. is being kept warm by several of the net members, and traffic continues to move. NMF is a new call in Johnson City. ANN is constructing a kw. for 7 Mc. CZL is also contemplating higher power with break-in refinements, using 813 p.p. final. The Section Emergency Coordinator is FCF. ECs are requested to make reports to him. Several areas in the section are lacking in AEC members. How about some applications? FCU invited the Tennessee C.W. Net members to visit with him Field Day at his cabin on Cherokee Lake. New ORS: BBT, ETN, HOJ, LCB, DIY, and NNJ. New OPS: EBQ. New OBS: FCU. HOJ is planning to add modulator and speech equipment. Traffic reports are gratifying but other news is lacking. Traffic: W4PL 659, WY 57, ETN 52, BBT 44, ABR/ZZ 25, LCB 23, HOJ 21, CZL 20, NNJ 16.

## GREAT LAKES DIVISION

**KENTUCKY** — SCM, W. C. Alcock, W4CDA — Kentucky is looking forward to a bigger season ahead with three nets: KYN, KYP, and KYE. The latter net is the 144-Mc. net formed by FBJ and BPE. They and KKG are Official Experimental Stations. MSC and MWX are new Official Relay Stations. JCN plans to do some DX-chasing. HAV did emergency work in flood back in March. FKM completed another 100 per cent attendance on the KYP Net. RPF's and TXC's activities were curtailed by flood. MWX says LLR and JQV are reporting into 'phone net from Henderson. BPE reports the KYE Net is going fine with JXM, VP, IUP, and KKG as new members. NBZ is taking an interest in emergency work. Contact FBJ if interested in 144-Mc. net (145.8 Mc.). Since working Indianapolis and Dayton on 50 Mc., he says everybody is going "beam happy." KKG has a sixteen-element beam for 144 Mc. TXC, the PAM, says the KYP Net now operates Saturday mornings. NJD, at Greensburg, has 400-watt p.p. 814s and three-element beam on 28 Mc.; he got his ticket March 10th. FQQ, YPR, and CDA need more time — for radio and fishing! BAZ is rebuilding everything. JXM has 199 countries for postwar DX. Official Observer FR measures frequencies of all on KYN daily, to show deviation in BGEC. UWR has new Collins 75A-1 receiver. JRO can only hit KYN on Sunday. FQQ is rebuilding. BAZ is to tell of the ideas he got at the Chicago radio show. Traffic: W4BAZ 153, FQQ 67, JCN 60, MSC 43, CDA 41, TXC 38, MWX 34, UWR 31, FR 23, FKM 12, KKG 11, BPE 9, JRO 2.

**MICHIGAN** — SCM, Joseph R. Beljan, jr., W8SCW — SEC: PVB. RMs: NOH, PVB, and UKV. UUS is OBS. Section Net Certificates have been issued to AJL, CTC, QQN, SOX, TRN, UES, UTH, and 0UFO/8. The QMN Nets closed down for the summer May 28th after a most successful season. Special bouquets are in order for the three Net Managers, NOH, PVB, and UKV, whose untiring efforts were instrumental in obtaining fine cooperation. ARJ, GSJ, NOH, and SAY did a fine job as Michigan outlets on the TEs. Congrats to the Allegan Area Radio Club on its affiliation with the ARRL. The Catalpa Amateur Radio Society elected ZOB, pres.; YGI, vice-pres.; YCU, secy.; and VVD, treas. The Detroit Metropolitan Club elected RPM, pres.; Nickle, secy.; RJI, corr. secy.; and LVR, treas. U. of M. Radio Club elected SZC, pres. and VLX, vice-pres. We regret to announce the passing of AIZ and HWO. UKV is upping the power to 150 watts. RX is back on the air with a Command transmitter. MV reports in the QMN. OCE put up the folded doublet for 3.85 Mc. and is running 300 watts. UES has mobile rig on 28 Mc. running fifty watts. The Genesee County Radio

(Continued on page 85)



The advent of television and the increased use of radio services at frequencies above those used by most amateurs has made it necessary for us to give consideration to the prevention of interference to these new services by harmonic radiation from our transmitters. There are two approaches to the problem of reducing harmonic radiation. One method of attack is to attempt to prevent harmonics developed by the transmitter from being radiated. The other method is to try to reduce or eliminate the generation of these harmonics.

The first method seems to have been given the most attention. The second is actually more important than most of us have realized. After all, if we don't generate any harmonics, we don't need to worry about preventing their radiation. You can't perpetuate what isn't there!

After adding a 300 watt linear amplifier to his 30 watt ten-meter Class C modulated amplifier, Jack Ivers, W1HSV, one of National's many active amateurs, noticed that previously-noted interference to a nearby broadcast receiver disappeared completely in spite of a 10DB increase in output power. Further checks indicated that the interference had been due entirely to harmonic output of the transmitter. We became curious as to why this was true and set about to see what factors are involved in harmonic output reduction.

One method of reducing harmonic output would be to run the final amplifier Class A. We know, however, that the efficiency of a Class A amplifier is very low and the reduction of harmonic output would be obtained at a price which we do not care to pay.

A compromise between Class C and Class A operation is available. Appropriately enough, this method is called Class B. Examination of curves showing the variation in harmonic output as the period of time (in degrees) with respect to a single cycle of excitation during which plate current flows, brings out a rather startling fact. When the amplifier bias is adjusted so that the plate current flows for exactly 180° (Class B operation) in the ideal amplifier, the odd-harmonic output goes to zero. (Curvature of the tube characteristic will introduce some harmonics, however.) The addition of a second tube to provide a perfectly balanced push-pull amplifier will cancel all even-harmonic output. We would then have an amplifier which gives only fundamental output with no harmonics at all. Although this perfect cancellation is never realized in practice, it is obvious that the harmonic output can be very low while still operating with fairly good efficiency. This amplifier can be used for CW, NFM, SSSC or linear amplification of AM. Here is a good way to get rid of harmonic interference before it gets started.

It should be remembered, that if the plate tank return to ground does not have essentially zero impedance, the push-pull amplifier can still generate even-harmonic power in this impedance, acting as a push-push doubler. This harmonic power might find its way into the antenna circuit, usually by capacity coupling to the link. Grounding the link, at one end for co-ax or in the center for a balanced line, will reduce the chances of this harmonic power from being radiated. The new National AR-17 coils have a six prong base, with a center tap on the link which can be connected to ground to help reduce capacity coupling.

Unfortunately, complete data for running tubes as Class B R.F. amplifiers are not commonly available, but we can get a fairly good idea as to what we can expect by going over the data for two tubes operated as Class B modulators. This will correspond roughly to your new Class B CW rating for a push-pull final. This is not the whole story, particularly with respect to bias, grid current, etc. but the problem is very similar to that of an SSSC Class B final. No doubt the manufacturers will provide data for this type of operation soon.

CAL HADLOCK, W1CTW



Club converted the old police transmitter and has it on 3.85 Mc. at its club room in the Red Cross Headquarters. HDK is on 144 Mc. WXO is working nice DX on 7 Mc. SAY continues to work choice DX and GP continues to snag them on 3.5 Mc. RTN is operating 14 Mc. until antennas for 3.5 and 7 Mc. are erected. QFF worked his first VK. EGI reports in the QMN and rag-cheers on 7 Mc. BZM and CIP are new hams at Negunee. YLA is DXing. TCD is putting up a windmill tower. YEY has changed over to 8005s in the final. KPL worked 37 countries and WAC on 7 Mc. ZTU is planning n.f.m. operation. BVK has new NC-173. CIG is ex-KL7AP. VMC is rebuilding. BDF has new 14-Mc. beam. GSI added the 35-w.p.m. sticker to his CP Certificate. DOI is running 125 watts on a 809. HBK is working on portable-mobile emergency equipment. NKK is putting p.p. 813s in a new final. BJP is rebuilding to p.p. 813s. KBI has rig completed with 35TGs on 28 Mc. OTG has new beam on 23 Mc. QWZ has 800 watts and six-element beam on 28 Mc. Traffic: (Mar.) W8YNG 32, DED 14, W8UFO/8.6, W8BJP 4, DOI 2, (Apr.) W8NOH 208, ARJ 149, TRN 120, GSJ 116, UJY 114, TBP 86, SCW 82, UUS 43, UPH 34, WOV 24, TQP 23, IV 12, UES 12, AQA 9, DWB 9, DNM 8, FX 8, UKB 8, DPE 7, SH 7, KPL 6, WVL 5, UKS 4, UGR 3, EGI 2.

**OHIO — SCM, William D. Montgomery, W8PNQ** — Traffic and reports fell off noticeably this month. Summer should be here. My congratulations to members of the Buckeye Net, to the Route Manager, RN, and to his assistants, PMJ, EBJ, and ZAU, for a swell season's work. CBI has a new Zepp 240-feet long for 14- and 3.85-Mc. 'phone. He plans to go to 220 volts for all his big rigs, too. According to PUN, BLS has new Collins transmitter and receiver. OUR says YAU is now 30JQ. LBH has 150 watts on 50 Mc. JFC has been hearing CIs and C7s lately. How about working them, Elmer? WRN says that May 1st and 2nd saw several good 144-Mc. openings. WRN and ZHS, in Columbus, worked WXV in Shiloh and WNM in Canton, and both were heard by several other "DX" stations that they themselves were unable to hear. They also heard Pittsburgh and Cleveland stations. ZAU reports that a new radio club has been organized at Wright-Patterson Field Airbase, known as the AMC Amateur Radio Club. AWL is president, and the club call is GIZ. The Toledo Radio Club recently elected as officers: PNY, pres.; RBZ, vice-pras.; W. Schnell, secy.; TKS, corr. secy.; WEW, sgt. at arms. From the *Central Ohio Radio Club News*, we see that YAU is now portable 3 while attending the Capital Radio Engineering Institute. From the *Mike and Ken*, we see that VEL has a new jr. operator with call letters already (8VEL/jr.), that JIN has a new Remco beam atop a new tower (ditto RY), and that PBU now is using an electronic key (he couldn't be read with regular fist — kind of a "self defense" item). From the *Listening Post*, we see that the Queen City Emergency Net gave a good account of itself during the recent Ohio River Flood. Ten mobile units were used and 17 fixed-station operators manned the two Red Cross fixed stations to handle 101 messages. The most valuable assistance was given to the Newport (Ky.) flood wall which threatened to collapse several times. Several people were rescued, and help was obtained for injured persons through their messages. Traffic: W8UPB 138, RN 134, EBJ 130, CBI 105, TKS 100, FFK 80, PZA 58, PNY 44, TAZ 27, ZAU 27, LWH 20, PUN 19, WAB 16, WE 15, BEW 10, PR 8, BUM 7, THJ 7, DAE 4, QIE 2.

## HUDSON DIVISION

**EASTERN NEW YORK — SCM, Ernest E. George, W2HZL** — Note traffic handled by LRW this month. This is the first BPL report in many, many months for this section. Another informal hamfest was held in Richfield Springs, N. Y., on April 11th by PGT, WPO, DSS, LU, and BSH, and their XYLs. LU, former SCM of Eastern New York, soon will be back on the air again. The boys are all excited waiting for Bob to start the brass again. BSH and others are getting his equipment rebuilt and in operating condition for him, so listen for LU. Schenectady hams hated to see that 28-Mc. rotary come down at MB recently. He now is mobile in retirement, so listen for him operating from his car. KLM is busily trying to decide what he will put to keep that block in the habit of seeing a ham tower. Judging from the building reported this month by the Amsterdam group, that city is one to be reckoned with in hamdom. RH reports 144-Mc. X Net is now extended to Massachusetts on the eastern end and Maryland on the southern end. A new little YL at ITX kept our RM silent. He reports, however, that the NYS Net continued good despite bad static conditions. It closed down on May 31st for the summer. WPO was off the air this month because of moving job. The Schenectady gang operated on Field Day from the same stand as last year. Traffic: W2LRW 595, RH 269, ITX 108, TYC 19, BSH 14.

**NEW YORK CITY & LONG ISLAND — SCM, Charles Ham, jr., W2KDC** — The NYC-LI AEC picnic will be held at Bethpage State Park, June 27th, 11 a.m. The 80 C.W. Net is participating in a series of simulated emergency tests with AEC groups with very good results. UNS is the latest addition. In Suffolk the regular April 5th drill was conducted under real emergency conditions; a plane hit a high tension line and most operators were without power

from 1930 until 0100 but normal tests were conducted. OQI operated mobile from Rock Hill and easily contacted KNA with ADW and EBT, also mobile, assisting. The 144-Mc. regulars are: ADW, EBT, AJF, PDU, KNA, FCH, and WLS. EBT has not missed a drill this year. FCH is using an ARC-3 receiver on 144 Mc. IXT is on 144 Mc. with a six-element beam and promises even higher power. WLS snagged a VEI on 144 Mc. AJF is using the 522 regularly. KNA has new mobile receiver. WH is back again with Millen exciter. UDP is taking up 144 Mc. again. UVM has a pair of 812s. OQI uses a BC-457A as VFO on 144 Mc. WYC is a new station at Amagansett on 3.5-Mc. c.w. From Nassau FI reports that attendance was excellent in the four regular drills in April; the usual 30 regulars reported in at 9 p.m. Monday and the ARRL official bulletins are still used to open the net. In a special test April 26th, fourteen messages were relayed to Binghamton in one hour and nine additional messages came through somewhat later. GG, QBS, and OXM are handling the 144/80 transfer. In Brooklyn OHE, the genial EC, has retired from work again so that he can have more time for snagging 144-Mc. DX. Manhattan now boasts an EC in the form of WBB, who is organizing a 3.5-Mc. c.w. net as a starter. EA, RBZ, and NKO are assisting. QBS is active regularly on NYC-LI Net and still needs Asia for WAC. LWB is restricted to 7 Mc. and is active with the Swing Shift Net. Two new hams are welcomed to Bethpage: YKM with a 522 on 144 Mc. and YLD with a 696 on 3.5-Mc. c.w. They took the test together after studying together. TRP and PDH demonstrated a Hy-Lite beam at a recent Trylon Radio Club meeting. SHE is all wrapped up in teletype. One conclusion Sam already has reached is that a beam antenna is no good for "TT". He has a wire recorder under construction. The Staten Island ARA sends in its regular report since the recent rejuvenation. MQO resigned as secretary and PZP has taken over. ACZ and GIK are seeking OPS appointment. OFD is continuing as EC, with GHT and JLC assisting. YJB is welcomed to the gang. NIB went to Italy recently and reports a fine visit with IIAA. FF just got back from Egypt and Europe and plans increasing activity. RTZ was forced to give up NCS because of house QAN. UZJ is doing a wonderful job taking all TYU schedules. TUK is slightly QRL with school. OUT has broad-band preamplifier on 28 Mc. URX got his Class A license and immediately tried 14-Mc. 'phone. EC reports that TLAP has been discontinued for the summer but maintains a free net Monday nights at 2030 on 3630 or 7085 kc. VOS is on 3.5-Mc. c.w. only. PZE has new BC-696. PRE is trying grid modulation; he also has new antenna for 14 Mc. BKK, of Brooklyn Polytech, is on 'phone/c.w. 500 watts. BO is taking a four-week trip to W6 Land to see if he can work a few Asiatics. ESO has worked 45 countries on 14 Mc. since mid-April using folded dipole antenna. KV4AF/2 moved and was QRL; Ted is going to KV4 Land for two weeks shortly. Traffic: W2UZX 714, VOS 153, RTZ 153, QYZ 129, TUK 112, MJO 100, OBU 97, QBS 92, EC 87, OUT 70, BO 38, KV4AF/2 29, W2PRF 26, ESO 11, PZE 8, URX 6, KDC 5, SPZ 5, PF 1.

**NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN** — Asst. SCM, Tom Lydon, 2ANW. NNJ Net (c.w.) kc. 7 p.m. daily except Sunday. N.J. 75 meter 'phone net 9 a.m. Sunday. NNJRA held its second annual dinner dance on April 24th with 121 members and guests in attendance. GFG is rebuilding power supplies. GEM lost shack and kilowatt transmitter in recent fire. 6COD, who is second operator at OEC, is on furlough to California. GVV handled 37 messages in Army Day rush. SLW is heard working OEC on 3.85-Mc. 'phone. GQY now has own station on the air. UMZ has been appointed EC for Perth Amboy. He is a member of the Raritan Bay Radio Club. YOB is new station in Teaneck. NIY is maintaining schedules with 7BE, BZI and LFR are remodeling their shacks (the QTH). Ed Perry, APL, worked Hal Perry, LFR, and Stew Perry, 1BB, on LO Night. NCY is again running low power, having sold his transmitter, and is trying to make up his mind on a new rig. PPH is new OPS. "X" Trunk Line on 144 Mc. now extends from Massachusetts down to Delaware. QUF, DFV, DME, and VQR are doing a swell traffic job up and down the coast every Sunday night at 8 p.m. BLS is now a member of the A-1 Operators Club. GIQ is back on the air on 144 Mc. in Roselle. KUS is on 3.5 Mc. and now holds ORS appointment. 6CHV would like to contact LFI for that FR8FP contact last year for his DXCC. Where is Frank now? OOC is experimenting with horizontal beams on 144 Mc. and reports good results with twelve contacts in the fourth district. CQB has sixteen elements on 144 Mc. and is the cross link to NNJ 3630 kc. net from the Monmouth County AEC 145.8-Mc. Net. EUI has two beams on 144 Mc. vertical and horizontal. JDW is EC for Summit. The Monmouth County AEC (144) Net, which meets every Monday night at 8 p.m. on 145.8 Mc. with VQR, County Coordinator, in charge of drills, is doing a fine job on the air and holds a meeting each month at a member's home. Some good times are had after the meetings, too. The MCARA Woman's Auxiliary meets at the same place and time. Officers are: BTG's XYL, pres.; HKY's XYL, treas.; and DME's XYL, secy. The SCM was guest and speaker at the auxiliary's last meeting. The UCARA's Technical Committee, headed by EUI, is rebuilding the W2GIZ Me-

(Continued on page 88)

# Peace of Mind



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morial Station's low-frequency rig and will have the "new look" and the latest in circuit design, and in the fall will be a regular caller into the NNJ C.W. Net. Calls are made into the Union County AEC Net on 146.8 Mc. on Tuesday nights at 8:30 p.m. and will be this net's low frequency link. OSQ is County EC for Union, and is operating net control from his home QTH but expects soon to have a spot in the Court House Tower for his NCS. Traffic: W2OEC 653, CGG 402, LFR 307, DRV 105, CQB 90, NKD 88, MTV 68, ANW 55, N1Y 55, PPH 38, N1Y 29, TZY 28, GJC 21, IIN 21, KUS 20, APL 14, CJX 14, BZJ 9, OOC 4, GVZ 3, GFG 2.

### MIDWEST DIVISION

**IOWA**—SCM, William G. Davis, W0PP—YBV, in Law School in Iowa City, has new two-room shack and is itching to get up the sky hooks. The Iowa City gang is all set for summer activities. Six or more stations there are on 144 Mc. regularly. TWX is busy making cyclemasters for NTI. HMM says he dropped a little this month; his traffic total is only 9171 SWY likes his new Mon-Key. DVP has new YL jr. operator. HKN is getting new SX-24. SEF has new rig with 809, 35 to 50 watts input. SEE reports lots of contacts and lots of DX with his kw. The Council Bluffs gang is hot on 144 Mc. with QFZ mobile and fixed. JRY, SEE, VEY, and YZF are active. CCY is back on the air. PDM is using Thyratrons to control plate power and says it works swell. QFZ is working on 24-element beam for 144 Mc. FWL lost beam during recent wind storm. The Iowa section lost a fine ham when Grandpa Kerr, GP, answered the call of the Great Architect. ANU, SVS, HQA, and SQF are new members of Iowa 75 Net. PP was re-elected NCS for Iowa 75 Net. SQQ, CPU, and FKB were elected Alternates NCS. ANU is new Minnesota contact for Iowa 75. FP sent in a fine SEC report. The EC set-up is shaping up fine. News was rather scarce this month, fellows. Your vacation plans, etc., are good news for this column. Send 'em in. Thanks for your cooperation the past year and may the coming term be equal or better. Traffic: W0HMM 917, PP 44, FKB 29, QVA 18, TWX 16, SEF 8.

**KANSAS**—SCM, Alvin B. Unruh, W8AWP—North Central Kansas hams met with RLZ to organize a club. Festivities ended with a covered dish supper. VKKS, a new AEC member, has HT-18 driving p.p. 812a. He lost 40-foot pole and 28-Mc. beam in winter ice storm. OUU received 30 w.p.m. certificate, and is installing 28-Mc. mobile, after losing beam. AHA handled traffic on schedules. ZOC has VHF-152. He also has 20 watts to BC-458 which netted VE8OY on 7 Mc. MDI has BC-696. CUL reports UQM has new 50-Mc. rig. FEE has Class A license and three-element 14-Mc. beam. OVS is active on "75." EEB teaches in nuclear research project of K.U. physics department where his father, FON, is a machinist. FON has new TZ40 modulators to pep up the old 3.5-, 14-, 28-Mc. final, along with new 3.5-Mc. Zepp and four-element 28-Mc. beam, at new QTH. EEB uses BC-610 and Super Pro. CVN and AB were hosts to members of WARC at K. G. & E.'s Communication and Electronics Center. EMW has three-element beam. UNQ did some nice 50-Mc. work with rotary beam 65 feet high. ZYC returned to Boeing as electrical engineer; AWP as electronic engineer. Remember the Midwest Division Convention in Wichita in October!! Traffic: W0JON 20, AHA 18, AWP 15, PDX 6, JDX 5, JLY 5, BNU 4, CUL 4, FPC 4, LIX 3, ZOC 3, OUU 2, CXF 1.

**MISSOURI**—SCM, Ben H. Wendt, W0ICD—Eleven minutes after 6NX received his ticket he was in his first QSO. INK heard an incoming message while his transmitter was incapacitated. In his haste to reach a near-by phone he encountered a well-strung clothes line. After the message was taken care of six stitches repaired the damage to his upper lip. A few changes in the antenna coupler and a full-wave end-fed Zepp antenna gave INK an increase of 80 per cent in power loading. OMG worked WAC in 7 hours and 27 minutes on 28 Mc. ULM has QSYed to Willow Springs. HDK is now among the W6s. OUD increased power 17 watts by increasing antenna length. BXB purchased a home and then he discovered that his neighbor is the Radio Inspector. QXD is on the air between 7:00 and 7:30 each morning. He is looking for traffic schedules and outlets on 7155 kc. CMH's ORS appointment has been renewed. YQJ's 70-ft. mast supporting a three-element beam gives his 800 watts a good send-off. Fifteen seconds changes the rig from 14-Mc. phone to 3.85-Mc. phone. ZZW is on his way to receiving an engineering degree at M.U. His 500 watts serves him on 3.5, 3.85, 7, and 28 Mc. CRM has 107,531 QSOs to date. Columbia amateurs are well represented in the 3.85-Mc. Mo. Net. YQJ is looking for a traffic outlet in St. Louis at noon on 3.85 Mc. There is a full house at all Heart of America Radio Club meetings. ZAO is active in AEC work on 3.5-Mc. c.w. SOC is on 7 Mc. EEE is on with 500 watts. Traffic: W0QXO 154, DPO 144, ARH 127, OUD 65, CMH 62, GEP 51, KIK 50, ZZW 39, CRS 28, CRM 22, VMO 16, DEA 12, YQJ 12, EEE 10, KSR 4.

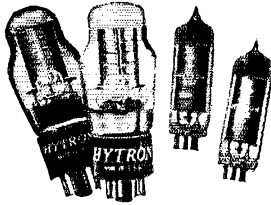
**NEBRASKA**—SCM, William T. Gemmer, W0RQK—EKK, LJO, and OZC are new ECs. EKK has been appointed OBS. DJB, LJO, OZC, and YCG are ORS. FQB

(Continued on page 80)



**TUBES ARE KNOWN BY**

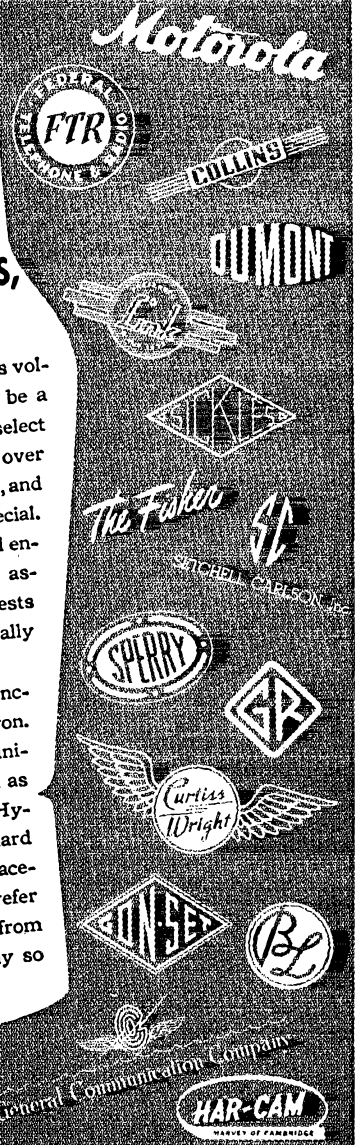
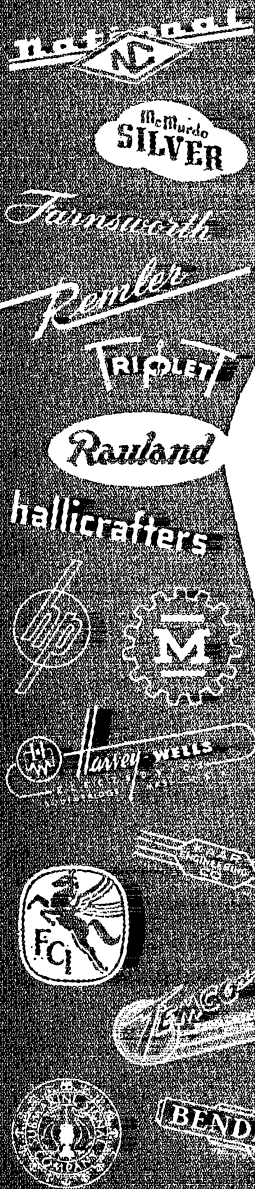
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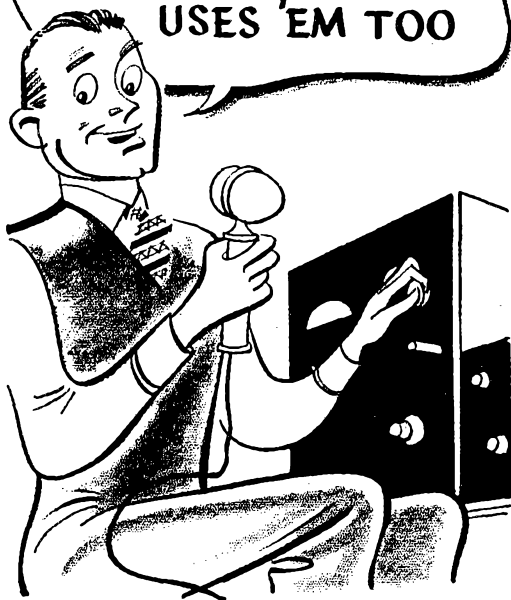
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# MALLORY

says, "RQS hooked 23 new countries during DX Contest." FQB has been appointed Assistant Director by DEA. QXR and EHF are running around with one-watt i.f.m. portables on 28 Mc. Bellevue has organized the Tri-Angle ARC with eleven charter members. Officers are: GYM, pres.; GJF, vice-pres.; SHH, secy. and treas.; and EJY, auditor. AVM built an 811 final and feeds a three-element beam on 28 Mc. QUA will be on 144 Mc. this summer. EAO is working for UFD. GPE is using 807 and Workshop beam on 28 Mc. OVL, ex-9WP, showed up on 28 Mc. with a pair of 6L6s, RME-43, and two-element beam. ZTE has 28-Mc. transmitter and BC-454 in his car. 9WII/0 has new "Mon-Key." LZO is operating 28-Mc. phone and 7-Mc. c.w. UZF is running 400 watts to 35TGs and defied a 50-m.p.h. wind to put up 14-Mc. beam. RUG is on c.w. from Trailercoach. PLF is new ham in Hastings. BRO is on 7- and 3.5-Mc. c.w. WVE is using an NC-173 and is rebuilding to an 813 in final with 811s as modulators and will use BC-696 as VFO. FEA is on all bands with Hammarlund Four-20 running at 22 watts. IJB received his ticket and a YL harmonic the same day. HBS is on 7-Mc. c.w. with BC-459A. BPY worked a VK2 on 3.85-Mc. phone. The Southeastern Nebraska Radio Club reorganized with 22 members present. NWC is pres.; EAL, vice-pres.; and GJM, secy. Traffic: W0SAI 46, FQB 38, YCG 27, HSO 11.

### NEW ENGLAND DIVISION

**C**ONNECTICUT—SCM, Walter L. Clover, W1VB—HYF has joined the Swing Shift Net. ZL finally made DXCC with 111 confirmed. APA is rebuilding final with pair of 810s and has new BC-458A. VFO. IIN is shutting down for a rebuilding program. AV and INF made BPL on deliveries. BIH schedules VE8MA on 14 Mc. KUO got himself a nice write-up with pictures on the front page of *Stratford News*. New calls in Stratford are RFJ and REZ. The Stratford Red Cross has appropriated \$500 to purchase radio equipment for its station, RCV, under the direction of OGG. Homer Nichols got his old call back, BM. MCO is erecting new mast. DJC, IYI, and LMK visited Tri-City Club meeting. The Manchester Club is planning emergency drills this summer. The Hampden County Radio Club of Springfield, Mass., newly organized, elected APA, of our section, as president. ALW is building new shack. GTV is on 14-Mc. phone. DET has B.C.I. trouble. OPG is using n.f.m. on 28 Mc. BDI reports the X Net hopes to set up a relay system from Maine to Washington, D. C. on 144 Mc. It operates each Sunday night. AW is getting some new poles. DWP has beam fever, now it's a three-element 14-Mc. rotary. IKE expects to be active this summer from his home in Oakville. JQD is transmitting Official Bulletins daily on 3670 and 7075 kc. at 10 p.m. BARA is meeting at members' houses since losing its clubroom. QZB and EER applied for AEC membership. The Meriden Club meets every Sunday at 8 p.m. at the Ritz Restaurant. AZP got his Class A ticket. Traffic: W1VB 238, EFW 220, LKF 199, INF 181, AW 176, NJM 170, DAV 91, ORP 56, BDI 49, KQY 40, KUO 32, ADW 31, BIH 27, ZL 21, HYF 11, APA 9, DXT 7, TD 5, CTI 4.

**MAINE**—SCM, F. Norman Davis, W1GKJ—SEC: LNI. RM: NXX. PAM: FBJ. The SEC and PAM have renewed their appointments. Renewed ORS: EFR and NXX. New ORS: KYO. Renewed OPS: NXX. VV was forced on c.w. by the loss of his modulation transformer and claims he likes it. DHH is back on the air after a long absence and is operating on 3.85-Mc. phone. KYO visited AW. QEQ has 144 Mc. portable-mobile and uses a ground plane antenna on car roof. PWW has an SCR-522. EFR was visited by CTR. JAS will be at Duck Pond until the last of November. GKJ and NXX made short but enjoyable visits to KMM, AFT, AMR, and QIQ at K1NAD. GKJ is on 144 Mc. for the summer. The P.T.N. and S.G.N. have closed officially for the summer but some of the gang usually will be found on the net frequencies if any traffic develops. 2PRW is at Pine Point for the summer and is operating on 28-Mc. phone. Traffic: (Mar.) W1ODA 42. (Apr.) W1JAS 122, NXX 120, LKP 79, ODA 64, K1NAD 40, W1FB3, AFT 25, GKJ 25, NHT 20, KYO 16, VV 13, DHH 4, AMR 1.

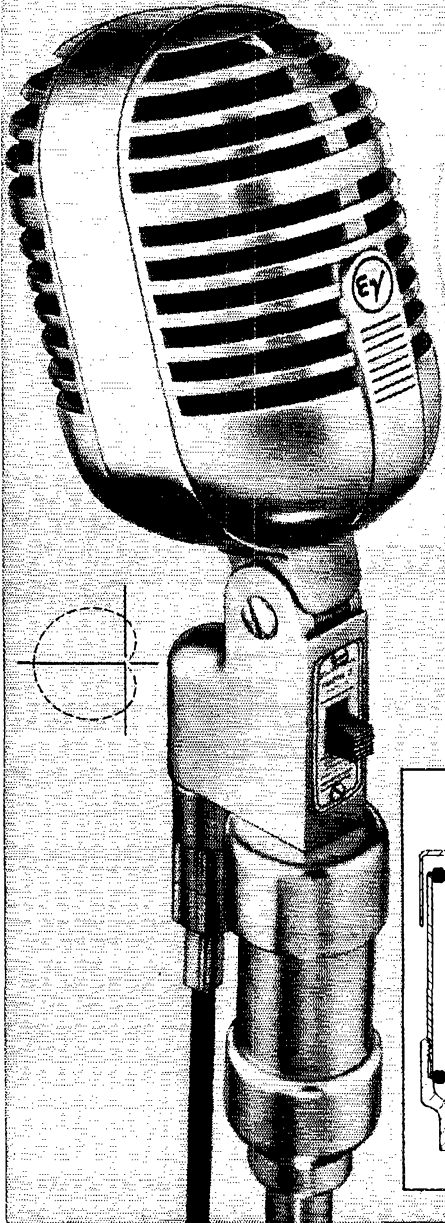
**EASTERN MASSACHUSETTS**—SCM, Frank L. Baker, jr., W1ALP—New appointments: ICO as EC for Framingham; MMH and PLQ as OES; WU, QJB, and QMJ as ORS; BGW as OO Class 1; BB as OO Class 1-2-3-4. PXH is now Class 1-3-4 OO. Following appointments were renewed: HOB and IIM as OPS; AYG and GGV as OO; JXH, PCJ, MCR, BB, and AR as ECs; OBN as ORS. The South Shore Amateur Radio Club elected the following officers: LMG, pres.; KCP and QMJ, vice-pres.; PXH, secy.; IVI, treas. KB renewed EC and OES appointments. We are sorry to have to report the death of LGY. AWX has worked 117 countries. The Brockton Amateur Radio Club has shown two ARRL films at its meetings. The T9 Radio Club met at MVQ's QTH. KON has a T-9er. DF and FUR gave talks at Eastern Mass ARA meetings. POL talked and showed his s.s.s.r. from Oct. QST. HP has a new NC-173 with a VFO coming up. JNE is J3JNE in Japan. JFS has motor on rotary dipole. NVB is working DX on 28 Mc. OMM has five-element beam on 28 Mc. PMC has 522 on 144 Mc. He is on the executive committee of the Red Cross. SU is on

(Continued on page 98)



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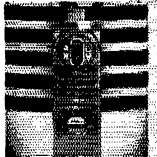
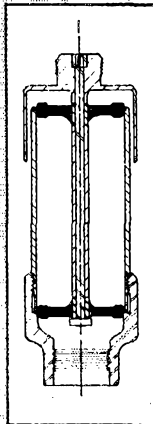
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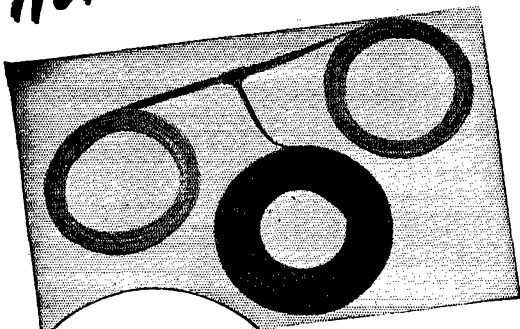
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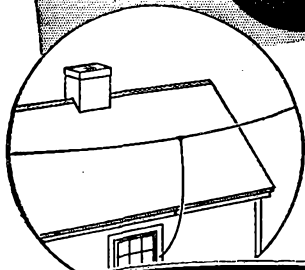
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14 Mc. Other hams on in Nantucket are ML, QDZ, and QLL. QWI will be on 144 Mc. AYG went to Framingham Club's time at the Meadows. BWH has new emergency rig. The Parkway Radio Club went to Bow Lake, N. H., on Field Day. GAD has new loop beam. EYP made WAS and has worked 175 countries with only 50 watts. The Gumbeaters meets Mondays at 8 p.m. on 28 Mc. BWN is president and CAU is vice-president. LAO has 370 watts on all bands with 813 final. The Tuesday 50-Mc. Net is on with CLS as M.C. with the following stations: AF, PZG, RO, NWL, BKE, EZV, 3CIR, 1NF, 4HUV, KNI, HPI, GJZ, EKT, BJB, OKQ, FMH, CAU, FSN, DJ, and ATP. PZG has bandswitch on 3.5, 7, 14, and 28 Mc. DWO is putting up new antenna. ORT was on Field Day at 4th Cliff, Scituate. AGE made 484,100 points in CD Party. The Raytheon Radio Club was on Field Day. MX was on the air during M.I.T. open house. LXQ says the Sea Gull Net is closed until September. AAL has remote control position for his rig. QJB is working on break-in system, and wants South Dakota. MRQ has new long wire antenna. MEC has new 813 final for 3.5-Mc. c.w. LAZ made WAS. MAQ is back on the air. MHN has Class A 1NF made 420-Mc. pole oscillator and corner reflector. QUX, LOV, and QQU are on 144 Mc. RLP is on 28 Mc. RFN is on 7 Mc. LHT has a 522. IWR and OLN have 522s. KB worked 389 on 144 Mc. recently. LNU reports that the City of Newton has bought eight 522s to be installed in case of emergency work. He has a BC-457 for 3.5-Mc. c.w. NAV is working on 3.9 Mc. PCJ, at M.I.T., has been working on rig for MX. IIM is working DX on 3.9 Mc. KNI says n.f.m. net conducted by KCQ is on Thursday nights on 52.5 Mc. Regulars are: JCI, RJB, and KNI. NBS, Dedham EC, has INX, LY, KCT, OEL, OUM, and SH working with him. Traffic: W1MX 181, RCT 144, JCK 127, LM 105, NBS 69, TY 64, AQE 58, AAL 50, EMG 43, KKI 36, QGD 33, QMJ 28, DWO 27, QJB 25, PYM 21, BB 18, PZG 12, LXQ 12, ORT 11, MEG 10, QZS 7, MRQ 6, MDU 4, WU 4, NF 1.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — RM; BVR, SEC; UD, PAM; NY, JE spent his vacation visiting fellow hams. He escorted GZ to Headquarters, AW, and visited BVR, GZ, who is blind, enjoyed every moment of the trip. QLT is busy arranging overseas trips. He and JGY were visited by JE. K1NRU will be on with high power soon. EOB has new 813 final and new antenna. COI still is trying 144 Mc. He has heard Cape Cod and Rhode Island from North Adams. GVJ is converting BC-459A and h.c. receiver. BDV will spend the summer in York Beach, Maine. IBZ has been appointed EC for Leominster and Fitchburg. MUN is very busy and finds little time for radio. PIL is at Cushing Vets Hospital after falling from catwalk of WNEB tower. QLP changed QTH in Millbury. AQM is recovering from a serious illness. CH worked his 200th country. AZW and JGY visited the Worcester County Radio Club. OMJ was traveling during the month and missed 'phone net. JTT still has 28-Mc 'phone net under control and expects to completely cover Western Massachusetts soon. HFO has all-band antenna now and was active in Field Day. He has been knocking off DX on 14 Mc. with 35 watts. 2VVO/W1 is operating from Mt. Hermon. Dave has 60 watts to an 807 and has worked WAC and 36 countries. The Hampden County Radio Club is active and was on Field Day. Officers of the club are APA, pres.; LRE, vice-pres.; NLE, treas.; and KUE, secy. Meetings are held the first Friday of each month. The Pittsfield Radio Club was visited by 2HZL, Eastern New York SCM, and 2KIM, who both gave talks. LKO has kw. 'phone on 14 Mc. and is contemplating a beam. The PRC was active in Field Day. AZW was visited by RM and JE. Traffic: W1JE 126, BVR 91, EOB 38, BDV 17, GJV 17, JTT 13, AZW 11, NGE 11, NLE 9, K1NRU 8, W1QLT 5, JAH 1.

NEW HAMPSHIRE — SCM, Gilman K. Crowell, W1AQQ — A meeting of the Great Bay Radio Club was held in Berwick, with CTW as speaker. The Concord Club participated in the Concord Hobby Show. The Nashua Club is busy with its construction program. The Manchester Club has had some very interesting speakers at its meetings. MKD is operating on 28-Mc. 'phone. The Nashua boys report increased activity on 144 Mc. PQK may now be heard with a new transmitter. QJE is n.f.m. on 28-Mc. 'phone. QEU is building a 3.85-Mc. 'phone rig. ATJ and AXL are active in CAP. BKB is active on 7- and 14-Mc. c.w. The 3.85-Mc. 'phone net will continue operations throughout the summer. GEY is rebuilding. TA has again joined the c.w. boys. QCY is active nightly on NEN. PVF is sporting more power. BWR and IJB are doing a fine job helping CRW handle the c.w. net. LSN and his 50-Mc. boys want outlets in the larger cities, especially Concord. The 28-Mc. net has grown to 52 members. Don't forget the Concord Hamfest, Sept. 12th. Traffic: (Mar.) W1PVF 18, GMM 16, QJY 11, AXL 4. (Apr.) W1CRW 301, AOQ 135, QCY 131, IJB 117, OCY 1101, BWR 62, BFT 37, GMM 24, PFU 16, APK 11, GEY 11, MXP 11, PVF 11, PZI 9, QEU 8, QJY 8, ANS 6, PML 6, QYU 5.

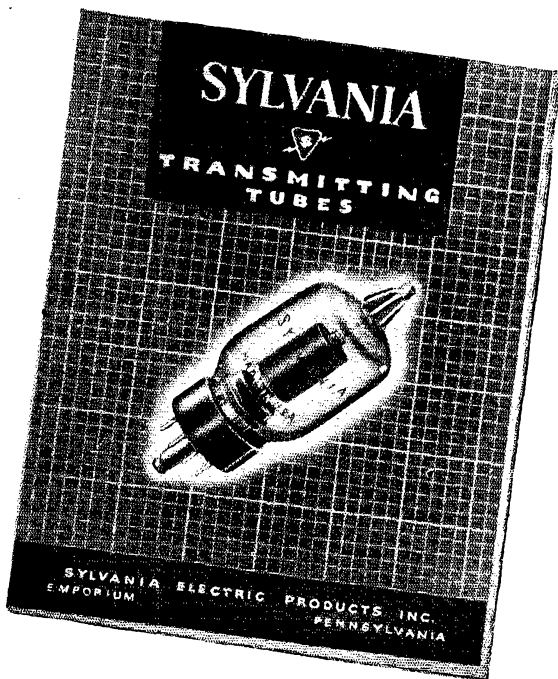
RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — MSD has the first 2300-Mc. transmitter and HXS has the first 420-Mc. rig that we have heard of in Rhode Island. The following are portable-mobile on 28 Mc.: ONN, PTF, NBU, TN, TH, MNC, OOG, MIJ, PCQ, QLD, OAV, and NBI. The PRA is showing movies at all meetings, some

(Continued on page 94)

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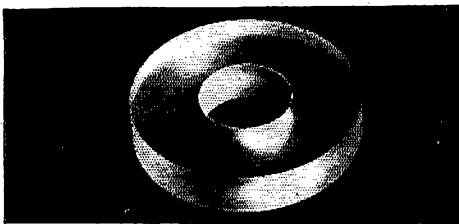
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Training Aide from ARRL and some furnished by local utilities. B.C.I. from 28-Mc. 'phone stations seems to be rather common and for the benefit of those who are not aware of it, ARRL has a very helpful mimeographed sheet for you to hand to the B.C.L. which serves to restore friendly relations between the parties concerned and smooths the way for the cooperation needed to get the situation under control. Also, folks, there is reason to believe that certain hams need to review amateur regulations. One is to the effect that an amateur may permit a non-licensed person to talk over his radiotelephone transmitter but the signing on and off must be done by a licensed operator, and another to the effect that an amateur station is licensed only to communicate with other licensed amateur stations or non-amateur stations specially authorized to communicate with us. Traffic: W1BTY 49, ODJ 27.

VERMONT—SCM, Gerald Benedict, W1NDL—KRV has new jr. operator, born April 21st. After several years' absence BD is back on the air on 7 Mc. with low power. EWF reports low-line voltage keeps his big rig off but he is able to use a 35T with 250 watts. New addition to Green Mountain Net is QZE of Northfield, of the Norwich Radio Club. NDJ is dusting off 144-Mc. rig. Traffic: W1KRV 102, PSD 59, EWF 8.

## NORTHWESTERN DIVISION

IDAHO—SCM, Alan K. Ross, W71WU—Nampa: IDMFV is new call, JL relayed, one hop, from KL7EM to W1QWV, 40 miles within destination in Maine Woods. ETU is new EC. Twin Falls: JMX sends in clipping from local paper with nice write-up on amateur radio. MFC is on 14-Mc. c.w. and 29-Mc. 'phone. MEJ is on 7-Mc. c.w. Moscow: Campus Radio Club, UQ, reports increasing activity via ZLOP activities club, manager. The club uses a converted BC-854A and two ART-13s. Code and theory classes are given. My thanks to the Moscow and Lewiston fellows for their interest in my meeting with them in April. Boise: JMH gave a very interesting talk on s.a.s.c. at the club meeting, and is building up an s.a.s.c. rig. American Falls: DMZ reports the FARM Net now is on at 8 P.M. ACD, of Shelley, is recovering from a severe illness with the aid of portable receiver and DMZ says "a little ham radio is the best medicine for Louie." Traffic: W7GTN 32, GFW 26, DMZ 18, BZT 6, IWU 4, BAA 2.

MONTANA—SCM, Albert Beck, W7EQM—SEC: EMF, CJN and KVV are working 51-Mc. schedules between Butte and Bozeman. KVV has 80 countries chalked up; also WAC on 3.5 Mc. KKB, KUX, and KVV took Class A exams in April. KJX and KUX are conducting ground wave QSOs on 28 Mc. between Livingston and Manhattan. CT built a dial-less converter for 28 Mc. KVV raised KZ5OV and after getting acquainted found that KZ5OV was a fraternity brother and had a ham station in the same house and room in 1939. FGB has new 23-Mc. beam. KUH is moving to Great Falls. BKM announces a new jr. operator. EMF, FL, JKR, and BAY are conducting 44-Mc. tests throughout the State for the highway department. LOB, in Kalispell, reports 28-Mc. mobile net is growing by leaps and bounds. GFV constructed a dial type 28-Mc. converter. KGJ is putting up a plumber's delight. LCM is overhauling. JFA is working c.w. FTV is proud of his 3rd harmonic, a baby girl. KGF clicked for a ZS on 7 Mc. The Gallatin Amateur Radio Club now is officially affiliated with the ARRL. Congratulations, gang. The Butte Amateur Radio Club now has a club paper. The name will be announced later. Traffic: W7EGN 39, CT 20, FGB 16, KVV 6, EQM 1.

OREGON—SCM, Raleigh A. Munkres, W7HAZ—Portland: A new club has been formed in Portland known as the Oregonian Amateur Radio Society. Officers are: KJG, pres.; LVQ, vice-pres.; XYL of JBE, secy.; FJZ, treas.; Frank Barnes and JGC, activities directors. Many fine 28-Mc. mobile contacts were had by the SCM while passing through Portland recently. FJZ was tracked down and located under the KOIN towers trying to work short skip. Astoria: Mobile activity is good in Astoria with considerable DX being worked. The "Angora" Net on 3886 kc. sprang from someone calling someone else an old goat! HQL has moved to Milwaukie. COZ says the salt air around Astoria is very hard on cast aluminum beam supports. The XYLs have formed the "Astoria XYL Club." Klamath Falls: Oregon Vocation School has produced three new calls: MHB, MHD, MCN. The school has applied for a station license. HDU leads KQD by one state toward WAS. Pendleton: MQ sent in a fine report but I must admit that I mislaid it. Awfully sorry, fellows, and promise it won't happen again. Pendleton is going good on the emergency set-up and is looking toward a ham get-together this spring. Baker: A new call is IXT, recently transferred from Everett CAA station. HAZ/JFM have returned from mobile trip to Portland and Seattle and are very enthusiastic about 28-Mc. mobile around the large cities. Sort of a reminder of 160-meter days! GVX is monitoring 144 Mc. regularly. Traffic: W7APF 192, HVD 123, GPZ 100, JMZ 41, LT 24, GLF 16, HVR 12, FNZ 11.

WASHINGTON—SCM, Clifford Cavanaugh, W7ACF—GP, the SEC, is doing an FB job getting the AEC units going and reports plenty of interest on both sides of the State. CAM, EC for Yakima County, needs valley hams

(Continued on page 88)

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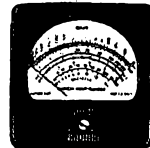
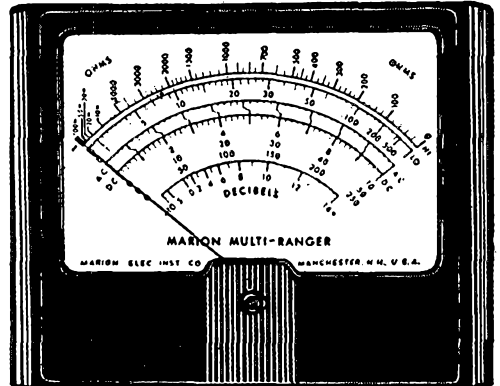
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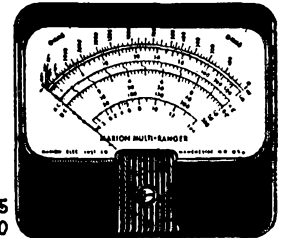
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with mobile v.h.f. gear for EC Assistants. KNV, EC for Olympia, says his gang is having an FB time on AEC drills. ZU is having trouble with the fancy "Q" signals used on WSNET. FRU, the RM, handles traffic on three nets, PN, TLA, and WSNET. EGR is busy with trans-Pacific traffic. We hear that ETO is busy building v.h.f. gear on his law-mower so he can QSO the boys while making hay. JC is in the hospital with busted ear drums, resulting no doubt from tuning too close to FWD's signals. JER, EC for Issaquah, bought a BC-654 for his AEC rig. JKO is converting his rig to 50-Mc. f.m. EYS is having trouble with rotary antenna. CWN has been doing a little fishing, both for traffic and for fish. BL has converted a Bendix MP-28BA to an FB 75-watt mobile job. FWD says that with his transmitter on 3.5 Mc. and receiver on 7 Mc. nobody seems to answer his calls. HI. CKT is another hard-working operator; he works on four nets, TLL, PN, Mission Trail, and WARTS Net, and is control station of the latter. He states he will be Western Terminal station on newly-formed ARRL summer net and will be glad to handle any traffic for other states. This is the third month Rylie has made the BPL. RAO is new WSN Net Manager. He is turning out reams of attendance and traffic reports. BE and SSQ are new ORS appointees. DXZ sends in his usual long list of OO reports. FIX, the editor of WSNET bulletin, is laid up in the Naval Hospital at Bremerton. Hope they patch you up in a hurry, Vic, as we need you and that bulletin. CZY has been checking in on WSNET from sanitarium at Snohomish. Sure glad you're coming along so well, Larry. LJM is going great guns with one watt on 28-Mc. phone. JDC, the EC for Auburn, reports much activity on Sunday morning AEC drills, of which he acts as NCS. Traffic: W7CKT 920, PRU 224, FWD 74, ACF 71, EGR 45, ZU 38, ETO 35, EYS 16, BL 12, DGN 10, CWN 8, JC 4, CAM 3.

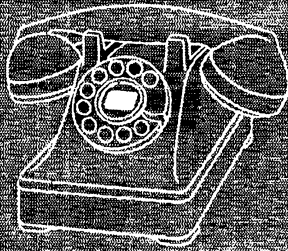
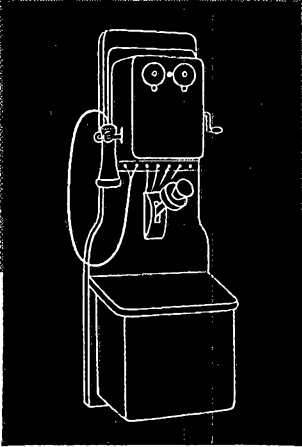
**PACIFIC DIVISION**

**N**EVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. ECs: OPP, BED, TJJ, QYK, JLV, and JVV. RM: PST. PAM: KHU. JU reports that not one EC sent in a report this month. He also reports much activity converting 231-B5. BVZ reports everything normal and that a pre-Field Day picnic at Lake Mead kept the southern gang busy. FRE has raised power with a p.p. 127A final and operates on the FARM Net. BED reports traffic slow this month. TJJ has some 50-Mc. gear operating. I was swamped with reports this month? Traffic: W7BED 167, TJJ 28.

**S**ANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBE. RM: CIS. PAM: QLP. ECs: CFK, TFZ, JSB. The San Mateo Radio Club elected the following directors: UKO, DXB, TFZ, YGX, and WSE. TFZ and other club members worked 144 Mc. from top of Mt. Hamilton. MLY has worked WAZ. WMM is working DX on 14 Mc. using Triplex beam. EJS is using dual 14- and 28-Mc. beam for his DX work. NMG reported for the San Mateo club. The Palo Alto club has emergency net in operation on 29.2 Mc. on each Wednesday night, with JSB acting as net control. The Monterey Bay Radio Club members operated in Field Day using 659 surplus units and an emergency net. A new club known as the Tri-City Radio Club has been formed in Sunnyvale, Mt. View, and Los Altos. The members of this club have a net in operation one night a week. How about SCARA? VIQ has moved back to his old QTH in Los Gatos and installed four-element 28-Mc. beam. WNM is working with low power rig using 3 watts input. OVK has worked Berkeley on 420 Mc. and is gunning for a contact with Sacramento. YQN has a three-element beam using a cage-driven element for operation on 28 Mc. CFK is QRL building reflecting telescope to watch his signals bounce from the E2 layer. TAN spends his time on 27 Mc. and reports good DX contacts. LCF went visiting in Sacramento and came home all pepped up about building a.s.a.r. adaptor for his HRO. Traffic: (Mar. & Apr.) W6JSM 112. (Apr.) W6WJM 193 NNX 19, VZE 10.

**E**AST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, ZB, and WGN. During April OBJ, the SEC, called an emergency meeting of the complete group and a good turnout was had. Problems and general conditions were the main topic of the evening. KKB is trying to get the right match on his three-element rotary. BF has new HK57 in p.p. with 350 watts in final. YDI is working out on Mission Trail slow-speed c.w. net on 3804 kc. QXN is QRL Pioneer Net. VDR is new ORS and OPS. FDR has 1 kw. final on all bands using c.w. LMZ is looking for DX when he finds the time. EJA reports that the Richmond Radio Club is trying out a new club meeting place in the Red Cross Bldg., 23rd and MacDonald, which started with the May 1st meeting. WGM, of Vallejo, has been appointed Class 2 OO. OJW finds himself in the East Bay section after all this time. The East Bay Radio Club has its own call, CUS, for its station. The Club is making great progress and has already affiliated with ARRL. NBARA news: RVU is leaving for the East and the gang hates to see him go as he has been an outstanding president. WNJ, YHI, AYN, and CHI are interested in u.h.f. work. CHA has moved to W2 Land. VPI and AIM lost beams in recent wind storm. VPI,

(Continued on page 98)



## MODERN DESIGN IS COMPACT!

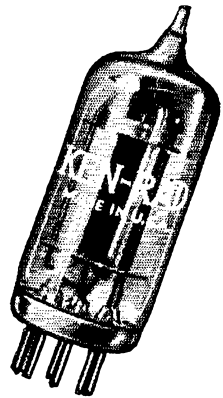
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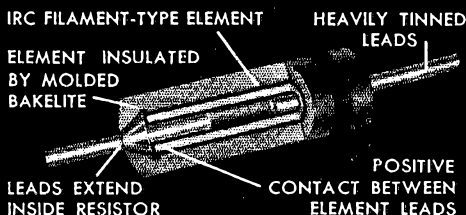


# Here's **INSIDE** Information

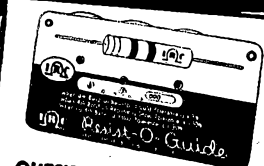
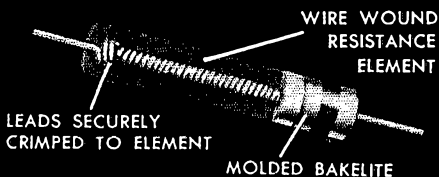
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### CROSS SECTION VIEW OF TYPE BW RESISTOR



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AYN, UVK, YHI, CQZ, ZZP, and AIM are in the process of rebuilding. CHI has 829 on 28 Mc. Heard on 28 Mc. are ZHU, ZHP, and YZS. TT and DUB took in the radio show in Chicago during May. The Oakland Radio Club is planning a big hamfest. Keep an eye and ear open for the date. PB is planning on making a few rig changes. UPV has new Collins 32V-A. Sun spots have slowed down DX around these parts but some of the members of the Northern Calif. DX Club keep knocking over a few new ones. The SARO had a good turnout for Field Day. About 250 of the East Bay gang got together on top of Mt. Diablo with gear, etc., on May 2nd and a good time was had by all, according to the SEC. Now is the time to make your plans for attending the ARRL National Convention in Milwaukee over Labor Day. This should be a gala event with more than 4000 in attendance. Guess everyone has spring fever as reports were light this month. Keep the dates of Oct. 2nd and 3rd open for the Southwestern Convention in Los Angeles. TI suggests you keep an envelope at the W6 QSL Bureau as there are plenty of cards on hand. Traffic: W6FDR 189, QXN 170, VDR 110, YDI 45, EJA 19, BF 9, TI 9.

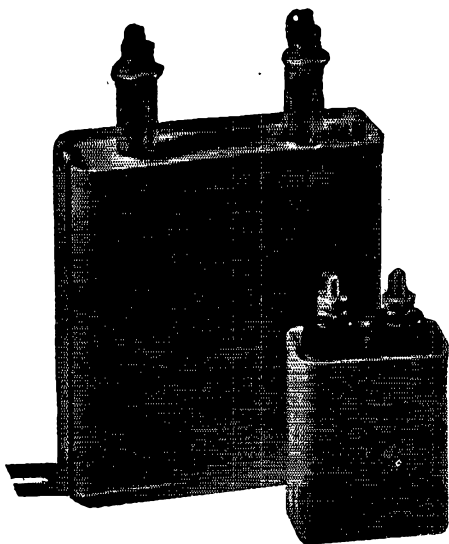
SAN FRANCISCO—SCM, Samuel C. Van Liew, W6NL—Phone—JU 7-6457. E. B. De Turk, ex-3WG, now is operating from his San Francisco QTH under the new call of 6VC. He expects to make California his home and is eager to get his station up again. For the present he can be found on 28 Mc. using a BC-659. Welcome to San Francisco and good luck with the station. The power conservation was recalled; results, DOT is rebuilding his rig. Yes, a full kw. Likewise ATO. Dick says he is out to beat those top flight contests scores so he needs the added power. NYQ has been working plenty of DX on 14-Mc. c.w. from his country home QTH under the call SR. Art is running about 150 watts to an 813 final at present. He has a sixty-ft. tower and three-element rotary beam which is giving him fine results. HJP is planning to leave the Air Force this coming year and will be visiting San Francisco this summer. Hope to see you soon and luck in finding a suitable QTH. The San Francisco Naval Shipyard Amateur Radio Club announces the club station has been assigned the call CXO. At present most of the operating will be on 3.5-Mc. phone and 7-Mc. c.w. The club's Field Day activities this year were under the newly-assigned call. SRT is now building up a home rig. He has been exclusively portable-mobile. VVK is getting many fine contacts on 50-Mc. phone. WB is working over his transmitter. JWF is all set with emergency power, having purchased a gasoline driven generator. Clide Dick is now the proud owner of station CHP. Welcome on the air, Dick. He is active on 144-Mc. phone, 7- and 3.5-Mc. c.w., and checks in nightly on the American Legion Net. YWC's new 1/2-kw. phone rig is to be heard on 3.85-, 14-, and 28-Mc. phone. MZ is now the proud owner of new Collins exciter unit. WN was in charge of the Field Day activities for the San Francisco Radio Club. A big turnout is assured with plenty of equipment and operators. The location is to be MacLaren Park, San Francisco. The San Francisco Radio Club now has over two hundred members with a turnout of about sixty per cent per meeting. The University of San Francisco officially opened its amateur radio station April 28th. More details on equipment, operating frequencies, and schedules will be available soon.

SACRAMENTO VALLEY—SCM, John R. Kinney, W6MGC—Asst. SCM, R. G. Martin, 6ZF. SEC: KME. ECs: GHP and LYQ. RM: REB. OOs: ZF, ZQD, and AK. OEs: PIV. OBS: AF, ORS: REB, PIV, and ZF. AF, in Oroville, has new BC-342N and operates station on fixed crystal frequencies on 14,016, 14,050, 14,070, 14,100, and 14,120 kc. Official bulletins are on 14,070 kc. With deep regret we have learned of the deaths in the families of AF and ZF. OJW, formerly of the Sacramento Valley Section, reports that he recently worked V6GAR, VR2BA, KZ5AH, and a number of ZLs on 7 and 14 Mc. MW was chairman and the hard-working organizer of the SARC's first Annual ARRL Field Day. SEC KME has acquired a new BC-654 with 807s in p.p. with output of 100 watts to be used in emergency portable operation on 3.5 Mc. at his summer cabin in the Sierra Nevada Mts. KME reports that the Sacramento Valley 144-Mc. net now consists of 30 members, that LYQ is trying to boost 144 Mc. activity in and near Corning, and that PIV will be in San Francisco for over a month. At a recent meeting of the SARC, after the introduction of visiting amateurs from the Stockton Amateur Radio Club, GDJ introduced to the membership a good old friend of many years, D4YVW, ex-W6BYB. Through the courtesy of WRD the SARC membership enjoyed moving pictures on television. The SARC plans a diner meeting in June and an auction night in August for those interested in disposing of equipment. Traffic: W6REB 864, ZF 55, PIV 27.

SAN JOAQUIN VALLEY—SCM, Ted R. Souza, W6FKL. The Sixth Annual Fresno Hamfest was a huge success. PSQ is building a 14- and 28-Mc. beam. JWK is dressing up the rig with new panels. MEY is Net Control for Mission Trail C.W. Net. AHO is busy with Naval Reserve. KUT made DXCC. SRU is knocking out the DX in spite of ignition noise. PHL moved up to 14 Mc. and now says he's suffering from DXitis. PXP and WKT are sporting new 80-ft. skyhooks. OHB passed his Class A exam. FKL

(Continued on page 100)





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4	2000	13.67	9.24	4.43
2	3000	22.78	15.40	7.38
1	4000	33.54	27.50	6.04
2	5000	48.73	41.25	7.48

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### 2. Smaller—Lighter

MFD.	Volts DC	Approx. Weight		Approx. Cubic Dimensions	
		Paper Capacitors	Plasticons	Paper Capacitors	Plasticons
10	1000	1.95 lbs.	1.7 lbs.	31 cu. in.	30 cu. in.
4	2000	2.0	1.23	31	23
2	3000	2.0	1.21	31	19
1	4000	1.77	.94	28	19
2	5000	5.2	2.9	70	60

### 3. Better Electrical Characteristics

	Paper Capacitors	Plasticons
Power Factor at 85°C 60 cycles	0.7%	0.3%
Resistance at 85°C megohms per Mfd.	40	100
Capacitance Temp. Coefficient 100% at 25°	-10°C=73% +85°C=97%	-10°C= 94% +85°C=103%
PLASTICON CAPACITORS given are Type AOC, mineral oil-filled. PLASTICON ASC silicone-filled have better characteristics. Paper Capacitors given are chlorinated diphenyl impregnated.		

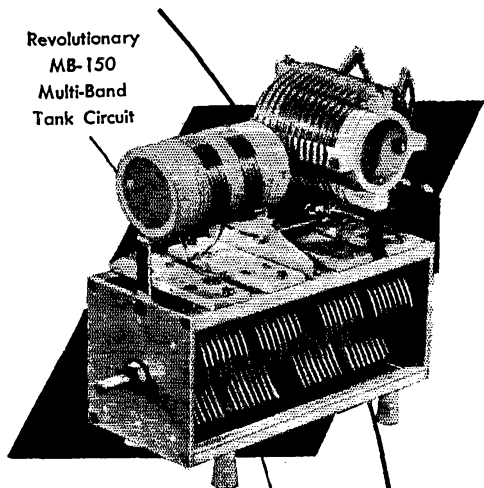


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has new de luxe cabinet for rig. UVN is back on the air. EJD is very busy chiefing KMJ, JCB and the XYL turned out a very FB edition of *Skip* for SJVRC Hamfest and OXE made up some swell posters and cartoons. New officers of the Turlock Amateur Radio Club are: QER, pres.; ADB, vice-pres.; and FYM, secy.-treas. IFE gave an FB microwave demonstration at the hamfest and AHO was responsible for the swell radar set-up. VPV reports the following: PNM is struggling with his 28-Mc. beams. DVI worked 38 zones in little more than a month on 14-Mc. c.w. The 144-Mc. gang includes UWY, ZNL, VPV, MDQ, EXH, GQZ, PJE, AQQ, OYF, EEX, AJE, BCL, NGT, and INP. ZJQ is sporting a new ham shack. EXH checks the boys in on the 144-Mc. emergency net and reports in to CZB up on the mountain. The Stockton Radio Club held its annual picnic May 2nd at Angels Camp. MHD was on 144 Mc. with a 522. VSJ, VPV, MDQ, BEH, INP, ZNP, and WQR are on 28-Mc. mobile. WBZ is giving the audio frequencies a try. XE2FY, a former Stockton boy, visited some of the boys in the valley.

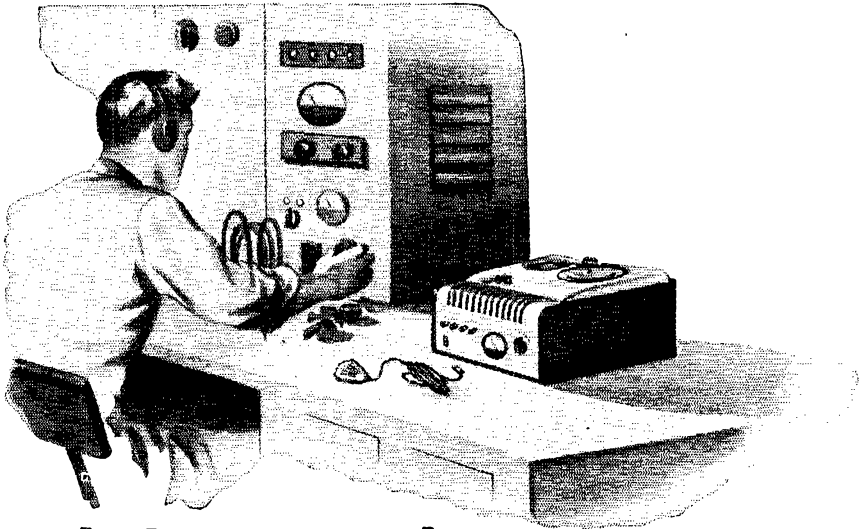
### ROANOKE DIVISION

**N**ORTH CAROLINA — SCM, W. J. Wortman, W4CYB — BCS had charge of the plans for the Key and Mike Club's first Field Day activity. EYF had charge of those for the Charlotte club. MYO is moving to 7 Mc. IZR completed WAS, BYA and HUL are busy in the Tar Heel Net, and BYA is getting up early enough to work the Hoot Owl gang. IDO and IFS are busy on 28 Mc. and plans new beams. NI built the broad-band frequency multiplier in December QST. BCS is building new 50-Mc. rig, but expects to give 7 Mc. a whirl this summer. LAH is approaching DXCC. DCW has postwar WAS, WAC, and WBE. MPF is operating on 7 Mc. keeping schedules at 6R30, 7R00, and 4R00 almost daily. He wants the gang to come up to 7 Mc. and wants some traffic. MDE is operating on the slow speed trunk. Watch for the North Carolina gang on 7210 kc. before long. NAP is a relatively new ham over in Reidsville, and from the report has been doing right well with plenty of DX on 7 Mc. since coming on about four months ago. Thanks for the report, Walt. The North Carolina Emergency 'Phone Net is now going full blast on 3865 kc. CVQ is acting as temporary NCS and the membership has reached twenty. You are invited to join the gang Mon.-Fri. on 7R30 EST. The Net is also known as the Tar Heel Net. The North Carolina Net has closed for the summer. Officers of the newly-organized Alamance Radio Club are: COC, pres.; LXH, vice-pres.; MLT, secy.; AEH, treas. Traffic: W4CFL 785, KJS 74, MDE 44, EZN 42, CYB 18.

**S**OUTH CAROLINA — SCM, Ted Ferguson, W4BQF/ANG — DPN operates 3.85-Mc. 'phone and reports that DRG and GJC now live in Orangeburg. BFQ is looking for more ECs. ANK keeps plugging at the 3.5-Mc. c.w. net and turns in good activity report from Charleston. DFC has a new emergency rig for 3.5 and 7 Mc. and is 6-volt battery operated. HTR has a new three-element beam on 28 Mc. DNR says after one week of n.f.m. on 14-Mc. 'phone he is back to c.w. to stay. HJR operates 3.5- and 7-Mc. c.w. BIZ operates 3.5, 7, and 14 Mc. CZN can be heard beating 'em out on 3.5 and 7 Mc. IZD has the urge to build up some portable gear. MRJ has 300 watts and is busy with the South Carolina C.W. State Net. MYM has been appointed EC for the Rock Hill area. MJT has been appointed EC for the Columbia area. BEN is looking for 50-Mc. contacts. KMK, in Greenville, would like more 50-Mc. contacts. ANK is reviving the old 3.5-Mc. c.w. net in South Carolina. He would like to have you join the net week-day nights at 9:00 p.m. on 3725 kc. LMB sent a nice report on the operation of the South Carolina 28-Mc. net. HEV is on 3.85-Mc. 'phone. EDQ works 14 Mc., c.w. and 'phone. Traffic: W4ANK 193, BFQ 22, MRJ 15, CZN 8, HTR 4, HEV 2.

**WEST VIRGINIA** — SCM, Donald B. Morris, W8JM — The MARA with club call, BIA, will have rig on 3.85 and 3.5 Mc. with 250 watts. ESQ and JM are converting SCR-522s. KWI's new mobile 28-Mc. rig with ground plane aerial is helping State amateurs work all counties. SGO, ex-NY4AC, is now 3SGO at Washington. New amateurs are CCR, Clarksburg; CLT, Princeton; CLD, Parkersburg. DNN has bought a new home which is ideal for VHF. He has 522 and likes the 144-Mc. beam of April '47 QST. MOP has new HT-18 and n.f.m. on 3.85-Mc. 'phone. QHG reports he is inactive because of moving. PQQ has new 167BY and reports DX good. EP has 28-, 50-, and 144-Mc. beams on the same pole and worked Cleveland on 144 Mc. EHA and FEO are operating on 50 and 144 Mc. with surplus gear. West Virginia 3770 C.W. Net will reopen on Oct. 1st with time and frequency to be decided on by members. BTV, YBI, HUG, SYJ, AUJ, OXO, and GBF handled important traffic during the Ohio River Flood. BWD, active on 3.5-Mc. c.w., will be a reliable station for Upshur County contact. JM leads WACWV with 40 counties. WSL has moved to 7 Mc. and with low power has worked over 15 counties. Traffic: W8GBF 172, OXO 72, DFC 22, JM 5, PQQ 5.

(Continued on page 104)



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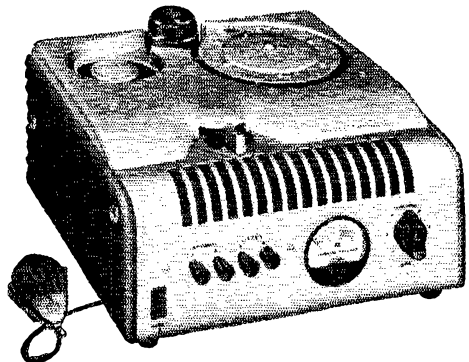
The Webster-Chicago Model 78 Wire Recorder is a real asset in ham radio operation. It takes input from microphone, phono pickup or direct from your receiver. Outputs for external amplifier or speaker. Push button control makes Model 78 easy to operate while you are on the air, and provides all desirable recording, playback, and erasing combinations.

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

Model 78 Wire Recorder is ideal for handling traffic—no chance of error in relaying important messages.

Stop in tomorrow and see the Webster-Chicago Model 78 Wire Recorder. Check Webster-Chicago Recording Wire, too. It is *pretested* for magnetic, physical and chemical characteristics —your assurance of best results.

See Your Ham Supply House



Famous for Webster-Chicago Record Changers and Magic Nylon  
 Phonograph Needles

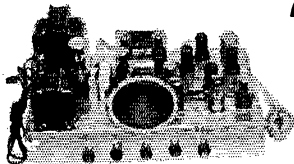


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# HEADQUARTERS FOR TELEVISION

## Terrific Value! IMPROVED Electro-Tech 7" TELEVISION KIT



**10" TELEKIT**—Similar to above, but with 10BP4 tube and additional circuit refinements.  
**Cat. No. A-19522. \$99.50**  
 Wgt. 35 lbs. ....  
**\$39.90 Down—\$7.03 per Mo.**  
 19 Tubes, including 10BP4. **\$51.50**  
 10" Cabinet. **No. A-19524. \$23.50**

**New Low Price \$59.50**  
 Complete with 13 channel Tuner, All Parts and Step-by-Step Instructions. **LESS TUBES**

Latest circuit refinements for sharp, clear pictures. 17 tubes including 7JP4, pre-tuned IF coils, new high voltage transformer, FM sound. Can use Sylvania 10HP4, 10" tube without modifications. Everything you need included. Wgt. 25 lbs.  
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**Kit of 17 tubes, incl. 7JP4. \$39.97**  
**With Tubes \$18.69D'n, \$6.61per Mo.**  
**7" Cabinet, No. A-19523. \$21.00**

## Price Slashed! HAMMARLUND FS-135-C FREQUENCY STANDARD

**\$6.95** with Tube & Crystal  
 (Formerly \$14.25)



'Be Sure You're in Your Band! With this tiny (2" x 2") unit comply with Sec. 12.135 of the F.C.C. rules. Your receiver becomes an accurate frequency meter. All Brand New — Guaranteed. Complete with 6AK5 tube, 100 Kc Crystal, and instructions.  
**Cat. No. S-744. .... Your Cost \$6.95**

### TELEVISION SCHEMATICS and INSTRUCTIONS

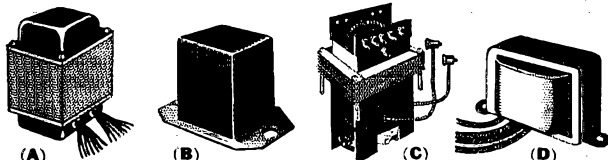
**Transvision Instruction Manual** for 7" or 12" TV Kits. Schematic, layout diagrams, photos, parts list. **Cat. No. 24164. Your Cost \$1.25**  
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**(A) Power Transformer**—Equivalent to RCA #201T6 as used in 630TS 10" receiver. (Regularly \$27.00). Shpg. Wt. 18 lbs. **\$14.95**  
**Cat. No. S-826. .... Very Special**

**(B) Vertical Blocking Transformer.** Completely shielded. \$2.70  
 Very efficient at 60 cycles. **Cat. No. S-827. ....**

**(C) Horizontal Output Transformer,** with socket. RCA part #52496. Similar to RCA 211T1 except that max. voltage is 6000. For use with 8016 tube. **Cat. No. S-737. .... \$3.49**

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Complete Front End for TV Rcvr. with tubes. RCA No. 71531. **\$44.10**  
 Formerly \$58.65. **Cat. No. 25042. .... Special**

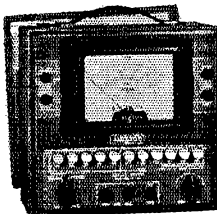


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Complete with 15 tubes and instructions for converting to 420-500 mc band and making AC power supply, modulator and transceiver modifications for voice or CW. Has 4-7F7, 4-7H7, 2-7E6, 2-6F6, 2-955, 1-WE316A. Original sealed carton. While They Last!  
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## Save \$15.50 on this JACKSON MULTIMETER



Model 643

**\$29.50**

While They Last!  
 Regularly \$45

**1000 ohms per volt.** A Real Buy! Automatic range selection—push button controlled. 23 ranges—7 functions: 1/2 ohm to 3 megs, AC Volts 0-5000, DC Volts 0-5000, Decibels -10 to +54, DC Ma. 0-250, Microamps 0-1000, Amps. 0-10. Welded steel case 8 1/4 x 8 1/4 x 6". Self-contained battery and test leads included. While They Last! Wgt. 8 lbs.  
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## New Low Prices on RCA TELEVISION PARTS

Cat. No.	RCA Type	Description	Your Cost
25020	201B1	Mirror.....	\$88.20
25000	201D1	Deflection Yoke.....	5.29
25001	201D2	Deflection Yoke.....	8.76
25045	201P2	Lens.....	18.82
25003	201R1	Width Control.....	.47
25004	201R2	Width Control.....	1.29
25017	201R3	Horizontal Linearity Control	.50
25005	201X1	Yoke Mounting Hood.....	.94
25006	202D1	Focus Coil.....	5.34
25007	203D1	Ion Trap Magnet.....	3.82
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25008	204T1	Horiz. Output.....	\$13.52
25009	204T2	Vert. Output.....	4.12
25010	204T3	Horiz. Output.....	6.76
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25013	208T3	Horiz. Blocking.....	1.88
25018	208T6	Horiz. Sync. Discriminator	1.61
25014	211T1	Horiz. Output and H.V.....	5.86
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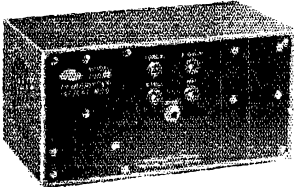
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### McMurdo Silver RECEIVER-TRANSMITTER

Stay On The Air All Summer with these Units — Ideal for Portable Use — Enough Punch for Fixed Operation!

#### McMurdo Silver Model 700 XMITTER

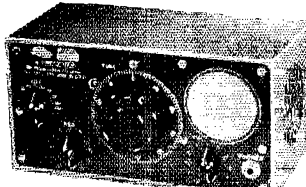


Cat. No. A-267 **\$19<sup>95</sup>**  
Regularly \$36.95

Limited Quantity! Save \$17 on this 2-band crystal-controlled Phone Transmitter for 144/148 and 235/240 mc. Compact, Portable! 5 watts output @ 240 mc. and 8 watts or more @ 144 mc. Uses 6AQ5 (tritron xtal osc.), 2-6C4 (frequency doublers), 832 (power amp.). Modulator uses 2-6AQ5 in Push-Pull. Input transformer included for use with any good carbon mike. Requires 6.3V @ 3.35 amps. AC or DC, and 300V @ 220 ma. Size: 10x5x5 1/4". Wgt. 12 lbs. Complete, less tubes, power supply, xtal, mike.

Kit of 6 tubes.....\$4.77  
Crystal (specify freq.)... Ea. 3.95

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Another Great Buy! Save \$17 on the McMurdo 800 "Atom X" UHF Receiver, 144 to 200 mc. An extremely sensitive receiver using 6AK5 high gain TRF stage and 9002 super-regenerative detector circuit followed by 6AU6 (first Audio) and 6AK6 (Power Amp.). Low internal noise, very selective, practically zero radiation. Has built-in speaker. Uses batteries, vibra-pack or simple AC unit delivering 6.3V @ 1.05 amps and 135-180V @ 40 ma. Complete with 2 pairs of plug-in coils. Size: 13 1/2 x 9 x 8 1/2". Wgt. 10 lbs. Less tubes and power supply. Limited Quantity!

Kit of 5 tubes.....\$5.37

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ALL NEW—GUARANTEED. First Quality Tubes from our Tremendous Stock, at Great Savings. All made by leading manufacturers—JAN Approved.

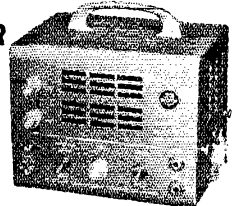
2API	\$2.49	826	\$1.35
2C40	.89	829B	4.95
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2X2 879	.49	832A	2.65
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3CPI	.99	845W	3.45
3C24 24G	.67	872A	1.75
6AK5	.89	931A	2.39
10Y	.59	955	.49
211	.69	957	.49
304TL	1.39	958A	.49
316A	.49	959	.49
803	8.95	1626	.49
804	8.95	1665/2050	1.18
805	4.95	9001	.49
807	1.15	9002	.69
809	1.65	9004	.69
810	6.95	9006	.49
811	2.29	9006	.99
813	4.45	6AC7	.29
814	2.95	6C4	.29
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### MOBILE XMITTER KIT

STANGOR  
ST-203-A

**\$44<sup>70</sup>**

Amateur  
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For 27-32 Mc. A swell new, inexpensive, crystal-controlled transmitter. Designed for mobile use, but fine for fixed operation as well. 25 watts amplifier plate power input. Requires 450 VDC @ 200 ma and 6 VA C/DC @ 2.8 Amps. Uses 6V6 (Harmonic Oscillator) working with 7 mc crystals, 2E26 (Class C Amp.), 6I5 (Grounded-Grid Speech Amp.) and PP 6V6 (Class A Modulator). Selector switch for either of 2 frequencies, self-contained ant. change-over relay. Power supply obtained from Dynomotor or Vibrator, or from AC source. Grey cabinet 8 3/4 x 7 3/4 x 6 3/4" D. Instruction manual and all materials incl. Wgt. 12 lbs. **Cat. No. A-2161**, less tubes and Crystals.....\$44.70

Kit of 5 tubes (as above). **Your Cost \$8.74**  
7 Mc Crystals (Specify Frequency)  
**Your Cost Each.....\$2.80**

### Newark Scoop!



HS-38A  
PHONES  
**99¢**  
NO. 5-781

Again you get the benefit of a fortunate buy. Brand New HS-38A phones with sponge rubber cushions and sturdy, adjustable leather headband. Made by Utah to rigid Signal Corps specs. Low impedance—600 ohms, flat response. PL-354 plug attached. While they last!

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### Smashing Reduction! CRYSTAL MIKE

**\$4.49**

Complete with Non-Breakable Plastic Stand and 7 ft. cable. A fine crystal mike for Home Recording, Broadcast, PA, or Ham use. 3 sections can be taken apart or assembled instantly. Mike fits any stand. High output, excellent quality. Limited Quantity. 4 lbs. List \$10.90. **Cat. No. 8697.**



HAMS—Visit and Chat with Bob Gunderson, W2J10, at EITHER New York Store EVERY SATURDAY. He's Really Terrific!

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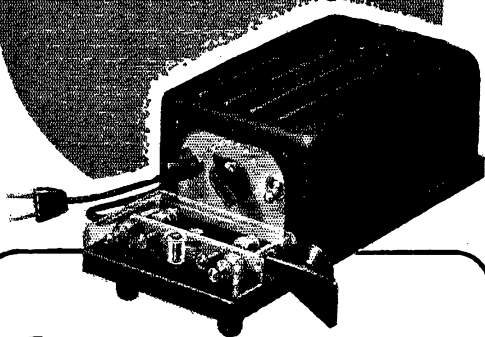
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# THE KEY TO FLAWLESS CW



**Electronic MONITOR and KEY**



Flawless CW—smooth, rhythmic as a tape—can be quickly achieved by anyone who uses the new MON-KEY.

It's easy because the MON-KEY is an electro-timed automatic key that makes dashes—as well as dots—both spaced in proportion to their length.

Simple to operate . . . a pleasure to read . . . the MON-KEY is a real short cut to flawless CW.

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- No weights to adjust
- 3 tubes—2—12AU7; 1—35W4
- Built in monitor with volume control
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"WOT U USIN', QV? SOUNDS LIKE A TAPE!"

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Manufacturers of specialized electronic devices since 1937

EXPORT: Rocke International Corp., 13 East 40th Street,  
New York 16, New York

(Continued from page 100)

## ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Glen Bond, W0QYT—To facilitate handling traffic through the summer the Interstate Utility Net will meet until further notice on 7080 kc. Time 6:30 p.m. as before, DYS NCS as usual. LZV will be glad to QSP traffic for Colorado on 3600 kc. as long as 3.5 Mc. holds up. Elmer also is on TLS No. 4. SGG, in Colorado Springs, handled traffic for Army Day, Boy Scout Exposition, and Local Show of Progress. Otto also is assistant to DYS on the IUN Net. DRB is still building on the kw. rig out in Olathe, Kansas, and hopes to be on the air soon with the call NAB and is building the Table Top rig as per '48 Handbook. It will be good to hear Clay once more. MOM, in Lamar, reports ZCX is building a 100-watt portable. Lamar now has four hams on 28 Mc. CXW has an ART-13 on 28 and 3.85 Mc. now. It has several pretuned frequencies and when Shreve pushes a button a motor hums and dials begin to turn. The thing is interesting to watch when in operation. Have not heard anything from the western slope of Colorado for some time now. Hope the activities over there are not falling by the wayside. Traffic: W0SGG 56, MOM 16, QYT 8, LZV 6.

**UTAH-YOMING**—SCM, Alvin M. Phillips, W7NPU—TPV has his 250 watts going at his new QTH at Layton. DLR modified his TDF to use p.p. 813s and is started on u. 3.5 to 28 Mc. VJO. UTM found the 3.5-Mc. QRN so bad he now uses 7 Mc. to maintain his Colorado schedules. UOM is rebuilding once more. The FARM NET, after a very successful season, has tentative plans to continue right on through the usual summer vacation. New OPS in TST, SP and UPI, our u.h.f. "pioneers" are doing a lot of swell propagation work on the ultra highs. NPU is busy with broadcasting work, taxicab v.h.f. maintenance, SCM work, and building a house. Traffic: W7UTM 343, DLR 121, RFX 81, TST 29.

## SOUTHEASTERN DIVISION

**ALABAMA**—SCM, Dr. Arthur W. Woods, W4GJW—ALMGD is stationed at Craig Field and invites any hams driving by to stop in and see him at the Inspection Division. He is ex-6LIG. MXU is running low power tests on 14 and 7 Mc. and claims to be pleased but not satisfied with the results. MCF is experimenting with antenna systems—he currently favors the delta match. NLB is a new station in Dothan and his examination was administered by EVQ, from whom we never hear personally. Last fall NLB helped the Gulfport hams during the hurricane and most of his gear is still there. Glad to hear from you, Chas. KCQ has 200 instruction manuals for the Alabama Emergency Net and urges prospective full or part time net members to communicate with him. Low and high frequencies will be utilized, and drills will be held regularly during all seasons. KCQ is SEC.

**EASTERN FLORIDA**—SCM, John W. Hollister, W4FWZ—New QTH for SCM is 3809 Springfield Blvd. The critical season is just around the corner. Has everyone checked his emergency gear? Has everyone studied the ARRL Emergency Manual? A state v.h.f. net is shaping up. Write BYR for information. Brooksville: MINT is too courteous to dispute the issue, but by one month he is the youngest ARRL activities station in the section. More power to him and to MKP, they are both jam-up operators. Gainesville: A visit with GYO during a 50-Mc. QSO with Orlando was indicative of what the well-planned station can do on 50 Mc. Bob and his brother are using p.p. 35TGs, VH-152, three-element beam, and work other bands besides 50 Mc. GYO and EID are the first OES in the section. Jax: MBM is mobile on 28 Mc. with a 701. JKI works 28 Mc. all over with vertical whip in the house. Norfolk is now MKL's QTH. HWA at last has antenna that works on 3910 kc. Key West: DJ runs kw. on 14 Mc. and sends an imposing list of DX. Lake City: HCL is working with s.s.s.c. It's an eight-element beam for IQV on 144 Mc. Another link in the State net, Orlando: GIP sends official bulletins on 7042 kc. at 8:30 p.m. Mon., Wed., and Fri. Miami: BYF schedules OA4CS Mon.-Fri. for traffic nets. The 3675-kc. net is on Tuesdays during QRN season. The 7290-kc. net is on each night at 7:00 p.m. The 3910-kc. net is on Tues. at 6:15 p.m. The NCS rotates on the c.w. nets and follows QNA procedure. WS is NCS on 3910 kc. Send Field Day reports to IQV for bulletin. More AEC members are needed. Write to SCM for information on AEC, ORS, OPS, OBS, and other appointments. Traffic: W4AAR 166, ES 127, AVV 77, IKI 58, IQV 53, MVJ 40, MNT 38, DQW 28, MKP 26, FWZ 23, DES 19, GIP 18, LCZ 16, AYX 12, NIJ 12, BYF 10, IYT 10, W4LJM 7, GWH 3, DRH 1.

**GEORGIA**—SCM, Clay Griffin, W4DXI—SEC; BIW, PAM; BOL, RM; HYW. Send reports and inquiries concerning emergency matters to our new SEC, BIW. BOL reports approximately twelve stations active on the Cracker C.W. Net, 3705 kc. Anyone interested is invited to join. GGD is new EC replacing BOL, who has resigned. MWF is new ORS. Thanks to LNG and KXX for the following Atlanta news: LNG is NCS of 144-Mc. net, which meets every Monday night at 8:30 (DX stations, please copy).

(Continued on page 106)



# ALLIED

## PRESENTS THE NEW hallicrafters Equipment!



### NEW! HT-19 Transmitter

The ideal medium-power transmitter! Completely self-contained; power output not less than 125 watts on all bands. Covers 5 Amateur bands: 3.5-4 mc; 7.0-7.3 mc; 14.0-14.4 mc; 21.0-21.45 mc; 27.16-29.7 mc. Complete bandswitching on all frequency bands; VFO all bands, plus 3-spot-frequency crystal positions; narrow band FM on all frequency bands; FM deviation calibrated for each band; preamplifier for high-impedance mikes; oscillator keyed for CW; temperature compensation and voltage regulation of VFO; variable output impedance from 50-600 ohms; two separate antenna outputs; 4-65A final amplifier. Handsome steel cabinet; 20" x 18" x 10 1/4". For 105-125 v., 60 cy. A.C. Shpg. wt., 85 lbs. Complete with tubes, less crystals.

97-589. HT-19 Transmitter. **\$298**  
NET, f.o.b. Chicago.....

\$59.60 down, \$21.06 monthly for 12 months  
Delivery in September, 1948. Reserve yours today!

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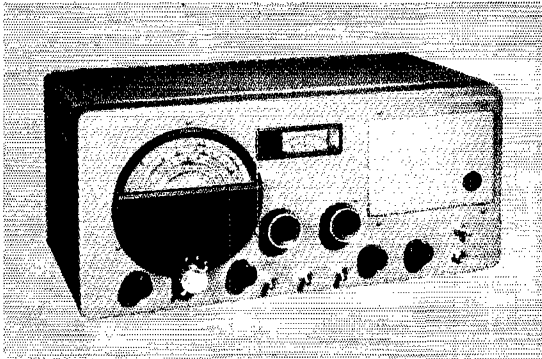
**For Earliest Delivery, Place  
Your Order with ALLIED Today**

### NEW! S-52 AC-DC Receiver

A popularly-priced new Hallicrafters receiver for AC-DC operation, packed with fine features. Tunes 550 kc to 43 mc in 4 bands. Includes full electrical bandspread; inertia flywheel tuning; calibrated main dial; automatic noise limiter; adjustable pitch BFO; standby switch; code-phone switch; shock-mounted speaker; separate sensitivity and volume controls; 3-position tone control. All-steel cabinet; 18 1/2" x 9 3/8" x 8 1/2". For 117 volts, AC/DC. Shpg. wt., 25 lbs.

97-588. S-52 Receiver. NET, f.o.b. Chicago **\$99.50**  
\$19.90 down, \$7.03 monthly for 12 months

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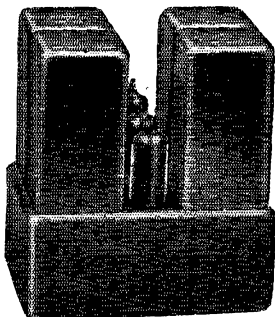
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Enclosed find \$.....  Full Payment  Part Payment  
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# McMurdo SILVER

## ADDS REVOLUTIONARY NEW SELECTIVITY

We use "revolutionary" advisedly. You'll agree when you add new "805" 100 kc. I.F. Amplifier to your present receiver that the phone/broadcast selectivity and noise reduction it gives are revolutionary. Less than this improvement



has been described as "like nothing you've ever seen or heard before". Added to any superhet having i.f. lying between 450 and 500 kc., Model 805 will cut dial-spread on even the strongest local station down by 75% . . . will reduce noise unbelievably. It gives your present set a selectivity

curve of 2.4 kc. wide 2X down, falling almost vertically to only 7.2 kc. wide at 10,000X down—an engineering dream come true. 805 gives single-side-band selectivity, the ability to reject noise, heterodyne squeals and all QRM on one side of the signal or the other—yet get clear, crisp speech and music without deleterious side-band cutting. Add Model 805 to your present set, and you have next year's new receiver at your finger tips today. Its selectivity gain-noise reduction is revolutionary.

Price, less 1 each 6BE6, 6BA6, 6C4 tubes **\$18.90**

Model 805K Kit with complete pictorial instructions **\$15.90**

**701 Transmitter, 75 Watt CW, 30 Watt Phone** Following "HANDBOOK" teachings for maximum transmitter efficiency vs. cost and complexity, 701 Transmitter has proven itself in tens of thousands of QSO's. Compact to save space in home or mobile installation, it's the sure-fire answer to 75 watts of clean CW, 30 watts of AM phone signals. A 6AQ5 extal Tritet drives an 807, 80 thru 6 meters. Two 6AQ5's turn out 14 watts audio to 100% speech

modulate 807 plate/screen. Power supply requirements are satisfied by Model 301 Power for 40 watts input or by a simple "HANDBOOK" assembly for 75 watts input. About 1500 amateurs agree that 701 is the trimmest, smallest "powerhouse" you've ever seen. Price less tubes, coils, power supply only **\$36.95**; coils (3 per band) **\$75 ea.**



LMF worked LNB in Chattanooga on 144 Mc. LNB also worked KPQ, Bremen, and MFW, Rome. FBH and LNG worked out on 50 Mc. May 1st. DJZ is new station on 50 Mc. KL, a 7-Mc. ham, has been on 3.85-Mc. 'phone some. MIP has old street car for a shack. LJB works out better with his new 3.85-Mc. doublet. KGI sent nice reports from Valdosta: BVK is president of the club and is on 3.5 Mc. nightly handling traffic. APS has new 14-Mc. beam. AAZ is on 7 and 28 Mc. GSC has new c.w. rig on 3.5 Mc. BQT is on 28 Mc. KGI has joined SSSL Net and is handling traffic. DJA is on 7 Mc. and is building rig for 28 Mc. HKA reports from Albany: New club officers are MBC, pres.; NJK, secy.; HKA, act. mgr. GHU moved to Miami for CAA.

**WEST INDIES**—SCM, Everett Mayer, KP4KD—AM reports two new countries and says the new beam is really working out. BE reports no DX but plenty of ragchews with the W gang. Both are on 28-Mc. 'phone. GN and BQ are putting up three-element beams. BI has new 10 over 20 beam. FJ has 30 countries and 46 states on 28-Mc. 'phone. He and CI are building four-element beams. ES has been appointed OBS and has worked 80 countries. Pedro is building PP-304TH kw. rig for new shack. He and AA are working Ws on 3.85-Mc. 'phone regularly. FZ got on 7 Mc. and also made his first 28-Mc. 'phone QSO. AU, CM, and KD made a business trip to Miami and Atlanta. KD had FB personal QSOs with W4EYW and W4RBQ. The PRARC Hamfest and election went off on schedule. CL is again presy. KD received the first WAVE Certificate in KP4 and also the first DXCC Certificate to a KP4. The Coast Guard Auxiliary cruise to the Virgin Islands was a success. Let's have more reports.

**CANAL ZONE**—The following is reported by KZ5AW: Latest official release lists 103 KZ5 stations. The CZARA, KZ5GD president, always has a good attendance. The gang on the Atlantic side has formed an Atlantic Chapter of the CZARA and meets once a week at the Strangers Club in Colon. A 7-Mc. net is being built for trans-Isthmian traffic and four Atlantic-side stations, AX, MB, OJ, and WS, take turns nightly feeding traffic directly into the Florida 7290-ke. net. Static level is very high on 3.5 Mc. at this time of year, and although they can work into the Palmetto Net, 7 Mc. is best fitted for handling traffic under tropical summer conditions. What is believed to be the first contact between the Canal Zone and the Gatti-Hallcrafters Expedition in equatorial Africa, was made recently when KZ5RS, at France Field, established two-way voice communications with the expedition. Traffic: KZ5MB 7.

### SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, Vincent J. Haggerty, W6IOX—Asst. SCMs: W. J. Schuch, 6CMN; I. O. Hege, 6FYW. AEC activities in West Los Angeles and Santa Monica areas are in high gear, as indicated by reports from PTR and OWU. Working in conjunction with the American Red Cross, the AEC's control station, CRG, is in operation at Santa Monica Chapter House. AEC members run seven private mobile units equipped with two-way radio which are ready to cover the Bay District in case of disaster. Twenty-three active members are in this AEC net. MFK, OES in Lancaster, is interested in v.h.f. work; experiments with vertical rhombics have been successful and a rotary rhombic is the next test. A 144-Mc. 100-watt rig nears completion also. KEI reports AEC drills in San Fernando Valley. Seven emergency-powered rigs were on for latest drill. IWU is busy as OO and on 3.85-Mc. 'phone. MU is going on 144 Mc. with Millen v.h.f. rig. MEP has VFO for 28 and 3.85 Mc. Five hams and five other fellows hoisted 50-ft. mast for MMB and remained for refreshments on Sunday evening. The section mourns the loss of AGF, who died on April 17th. AAE is working on keying monitor. BUK got his VFO working. The Inglewood Amateur Radio Club is now located at Women's Progressive Club, 3727 West 111th Place, and meets the second and fourth Wednesdays. The club call is CFZ. The club participated in Field Day activities from Palo Verde Hills. BXL was in charge of Field Day activities for the Pasadena Short Wave Club. UOZ is having 28-Mc. t.v.i. problems. BOU has new VFO. IIV put up new 7-Mc. antenna. SMI and VOD are building kw. rigs. BXL is working 14-Mc. DX. FQG is active on four bands. ZCK has five-element beam driven by 8JE. DQZ is trying n.f.m. ROP likes c.w. and is on 7150 kc. The Metropolitan Radio Club of Los Angeles and Paso Robles Radio Club have attained ARRL affiliation. MVK is new PAM. AEE works on MTN, schedules CEZAF on 14 Mc., and is working with a.s.s.c. on 14 and 3.85 Mc. AM claims 146 countries but laments the fact that only 103 cards have been received so far. FMG is new ORS and is on SCN. QIW is on SCN and is trying DX. too. ZMZ holds down Pasadena end of SCN. AKS looks for more traffic on 7 Mc. FYW is on SCN and PN as well as being active with Paso Robles Radio Club. CMN managed to squeeze in some DX, get a new 100TH final, new VFO, and assist with plans for ARRL convention, as well as devote 69 per cent of his time handling traffic on SCN and PN. PAP manages to keep busy, too. He keeps OBS schedules, is secretary of San Fernando Radio Club, and chairman of Publicity and Ticket Sales for AEC convention. Pappy says: "Southwest Division ARRL Convention will be held at Los Angeles Oct. 2 and 3. Registration Headquarters, (Continued on page 108)

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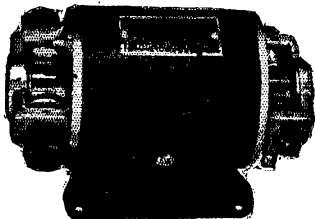
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ARIZONA — SCM, Gladden C. Elliott, W7MLL — LUM has a new three-element wide-spaced beam. LXM is on 3.85 Mc. at Benson. LPA is handling traffic on 3.5-Mc. c.w. LLO found the transmitter in the first 144-Mc. hidden transmitter hunt in Tucson. KOK lost all his gear when his home burned. MDD has a new 250-watt rig on 3.85 Mc. SGG has a 2-watt mobile on 28 Mc. DFE has a quarter-kw. on at Ajo. UFR worked UB5AG on 28 Mc. for DX and LFZ in Phoenix and BFA in Prescott for reflected skip. New calls: MGM, on 28-Mc. 'phone; MEC, on 7- and 14-Mc. c.w.; MFB, on 3.5-Mc. c.w. PWW is on 14-Mc. 'phone in Nogales. JMO is handling 3.5-Mc. traffic in Tucson. LZA worked 27 countries in one month with a Meek T-60. QAP has an 832 crystal-control rig on 144 Mc. MAW has a 60-watt mobile rig. LZL has a Harvey-Wells rig on 28 Mc. LSK is on 3.85 Mc. at Flag. LBN has the call MGE for Globe, and 150 watts on 28-Mc. 'phone and a 205-ft. vertical. LPK is trying out a variable height 28-Mc. beam. QLZ has 400 watts on 50 and 27 Mc. after winding a full set of 25-cycle transformers. JNN is on 144 Mc. in Phoenix. LLO reports hearing 144-Mc. signals from Phoenix. JMS has an FB compact all-band portable.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCM and SEC, Gordon Brown, 6APG. OBD has been appointed OO and OBS. Two more clubs are now affiliated with ARRL: The Imperial Valley Amateur Radio Assn. and the FAETU-PAC Amateur Radio Club. BGF reports the Southern Border Net is gaining momentum with LYF, VTS, AD, CNQ, CTN, BKZ, DLN, CGF, and BLL participating. Meeting time is 9 p.m. daily on 3550 kc. CNQ, reporting from El Centro, says the Valley Club operated from the Laguna Mountains during Field Day. BAM operates on 3.5 and 144 Mc. YDK schedules 4MCI/KG6 Mondays through Fridays at 6 p.m. FMJ is active on Mission Trail Net. LDJ keeps schedule with Guam and reports the following news from Santa Ana: The Orange County Emergency Net operates on 144 Mc. at 7:30 p.m. and on 3550 kc. at 8:00 p.m. each Monday night. More participants in both nets are needed. Active stations on 3550 kc. are BAM, BWO, BEL, AHA, LDJ, CGF, and EEK. K6NMC/W6, at Camp Pendleton, operates on all bands. Newly-elected officers of the San Diego Amateur Radio Club are: YSF, pres.; WGS, vice-pres.; YXU, secy.; VOP, treas.; CAL, sgt. at arms. YXM and NBJ operate on 144 Mc. 600T/KG6 is returning to W6 while YJO is going to W1. Land. 8VGZ/W6 is moving to either C6 or KG6. AWW and her OM, VUK, are operating portable-mobile 'phone on 28 Mc. ZYO will be first YL on 144 Mc. in San Diego. BGC, AWW, and YXI are having fun on 3.5-Mc. c.w. BCU is working lots of DX on 28-Mc. 'phone. The San Diego YLRL will hold its birthday picnic at El Monte Park. 2TVM now is 6CPI. NA and KW were heard on 3.85-Mc. 'phone. EBT will be on with p.p. 357Gs on both a.m. and n.f.m. CCK has installed a 28-Mc. 'phone rig in his car. CBC is heard on 3.85-, 14-, and 28-Mc. 'phone. Traffic: W6YDK 63, CNQ 47, BGF 39, LYF 22, K6NMC/W6 17, W6LDJ 13, BCU 12, WUW 12, FMJ 11, BAM 1.

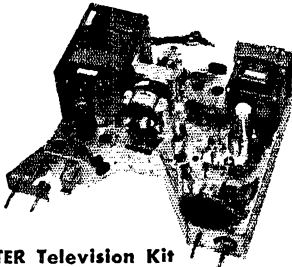
### WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/MNL — North and South Texas amateurs will miss QA, who died as the result of a traffic accident. The accident occurred on April 29th, and Vol died the following day. A final 73 to a swell friend and amateur. Amateurs were on the job following the tornado that struck McKinney, Tex., on the afternoon of May 3rd. While a complete list of participating amateurs is not available at this time, five emergency rigs were known to have been on the job. ENE was the first station on the air. Other rigs present were as follows: HBE, of Dallas; FC, emergency rig of the Dallas Amateur Radio Club; NRD, emergency rig of the Fort Worth Radio Club; and the portable rig belonging to DAS. A considerable amount of traffic was handled through extremely heavy QRN plus an undue amount of QRM by amateurs who insisted on stating their willingness to assist by squatting on the emergency frequency. NTX Traffic and Emergency Net will operate throughout the summer months on a reduced schedule basis. DOY recently was admitted to the Texas bar, culminating study at the South Texas College of Law, Houston. He has held a ham ticket since 1930, with the calls 9DOY, 3NZA, and 5DOY, and expects to be active soon, probably on 28 Mc. Since 1940, he has been a field engineer, with offices in Kansas City, Galveston, Beaumont, and Dallas. Traffic: W5LSN 952, GZU 316, CDU 181, ILZ 20.

OKLAHOMA — SCM, Bert Weidner, W5HXI — Asst. (Continued on page 110)

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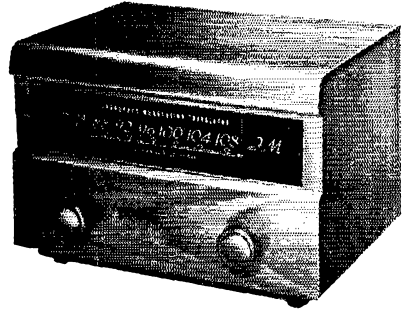
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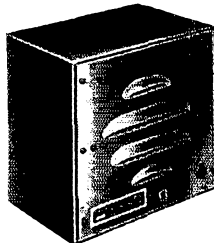


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**WEST HARTFORD 7, CONNECTICUT**

SCM, George Bird, 5HGC. SEC: AHT. RM: IGO. Two stations on OLZ made BPL for the first time since I have been reporting. AST and NMM were the ones snowed under with traffic. The Boy Scout Jamboree at Oklahoma City and the A.&M. Engineers St. Patrick's Day celebration really developed the traffic. The Emergency 'Phone Net tied in with the Highway Patrol and the CAA to search for a missing plane at 0830 on the 18th of April. HXC was acting Net Control. GZM is operating portable at Thomas. IGO and family visited AHT over the week end. The annual picnic of the Pole Cat gang was held at the home of Eggs, Apples, and Kraut in South Coffeyville — a wonderful time was had by all. The following, with their families, were among those present: AEK, EAK, EGC, EST, FDQ, FJU, FMB, GOL, GZR, HFW, HGC, HUI, HXC, HXI, IXJ, JBX, JKS, JNG, MGV, MMH, MQV, PA, WI, ex-9DKY, 9AHA, BNU, BPL, BRG, BRN, CRK, CQC, CQD, EQD, EWM, FLZ, HEC, ICV, KLK, KPU, LFL, LIX, NCV, NSD, NXJ, OZF, RGC, SRF, UTH, TTU, TKF, WPN. Traffic: W5NMM 428, AST 321, NBV 314, IGO 302, GVS 166, NTR 70, LTF 36, IOW 35, ABD 17, JKS 15, FRB 12.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — SEC: ZM. RM: HJF. PAM: FAG. On April 11th, New Mexico held a State-wide Field Day. Clubs participating were: Albuquerque, Roswell, and Los Alamos. HJF was on from a farm near Clovis. UVW was operating on 144 Mc. from an airplane. MYA was on 7 Mc. from Vanadium. 144-Mc. activity was very good but no distant contacts were made between ground stations. 3.85 and 3.5 Mc. were very good early in the morning but bad weather caused an early shut-down at Los Alamos. 14 and 28 Mc. were wide open but Sunday QRM on 7 Mc. was really tough. Higher power and beam antennas would appear to be the answer on 7 Mc. UFA had a YL jr. operator. SMA is taking a vacation. OMR and his XYL, OMI, are on 7 Mc. now. JYW is practically inoperative because of CREI-Home Study. MUI gave a talk on stabilized VFOs at the Los Alamos Radio Club meeting April 28th. FPC, Hanover, expects to join the Army. NWH is active on 28 Mc. and needs only 7 states for WAS. Traffic: W5NXXE 24, MYA 2.

## CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — Since Oct. '47, PA, of Lakeburn, has kept schedules with VESNB on 14.3 Mc. daily at 2100 GMT and handled an average of 75 messages a month. The rig is running only 65 watts. CU reports the YARC meets monthly and officers are: DW, pres.; QY, vice-pres.; LN, treas.; CU, secy. DW, QY, and BU are active on 50, 144, and 400 Mc., with DW also on 28 and 14 Mc. and BU on 3.85 Mc. LN is on 14-Mc. 'phone. JY is on 28 and 3.85 Mc. HG is on 14-Mc. c.w. BN is on 7 Mc. CU is on 28, 14, and 7 Mc. The YARC entered three rigs in the Field Day tests. ST is the ham station of the 5th Inf. Division Sig. at Charlottetown, using equipment of CLX. Operation is mostly on 7- and 14-Mc. c.w. QSL to Capt. Stan Thompson. DB is holding down Sunday schedules with EY. QG has the 814 going with 250 watts input on 28-Mc. n.f.m. NO is on 14-Mc. 'phone with new 812 final. BC is on 3.85-Mc. 'phone with 5 watts. LK worked MI3ZJ on 28-Mc. 'phone. The Halifax Ladies Dit and Dah Club recently held an enjoyable dinner. LZ has been working on Command nets. DQ and FQ are holding schedules daily with 8NB and 8OE on 14-Mc. 'phone. Traffic: VE1FQ 27, DQ 24, PX 8, GR 6, DB 4, QG 1.

## ONTARIO DIVISION

ONTARIO — SCM, David S. Hutchinson, VE3DU — Many thanks to the Windsor, Hamilton and Kingston clubs for the fine club papers put out by their respective clubs. Keep the dates of Sept. 11th and 12th in mind and attend the Kingston Hamfest. BTH had a crack at BERU Test. The following u.h.f. fellows were active with the HARC on Field Day: BGT, AQC, AWR, BFF, AND, KM, BKM, AEZ, and QT. 144- and 50-Mc. nets are going strong in Hamilton. BNG, BIK, BQF, BKR, AVK, and CJ are active on 28 Mc. YM, AYE, FH, QU, AKW, BHS, TG, ARB, AQS, IZ, AGB, JU, and BHX are regulars on 14-Mc. 'phone. QU made it 17 countries and 5 continents on 7 Mc. AWE also is on 7 Mc. BEX added VQ4, MD5, VP6, and VK4 to make it 52 countries on 14 and 7 Mc. BQC has seven-element beam on SC-522. BBE is using a five-element beam with SC-522. CP and AHL are forming emergency net in Border Cities area. AGB is on 50 Mc. with 332 in final. Results of election of officers for West Side Radio Club are as follows: AHV, pres.; ADR, past pres.; AIB, vice-pres.; AEM, secy.; ANO, treas.; and IZ, engineer. AWE had a visit from AHV, AIB, ANO, ACR, IZ, and VO. BCP reports the DOT Net is in need of more participants. Your SCM broke into the DX this month with G, GC, GM, GW, GI, F, OZ, SM, CNO, PY7, KH6, VR5, V, K, and ZL, all with 70 watts and 3.5-Mc. Marconi antenna on 14 and 7 Mc. The Scarborough Amateur Radio Club recently elected the following officers: NZ, pres.; BKB, vice-pres.; AQR, secy.; FO, asst. secy.; K. H. Tripp, treas.; ARC, adv. mgr.; AJO, QSL mgr.; BEX and AMB engineers; Dick Roberts and Al Clark, entertainment. RU transmits code instruction

(Continued on page 118)

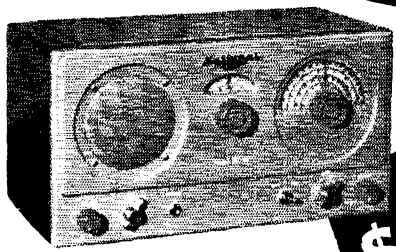
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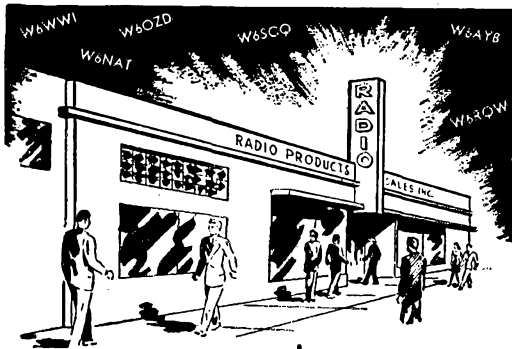
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**QUEBEC DIVISION**

**QUEBEC** — SCM, Gordon A. Lynn, VE2GL — BB is new Route Manager and is looking for recruits for ORS. DD is OBS and is satisfied with n.f.m. on 14 Mc. TM schedules ACI daily. ACI is YL operator at Chicoutimi on 7 Mc. OE has moved to Quebec from Chicoutimi. IW is on 3.85-Mc. 'phone. TN is rebuilding. JL reports work on 7 Mc. slowed down but he had time to work ZL2, OZ, G, and F on that band. XB maintains his schedules with BB and on SSTL. ACV has 75 watts on 3.85- and 7-Mc. c.w. and is looking for slow speed QSOs. LO visited TD and reports that he has nice rig using 813 in final. EC reports from Grand Mere for St. Maurice Valley gang, that TR, OD, and ABJ are working 1P and others in Montreal on 50 Mc. MW is now in Shawinigan Falls. QJ is back on 3.85 Mc. KY has a 50-Mc. beam. TI, VI, VE, PV, and AAE are doing FB on 28 Mc. in a net. LF reports from Vercheres. He has parts for 5-inch 'scope and 5-inch Panoramic adaptor, and has secured Code Proficiency Certificate for 15 and 20 w.p.m. The gang at St. Johns, consisting of HE, LQ, JN, RF, WB, GD, and SG, met to form a radio club in that area. WI has a pair of 810s in final. KH has a five-element beam on 50 Mc. Arrangements for the Eastern Canada Convention in Montreal on October 8th and 9th are well organized and advance reservations numbering approximately 100 have been received. Get yours made now if you have not already done so. Traffic: VE2EC 40, GL 32, XB 17, DD 16, TM 14, LO 11.

**VANALTA DIVISION**

**ALBERTA** — SCM, W. W. Butchart, VE6LQ — CARA is working hard on Alberta Hamfest details. The big event is set for July 31st and August 1st. Make your reservations early. Give the Calgary gang the support they deserve and help make their "do" the biggest and best yet! AX has basement "shack" in new QTH for ham activity. WB has been bitten by DX bug again. BN will make his QTH in Edmonton. He has bought a home very close to LQ. JL has moved to Calgary to take over Chief R.I. duties for Alberta. AC visited Edmonton recently. AL gets out FB with his new rig. He keeps schedule with EG in Westlock during flood danger. HM has trouble with his new beam motor. BW is surprised at excellent results obtained with 815 final and 60 watts input. LQ's 20-watt rig gets out FB. HM and ZFG have kept 7-Mc. c.w. schedule for 13 years. MJ is new SCM for this section. Give him all the support you can, boys OA's speech clipper seems to be working backward. 7NL has moved back to Calgary and has call 6ND. Well, boys, that wraps up my work as SCM for this term. Thanks for giving me the privilege of representing you for the past two years. It has been a pleasure. Traffic: VE6LQ 29, BN 24, QS 6, CJ 5.

**BRITISH COLUMBIA** — SCM, W. W. Storey, VE7WS — Following are officers of the Vancouver Amateur Radio Club: AKF, pres.; Don Bryne, secy.; Bill White, vice-pres.; Jack Morrow, treas.; FB, activities, VX, historian, EV, technical; ABY, publicity. WR is in Saint Paul's Hospital, Room 416. AKC has been working VQ3 and ZS with mobile 28-Mc. rig. Officers of the "13" Amateur Radio Club are: AC, pres.; TE, secy.; HI, treas.; LT, coordinator of activities; HC, publicity. HI has new system of modulation. ZZ has HRO. HC has added RME preselector to AR SS. New members are ACQ, MO, AV, and AJT. Collingwood Club News: The Collingwood membership visited the "13" Club en masse on March 23rd. Following club officers have been elected: AKK, pres.; OJ, secy.; and ABP, vice-pres. UU is using folded dipole and supergen. on 144 Mc.; he worked France on 28-Mc. 'phone. AME, ADV, and ABP are on 144 Mc. AKK, LT, and OJ are on 28-Mc. 'phone. UU is on 14-Mc. c.w. with 813 final and dipole fed through Q bars. AIH is building new tower with six-element beam for 28 Mc. AME is running 45 watts on 144 Mc. XT has two-element beam on 14 Mc. about 27 ft. high. LF is ironing the bugs out of a pair of 813s for 14-Mc. c.w. ADV is running 807 rig mobile on 28 Mc. ZF is on 3825 and 3850 kc. using p.p. 810s. ACT is operating with about 10 watts. Victoria: TZ keeps 3.85-Mc. schedules with VE6. FX is now numbered among the Silent Keys. HP reported on doings of BCARA. EP built a multivibrator.

**PRAIRIE DIVISION**

**MANITOBA** — SCM, A. W. Morley, VE4AM — Remember Emerson? Do you belong to the AEC? Have you tested your equipment lately? QV and RO want to thank everyone who helped out in the emergency. DE is interested in ORS appointment and is running a 8L6 on 7 Mc. DT, at Myrtle, has new VFO. EO, at Flin Flon, is snagging DX on 14 Mc. DN, at Shilo, is new member on Manitoba 'phone net. He advises that EG and AL are using 19 set with about 12 watts. DY is there on Army duty. DF is

(Continued on page 114)

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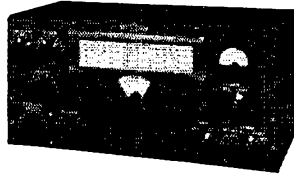
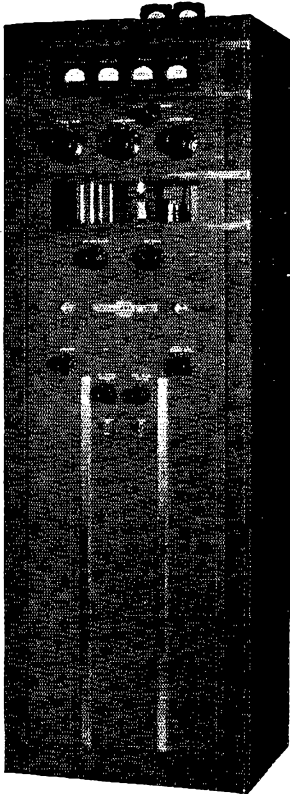
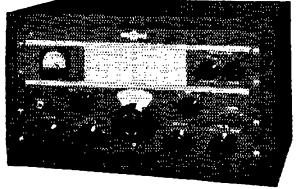
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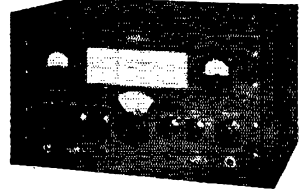
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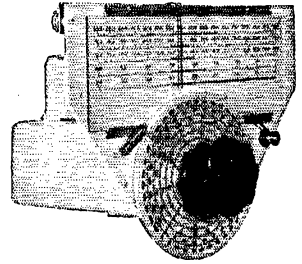
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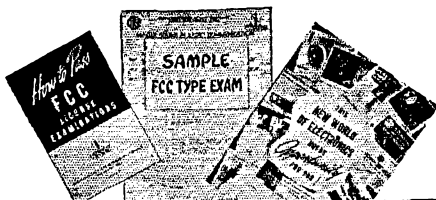
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running 300 watts to 813, all bands, and is planning 'phone rig. JB, at Binscarth, runs 25 watts to 807 and uses an RME-34. AI is on 28 Mc. exclusively and DK uses an RME-45. FG, at Flin Flon, has had the mumps and requests no wise cracks. DP has applied to have his license endorsed for 28-Mc. 'phone. KK is push button control n.f.m./a.m. for all bands. The Above 100 Club celebrated its affiliation with ARRL by working 17 miles on 144 Mc. with portable equipment. No news from Brandon or Portage this month. How about it, fellows? Traffic: VE4RO 98, AM 63, QV 56, MM 6, SS 5, DG 2, EA 1.

SASKATCHEWAN—SCM, Norman Thompson—VE5CO — KJ reports that daylight time and spring static make T.L. "I" schedules difficult during the summer months. HR does a lot of early morning operating and handling of traffic. BF reports that he is on f.m. on 3.85, 14, 27, and 28 Mc. He replaced his T55s with 811s but soon changed back after blowing a hole through one of the 811s. He hooked up with VQ3HG (Hallcrafters Expedition). The Saskatoon ARC reports that MQ, UZ, and AX have been busy with exams. JF is working 28-Mc. 'phone with 4½ watts and got his first VK. FL is on 28-Mc. 'phone as well as 3.5-Mc. c.w. YF is on 3.5- and 7-Mc. c.w. UC is rebuilding. XU's beam blew down. He now has worked 97 countries. AN is on 14-Mc. 'phone. LG is working 3.5 Mc. DC and GR are building. RJ is on 27- and 28-Mc. 'phone again. RC will be on 50 Mc. with an 829 and homegrown beam. Several of the gang will go down to Regina for the hamfest and JF and RC will take along portable equipment. DP received his operator's certificate (2nd-class commercial). EK got tired of buying 807s and is using an 814. HB, OM, CO, CZ, DF, and JS are quite active on 50 Mc. around Moose Jaw and are looking for some out-of-town schedules. Traffic: VE5KJ 32, HR 12.

**Book Reviews**

(Continued from page 50)

**Radar: What Radar Is and How It Works**, by Orrin E. Dunlap, jr. Published, 1946, by Harper & Brothers, New York and London. 208 pages + xi pages + 8 plates. 5½ × 8¼ inches. Price \$2.50.

This book will serve to enlighten the uninitiated and broaden the scope of those already experienced with radar. The author has aimed his sights at the layman. He imparts his subject matter in a straightforward, complete manner without recourse to overwhelming technical data.

Mr. Dunlap begins with the origins of the scientific concepts essential to radar. To many, they will not be new, but rather a review of the work of people whose names are already familiar — Marconi, Tesla, Thomson, Taylor, Zworykin.

Adherence to chronological development is one of the book's assets. In light of the various brief disclosures on radar that have appeared in Sunday supplements during the past few years, the text is notable.

A point of considerable controversy since the first public consciousness of radar, the identity of its inventor, is neatly handled by carefully accrediting some of the myriad of persons, colleges, companies and countries associated with its development.

Peacetime radar is considered and analyzed fairly. Eight photographic plates show equipment, radar-scope patterns, and some of the outstanding men behind this scientific miracle. A glossary is included.

To whet the reader's appetite for further acquaintance with radar, Mr. Dunlap suggests 145 articles as auxiliary reading material, and he provides a remarkable list complete with title, author, publisher and date of publication. — John Merrill, W1CGS

**Stays**

Amateurs who are actively engaged in police radio communications work are cordially invited to attend the National Conference of Associated Police Communication Officers, Inc., which will be held this year at the Rice Hotel in Houston, Texas, on September 20th to 23rd inclusive. This year's assembly, which is expected to be the largest ever held, will celebrate 20 years of practical police mobile-radio communication. Interested amateurs may make reservations through APCO Conference Chairman Paul Franklin, radio supervisor of the Houston Police Department.



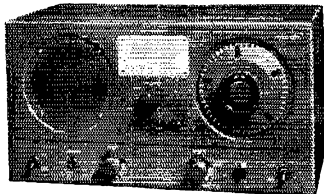
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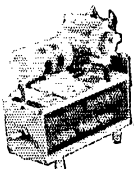
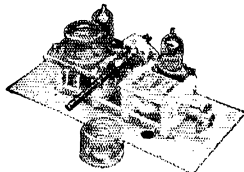
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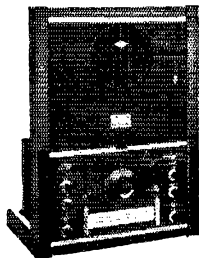
Fast band change with no coil switching! The MB-150 Multi-Band Tank tunes all bands from 10 to 80 meters with a 180° rotation of the shaft. See article in March QST. Constant L/C ratio. Superbly engineered. Adjustable link. Run up to 150 watts input. A set new high in operating ease! MB-150 Multi-Band Tank Assembly. Only.....

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## Expedition "Gon-Waki"

(Continued from page 81)

we do. If you like to rag-chew, do it with every tenth or twentieth contact and give the masses a break in between. All the chaps calling you will hear your QTH when you give it on the tenth contact and will enjoy that QSO just as much as the fellow you are working does.

Don't worry about the QSL problem. Just do this: Ask some W station if his club would like to handle your cards. His club will probably want to buy the cards for you as they are cheap in this country when compared with the prices in most others. Then once a week air mail a copy of your log to the chosen club and they will handle your incoming and outgoing QSLs. This system is being used by several rare DX stations at present and works to the great satisfaction of all concerned.

After you have worked most of the W DX-hounds, they will leave you alone and you can hunt DX or rag-chew to your heart's content, happy in the thought that you have made a lot of hams very, very happy. This fact has been demonstrated by several different "one-in-a-country" stations.

*To Ws and other DX-chasers:*

Don't work the rare ones a second and third time except in contests. Remember every time you do it you are keeping somebody from working a new country. Ask about your QSL by mail, not at someone else's expense. There are a lot of stations with small signals chasing DX and their only chance to work it is when the rock-crushers are silent.

Make your QSOs short. The shorter they are, the more QSOs that can be squeezed into the precious little time that the elusive station is on the air.

Don't call when the station is busy. Many rare stations have given up in disgust just on account of this one evil.

Don't feel that just because you have a big signal you can get away with anything. More stations are hearing you and forming a bad opinion of your ethics.

*If you are a gentleman off the air, be one on the air.*

— . . . —

After two days of recuperating in the balmy Gulf Stream climate, we felt able to make the return trip. (Another day there and we would have decided to stay.) Back into the boxes went the gear and we bade farewell to that quaint land of wrong-side driving and leisurely living. Bill and Harry, who had helped us in every way imaginable, saw us off at the airport and the first thing we knew we were just plain Ws again. What a letdown. It's lots of fun changing from W to VP7 but that changing back "ain't got it."

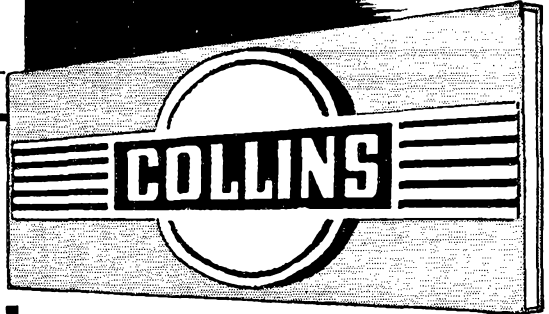
On the return trip we visited W4BRB, the eighty-meter king, and got in on the tail end of a West Palm Beach Club meeting. We also dropped in on W4BPD of rhombic-farm fame. What a

(Continued on page 118)



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Collins 75A-1 receiver	\$ 375.00
Collins 32V-1	475.00
Collins 30K-1	1450.00
Collins 70E-8	40.00
Collins 310C-1	85.00
Collins 310C-2	100.00
Collins 210B-1	190.00
Collins 310B-3	215.00

### COMPLETE STOCKS

Henry has *everything* in the ham field.

### QUICK DELIVERY

Shipments *4 hours* after receipt of order. Send \$5.00 with order and shipment will be made at once C.O.D.

### TRADE-INS

You can't beat Bob Henry for trade-ins. Write, wire or phone today about your equipment and Bob Henry will make you a better offer than you can get anywhere else.

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Because Bob Henry finances the terms himself you get a better break. Save time and money, deal with Bob Henry on his personal, profitable time payment plan.

Butler, Missouri

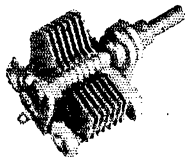
# HENRY RADIO STORES

11240 Olympic Blvd.  
LOS ANGELES 25  
CALIF.

'WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS'

# LOOK

## CONDENSER SPECIAL

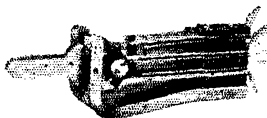


The biggest bargain we have ever offered. Famous make double-bearing condensers, regularly listing at \$2.70 and \$3.00, isolantite insulation, semi-circular plates (straight-line capacity) .024" air-gap,

100 mmf. or 140 mmf, either size, brand new.

ONLY **89¢**

## ANTI-CAPACITY SWITCH



One set of 3PDT contacts, two sets of SPST contacts normally closed. Center, up down action on rubber cushioned cams, positive hold in. Nickel plated metal bracket for plate mounting. **60¢**

## STRUTHERS-DUNN RELAY

Control all of your equipment with this one relay, 110 VAC coil, 4-pole, 2 double throw, 2 single throw, 6 Amp. contacts, screw terminals, insulated base, 3" x 3 1/2", a terrific bargain at **\$2.00**



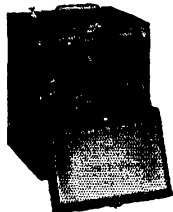
## THORDARSON MULTI-FILAMENT TRANSFORMER

2.5 Volt 10 Amp., 6.3 Volt 5.5 Amp., 6.3 Volt 1 Amp. 3000 Volt Insulation, hermetically sealed, ceramic feed-thru connections, 110 Volt, 60 cycle primary, 4 1/2" x 3 1/2" x 5 1/2" **\$2.95**



UTC SC-3 24/16/12/8/4 volt, 4 amp. .... **\$4.00**

## Famous BC-221



W4FU, W8JIN, W8FGX, all top-notch DX men, use the BC-221 to mark location of weak DX so they can quickly return to his frequency. An excellent fone or CW monitor. This instrument is accurate to .02% from 125 KC to 20 MC. Compact 150 volt power supply can be mounted in battery compartment. Add two 6AG7 voltage amplifiers and you have a terrific VFO. Complete with tubes, crystal, frequency charts. Excellent condition. **\$39.95**  
With internal modulation, for signal tracing. .... **\$79.50**

# Steinberg's

633 WALNUT STREET • CINCINNATI 2, OHIO

set-up that man Gus has: receivers, rigs and rhombics galore!

When we pulled into Arlington we were tired, dirty and \$430 lighter but happy about the fact that we had really "had it." Another reason that we felt our trip was a success was because we had worked W9BRD/1. After all, since Rod can't manage a signal into CM-land, somebody had to find him a country closer by.

What does it feel like to be extra-special DX? Wonderful, man, wonderful — the most fun we've ever had. So if you need a "pick-up" — just pack up. You won't regret it.

The VP7NG cards were donated by the Potomac Valley Radio Club and made out by the members. Two thousand of them, one for each contact, were sent to ARRL on April 7th via air express, so if you haven't received all the cards due you, see your QSL manager — with a stamped, self-addressed envelope.

If you do not get a card for each contact, write PVRC, Box 2003, Arlington, Va.  
73 ES CU NEXT YR FM AC4.

## QRP Portable

(Continued from page 28)

As to results that may be expected, this rig has been operated in two locations. In Maryland a wire 70 feet long and 20 feet high was used for an antenna. All districts were worked on 40-meter c.w. along with plenty of DX. On 80-meter 'phone, using the same antenna, solid QSOs resulted within a 150-mile radius, and, when the QRM was not too heavy, up to 500 miles. Then, for two months the set was operated in downtown Washington, D. C., on the third floor of an eight-story building. A 20-foot length of bell wire hanging from the window down the side of the steel-frame building was unsuccessful. Next a weight was tied to the free end of the wire and it was swung out and draped over the limb of a tree about ten feet from the window. The very first CQ was answered and from then on the little rig put out consistently. KZ5ND copied it through the 9 p.m. QRM on 40 and the calls answered averaged better than 50 per cent.

Many uses will be found for the little portable in addition to those of stand-by or portable work. With proper crystals and without antenna, it is useful for band-edge or net-frequency spotting or other h.f. signal-generator use. All in all it is a handy piece of gear to have around the shack.

## Happenings

(Continued from page 58)

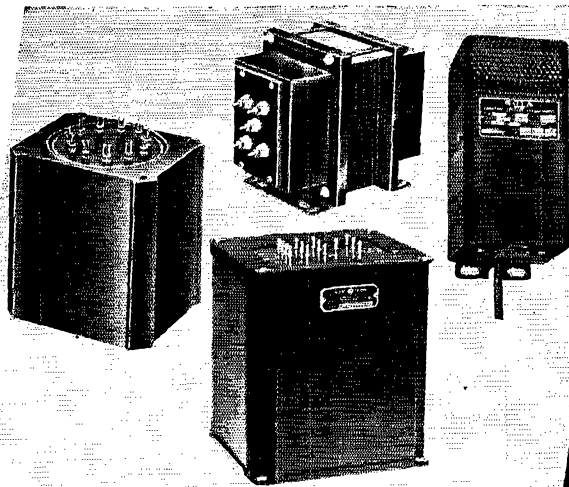
tion was rejected, 6 votes in favor to 11 opposed, Mr. Collett asking to be recorded as voting in favor.

71) The Board was in recess from 3:36 p.m. to 3:42 p.m.

72) In the matter of the Chair's decision the previous day permitting reconsideration of the question of amending Paragraph (e) of By-Law 12: Moved, by Mr. Doeland, that the Board appeal from the decision of the Chair. As provided in the Standing Rules of Order, the Chair explained the reasons for his ruling. The question being on the appeal from the Chair, the motion was rejected. Mr. Collett requested to be recorded as voting to reverse the Chair, and

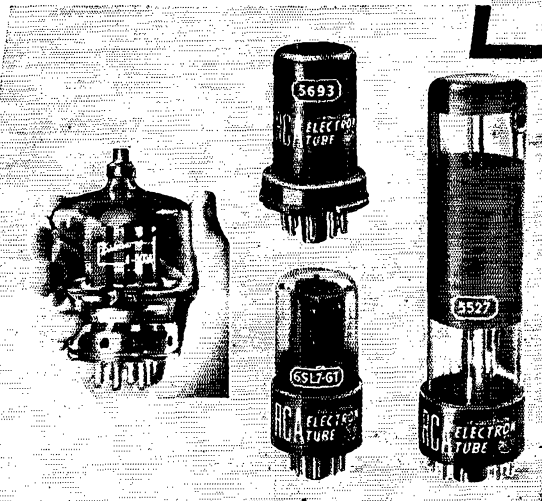
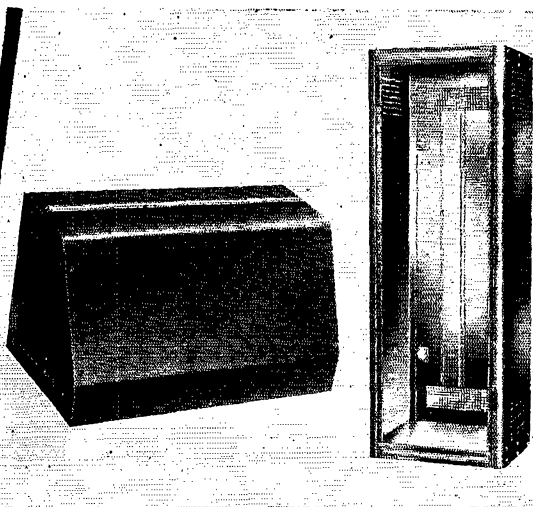
(Continued on page 180)

# To Have What YOU Need... When YOU Want It... *That's OUR Job*



**Transformers?** We are distributors for U.T.C., Kenyon, Stancor, Thordarson and Sola. Terminal can supply transformers for every requirement!

**Steel?** Beat the steel shortage by ordering Par-Metal and Bud chassis, cabinets, racks, panels, etc. from us!



**Tubes?** We carry all numbers of well-known brands for receiving, transmitting and industrial use. Check with us for all type numbers of RCA and Eitel-McCullough (Eimac) tubes, also new RCA special long-life Red Tubes (5691, 5692, 5693).

**What else?** All high quality lines of parts and equipment — Terminal is New York's leading distributor of radio and electronic equipment!

**Prices?** Some say you only get what you pay for, but we say you get more for your money at Terminal!

**Service?** Try us and see for yourself — we're all eager beavers!  
*Yes, Terminal is Your Best Bet for Everything in Radio!*

# TERMINAL

RADIO CORPORATION

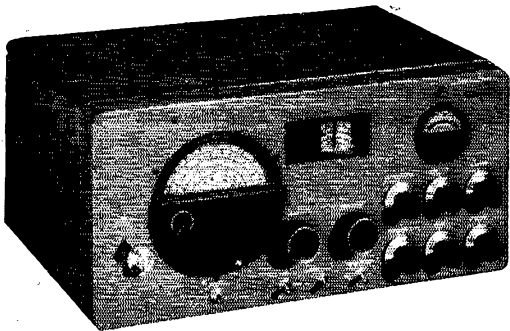
Distributors of Radio & Electronic Equipment  
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NEW YORK 7, N. Y. Phone: WOrth 4-3311

H & Y  
**20th Anniversary**  
**"The ELECT**  
**In Electronics"**

**hallicrafters**

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**MODEL SX-43**



All the essential amateur frequencies  
 from 540 Kc to 108 Mc..... **\$169.50**

★ On Hatry & Young's 20th Anniversary, we salute Hallicrafters, a custom quality line with precision engineering and excellent performance. It's another of "the Elect in Electronics" which make H & Y the choice of amateurs throughout Connecticut and Massachusetts.



CONNECTICUT		MASSACHUSETTS
HARTFORD 203 ANN STREET	NEW LONDON 428 BANK STREET	BOSTON 42-44 CORNHILL
BRIDGEPORT 544 E. MAIN STREET	WATERBURY 89 CHERRY STREET	LAWRENCE 639 ESSEX STREET
NEW HAVEN 77 BROADWAY	STAMFORD 97 MAIN STREET	SPRINGFIELD 169 SPRING STREET

Messrs. Canfield and Richelieu as abstaining. So the Chair was sustained.

73) On motion of Mr. Richelieu, after discussion, unanimously VOTED that this Board instructs Managing Secretary Warner that enthusiastic co-operation, support and assistance, exclusive of financial assistance, be given the Milwaukee Radio Amateurs' Club, Inc., in their sponsorship of the forthcoming National Convention and, as an initial step, Assistant Secretary Huntoon should be detailed to Milwaukee within the next 30 days for a prearranged meeting and subsequent conference with Convention Chairman Doyle, for the purpose of giving whatever help is necessary.

74) Unanimous consent being given, Mr. Richelieu made a statement concerning the recent examination of eligibility requirements, and pledging the continuation of his best efforts for the interests of amateur radio and ARRL. (Applause) At which point, at 4:05 p.m., Directors Bird and Richelieu, under the necessity of returning to their homes, retired from the meeting.

75) Mr. Reid, as chairman, made an oral report on behalf of the Finance Committee. On motion of Mr. Jepsen, VOTED to accept the report of the Finance Committee. By request, the General Manager commented upon the financial position of the League, stating that with heavy appropriations and rising costs the League was confronted with operating losses and substantial reductions of its surplus, and asking the Board's advice. After discussion, moved, by Mr. Collett, that advertising rates in all ARRL publications be raised 10% effective upon the conclusion of all contracts. But, after discussion, the motion was rejected, Mr. Collett requesting to be recorded as voting in its favor. Moved, by Mr. Jepsen, that, in order to maintain to the fullest possible extent the quality and dimensions of the League's services to the radio amateurs, By-Laws 3 and 4 be amended, effective July 1, 1948, to read respectively as follows:

3. The dues shall be \$4.00 per year in the United States & Possessions, \$4.50 in the Dominion of Canada, payable annually in advance.

4. Provided that a Full Member is the husband or wife, brother or sister, son or daughter, father or mother of another Full Member living at the same address paying dues at the rate of \$4.00 per year in the United States & Possessions or \$4.50 in the Dominion of Canada, he may at his request pay dues of \$1.00 per year, in advance, but without the right to receive "QST"; said membership to be concurrent with that of the member receiving "QST."

After extended discussion, the yeas and nays being ordered, the said question was decided in the affirmative: Whole number of votes cast, 14; necessary for adoption, 11; yeas, 13; nays, 1. Those who voted in the affirmative are Messrs. Canfield, Caveness, Dosland, Groves, Jepsen, H. W. Johnston, J. M. Johnston, Ladley, Martin, Matejka, Noble, Reid and Shelton. Mr. Collett voted opposed. Absent, Messrs. Bird and Richelieu. The President and Vice-President abstained as required. So the by-laws were amended to increase the membership dues.

76) Moved, by Mr. H. W. Johnston, that By-Law 42 be amended by striking all the language appearing after the words "two-thirds vote" (in the fourth line) and substituting the following text, "the procedure at the meetings of the Board of Directors shall be as prescribed in the current edition of Roberts' Rules of Order." Discussion followed, in the course of which Mr. McCargar briefly occupied the Chair while the President spoke from the floor. On motion of Mr. Collett, VOTED that the motion shall lie on the table. Moved, by Mr. Collett, that the Secretary be directed to supply each director with a copy of an up-to-date edition of Cushing's Manual, at the expense of the League, to replace their present copies. Moved, by Mr. H. W. Johnston, that the motion lie on the table; but the said motion to table was rejected, 4 votes in favor to 9 opposed. The question then being on Mr. Collett's motion, the same was ADOPTED, Mr. J. M. Johnston requesting to be recorded as voting opposed.

77) Mr. Noble asked for an interpretation of yesterday's action giving the Communications Manager discretionary authority to authorize, exceptionally, travel by an SCM or QSL Manager outside his own division, to determine whether this meant, for example, that QSL Managers from other divisions could be authorized to attend the National Convention. Reflecting the sense of the meeting, RULED, by the Chair: that the action taken did not so authorize.

(Continued on page 122)

Our 26th Year

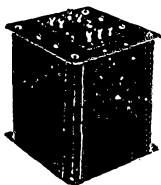


QUALITY—PRICE  
DEPENDABILITY

THIS MONTH'S SPECIALS

PLATE TRANSFORMER

Primary 115/230 Volt, 25-60 cycle. Secondary 820 Volts Center Tapped at 775 Ma. Hardly any voltage drop at 950 Ma. Completely shielded. Dimensions 6 1/2 x 6 1/2 x 7 1/2. Net Weight 36 lbs. Special.....\$7.95



HEAVY DUTY CHOKE

6 Henries at 550 Ma. 28 Ohms DC Resistance. High voltage insulation. Completely shielded. Dimensions 5 1/2 x 4 1/2 x 5 1/2. Net Weight 15 lbs. Special, \$4.95

FILAMENT TRANSFORMER

Primary 115/230 volt 60 cycle. Secondary 5 volts at 15 Amps., 5000 volt insulation. Swell for 35T, 75T, 100TH, 250TH, HK-54, etc. Completely shielded dimensions 4 1/4 x 5 x 5 1/2. Net Weight 10 lbs. Special.....\$3.95

INSULATOR

Porcelain Beehive type stand-off Insulator. Type 4451-J. Stands 4 1/2" High, with 2 1/4" Square metal base for mounting, with jumbo banana jack in top.

Each, 24c 10 for \$2.00

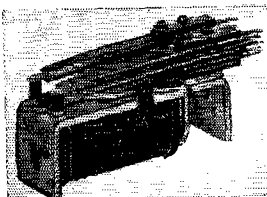
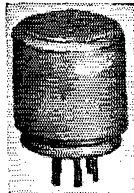
VARIABLE CONDENSER

6 Gang; 1 section of .00025 Mmfd, 4 sections .000035 Mmfd, 1 section of .00005 Mmfd; with 5 air trimmers of 15 to 25 Mmfd capacity. This condenser is all silver plated.

Each Only... 95c

RELAYS

G.E.; 2500 Ohm, 4 Ma SPDT, 5-prong plug in type, hermetically sealed. Brand New..... 95c



CS DIFFERENTIAL

Dual coil with armature pivoted between coils. All contacts normally open. Operates 220-250 Volts. 8000 Ohms each coil, contacts S.P.D.T. Controls rated 2 amps. at 110 VAC. Ideally suited for balanced or bridge type circuits where limited current or power is available. Will withstand 12 G Vibration up to 60 cycles at 35,000 feet altitude. Special low price..... 95c

MULTIPLE CONTACT

telephone type relays high resistance. Extra Special 49c



POWERSTAT

VARIABLE TRANSFORMERS

Type 20: 115 V. input, 0-135 V. output @ 3.0 amps. 0.4 KVA.....\$12.50  
 Type 116: mounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA.....\$23.00  
 Type 116U: unmounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA.....\$19.00  
 Type 1126: 115 V. input, 0-135 V. output @ 15.0 amps. 2.0 KVA.....\$46.00  
 Type 1226: 230 V. input, taped at 115 V., 0-270 output @ 9.0 amps. 2.4 KVA.....\$46.00  
 Type 1156: 115 V. input, 0-135 V. output @ 45.0 amps. 6.1 KVA.....\$118.00

SELSYN MOTORS

Just Arrived

115 Volt AC 60 cycles. Transmitters only. Can be used to turn small beam antenna or as indicators only. 3 1/2" Diameter x 5 1/2" High. Shipping Weight 12 lbs. Per Pair. Special Per Pair..... \$5.95



Selsyns Type 2J1G1 and 2J1H1. 57.5 Volts AC, 400 cycle. Make excellent beam indicators when used on 6 to 12 Volts AC, 60 cycles. A Real Buy. Each..... 95c

PLATE TRANSFORMERS

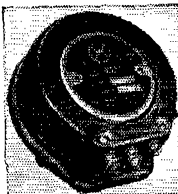
For Small Transmitters. DC Voltage Ratings are Approx. Values Obtained at Output of a 2 section Choke Input Filter. Using Mercury Vapor Rectifier Tubes. Pri. Is for 115 V. 60 cy.

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. MA.	Dimensions			Price Each
				H.	W.	D.	
P 57	660-660† 550-550	500 400	250	4 3/8	3 13/16	4 3/8	\$ 5.55
P 58	1080-1080 500-500	1000* 400	125 150	4 3/8	3 13/16	5	7.20
P 59	900-900 800-800	750 600	225	4 3/8	3 13/16	5 1/2	6.00
P 67	1450-1450 1175-1175	1200 1000	300	5 3/4	6 1/8	4	17.85

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

H & H Wire Wound Rheostat

150 Watts, 5 ohms. @ 5.48 amps., in approximately 67 steps. Resistance Wire Wound toroidally around refractory core and embedded in vitreous enamel. 4" Diameter. Depth behind panel 1 1/4". Makes excellent control for Toy Trains. A Buy At..... \$1.95



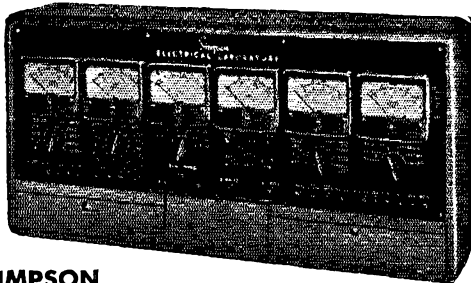
If not rated 25% with order, balance C. O. D. All prices F. O. B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

LEEDS RADIO CO.

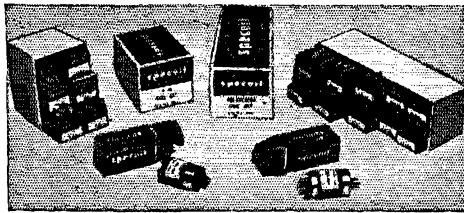
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Look to E.M.I. for the  
Latest in Electronic Equipment  
**NEW ITEMS AVAILABLE NOW**



**SIMPSON**  
**MODEL 1005 ELECTRICAL LABORATORY**  
All the functions of over 60 separate instruments  
combined in one unit! Net price **\$218.00**



**SPECOILS** STANDARDIZED SMALL SIZE  
for FM and TELEVISION

Type No.	Amateur Net	Type No.	Amateur Net
FM-107	\$3.57	TVI-264-1	\$3.57
FMD-107	3.57	TFM-219	3.57
FMBP	3.57	TFMD-219	3.57
RFFM	.90	TAT-279	.90
TVA-264	3.57	TVS-219-2	.90
TVD-264	3.57	TST-219	.90

**COMPLETE KITS** 6 FM Coils.....**\$12.95**  
11 TELEVISION Coils.. **19.95**

With Circuit Diagrams and Instructions

**NATIONAL'S Revolutionary MB-150**  
**MULTI-BAND TANK CIRCUIT**

Single Rotation . . . tunes 80 to 10 meters without chang-  
ing coils. Amateur Net .....**\$18.75**

E-M-I is famous for New Electronic Items, Bargains,  
Service, the finest equipment of National, Millen, Weston,  
Thordarson, Johnson, Cornell-Dubilier and many others.  
Order by mail, phone, wire or in person.

Terms: 20% cash with order — balance C.O.D.  
If "not in stock" we'll refund by check — not credit slip.

**EMI** **ELECTRONIC**  
**MARKETERS, Inc.**

190 VARICK STREET, NEW YORK 14, N. Y.

Phone: WAtkins 4-4540

78) On motion of Mr. Reid, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of this date, the additional sum of five hundred dollars (\$500) for the legitimate administrative expenses of the Canadian General Manager for the calendar year 1948, any unexpended remainder at the end of the year to be restored to surplus.

79) Moved, by Mr. Noble, that on future polls of opinion on c.w.-'phone allocations on the 3.5- and 14-Mc. bands, the poll be restricted (for each band) to those who spend at least 20% of their operating time on the band in question. But, after discussion, with unanimous consent, Mr. Noble withdrew the motion.

80) On motion, of Mr. Noble, VOTED that all future questionnaires conducted by the League in QST shall be accompanied by two separate articles, written by separate writers, one giving the "pros" and the other "cons", of the question involved.

81) Moved, by Mr. Matejka, that our QSL Managers who are located within the continental United States be invited to attend the National Convention at Milwaukee with traveling expenses and hotel costs allowed by the League as a gesture of good will. But, after discussion, the motion was rejected, Messrs. Collett and Ladley asking to be recorded as voting in the affirmative.

82) On motion of Mr. J. M. Johnston, unanimously RESOLVED that this Board extends its sincere thanks to Mr. Warner and his assistant, Mr. Budlong, for their outstanding work and achievements in representing the League at the International Telecommunication and Radio Conferences at Atlantic City.

83) On motion of Mr. Groves, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of this date, the additional sum of two hundred dollars (\$200) for the legitimate administrative expenses of the director of the West Gulf Division for the calendar year 1948, any unexpended remainder at the end of the year to be restored to surplus.

84) On motion of Mr. Canfield, unanimously VOTED that there is hereby appropriated from the surplus of the League, as of this date, the additional sum of two hundred dollars (\$200) for the legitimate administrative expenses of the director of the Delta Division for the calendar year 1948, any unexpended remainder at the end of the year to be restored to surplus.

85) The Chair announced that he appointed to the Building Committee, established by an earlier action of the Board, Mr. McCargar as chairman and, as members, Messrs. Doeland, Matejka, Noble and Shelton.

86) Proceeding now to the election of president and vice-president: On motion of Mr. H. W. Johnston, two-thirds concurring, Special Rule A was SUSPENDED. Nominations for president being in order, Mr. J. M. Johnston nominated Mr. Bailey. Mr. Collett nominated Mr. Noble. Mr. Noble withdrew his name. On motion of Mr. Reid, unanimously VOTED that the nominations are closed. On motion of Mr. Caveness, unanimously VOTED that George W. Bailey is declared elected as president of the League for a term of two years or until his successor is duly elected. Mr. Bailey spoke briefly in appreciation. (Applause)

87) Nominations for vice-president being in order, Mr. Noble nominated Mr. McCargar. On motion of Mr. Jepsen, unanimously VOTED that the nominations are closed. On motion of Mr. Caveness, unanimously VOTED that J. Lincoln McCargar is declared elected as vice-president of the League for a term of two years or until his successor is duly elected. Mr. McCargar spoke briefly in appreciation. (Applause)

88) Whereupon, on motion of Mr. Caveness, the Board adjourned, sine die, at 5:57 p.m.

89) (In the course of its deliberations the Board, either as a Board or as a Committee of the Whole, also discussed, without formal action, the desirability of retaining Class A, the future of s.s.s.c., policy re 7-Mc. operation under Atlantic City allocations, opening part of 75-meter 'phone to Class B, emergency traffic planning, Latin 'phone allocations, Canadian 'phone allocations, allocation possibilities below 10 kc., the 7-Mc. 'phone question and divisional polls. Time in session, as a Board, 12 hrs., 30 mins.; as a Committee of the Whole, 5 hrs., 12 mins.; total time, 17 hrs., 42 mins. Total appropriations, \$33,950.)

*W. Warner*

Secretary



# HOT RADIO VALUES *at Sun Radio*

## CRYSTALS!

In the greatest purchase of radio transmitting crystals ever made by one wholesaler in the history of the Radio Parts Industry, Sun Radio acquired title to over a half million dollars (\$500,000.00) of Army Surplus, precision built, exactly tooled crystals in moisture proof holders which are shock mounted. Please note that crystal shipments of 6 or less are packed in cloth containers to expedite handling. . . . No worry because all crystals are shock mounted and guaranteed delivered perfect. All crystals have Army MC harmonic ratings but Sun encloses directions for deriving the correct fundamental frequency in kilocycles.

### CRYSTALS WITH A MILLION USES

Fractions Omitted											
kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc
412	420	429	437	445	459	470	479	490	497	506	516
413	422	430	438	446	466	472	481	491	498	507	518
414	423	431	440	447	468	473	483	492	501	508	519
415	424	433	441	448		474	484	493	502	509	522
416	425	434	442	451		475	485	494	503	511	523
418	426	435	443	453		477	487	495	504	512	
419	427	436	444			488	496	505	515		

**49¢**  
each

I.F. Frequency Standards			Crystal Frequency Standards 98.356kc			For Crystal Controlled Signal Generators 525kc		
kc	kc	kc	kc	kc	kc	kc	kc	kc
450	454.166	461.111	Easily altered for 100 kc Standard mounted in low loss 3 prong holder.			526.388	531.944	536.111
451.388	455.556	464.815				527.777	533.333	537.500
452.777	459.259	465.277				529.166	534.722	538.888
						530.555		

99¢ each

\$3.89 each

99¢ each

ASSORTED MISCELLANEOUS CRYSTALS				FOR HAM AND GENERAL USE					
Fractions Omitted				Fractions Omitted					
372kc	376kc	381kc	384kc	387kc	390kc	395kc	402kc	405kc	408kc
374	377	383	386	398	391	396	403	406	409
375	379				392	398	404	407	411
					393	401			
					394				

39¢ each

79¢ each

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

CRYSTALS FOR SCR 522	
5910kc	7350
6370	7480
6450	7580
6610	7810
	7930

\$1.29 each

CRYSTALS FROM BC 610				
3/4" Spacing — 2 Banana Plugs				
2045	2258	2360	2532	3250
2105	2260	2390	2545	3322
2125	2282	2415	2557	3510
2145	2300	2430	3202	3520
2155	2305	2435	3215	3550
2220	2320	2442	3237	3570
				3580
				3945
				3955
				3995

\$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.

### ATTENTION: CLOSEOUT SPECIALS ON PARTS KITS

- KIT No. 1 Asstd Mica Condensers — Unmarked, 100 for... \$1.50
- KIT No. 2 Asstd Resistors 1/2 W-1W, 100 for... \$1.00
- KIT No. 3 Asstd Condensers — Tubular By-pass, 25 for... \$1.00
- KIT No. 4 Asstd Condensers — Electrolytic, 25 for... \$2.00
- KIT No. 5 Asstd Potentiometers — with or without switch, 10 for... \$1.00
- KIT No. 6 Asstd Ballast Tubes — Line Ballast, 10 for... \$1.00
- KIT No. 7 Asstd Hardware — Screws, Rivets, Nuts, etc., 10 lb. for... \$1.00
- KIT No. 8 Octal Sockets — Wafer 25 for... \$1.00
- KIT No. 9 Octal Sockets — Plastic with Flange, 20 for... \$1.00

SPECIAL!! All 9 Kits for \$9.00

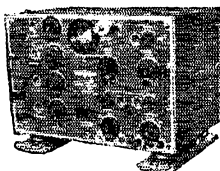


### TS-13 HANDSET

Combining a 200 ohm carbon mike and 2500 ohm earphone with butterfly switch for talk-listen. Has 6" flexible rubber cord with 1-PL55 and 1-PL68 plugs attached. BRAND NEW... \$2.95

## 100 WATT BENDIX TRANSMITTER

4 Separate E.C.O.

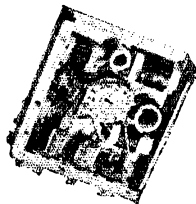


These can be easily converted to 20-40-80 meters. Crystal required for 10 meters. Each electronic coupled oscillator dial has 3000 divisions enabling quick precision shifting. This transmitter built with laboratory precision. Four separate output tanks; one 4-position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. — BRAND NEW, complete with tubes... \$49.95



## SCR-522 VHF TRANSCEIVER

Tunes 100-156 Mc. Don't confuse these with other incomplete and abused 522s. Sun Radio offers electronically perfect and guaranteed 522s... AND COMPLETE with tubes, remote control box, 28 volt dynamotor (can be converted to 110 V operation), 4 crystals and ALL CABLE CONNECTORS but less cable... \$39.95



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A wealth of expensive parts. Contains: 6-A.P.C. Condensers, 6-coils, 3 or more mica condensers and resistors, 1-porcelain two gang wafer switch and dozens of other useful units... \$1.29



## Build Your Own LABORATORY TYPE

### DYNAMIC MUTUAL CONDUCTANCE TUBE TESTER

You've been waiting for this chance to get one of these brand new 3" round foundation meters calibrated in micromhos with Good-Bad Scale. Complete with schematic only... \$9.50

## RHOMBIC ANTENNAE

Complete with all accessories including 2200 feet of No. 14 copper weld wire, 50 feet of heavy twin X lead 72 ohm good up to 2 KW, dozens of insulators, pulleys, neon lightning arrestors, ground rod, less poles, only... \$24.95

\* 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.



## PANEL METERS

ALL BRAND NEW AND GUARANTEED

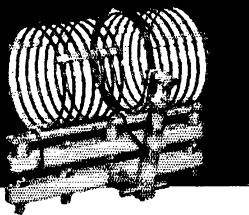
GE	2" Round	0-500 D.C.-M.A.	\$2.97
Simpson	2" Round	0-15 D.C.-V.	2.97
Triplett	2" Square	0-40 D.C.-V.	2.97
Sun	2" Round	0-300 D.C.-V.	2.97
GE	3" Square	0-150 A.C.-V.	3.49

# SUN RADIO

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

# New JOHNSON INDUCTORS

**MATCH**  
Coil to Tube  
Link to Line



JOHNSON'S new and comprehensive line of inductors and "plug-in" swinging link assemblies bring to the amateur the same efficiency achieved in commercial and broadcast components.

This efficiency is secured by the use of two fundamental types of inductors for each band — inductors for use with either high voltage low current tubes or inductors for use with low voltage high current tubes. Each of these models is available in 150, 500 and 1,000 watt ratings.

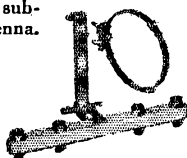
Another great feature is the matching of "plug-in" link to feed line. The new JOHNSON Inductor Catalog provides the information necessary to select the "plug-in" link that will best match a particular inductor to any feed line ranging from 50 to 600 ohms impedance.

A complete line of semi-fixed link inductors is also available.

All inductor components, including hardware, are spaced to fit conventional, present day jack and plug assemblies in their respective ratings and can be purchased individually.

You'll find that the new matched JOHNSON coils and "plug-in" links will put substantially more RF in your antenna.

See them at your dealer  
or write for new JOHN-  
SON AMATEUR INDUC-  
TOR CATALOG



**E. F. JOHNSON CO.**  
WASECA, MINNESOTA

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## INSTRUCTOGRAPH COMPANY

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## Member Party

(Continued from page 53)

### ROANOKE DIVISION

<i>North Carolina</i>	
W4KJS	9,728-38-78
W4GG	9,672-39-74
<i>South Carolina</i>	
W4FNS	12,573-49-115
<i>Virginia</i>	
W4KFC	75,208-68-503
W4IFC	27,328-56-194
W4IA	25,704-68-165
W4FF	24,624-54-203
W4WO	19,864-52-191
W4NCR	4,000-20-50

### West Virginia

W8JJA	26,220-57-180
W8BTV	5,632-44-64
W8CSF	3,200-20-30
W8HTG	2,184-21-27
W8AVW*	210-5-8

### ROCKY MOUNTAIN DIVISION

#### Utah-Wyoming

W7LE	16,020-45-128
W7JQU	11,760-40-122
W7KIY	9,438-39-71
W7FST	8,156-42-59
W7UTM	6,230-30-51
W7FYR	928-16-29
W7KHI*	900-18-25

#### Colorado

W6CDP	25,064-52-191
W6SJT	12,848-44-95
W6SGG	6,420-30-57

### SOUTHEASTERN DIVISION

#### Alabama

W4FIJ	25,986-61-163
W4MXU	19,110-49-143
W4FBZ	550-5-10

#### Eastern Florida

W4BRB	50,927-67-331
W4GOG	39,065-65-303
W4FNQ	25,742-61-161
W4FNR	21,315-49-193
W4BYF	18,020-53-120
W4FWZ	16,080-48-143
W4MVQ	15,150-46-140
W4IKI	3,070-15-19
W2WWY/A	1,648-16-27

#### Western Florida

W4BGO	37,524-59-268
W4TLL	19,152-56-173
W4AXP	2,808-18-28

#### Georgia

W4GGD	16,200-45-130
W4DXI	11,528-44-106
W4IRT	420-5-17

#### West Indies

K84AI	20,532-59-248
CM28W	14,229-51-141
HE2CW	9,120-39-95
KP4kd	4,474-37-76
CM8DL	3,570-17-80

### SOUTHWESTERN DIVISION

#### Los Angeles

W6AOA	53,584-68-344
W6DTY	24,576-66-169
W6VAQ	22,620-58-170
W6SP8	19,926-54-136
W6AM	15,268-48-136
W6TIP	13,442-47-143
W6WOO	7,098-31-64
W6CMN	4,120-29-54
W6ACL	3,128-34-46
W6LVQ	1,062-13-14
W6YVJ	576-8-11
W6JZT	154-8-9

<i>Arizona</i>	
W7QAP	23,370-57-203

#### San Diego

W6EPZ/5	58,926-69-377
W6MI	14,000-50-115
W6BGF	1,620-15-29

### WEST GULF DIVISION

#### Northern Texas

W5A WT	29,795-59-215
W5JD	22,512-56-176
W5LIU	15,402-51-151
W5OBP	3,402-21-32
W5ATW	24-6-2

#### Oklahoma

W5AQE	32,830-60-224
W5LW	15,680-49-160

#### Southern Texas

W5ACL	32,760-63-210
W5NTY	24,255-63-143
W5NQL	21,870-54-179
W5NNK	6,460-38-60
W5FEWZ	4,008-24-34
W5CD	2,584-17-26

#### New Mexico

W5NXXE	16,300-50-114
W6WIO/5	10,664-43-99
W5ZU	7,896-42-69
W5SMA	4,266-27-54
W5OAI	4,030-26-53

### CANADA

#### Maritime

VE1PA	26,892-54-199
VE1EK	14,760-41-155
VE1IM	14,022-41-122
VO8FP	12,464-38-139
VE1IG	7,920-40-75
VE1IC	6,906-38-81
VE1DB	5,858-29-51

#### Ontario

VE3EF	53,300-65-360
VE3AEM	42,098-62-288
VE3AWE	27,068-57-237
VE3ACR	21,670-55-147
VE3BHX	21,492-54-199
VE3ATR	16,892-41-156
VE3DH	9,735-33-123
VE3AKB	9,477-39-98
VE3BBQ	8,960-40-62
VE3GT	8,769-37-70
VE3FED	6,048-28-58
VE3DU	5,668-26-84
VE3AMK	1,825-25-37
VE3BAJ	1,098-9-11
VE3AQB	1,946-11-18

#### Quebec

VE2QL	18,984-42-176
VE2GM	11,226-38-103
VE2BB	500-8-10

#### Alberta

VE6EE	21,175-55-143
VE6MJ	840-10-17

#### British Columbia

VE7ABU	29,184-57-206
VE7SW	23,838-58-156
VE7IP	20,043-56-154
VE7ZZ	12,376-52-119

#### Yukon

VE8NN*	2-1-1
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#### Mantoba

VE4RX	17,808-53-188
VE4AM	9,028-37-72
VE4EA	5,986-41-79
VE4DG	1,830-25-35

#### Saskatchewan

VE5OZ	30,856-58-216
VE5DW	14,602-49-124
VE5MQ	7,220-38-95

## 25 Years Ago

(Continued from page 53)

Strays: A pickle bottle, with clamp attachments, makes an ideal antenna insulator. . . . A "revolutionary" new device, a motor-driven synchronous rectifier, has appeared on the market.

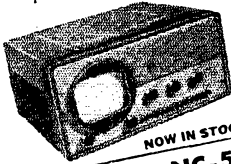
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## Washington's Big New Radio Parts Distributors Has All The Greatest Names In Radio!

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The only Television Receiver with  
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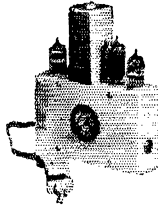


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RECEIVER**  
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### RME-NBF-4 .. \$19.50 NET



Narrow Band  
FM and AM  
either one with  
a flip of the  
switch, bring  
your RME-45  
up to date with  
this plug in unit

**5BP4 Tubes . \$1.89**

Socket for . 5BP4 54¢



**Air King Portable  
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**\$90.81 net**

Just right for recording  
that DX contact—makes a  
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LANSING • XCELLITE • KRAUETER • SPRAGUE • BELDEN •

**The Right Quality Bracket  
For Every Job**

## JOHNSON-GOTHARD

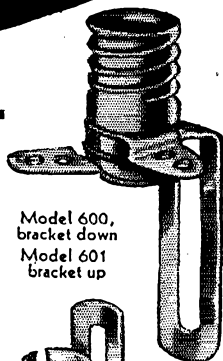
SERIES 600

### INDICATOR LIGHT BRACKET ASSEMBLIES

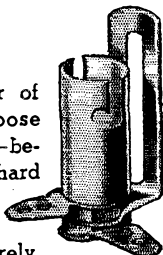
There's no danger of a short circuit—no loose terminals possible—because Johnson-Gothard terminals are fixed.

Each terminal is securely locked in position by means of an octagonal Bakelite washer which provides greater insulation, at the same time registering with one of the embossed ridges in the bracket to prevent terminal turning. Socket, terminals and bracket are all brass construction.

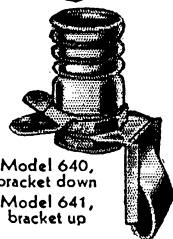
Johnson-Gothard catalog fully describes the complete line of Indicator Light Bracket Assemblies and many other styles of Indicator Lights—write for it.



Model 600,  
bracket down  
Model 601  
bracket up



Model 610,  
bracket down  
Model 611,  
bracket up



Model 640,  
bracket down  
Model 641,  
bracket up

**JOHNSON**  
*a famous name in Radio*

E. F. JOHNSON CO., WASECA, MINN.



## ELECTRICITY

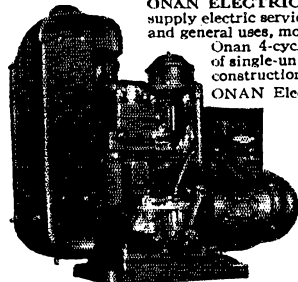
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Onan 4-cycle gasoline engines, they are of single-unit, compact design and sturdy construction.

ONAN Electric Plants are available in many sizes and models.

ALTERNATING CURRENT: 350 to 35,000 watts in all standard voltages and frequencies. DIRECT CURRENT: 600 to 15,000 watts. 115 and 230 volts. BATTERY CHARGERS: 500 to 6,000 watts; 6, 12, 24, 32 and 115 volts. Write for detailed literature or engineering assistance.



**D. W. ONAN & SONS** 4673 Royalston Ave. Minneapolis 5, Minn.

## Single Sideband

(Continued from page 87)

decent antenna and fellows who tell him his n.f.m. is out of adjustment when he is on s.s.s.c.!

Several fellows are on with homemade-filter jobs, to their eternal credit as good hams and capable experimenters. Out in Montana, s.s.s.c. really paid off for W7JCU. On 75 'phone with 500 watts peak input, he has worked Alaska and England (G8VB), as well as a considerable portion of the U. S. Dale also can be found on 20 around 14,250 kc. . . . Dick of W3ASW (Harrisburg, Pa.) runs 200 watts peak to a pair of 807s on 3871 kc., and can be found any evening from 6 to 8 P.M. EDST, with some occasional Saturday and Sunday morning operation. Biggest trouble, as with everyone else, is in getting fellows to listen properly, but W3IBM, W3MUF and W4KHR have been big helps. . . . In Minneapolis, WØTLE started out on 10 'phone with his s.s.s.c. with fair results locally, but should be on 75 by this time. An 807 drives a pair of 813s in the final.

W6DHG (Santa Barbara) is using the phasing system in his rig (see his description elsewhere in this issue) and has worked both 75 and 20. The final is a pair of 4-250As running a kilowatt peak, and on 20 he generally hangs out around 14,210 kc., although he uses VFO. Some receiver work, with an eye toward duplex, is in progress.

In Connecticut, W1DX has been on 14,235 and 14,260 evenings with a filter job driving a pair of 4-250As to a kilowatt peak. Barring a feeling at times of being the loneliest guy on the 20-meter band, and a few suggestions that the n.f.m. isn't working, some nice contacts around the country have been had. Best DX is W6DHG and VP2GE/VP2GB. In July, regular operating times will be the week-end times suggested by W1SZ. —B.G.

## V.H.F. Sweepstakes

(Continued from page 63)

### Club Scores

The special gavel award offered to the club that submitted the highest aggregate score of members was won by the Frankford Radio Club of Philadelphia with 7384 points. The Amateur V.H.F. Institute of New York gave F.R.C. some stiff competition and, scoring 7007 points, took second place. A total of 5963 points earned third place for the Union County Amateur Radio Association of New Jersey. Other clubs that submitted entries are listed in an accompanying tabulation together with the calls of individual members who are being awarded certificates for the highest score within their respective groups.

Now that the pace has been set, the next V.H.F. SS should provide even livelier competition for the section and club awards. As we complete the checking of entries in this contest, the May V.H.F. Party has just been concluded. See "The World Above 50 Mc." in

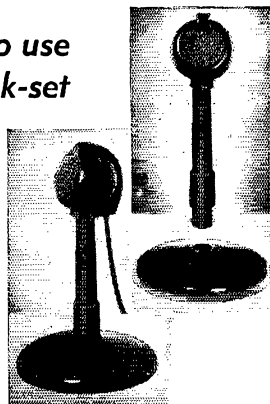
(Continued on page 128)

as convenient to use  
as a fountain-pen desk-set

## TURNER MODEL 35X FIREBALL

crystal desk mike with detachable base

Handsome and handy . . . and low priced too! It's a desk mike, it's a hand mike bringing high convenience to amateur communications. A quarter turn releases handle from base or locks it securely. High quality crystal circuit for voice and music pickups. Response: 70-7000 c.p.s. Level: 52 db below 1 volt/dyne/sq. cm. Richly finished light-weight die cast case, handle and stand. Complete with 7 ft. attached cable at \$13.25 list.



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Microphones licensed under U. S. patents of the American Telephone and Telegraph Company, and Western Electric Company, Incorporated. Crystals licensed under patents of the Brush Development Company.

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## • ALL-PURPOSE PORTABLE ELECTRIC POWER UNIT . . . 3 KVA

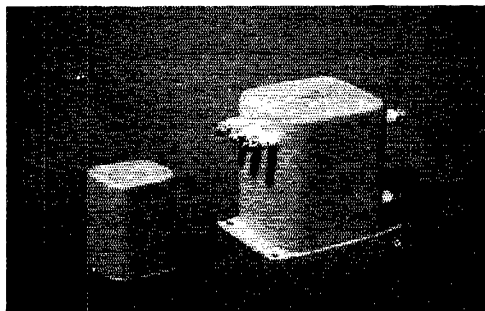
- Generator: 3KVA, 115, 120, or 125 volts, 3-phase, 60 cycles, 1200 r.p.m. (or 50 cycles at 1100 r.p.m.).
- Engine: Gasoline, 4-cylinder (Hercules Model ZXB) 9.5 h.p. at generator speed: 2 1/4" bore, 3" stroke, 64.9 cu. in. displ.
- Equipment: starting motor and generator for use with vehicle type 6-v. battery (battery not incl.). Oil filter, oil bath air cleaner; manual choke control; gas gauge on tank; gasoline strainer.
- Control Panel: main switch; circuit breaker and fuses; frequency meter; voltmeter and ammeter, charging ammeter, oil pressure gauge.
- Electrical Characteristics: Wiring, lights, small motors (either 3-phase or single-phase), and appliances served from these units can be used on most power company lines.

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## MODULATION & DRIVER TRANSFORMERS



These transformers are suitable for use with type 811, 809, TZ40, TZ20, etc. to modulate either triode or beam tube RF amplifiers. Two secondaries are provided. Impedance ratio primary to secondary number one, 2 to 1. Primary to secondary number two, 16 to 1. Will modulate up to 300 watts input. Modulation transformer, driver transformer, circuit diagrams and other information all for . . . . . \$6.90 Please include 50 cents for postage and handling.

Send full amount to speed delivery and save C.O.D. charges. Shipped only in the U. S., its possessions and Canada.

**ELECTRONIC NAVIGATION, INC.**

Box 735, Church Street Station  
New York 8, N. Y.

# GET READY FOR THIS SUMMER'S DX RECORDS ON 2 METERS WITH A 32 ELEMENT BEAM

weighing only 18 lbs.; amplifies the transmitted and received power 91 times; price \$60 shipped prepaid. Size, 12 ft. high, 10 ft. wide.

Also available in 16 ELEMENTS, weight 9 lbs.; power gain over a folded dipole is 40, price is \$35 shipped prepaid. 8 el. weighs 4 lbs. \$20.

The owner of one of these beams has already WORKED YARMOUTH, NOVA SCOTIA, FROM NEW YORK, IN APRIL, THIS YEAR, ON 2 METERS!

K2UN, The United Nations Stations at Lake Success, N. Y., installed our WIDE-SPACED TEN-OVER-TWENTY beams.

### WHY?

Because of HIGH POWER GAIN and NO TUNING TO DO.

"Listen to the man who owns one"

NO TUNING TO DO ON ANY OF THESE BEAMS! JUST PUT UP AND USE!

Send for literature

## U.H.F. RESONATOR CO.

GUION ROAD

RYE, N. Y.

W. F. HOISINGTON, W2BAV

this issue for highlights of that affair. Watch for announcement of the dates for the Second SS. Meanwhile, plan to take part in the V.H.F. Contest scheduled for September 25th. The three contests per year now on the v.h.f. activities calendar are designed to increase activity on the bands above 50 Mc. Get in there and do your part toward making the September shindig as successful as the First V.H.F. Sweepstakes!

### SCORES

#### A.R.R.L. V.H.F. SWEEPSTAKES

(Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . The number of stations and number of sections worked by each participant are given following the score. . . . Letters indicate band or bands used: A for 50, B for 144 and C for 235 Mc.)

#### ATLANTIC DIVISION

<i>B. Pennsylvania</i>	
W3BES	1116-141-4-A-B
W3NAH	820-108-4-A-B
W3NSI	778-97-4-A-B
W3PCG	763-57-3-B
W3DHM	568-71-4-A-B
W3FUF	496-57-4-A-B
W3MCU	472-51-4-A-B
W3ISE	345-58-3-B
W3KXN	331-57-3-B
W3ASD	320-55-3-B
W3IZU	318-54-3-B
W3LFC	315-53-3-B
W3EQA	282-47-3-B
W3FDN	228-38-3-B
W3GBS	220-35-3-B
W3CUL	204-34-3-B
W3VR	174-29-3-B
W3IBU	141-24-3-B
W3LWF	134-24-2-B
W3IND	146-22-2-B
W3GHD	72-18-2-A-B
W3BXE	60-13-2-A-B
W3NAD	52-15-2-B
W3KMI*	44-11-2-B
W3IRS	42-11-2-B
W3BHP*	36-9-2-B
W3FLH	10-5-1-A

W3VNL 40-10-2-B

W3UHC 30-15-1-B

#### CENTRAL DIVISION

<i>Illinois</i>	
W9WFC	228-58-2-B
W9OBW	220-56-2-B
W9AOW	81-42-1-B
W9OW	72-18-2-B
W9NFK	70-35-1-B
W9LWE	68-34-1-B
W9GTA	64-32-1-B
W9ALR	59-30-1-B
W9WJM	54-27-1-B
W9KCV	47-24-1-B
W9CWP	46-23-1-B
W9JGJ	46-23-1-B
W9MMV	46-23-1-B
W9CT	40-20-1-B
W9BZK	32-16-1-B
W9PMP	30-15-1-B
W9JFG	28-14-1-B
W9VGS	28-14-1-B
W9OER	25-13-1-B
W9HKO	24-12-1-B
W9JTQ	24-12-1-B
W9UMD	24-12-1-B
W9GTS	22-11-1-B
W9KJU	22-12-1-B
W9WFE	2-1-1-B

#### *Md.-Del.-D. C.*

W3JDP	480-69-4-B
W3CGV	384-48-4-A-B
W3GKP	243-43-3-A-B
W3AHQ	168-21-4-B
W3MKL	160-16-5-A-B
W1KML/3	158-16-5-A
W3MSR	146-32-2-B
W3AWS	132-33-2-B
W3KWF	120-30-2-B
W3LTR	118-29-2-B
W3HB	102-26-2-B
W3MLK	96-24-2-B
W3LW	86-22-2-B
W1MBR/3	80-21-2-B
W3MHV/MM	76-19-2-B

W9JMS	24-8-2-A-B
W8ZHL	14-7-1-A-B
W9UIA	8-4-1-A-B
W9AB	4-2-1-B
W9RT*	1-2-1-A

#### GREAT LAKES DIVISION

<i>Kentucky</i>	
W4BPE	3-1-B
W4FRJ	5-3-1-A-B
W4MRI	5-3-1-A-B

#### *Ohio*

W8SFG	392-49-4-A-B
W8WSE	150-25-3-A-B
W8BGJ	132-22-3-B
W8QYD	72-12-3-A
W8NTZ*	34-9-2-B
W8RMO	6-3-1-B
W8YEV	4-1-1-B

#### HUDSON DIVISION

<i>Et. New York</i>	
W2RH	1200-124-5-B
W2CLD	544-68-4-B
W2FCG	340-34-5-B
W2KXY	190-19-5-A-B
W2AFI	90-15-3-B
W2JPX	51-9-3-A
W2GBK	48-8-3-A
W2VGE/2	32-16-1-B
W2WAI	27-13-1-B
W2EPU	26-13-1-B
W2RYT	24-4-3-A
W2CRE	22-11-1-B
W2MAD	20-10-1-B
W2ACB	8-4-1-B

#### *N. Y. C. & L. I.*

W2ORH	1155-124-5-B
W2FCW	995-100-5-B
W2WEH	890-89-5-B
W2PFX	840-84-5-B
W2AOD	768-96-4-B
W2CDS	740-74-5-B
W2GQP	736-92-4-B
W2CET	680-85-4-B
W2WY	672-85-4-B
W2LEJ	640-64-5-B
W2HG/2	552-69-4-B
W2VOT	488-61-4-B

#### *So. New Jersey*

W3EKK/2	800-100-4-A-B
W2PAU	740-75-5-B
W2LDZ	492-37-6-A-B
W2PZK	418-52-4-A-B
W2SAI	396-66-3-A-B
W2DZY	365-39-5-B
W2PWF	208-26-4-A
W2RQ	186-29-3-B
W2TNN	144-24-3-A-B
W2BAY	88-11-4-A
W2UNT*	12-3-2-B
W2DCA*	2-1-1-B

#### *W. New York*

W2QNA 100-25-2-B

#### *W. Pennsylvania*

W3KT	552-67-4-A-B
W3RUE	225-38-3-B
W3CTN	124-31-2-B
W3GEG	92-23-2-B
W3NCD	92-23-2-B
W3KWL	80-23-2-B
W3KAI	86-22-2-B
W3KGA	84-21-2-B
W3EJF	76-19-2-B
W3TVG	76-19-2-B
W3MQW	72-18-2-B
W3LZE	60-15-2-B
W3CKI	48-12-2-B
W3LNA	48-12-2-B
W3LIF	44-11-2-B
W3TNG	40-10-2-B

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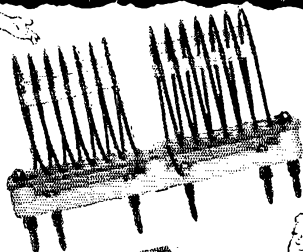
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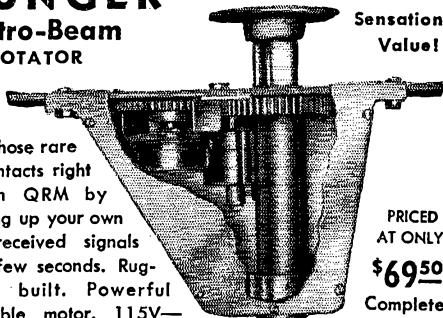
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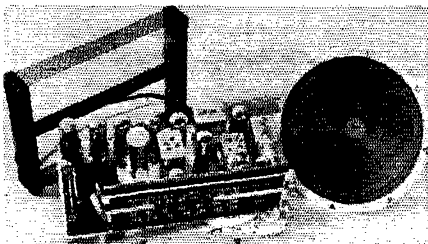
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W2TZT	360-45-4-B	WIFKS	34-17-1-B
W2JZX	352-44-4-B	WIQFO	33-13-1-B
W2AUF	336-42-4-B	WIFLX	12-6-1-B
W2WVN	216-27-4-B	WIMUB	12-6-1-B
W2WLS	204-26-4-B	WIALP	10-3-1-B
W2BQ	180-30-3-B	WIFRC	6-3-1-B
W2NGA	168-25-4-B		
W2TUK*	162-27-3-B	<i>W. Massachusetts</i>	
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W2ANN	156-26-3-B	WIQXE	570-57-5-B
W2QHZ	120-30-2-B	WIFCT	117-19-3-B
W2EPF	106-27-2-B	WIMTX	64-8-4-A-B
W2LGL	96-16-3-B	WIQCC	52-13-2-B
W2APM	56-14-2-B		
W2ATI	44-11-2-B	<i>New Hampshire</i>	
W2AIQ	40-10-2-B	WILSN	210-21-5-A
W2UGP	16-8-1-B	WIJYA	78-13-3-B
W2NXZ*	10-5-1-B	WIKEX	54-9-3-A-B
W2WVZ*	2-1-1-B		
W2WVQ	2-1-1-B	<i>Rhode Island</i>	

<i>No. New Jersey</i>		WIIQZ	500-64-4-A-B
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W2CHC	220-35-4-B	W7HUY*	4-2-1-B
W2BNA	220-35-4-B		
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W2UWN	189-32-3-B	W7AXS	26-13-1-A-B
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W2RQP	18-9-1-B		
W2BAI*	6-3-1-B	<i>East Bay</i>	

**MIDWEST DIVISION**

<i>Iowa</i>		W6ZRH	86-11-3-B
W6CYL	10-5-1-B	W6TV	60-10-3-A
<i>Kansas</i>			
W6GWS	4-2-1-A	<i>San Francisco</i>	
W6OZA	4-2-1-A	W6YHI/6	305-32-5-B
		W6CFW	280-32-5-A-B
		W6BDR/6	224-32-4-A-B
		W6DIX	220-24-5-A-B
		W6UYK/6	70-7-5-B
		W6TEL	28-7-2-B
		W6VEY	24-6-2-A
		W6GGE	12-3-2-B
		W6SVO*	4-1-1-B
		W6VXI	2-1-1-B
		<i>Sacramento Valley</i>	
		W6YLO	280-28-5-B
		W6PFI	152-18-4-A-B
		W6AUG	120-15-4-B
		W6DLB	6-3-1-B
		<i>San Joaquin Valley</i>	
		W6EXH	26-22-5-B
		W6PYM	130-13-5-B
		W6EEX*	6-3-1-B

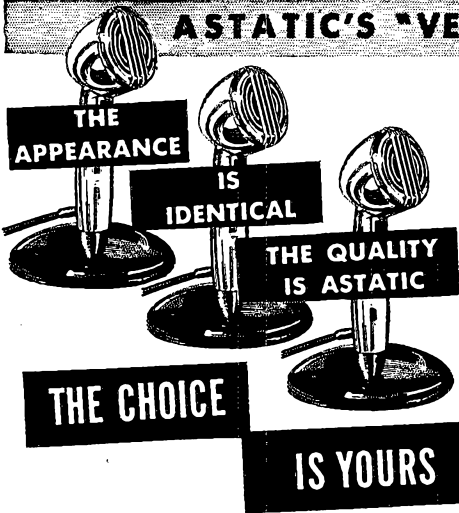
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W1MRP	80-8-4-A-B	W4LVA	136-34-2-B
W1MBK	58-14-2-B	W4KFT	104-28-2-B
W1OIA	18-9-1-B	W4LND	26-24-2-B
W1DQ	*1342-61-1-B-C	W2SYJ/4	90-22-2-A-B
W1BDI*	76-16-2-A-B	W4JUY/4	76-19-2-B
W1EH*	44-11-2-B	W4LUE	64-16-2-A-B
W1FVH*	20-10-1-B	W4MIZ	60-15-2-B
		W4KXN	52-13-2-B
		<i>W. Virginia</i>	
<i>Maine</i>		W8TDJ	18-3-3-A-B
W1EIO	60-9-3-A-B		
<i>E. Massachusetts</i>		<b>ROCKY MOUNTAIN DIVISION</b>	
W1MON	1068-88-6-B	<i>Utah-Wyoming</i>	
W1ATP	1056-88-6-A-B	W7PJS	28-14-1-A-B
W1OOP	832-104-4-A-B-C	W7QDD	23-12-1-A-B
W1AAR	680-68-5-B		
W1AQE	600-75-4-B	<b>SOUTHEASTERN DIVISION</b>	
W1PIV	570-58-5-B	<i>East Florida</i>	
W1BKR	536-67-4-B	W4RID	6-3-1-A-B
W1AFA	450-45-5-A-B		
W1DJ	420-35-6-A-B	<i>West Florida</i>	
W1YCY	400-40-2-B	W4EQR	6-2-1-A-B
W1NWL	400-40-5-A-B	W4CNK	5-3-1-A-B
W1CTW	380-44-4-B-C		
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W1IPZ	102-17-3-B		
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241	Crystal	Optional	5 Meg.	-50 db.	30-10,000*	8"
VC	Ceramic	Optional	5 Meg.	-62 db.	30-10,000	8"
VC1	Ceramic	Optional	5 Meg.	-62 db.	30-10,000*	8"
VDL	Dynamic	No	50 ohms	-50 db.	30-10,000	8"
VD2	Dynamic	No	200 ohms	-50 db.	30-10,000	8"
VDS	Dynamic	No	500 ohms	-50 db.	30-10,000	8"
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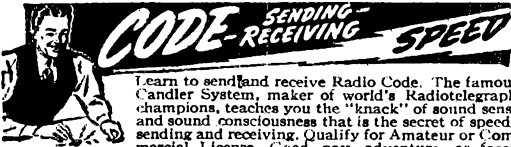
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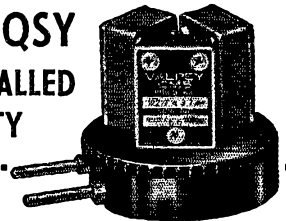
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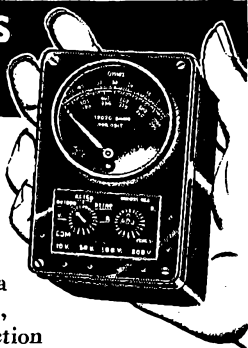


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W9BZN/6 66- 19-2-B  
W6BCT\* 16- 8-1-B  
W6BWG 10- 5-1-A

*San Diego*  
W6IV 76- 18-2-A-B  
W6ULX 46- 12-2-B  
W6MFK 4- 2-1-B

### WEST GULF DIVISION

*Southern Texas*  
W5FNA 10- 5-1-A

### CANADA

*Ontario*  
VE3AIB 164- 38-2-A-B

VE3KM 148- 37-2-A-B  
VE3AZP 73- 18-2-B  
VE3AQQ 68- 17-2-B  
VE3APP 50- 25-1-A  
VE3ANY 62- 31-1-A-B  
VE3AXT 46- 23-1-A  
VE3AFE 44- 22-1-A  
VE3BOP 44- 22-1-A  
VE3BRU 44- 22-1-A  
VE3DJ/ 43- 22-1-A  
VE3RFF 42- 21-1-A-H  
VE3QT 40- 10-2-B  
VE3AND 35- 19-1-A-B  
VE3OJ 32- 8-2-A-B  
VE3ATB 30- 15-1-A  
VE3BKM 22- 11-1-A  
VE3AEZ 12- 6-1-A  
VE3BGT 12- 6-1-B  
VE3BCN 10- 5-1-A  
VE3PC 10- 5-1-A  
VE3ABP 9- 5-1-A

### Maritime

VE1QZ 8- 3-1-A-B  
VE1SF 4- 2-1-A-B

\* Hq. staff member; not eligible for awards.

## 50 Mc.

(Continued from page 88)

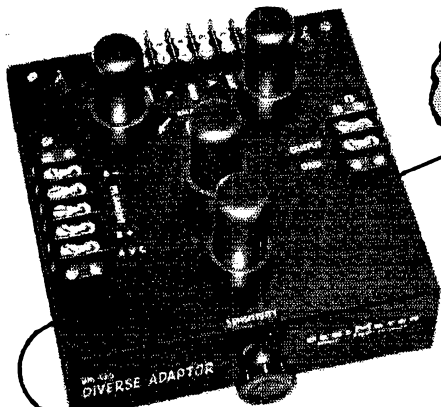
indicated better results with the verticals.

*El Paso, Texas* — About 20 stations are now active in this area on 144 Mc. W5LWP writes that a chain of stations is being lined up through Southern New Mexico and Arizona for the ARRL Field Day.

*Shiloh, Ohio* — What would appear to be the receiver to end all receivers is now in use on 144 Mc. at W8WXV. Al used up most of three surplus jobs to build just part of it. Removing the tuning condenser from a BC-453, he put it into a 455, to make it tune from 4 to 8 Mc. and this became the tunable portion of the set-up. Then he replaced the r.f. coils in the 453 with 175-kc. i.f. transformers. The b.f.o. in the 455 was made into a mixer to give 175-kc. output, which feeds into the 453. A 454 was torn completely down and a 144-Mc. bandpass converter built on its chassis, the line-up of this unit being two 6J4 grounded-grid r.f. stages, a 6AK5 r.f. stage, and a 9003 mixer. A 12SG7 crystal oscillator, another as a multiplier, and a 9003 amplifier on 140 Mc. provide the injection voltage, giving an i.f. of 4 Mc. which is fed into the 455. Follow us? No? Well, take the above through once again, because it works! Al hears plenty of stuff he can't work, though many of the DX stations he hears are running lower power than he is. The antenna system is a 45-degree corner reflector having 64 reflector elements, occupying two wavelengths on a side, and a dipole fed with twin coaxial cable. A stack of V beams is next on the agenda!

*St. Louis, Mo.* — And here's the antenna to end all antennas, while we're at it: W0ZIS has an array that consists of two stacks three wavelengths apart, each consisting of four 5-element beams, with a 6-element at the top, or a total of 52 elements! It all mounts on a tower, and can be rotated. Paul is on with 250 watts to a pair of 826s, and will be running a tape keyer with the big beam aimed east, transmitting for 10 minutes every 15, listening during the remaining five minutes for DX calls. The frequency is 144.005 Mc., with 144.414 as an alternate.

(Continued on page 134)



THE DM-430 DIVERSE ADAPTOR

## ECONOMICAL DIVERSITY RECEPTION

Now . . . receive more DX with less fading

The Diverse Adaptor, another Decimeter "first", brings diversity reception to the amateur rig at low cost. The DM-430 feeds the signal from either of two antennas through one stage of broad-band amplification, and then to the antenna terminals of any standard communications receiver. It instantaneously switches antennas to follow the strongest signal. Pilot lights indicate the antenna in use. The DM-430 can be used without tuning on any frequency from 3 to 30 MC.

In minimizing the deep fading which often occurs in high frequency communications, the Diverse Adaptor will select the proper antenna on as little as .05 volts of signal at second detector. It is suitable for balanced or unbalanced antennas, and for FM or AM phone signals. Sensitivity is easily adjusted to receiving conditions.

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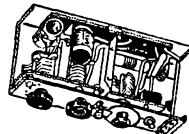
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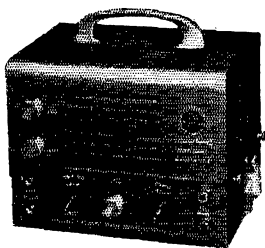
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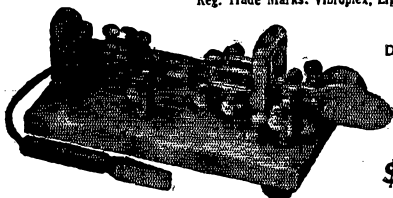
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**New Record on 2300 Mc.**

On Sunday, April 25th, between 1:15 and 3:40 p.m., W6LFE/6 and W6ET/6 were in contact on 2300 Mc. over the same 150-mile path as the one over which they established their 3300-Mc. record last October. Locations used were Mt. Hamilton and General Grant Park, California. Thus another two-way record moves from East to West.

**On APS-13 Conversion**

In the Surplus Corner of May *QST* we ran a story on the conversion of the APS-13 for amateur 420-Mc. use. There was an error in the procedure that any of you who have attempted the conversion will have probably spotted before now. It relates to  $R_{155}$  and  $R_{156}$ , the oscillator grid and cathode resistors, respectively. The correct procedure is to put a 2700-ohm resistor in place of  $R_{155}$ , instead of in the cathode, as the report states. An alternative is to use  $R_{155}$ , a 270-ohm resistor, in the cathode circuit and connect the grids directly to ground.

**I.A.R.U. News**

(Continued from page 69)

**BURMA**

The Headquarters was honored by a visit by U Kyaw Min, XZ2BH, president of the newly-reorganized *Burma Amateur Radio Society*. Mr. Min explained that Burmese amateurs are permitted to operate, c.w. only, in the 7-, 14- and 28-Mc. bands. Class A hams, who must pass a 12-w.p.m. code test, are permitted an input power of not to exceed 25 watts. Class B licenses are available to those who have held Class A for one year. Maximum input power permitted Class B licenses is 150 watts. Mr. Min further informed us that there are 35 active amateurs in the Union of Burma, of which a very high percentage are members of B.A.R.S.

**QSL BUREAUS**

Changes and additions; complete lists will be published as usual in the May and October issues of *QST*. It is suggested that the May list be amended to include the following:

*Bermuda:* VP9D, James A. Mann, R.N.W./T Station, Daniels Head, Somerset.  
*Burma:* B.A.R.S., P.O. Box 611, Rangoon.  
*Ecuador:* Victoriano Salvador, P.O. Box 2536, Quito.  
*India:* J. Nicholson, Nadiar Estate, % Munnar Post Office, Travancore.  
*Netherlands East Indies:* Hr. C. Loze, PK1LZ, Burg. Kuhrweg, 47 Bandoeng, Java.  
*Panama, Republic of:* L.P.R.A., P.O. Box 1616, Panama.  
*Roumania:* via A.R.R.L.  
*Trieste:* A.R.A.T., P.O. Box 301.  
*Yugoslavia:* Post Box 180, Ljubljana.

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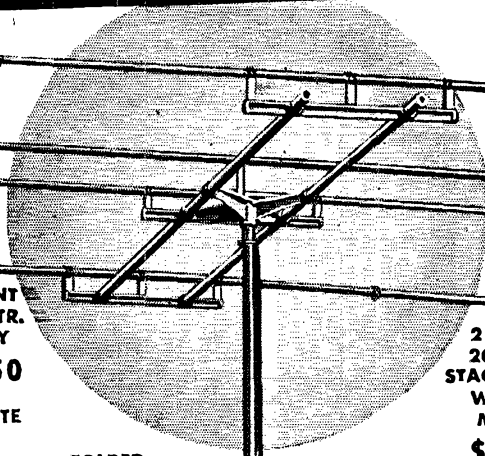
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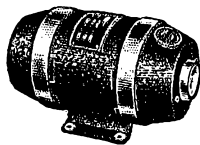
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**Correspondence**

(Continued from page 72)

organization usually never does the organization any good and certainly not himself, whether he be a member or not. It is sometimes unfortunate that ARRL members do not put more "constructive criticism" in their letters to you. I hope this statement is not misunderstood, because there are letters that come through from ARRL members that show good constructive thinking.

The absolute and pure gripes that come to you (and I am sure there are many) should be put under another heading well designated for peevish and sarcastic types of letters.

Anyway, I'd like to see the day come when all fellow hams put their heads together and make an honest effort to solve the problems that beset them. What a day! — S. R. Dresser, jr., W3LAO

Marysville, Ohio

Editor, QST:

I have heard a lot of "nasty" things over the air and was really worried. I have been a member since 1919 when I got an appointment to act as a relay station in the town of Bucyrus, Ohio. But you can see when that stuff was heard over the air it hit home; I didn't like the tone of things, and I was going to try and find out what the trouble was. Thank heavens I went to the hamfest at Ypsilanti, Michigan, because I did find out the trouble. Hal Bird, our division director, was there and he cleared up matters for a lot of us. It was a great pleasure to meet and talk with him. I think if the boys would have waited for their director's report, instead of going a lot on hearsay, we would all be a lot better off. It is the same old thing that always happens; each group has to give and take, just like in anything else. No one can please everyone. So let's all try and get along. — H. E. Stricker, W8WZ

**'PHONE IN EMERGENCY**

Box 1221, Southern Pines, N. C.

Editor, QST:

There has been one recent major emergency in North Carolina — a severe snow and ice storm which completely cut Wilmington and vicinity off from the rest of the world. Early that morning a 'phone amateur came on the air and moved business in and out of Wilmington all day. There were death messages, movement-of-trains messages, messages calling for work crews by the telephone company, Western Union and railroads. The Atlantic Coast Line lost completely one passenger train; a radio appeal promptly brought the information from a 'phone ham that the train had just passed his town, moving slow but sure, hours late and pushing snow ahead of it.

This 'phone ham net worked all day and late into the night and only ceased operation when commercial circuits had been partially restored. The net worked well. At no time did I see any evidence of "underbrush" or lack of organization. The 'phone men took to the net just like a duck takes to water. Believe that everything they did could be headed, "in the needs of the public."

Understand that later on the day of the storm a N. C. c.w. net was organized and did a very fine job — did it well, and we 'phone hams in N. C. extend to them our congratulations on a job well done.

I think there are sufficient faults in both the c.w. and 'phone nets, so that it behooves neither of us to talk about the other.

— Calvin H. Burkhead, W4GTH

**HONEST REPORTS**

Lombard, Illinois

Editor, QST:

Q: Is honesty a lost attribute? It would appear so when you listen on any amateur band. A station, splatting from 10 to 20 kc. each side of his carrier, calls CQ or some station, gets hooked up and the station he lands tells him he has a FB signal, making much fuss over the "30-db.-over-S9" report that he gives. In tuning in, he undoubtedly heard the bucksot — he couldn't miss it. Most amateurs operating on their favorite band hear dozens of stations that splatter all

over the place but when they hook up with them nary a mention is made of the habitual wide, splattery signal. A wide, splattery signal is a definite indication of a selfish individual — providing the individual knows about it; but he'll never know unless you and others tell him so every time you work him. After he is told and the signal is not corrected within reasonable time, such stations should be ostracized. Just don't work them — maybe that will get action.

After some discussion with other amateurs, it was agreed that some of us would start the ball rolling by identifying ourselves as "HR" stations. HR signifies honest reports, and we don't mean meter reports or tone-quality reports — we mean *clean-signal* reports. We'll check sidebands on every station we contact and tell truthfully exactly what we find — even to best friends. In calling CQ or any station, we will identify ourselves as an HR station so that everyone will know they may expect an honest report if contact is made.

Articles and editorials in *QST* have placed strong emphasis on the necessity of clearing up our signals. We hope that this suggestion meets with their approval and will receive their support. We suggest that anyone liking the idea begin at once along these general lines.

A station with a clean signal that does give HR reports then will really qualify for another HR — the honor roll composed of amateurs who practise the Golden Rule: Do unto others as you would have done unto you.

— Rex L. Munger, W6LIP  
F. Pres. Northwest Amateur Radio Club

### ROTARY BEAMS

2818 Que Street, S.E., Washington 20, D. C.

Editor, *QST*:

There is one factor in connection with rotary-beam operation that I personally consider to be of primary importance and consideration, yet it seems to be missed by practically all of the writers of articles and by most of the home designers. This is the speed of rotation.

In my experience, when using the beam as a receiving antenna, there is nothing quite equal to the null point for eliminating QRM. If the beam turns as slowly as 2 r.p.m. it is not possible efficiently to use the beam for this purpose, because it will require about  $\frac{1}{4}$  of a turn or  $7\frac{1}{2}$  seconds during the change-over from receive to transmit — not enough time. My beam will rotate about 5 r.p.m., utilizing but about 3 seconds for a quarter turn.

Slowness of beam rotation has sometimes been defended on the basis that a particular beam is quite heavy, and such weight will not lend itself to quick starting and stopping. This may be true in some cases. Most 10-meter beams, particularly the manufactured ones, are quite light and can easily be controlled when the rotating speed is 5 r.p.m.

Most beam-rotating mechanisms call for gears. None of them seems to mention a 12-inch V-belt pulley attached directly to the mast and driven by a round belt. Gears require alignment; a belt-driven job will work if the pulleys are any place near right. Again this is not recommended for heavy beams, but a lot of the fellows do not have heavy beams. . . .

— R. V. Anderson, W3NL

### LOW POWER

$\frac{1}{2}$  Radio Station WKSX, Pulaski, Tennessee

Editor, *QST*:

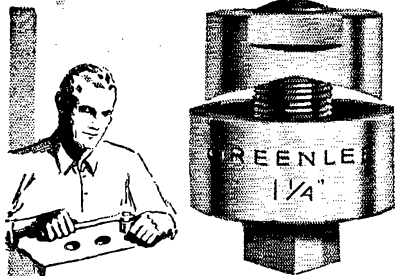
I would like to pass along a note of encouragement to some of the newcomers, and some of those fellows who tell me they are disgusted with low power. Although not an old-timer, I have been on since 10 meters opened up after the war and all the time using low power. I have had very good results with it; in the last six months I have got WAS (confirmed), WAC (not quite confirmed) and about 20 countries — all with 35 watts to an old prewar 807. You fellows can do it too if you have a fairly good antenna and a little patience.

— Elton B. Chick, W4LWP, ex-W9IPY

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Why struggle with unsightly "plumbing?" Install a neat, sturdy, professional-looking tower that is a credit to your rig and your hobby. Tower illustrated is a TRYLON standard 5-ft. spread utility base, 10-ft. high. It's self-supporting and additional straight 10-ft. sections with guys may be added at any time. Approx. Shipping Wt. 100 lbs.

Write to Tower and Antenna Div., Wind Turbine Co., West Chester, Pa. for Complete Details

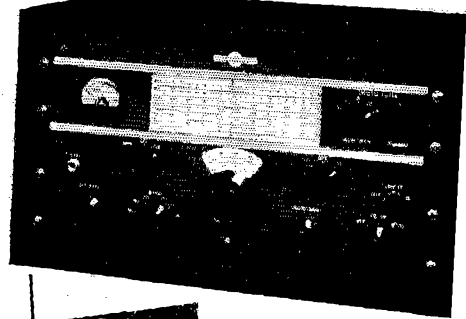
**TRYLON  
LADDER & TOWERS**

# Take your choice of these FAMOUS RECEIVERS for

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... and take a year to pay the balance. That's how easily you can own the latest gear ... to enjoy on our "play as you pay" plan.

- IMMEDIATE SHIPMENT of the gear you want is assured by our complete stocks of receivers, transmitters, instruments, and other amateur apparatus.
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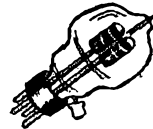
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CHECK CHOICE HERE	LIST PRICE	SEND US ONLY
75A rcvr	\$ 375.00	\$ 37.50
30K xmtr	1450.00	145.00
32V-1 xmtr	475.00	47.50
310B-1 exctr	190.00	19.00
310B-3 exctr	215.00	21.50
310C-1 exctr	85.00	8.50
310C-2 exctr	100.00	10.00
70E-8 exctr	40.00	4.00
<b>HALLICRAFTERS</b>		
S38 rcvr	47.50	4.75
S40A rcvr	89.50	8.95
S47 rcvr	200.00	20.00
S51 rcvr	129.50	12.95
S53 rcvr	79.50	7.95
S55 rcvr	119.50	11.95
S56 rcvr	99.50	9.95
SX42 rcvr	275.00	27.50
SX43 rcvr	169.50	16.95
SP44 panadapter	49.50	4.95
T-54 TV rcvr	169.50	16.95
HT9 xmtr	350.00	35.00
HT18 xmtr	110.00	11.00
<b>NATIONAL</b>		
NC-33 rcvr	65.95	6.60
NC-57 rcvr	89.50	8.95
NC-173 rcvr	179.50	17.95
NC-183 rcvr	269.00	26.90
NC240D rcvr	241.44	24.14
HRO-7 rcvr	279.00	27.90
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<b>HAMMARLUND</b>		
HQ129X rcvr	189.15	18.92
SP400X rcvr	450.00	45.00
<b>R. M. E.</b>		
HF-10-20 rcvr	77.00	7.70
VHF-152A rcvr	86.60	8.66
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90800	42.50	4.25
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## TUBE SPECIALS All brand new!

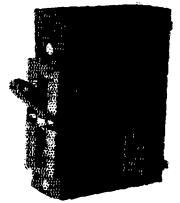
EIMAC 304-TH  
\$3.95 ea.  
6 for \$23.20

807 . . . . . \$ .95 ea. 3 for \$2.61  
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3C24/G . . . . . .49 ea. 6 for 2.21  
6C4 . . . . . .15 ea.  
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Minimum tube order \$2.00

## Protect your rig with this HEINEMANN CIRCUIT BREAKER

89¢  
each  
10 for  
\$8.50



Better than fuses. Carries starting surges but trips on sustained overloads. Resets at finger touch. Can be tripped manually and used as on-off switch. SPST; 4, 10, or 20 amp; ratings at 117 volts. Specify current. Brand new.

We can also furnish from our complete stocks test equipment by RCA, Sylvania, Simpson, Supreme, Triplett, Precision, Dumont, Hickok . . . all on our easy terms that put equipment in your hands on a down payment of only 10%.

## HAMMARLUND KIT SPECIALS

Factory-wired and ready to operate  
Four-20 xmtr complete with tubes  
Four-11 modulator

\$59.50  
49.50

# The RADIO SHACK Corp

CABLE ADDRESS: RADIOSHACK  
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# 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.

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(8) No advertiser may use more than 75 words in any 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.*

**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, \$1.50 up. Stamp for samples. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

**COMMERCIAL** radio operators examination, question-and-answers. One dollar per element. G. C. Waller, W5ATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

**WANTED:** old wireless gear from 1905 on up. State condition, price, details, W1CPI.

**WANTED:** Three AN/APR-4s and BC-638-A frequency meter. Cash or trade. Send information on price and condition to Wendell Fletcher, 1945 Hilldale, Montrose, Calif.

**WE** rewind burned-out transformers reasonably. Guaranteed. Frampton Transformer Shop, Box 109, Blackwell, Oklahoma.

**DON'S QSLs:** "Leaders in the Field." Samples. 2106 South Sixteenth Ave., Maywood, Illinois.

**PATENT** attorney. Registered U. S. Patent Office, Electronics, mechanics, chemistry. I. Jordan Kunik, 75-S Pearl, Hartford, Conn. **WANTED:** Early wireless equipment, and literature prior to 1925. Franklin Wingard, Rock Island, 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.

**10-METER** Beams, \$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

**ERECO** Beam Rotator. 110V Ac., heavy duty, variable speed, selayn indicator, weatherproofed. Complete indicator and rotator ready to plug in, \$69.95. Satisfied users all over the country. Buy from your dealer or direct. Free literature. Dick Rose, Erecos, 2912 Hewitt, Everett, Washington.

**QSLs.** Samples. Albertson, W4HUD, Box 322, High Point, N. C. **BEAM** control cable, new material. 2 #16; 6 #20 rubber insulated, coded, tinned conductors. Weatherproof rubber jacket. Heavy armor shield. 3/4" diameter. Price 10¢ a foot. F.o.b. Chicago. Trans-World Radio-Television Corp., 6639 S. Aberdeen St. Chicago 21, Illinois.

**HAMS:** Experiment 77 Transvision kits, ready wired, \$159. Radio Hospital, 113 Factory St., Trenton 9, N. J.

**FACTORY** custom-built phone xmtr, one kilowatt, seven foot rack. Completed January, cost \$1400. Gordon rotator with direction-finder, forty foot steel tower, Hallicrafters SX-28A. Will accept best offer or trade for property. W2MWW.

**NC-240D**, perfect condition, \$180. C. E. Tucker, W3KXY, 317 North 16th St., Allentown, Penna.

**SURPLUS:** Deluxe crystal finishing kits containing holders, quartz blanks, abrasive, etching fluid, complete instructions. Only few hundred left at \$2.00 each postpaid. Formerly sold \$8.75. Veato Company, Parkville, Missouri.

**QSLs.** High in quality, low in price. Colonial Press, 22 Jackson St., Cambridge 40, Mass.

**BC-348** E.H.K.T.M.O.P.R.S. owners. Plans and schematic for changing 200-500 kc band for 10 meter operation. \$2.00 or we will do conversion for you. Write for price, stating model number. Luster U. King, W5NLL, King's Radio & Photo Shop, Corning, Ark.

**WANTED:** HT-9 with crystals and coils. Collins 32V-1. Curtis, W5AQC, % Sta. KFRO, Longview, Texas.

**SELL** HT-9, like-new. Coils 20 and 40, \$290. F.o.b. W2HQD, 23 New Street, Staten Island 2, N. Y.

**BRAND** new Hickok model 203 vacuum tube multimeter. Volts, ohms, capacity, inductance. Very high input impedance. In original carton. \$60.00. F.o.b. 3518 Central Avenue, Kansas City 2, Missouri. Charles O. Schoene, W8SLV.

**WANTED:** Plate transformer, Amertran 6400 CT, 700 mil. E. Dillman, W7NM, 10333 Des Moines Way, Seattle, Washington.

**WILL** exchange factory wired Globe Trotter, new condition, complete, less coils, for Millen exciter and power supply. W4VHU, J. Wyatt, 230 Hollywood Drive, Middletown, Ky.

**QSLs** for discriminating hams. Distinctive Colorful New! Satisfaction guaranteed! Stamps for samples. Firman, W7JPN, 6338 23rd S. W., Seattle, Washington.

**HQ-129-X**, with speaker 1 year old. Melssner Deluxe signal shifter 1940 model, with 10-20-40-80-160 meter coils. No reasonable offer refused. Joseph Hoehlich, 1523 Mayflower Street, Harrisburg, Penna.

**TRANSMITTER** Phone-c.w. 2-8 M.C. 807 final. Send certified check \$70.00. W2YMI, Daniel Ciechanowski, 1311 South 10th Street, Camden, N. J.

**SELL** Collins MBF 6-meter transmitter-receiver, complete with 2xtals, mike, antenna. \$55. Melssner Deluxe signal shifter with tubes, coils for 10, 20, 40, 80, \$50. Bandswitching 75 watt fone c.w. transmitter with VX-101 VFO, ready to operate, \$150. BC-348R converted with power supply, speaker, phone, \$60. Keystone 8 mm movie camera with lens and finder, \$35. All f.o.b. W6KNM, 1101 Cedar St., Santa Monica, Calif.

**QSLs, SWLs.** Meade, W0KXL, 1507 Central Ave., Kansas City, Kans.

**FOR** Sale: Complete N. R. I. theory course bound in seven volumes. Asking \$75.00 or best offer. Originally cost \$100.00. Inquire of Vincent Fertitta, W2PFK, 179 1/2 Potomac Avenue, Buffalo 13, N. Y.

**SALE:** Silver Model 701 transmitter, never used, with tubes, coils, 2 xtals or 80 and one for 10 meters, absorption wavemeter, and 550 V. 200 Ma. power supply. \$65 or best offer. Mayo Smith, W4KJF, Crestwood, Ky.

**SELL:** Excellent BC-348-R converted to 110 Ac. \$50. Garnet Frank, Route 1, Norwood, N. Y.

**QSLs.** Samples free. Your design no extra cost. Sunland Print, Box 662, Hialeah, Florida.

**FREE QSL-SWL** samples! Cushing, W1HJL, Box 32, Manchester, N. H.

**WANTED:** Ink code recorder. Good condition. A. W. Terry, 8825 Manchester Road, St. Louis 17, Mo.

**CRYSTALS!** Fine commercial units for SCR-522's, Police, Taxi, Aircraft, Marine, Geophysical, and other services, except amateur. Commercial regrounding. Many crystals can be economically reground to new frequencies. Inquire. Over twelve years of satisfaction and fast service! Try us first. Eidson Electronic Co., Temple, Texas.

**FOR** Sale, complete station: HRO receiver, complete bandspread coils, New Tecmo 75GA transmitter, 2 extra new 1B35 tubes, Melssner signal shifter, 3 sets coils. Best offer over \$550. W2LLT, Wunsch, 387 Clifton Ave., Clifton, N. J.

**PRESELECTOR** for sale. Browning type 5DN. Coverage 1.6 to 64.0 Mc. bandswitching. Electrical bandspread. Calibrated dial. Regenerative circuit with 1852 tube, Good condition. \$25.00. F.o.b. Wright, W5KYK, 1707 Nashville, New Orleans, La.

**FOR** Sale: Complete 350-watt phone transmitter, \$350.00. 6-meter transmitter described by builder in April QST, \$50. Simpson signal generator, \$45.00. Tubes, antennas, etc. Estate of W2OXD. Mrs. S. T. Van Een, 10 Soundview Circle, White Plains, N. Y.

**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.

**SELL:** Stancor 300-watt modulation transformer, polycondensate with data, perfect. \$24.00; gear reducer for beams, 800:1 ratio, 1/2" shafts, new, \$9.00. Will ship collect. Deller, W9OON, 1042-A N. 28th Street, Milwaukee, Wisconsin.

**CREI** course, Sections 2-M-3, \$50.00 f.o.b. VE7AKZ, Foerster, 249 24th Street, Vancouver, B. C., Canada.

**SCHEMATICS,** SCR-274-N complete, \$1.95. W6CZM, 2252 University, Palo Alto, Calif.

**\$100** buys 3-element v.a. beam, excellent home-made rotary mechanism, 90 ft. 8 wire waterproof cable, 90 ft. heavy twin lead. Selayn indicator in metal cabinet. Reason: landlord objects to outside gear. W2EPZ, Schwartz, 1804 Washington Ave., Apt. 10, Bronx, N. Y.

**VHF-152A, DB-22A.** Bargain. W8ZTV, P.O. Box 218, Holland, Michigan.

**QSLs? SWLs?** "America's Finest". No cheap trash! Samples, 10¢. QSL Printer Sakkers, W8DED, Holland, Michigan. "Made-to-order QSL cards".

**PANELS** for custom instrument makers. Gilpin, Box 638R4, Mt. Clemens, Michigan.

**OPEN** nights: (until 9:00 PM) New York, Wednesdays. Jamaica, Fridays. Harrison has it!

**IN** Stock: New and used Collins, National, Hallicrafters, Hammarlund, RME, Millen, Sonar, Meck, other receivers, transmitters, parts, etc. Lowest prices. Time payments. Reconditioned S38s, \$35.00; S-40, \$59.00; SX-28, \$139.00; SX-42, \$199.00; HQ-129X, \$129.00; SPC-400X, \$249.00; NC-200, \$99.00; NC-100ASD, \$79.00; NC-240C, \$119.00; HRO Sr., \$119.00; HRO-7, \$199.00; DB20, \$29.00; RME-24, \$69.00; RME-45, \$99.00; EC-610 complete, \$595.00; VHF-152A, DB22A, HF-10-20, RME-69, SX-24, SX-25, SX-17, SX-28A, S-20R, NC-173, HT9, Tecmo 75GA, other receivers, transmitters, etc. Shipped on trial. Write to: Henry Radio, Butler, Mo.

**FOR** Sale: Hammarlund Super Pro 400-X with cabinet speaker. Hallicrafters HT-9 transmitter with all coils. Astatic crystal microphone, Model D-104. All are in excellent condition, and ready and complete for operation, \$750.00. Edward Podgorski, W2PZT, 1422 Mt. Ephraim Ave., Camden, N. J.

**WANTED:** QSTs, 1915 through 1916. Will pay cash or trade for 1917 through 1920 issues. Louis Rizoli, W1AAT, 100 Bay View, Salem, Mass.

SELL: BC 348-P new, converted 110 a.c. with matching speaker, instruction books. \$65.00. W8VHG, care L. Finzi, Electrical Engineering Department, Carnegie Institute of Technology, Pittsburgh, Pa.

SELL: Pair RCA 833-As. Used 5 hours, \$50.00 or will trade for small commercial xmitter. Don Lynne, W2QQW, 59 Monroe St., New Rochelle, New York.

HAVE 1600 foot rhombic and rotary beam. Desire 500-watt transmitter used, or new on 14.3 Mc. I grow vanilla and citronella and need DX to reach out from this rainy island. Best offer. VP2DB, "L'Imprevue", Dominica, British West Indies.

QSL: Quality cards priced right. Samples, beam rotators, propeller pitch changing mechanisms. \$4.50 each. Descriptive sheet free. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

FOR Sale: 829B all brand fone/cw xmitter in 29" cabinet, complete, \$100. 150-watt 830B modulator or speech amplifier with 11M77 modulation xtrm \$100.00. Heavy duty relay rack, \$12.50. Four 813 tubes at \$5.00. Browning frequency monitor, all bands, \$25.00. Robert Clough 37-28 86th Street, Jackson Heights, L. I., N. Y.

WANTED: Factory communications receivers. Atlas Radio Jobsbers, Nashville 6, Tenn.

WIRE Recorder: Webster Model #80. Record your QSOs, parties, anything. Write Estes, W9FYM, Brunswick, Missouri.

WANTED: BC-348 receiver, preferably new. W2AQK, F. Melville, 15 West 46th Street, N. Y. C.

QSL: SWLS, newest designs, finest stock. Fairest prices. Fastest service. W9BHV, Dossett, QSL Factory, 857 Burlington, Frankfort, Ind.

FOR Sale: Model HT-9 Hallcrafters transmitter with 10-20-40 meters coils. Excellent condition, \$250.00. Orval Hanson, Watertown, So. Dakota.

MUST Sell new HT-18 Hallcrafters VFO. Used approximately four hours. \$100.00. WILHY, 91 Chicomansett Village, Willimansett, Mass.

SELL: Hammarlund Super-Pro BC-1004 to 20 Mc. in 5 bands. Like new. War Department technical manuals included. Best offer over \$200.00? W2BNX.

T-23/ARC-5 xmitter, 100-156 Mc. brand new. Never used. Less xtals, \$10.00. W2GVF, E. Mack, 98 Bodine, Staten Island, N. Y.

HRO 5TAI with coils, power supply and National speaker. In excellent condition. \$159.00. All inquiries answered. W8WVU, J. Hamilton, 1753 Kensington Ave., Youngstown 4, Ohio.

SELL: TCS-14 trans. & rec. crystal or VFO control, 1.5-12 Mc. phone, cw, cables, plugs, mic, key, dynamotor 12v. input, tubes, instruction manual, \$145.00. Two HRO broadcast coils, 48 to 98, 9 to 2.05 Mc. \$15.00. New BC654 tubes, plugs, crystal, key, power pack, \$29.00. BC-348, like new, \$49. Also: RA-34-G rectifier supplies 1100 v.d.c. 350 mila, 12-14 v.a.c. 14 amps. 12 v.d.c., 2.4 amps. a.c. and dc. voltmeters, relays, switches, cables, plugs. Wt 180 lbs. \$85.00. T. C. Howar, 48 Chestnut St., Boston 8, Mass.

SX-28 and speaker, fine shape, \$140.00. Stancor P-10 transmitter, including tubes and crystal, \$20.00. Paul A. Leeb, W9TKY, 329 W. National Ave., Milwaukee 4, Wis.

BARGAINS: New and used transmitters, receivers, parts. New 150-watt phone, \$199.00; 60-watt phone, \$99.00; Signal shifter, \$39.00; Abbott TR-4, \$29.50; NC-173, SX-28, HRO Senior, HQ-129X, \$149.00 ea.; RME-45 \$99.50; NC-81X, S-40, \$65.00 ea.; JS-20R, S-15, \$49.00 each; NC-45, \$42.00; many others. Large stocks, trade-ins. Shipped on approval. Terms finance by Leo, W9GQ. Write for catalog and best deal to World Radio Labs, Council Bluffs, Iowa.

SWAP: 35 mm Kodak Ektra with Ektra with Ektra f-1.9 lens; set of filters including polaroid; Ektra flash synchronizer; kit-bag tripod and clearance head; GE type DW-48 light meter; calafkin kit bag; guaranteed perfect like new; Cost 1946 \$697.50. For Collins 32V-1 amateur transmitter in perfect like-new condition. Or first \$500.00 or better cash offer received. W9OQB, 848 94 N 7th St., Springfield, Illinois.

SELL: Collins 32RA, 50-watt fone, 75 watt cw, 4 channel 1.5 to 15 mc. Complete with tubes and coils. Good condition, \$125. Walter McPherson, W8ZKF, Newcomerstown, Ohio.

BACK copies of QST. From 1921 to 1941 inclusive, with some missing. Write E. C. Garrette, 611 Market Street, Colusa, California.

HALLICRAFTERS S-20-R in excellent working order, with phono input plug, \$42.00. W9LRG, 2715 2nd Avenue, SE, Cedar Rapids, Iowa.

FOR Sale: Millen 50-watt exciter, \$30. Millen 700 volt, 235 Ma. power supply, \$65. Both in perfect condition. Donald F. Kadish, W1OER, 9 Peters St., Cambridge 39, Mass.

SELL: 101X with speaker, \$70.00. Stancor 10-P transmitter 35.00. Hallcrafters SX-15 with speaker, Xtal filter, \$40.00, navy DB-20 \$30.00, BC-645A, \$10.00. F.o.b. New York. Also list of parts. James Geras, W2MVR, 373 8th Ave., New York, N. Y. Phone: LO-4-6044.

SELL: Harvey Wells TBS-50 xmitter, used only 2 months, \$90.00. AC power supply for above \$16.00. Write R. J. Rose, 423 Lebaum St., S.E., Washington, D. C.

LATE mfg'd SX-28-A, really top original condition, front to back, \$165.00. W. F. Murray, 1326 Grant Street, Dallas, Texas.

MEISSNER Deluxe signal shifter with coils. Best offer. W2DCQ, A. Zanoni, 208 Phillips Ave., Trenton 8, N. J.

SELL: Complete 55-watt Class B mod. Thordarson transformers, pwr supply on chassis. Meter 19" rack mounting, \$35.00. W2PJM, 403 Broad St., Horseheads, N. Y.

HRO rack model, coils, all bands. Looks like new: \$175.00. W8OLJ, R. Charbeneau.

QSL: Get your season's supply now, at lowered prices. C. Fritz, 1213 Briargate, Joliet, Illinois.

FOR Sale: Like new, complete station 10-11-20-40-80 phone/cw HT-9, HQ-129-X, Meissner, 9-1090, tubes, mike, key, beam, etc. \$625.00 or sell separately. List on request. W9LI, Mark Swearingen, Monroe City, Missouri.

WINSS now is KHGRF, 200 Dewey Way, Honolulu 20, Hawaii.

ROTARY converter 110 VDC input, 110 VAC, 60 cycles, 250 w filtered output. Used 3 hours. Best cash offer or trade. W9PTW.

SELL perfect Temco 5000A commercial kilowatt, complete for all-band operation, fone or cw, \$1000. No lower offers, please. Reason: marriage. W3ILD, 4912 Quebec NW, Washington, D. C.

REAMS pre-forward and matched to typical lines. Large diameter duro-aluminum tubing for elements and boom. Peter C. Houskeeper, 956 Paulding St., Peekskill, N. Y.

TRADE: Hallcrafters S-37, excellent condition, for SX-42 or best cash offer. H. Ellis, 7 Rawson Road, Brookline, Mass.

SELL C.R.E.I. radio engineering course, seventy lessons, including fifteen advanced broadcasting. Sixty dollars. Gabil, 607 South Chicago Street, Pontiac, Illinois.

BC-610-E, external VFO, butterfly tank. Worked DXCC 188 countries. \$500.00. W8RDZ, 3289 Washington, Cleveland, Ohio.

PRECISION low drift, mounted crystals, 80 to 20 meters, ± 5 kilocycles \$1.00. Exact frequency \$1.50. Specify mounting. Breon Laboratories, Williamsport, Penna.

SELLING Meissner 150-B transmitter complete. Converted for ten meter operation. Highest offer takes it. All inquiries answered. W2JQT, Robert H. Keer, 240 Oak St., Ridgewood, N. J.

WANTED: Case for BC-348 receiver. Art Fielder, W6QAE, 844C-14th St., Santa Monica, California.

TRADE R-9er with tube for SW3 receiver. 208 Broad St., Williston Park, L. I., N. Y.

WANTED: From somebody who has successfully padded a BC-654-A transmitter and receiver (preferably set having serial number above 30,000), exact information how to extend low end of tuning range to around 3,450 Kc. Want parts list and all electrical and mechanical details of job. Please quote your price immediately. W6CO, Wayzata, Minnesota.

WANTED: H. V. plate transformer 2800 to 4000V output. Write, stating condition, price wanted, etc. Jack Matthews, W3DPA, Box 1067, Wilmington, Del.

NATIONAL 240-D. Latest model. Used three months. Best offer accepted. W9CVU, P.O. Box 221, Cedar Rapids, Iowa.

BEAM motor 110V, AC 60 cycles. Requires 12 ufd condenser. Reversible Hi-Torque 3/4 r.p.m. No free swing. Flat mounting surface. Light weight. Sturdy. Brand new. Surplus. \$5.95. Postpaid in U. S. Alvarado, Dept. ST-2, 903 S. Alvarado, Los Angeles 6, Calif.

FIFTEEN dollars each, two 4-125A used, about four hours. First check or money order takes them. Dilley, W3MVZ, 3219 M St., Washington, D. C.

WANTED: New or new condition, BC-221 also surplus Amertrau plate transformer, 6200 V. CT 750 Ma. W4PH, Box 298, Alexandria, Virginia.

WANTED: BC-221 frequency meter, state condition, price, etc. W6LGO, 421 Fair Street, Petaluma, California.

FOR Sale: Federal 500-watt CW transmitter, 2 to 24 MCS, xtal or ECO, \$300.00. 250-watt CW transmitter for 20, 40, or 80 band, less high voltage, \$90.00. 150-watt 28 Mc phone transmitter, complete, \$125.00. Moving so must sell. W2CIT, Seaford, New York.

GIBSON Girl transmitters with box kite, balloon parachute, hydro gen generator, and key converted for field day use by changing oscillator. Giveaway price, \$12.00, complete. W2AU, Unadilla, N. Y.

FOR Sale: BC-610-D, on 10, 20, 40, 75. Speech amplifier BC-614 in good condition. Andrew W. Knapp, WINZG, 32 Noble Avenue, Milford, Conn.

MARK II tank set; converted; \$47.50, less power supply, \$30. New 813s, \$3.75 each. WBSVS, 313 Kenilworth, Oak Park, Illinois.

SELL Meissner deluxe signal shifter, \$50. F.o.b. W4JLA, Moore, 4606 Kensington Ave., Richmond, Va.

FOR Sale: BC-610-E complete with speech amplifier, tubes, 750 watts; 100% modulated, \$650.00. Home built 1 KW 6 foot rack and panel with 4-250As in final, Millen exciter, 3200 volt final supply, XE-10 NFM exciter with 6 xtals, \$400.00. Two Gonset converters for 10-11 \$70.00. Your inspection and removal. W3DC, Gariel, Jr., 14 Calverwood Road, Baltimore 10, Md.

ALUMINUM tubing for antennae: 9/16" OD x .0357" wall x 11 ft. length. ST alloy, 2 1/2" dia. 91.50 per length. Metalcraft Toy Co., 455 Paul Brown Building, St. Louis 1, Missouri.

FOR Sale: HT-4 transmitter (not surplus BC-610) 80-20-10 meter coils, in good condition, \$645.00. F.o.b. Knoxville. J. E. Broyles, W4JIF, % Radio Sta. WEGN, Knoxville, Tenn.

MUST sell out, complete five 1 KW fone/cw trans. receivers, test equipment and lots of parts. Send for list and prices. W2LMH, 33 Pleasant Place, Tuckahoe 7, N. Y.

FOR Sale: Sonar VFX 680. Exciter VFO, NBFM Modulator, \$70.00. BC-348-R receiver converted to AC. Nearly new. In splendid condition. Also new 10-11 meter Gonset converter. Make offer. Chuck Morat, W4MDG, 817 North Virginia, Reno, Nev.

16-ELEMENT 2-meter beam elements cut to length per ARRL Handbook, 5/16" dia. 24ST aluminum tubing, 8 radiators and 8 reflectors, \$3.45; aluminum clamps to fit, 25¢ dozen; ceramic standoffs tapped 6-32 both ends 5¢ ea. E. A. Supply Co., 687 West Lexington Ave., Elkhart, Ind.

QSL: SWLS, samples, Jaggi, W8FAY, 6118 Goliad, Dallas, Texas. MK. 2 transmitter, receiver 2-8 and 230-240 Mca. (amateur bands) with control boxes, variometer, extra tubes, parts. A.C. power supply unit. Ink recorder, up to 400 words p/m, on A.C. 8 tubes, extra pens, tape. Plus stands, instruction books, etc. Equipment bought new, used only 2 hours. Price \$185.00 plus shipping. Mr. Golder, 638 Montgomery St., Brooklyn, N. Y. Pr. 8-0887.

SELL: New Hammarlund HQ-129-X, matched speaker, in factory cartons, Receiver perfect. Need cash. \$170.00. W8KLP, 249 Franklin Drive, Berea, Ohio.

SELL complete station: SX-25 with speaker, 50-watt AM phone/xmtr in cabinet with Collins 70E8 VFO, 2 element beam. H. Kuck, W2FBK, 620 West 141st St., N. Y. 31, N. Y.

TWO K.V. transmitters in one rack, pair 250Ts on 40 and 20. Pair 100Ts on 10, 3000 volt 500 mill matched power supply. Finals driven by separate 813s and separate supply. Factory ECO with three crystals. Fifty foot Trylon tower, never used. HRO rcvr. in good condition. Lots of extras and all must go. Reasonable. Edward Couples, W4KBF, Route 3, Pinecrest, Alexandria, Va.

TRADE dual power supply 400 and 800 v. at 500 Ma., fully metered, Variac control, for Sonar MB-611 or best cash offer. H. W. Lawson, Electrical Engineering School, Cornell University, Ithaca, N. Y.

FOR Sale: NC-101-X receiver, in excellent condition. Eighty dollars but no C.o.d. W2CSO, 38 LeBritton St., Locust Valley, N. Y.

TRADE: Silver 7002-meter transmitter, like new, with tubes, crystal for Sonar XE-10 or sell \$30.00. W8VWK, 1717 Forbes, St. Joseph, Mich.

SELL: BC 348R converted to AC, \$50 or best offer. Unused! BC-3480 net converted to A & \$45 or best offer. T60 transmitter with coils for 10-20-40 meters, 18 xtals, \$100.00 or best offer. Unused Munger electro beam rotator with 50 ft. control cable, \$55.00 or best offer. Harry H. Bowers, W5EWZ, R.F.D. 1, Harlingen, Texas.

PIERSON KP-81 receiver, 540 Kc to 40 Mc, new, \$275.00. F.o.b. Chicago. Chicago area preferred. W9DHT, 2836 Leland Ave., Chicago, Illinois. Keystone 4655.

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SELL 15/16" O.D. aluminum tubing; TBV-2 28-80 Mc complete transmitter-receiver with portable power supply, new; 803, 815 and 5CP1 tubes, two 54 foot aluminum antenna masts. W2PUK, 347 Belleville, Bloomfield, N. J.

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SELLING out Kilowatt transmitter, all bands including Supreme AF100 built in as driver, PP 250TH final, 810 modulators. Remote control. Complete set BW kilowatt coils and vacuum padding condensers. Four new extra 250THs. AF100 can be used as 150-watt transmitter by simply not turning on amplifier filaments. All switching automatic by relays. Also 1 HRO, Remaco 4 element beam with 32-foot pipe tower and electric rotator. Hallicrafters Panoramic. Complete, \$1,000. H. Oringer, 820 Chestnut St., Port Huron, Michigan.

QSLs, SWLS. For distinctive cards, write McEachron, 1408 Brentwood, Austin, Texas, for samples.

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WANTED: National NC-100 or NC-100X. State price and condition. Walter Peck, 211 Third Street, Milford, Penna.

HT-9 for sale. Excellent, postwar model, now in use on all bands. Coils for all bands. \$250.00. Information on request. Bush, W9OUV, Emporia, Kansas.

SCR-522 complete. AC power supply for complete unit. Conversion to two-meter hand almost completed. Plans and parts for conversion included. \$45.00. M. Saltz, 1681 Prospect Place, Brooklyn, N. Y.

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WANTED: Licensed aviation radio man. Must be experienced. Reply to Box 425 Bedford, Massachusetts.

ALUMINUM antenna wire, No. 14 gauge high strength, 45¢ per 100 feet. M. H. Gould, W1OS, R.F.D. 3, Bridgeport, Connecticut.

SIXTY watt fone/cw transmitter. Commercial appearance, professional construction, complete less crystal and cabinet. Best offer over \$60.00. Cabinet, \$15.00. Description on request. J. M. Munns, W4FFJ, Route 6, Chattanooga, Tennessee.

FOR Sale: Complete 60-watt John Meck Industries transmitter. In perfect shape. Tubes, coils for 10, 20, 80, crystals and microphone. Goes to the highest bidder. Glenn E. Webster, 421 Sinclair Ave., S.E., Cedar Rapids, Iowa.

SELL pair new Eimacs 4-125A, \$30.00 pair. Charles F. Bible, W2KWQ, 111 Orchid St., Floral Park, L. I., N. Y.

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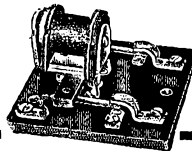
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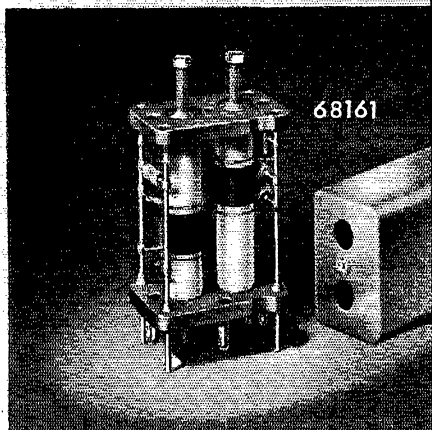
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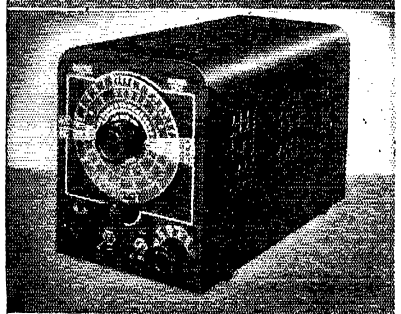
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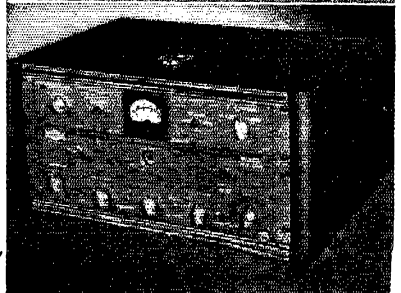
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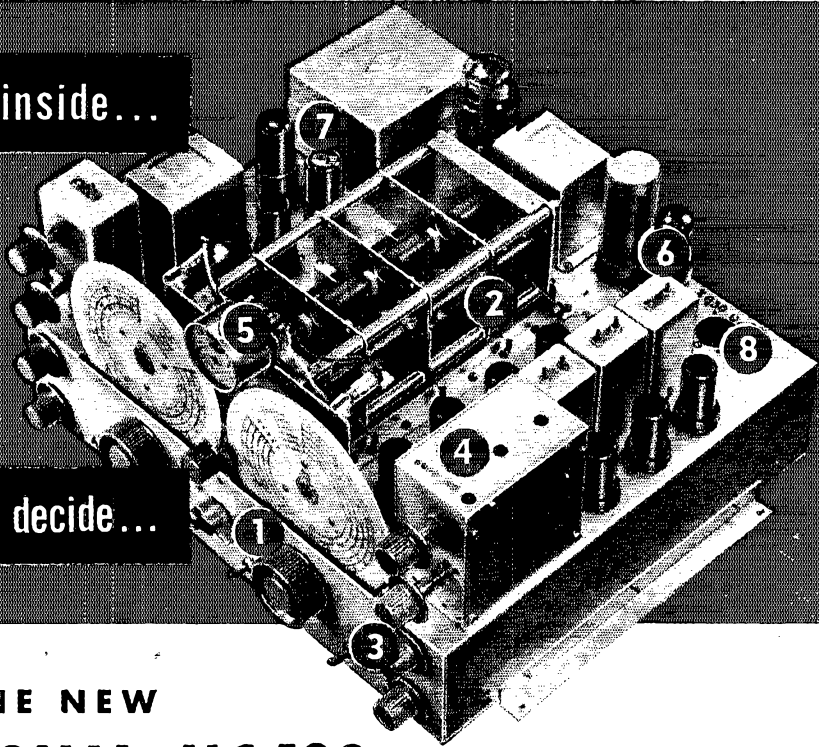
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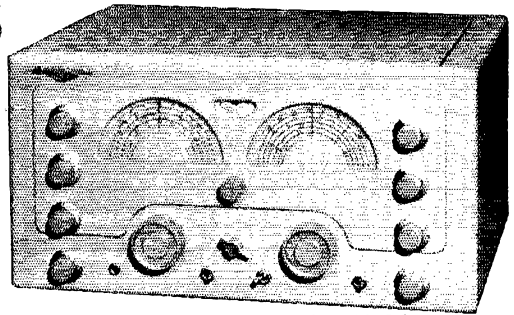
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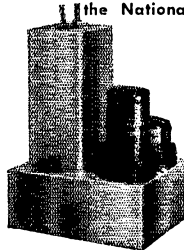
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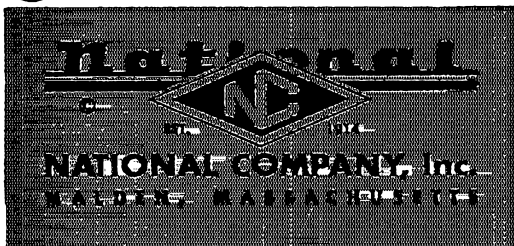
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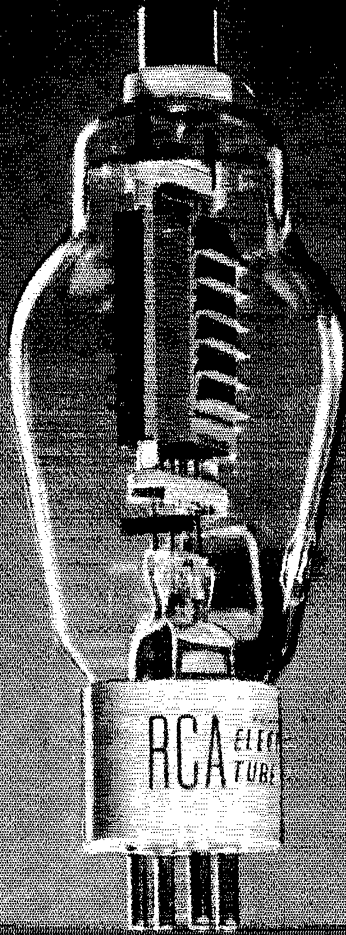


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