November 1960
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QST

devoted entirely to

amateur radio

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE


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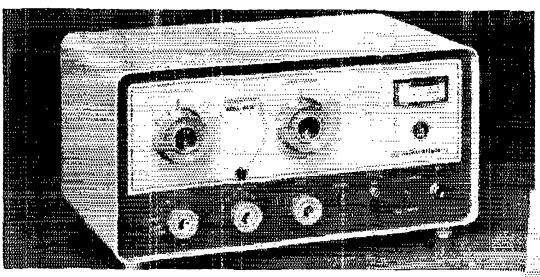

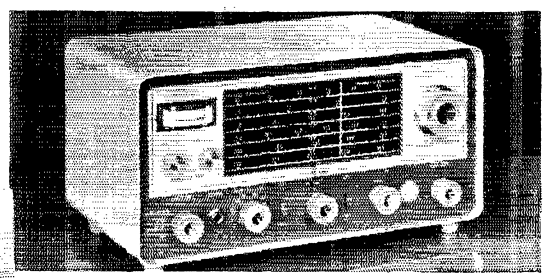

HT-40 TRANSMITTER, $79.95

A perfect match for the handsome SX-140, both in quality and appearance. Hallicrafters' transmitter leadership is evident in every precision-engineered feature of this crystal-controlled 75-watt beauty—features as important to old-timers as they are to novices.

- **FEATURES:** You get excellent CW performance as well as AM. Full band switching, 80 through 6 meters. Enjoy easy tune-up and crisp, clean styling that has efficient operation as well as appearance in mind. Unit is fully metered, TVI filtered.
- **SPECIFICATIONS:** Maximum D.C. power input: 75 watts. Power output in excess of 35 watts CW, 30 watts peak AM phone. (Slightly less on 6 meters.) Frequency bands: 80, 40, 20, 15, 10 and 6 meters.
- **TUBES AND FUNCTIONS:** 6DQ5 power output; 6CX8 crystal oscillator and driver; 12AX7 speech amplifier; 6DE7 modulator; silicon high voltage rectifiers.
- **FRONT PANEL:** Function (AC off, tune, standby, AM, CW); Band Selector (80, 40, 20, 15, 10, 6); Drive control; Plate tuning, plate loading, Crystal-V.F.O.; Grid Current; Meter; AC indicator light; RF output.
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SX-140 RECEIVER, $94.95

Doesn't it make sense to team up your skill with the experience of a company who has designed and built more high-performance receivers than any other in the world? Especially when the result is the *lowest-priced amateur band receiver available?*

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- **TUBES AND FUNCTIONS:** 6AZ8 tuned RF amplifier and crystal calibrator; 6U8 oscillator and mixer; 6BA6 1650 kc. IF amplifier and BFO; 6T8A 2nd detector, A.V.C., ANL and 1st audio; 6AW8A audio power amplifier and S-meter amplifier; (2) silicon high voltage rectifiers.

P.S. *Both units are available fully wired, and tested. SX-140, $109.95. HT-40, $99.95.*

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QST

NOVEMBER 1960

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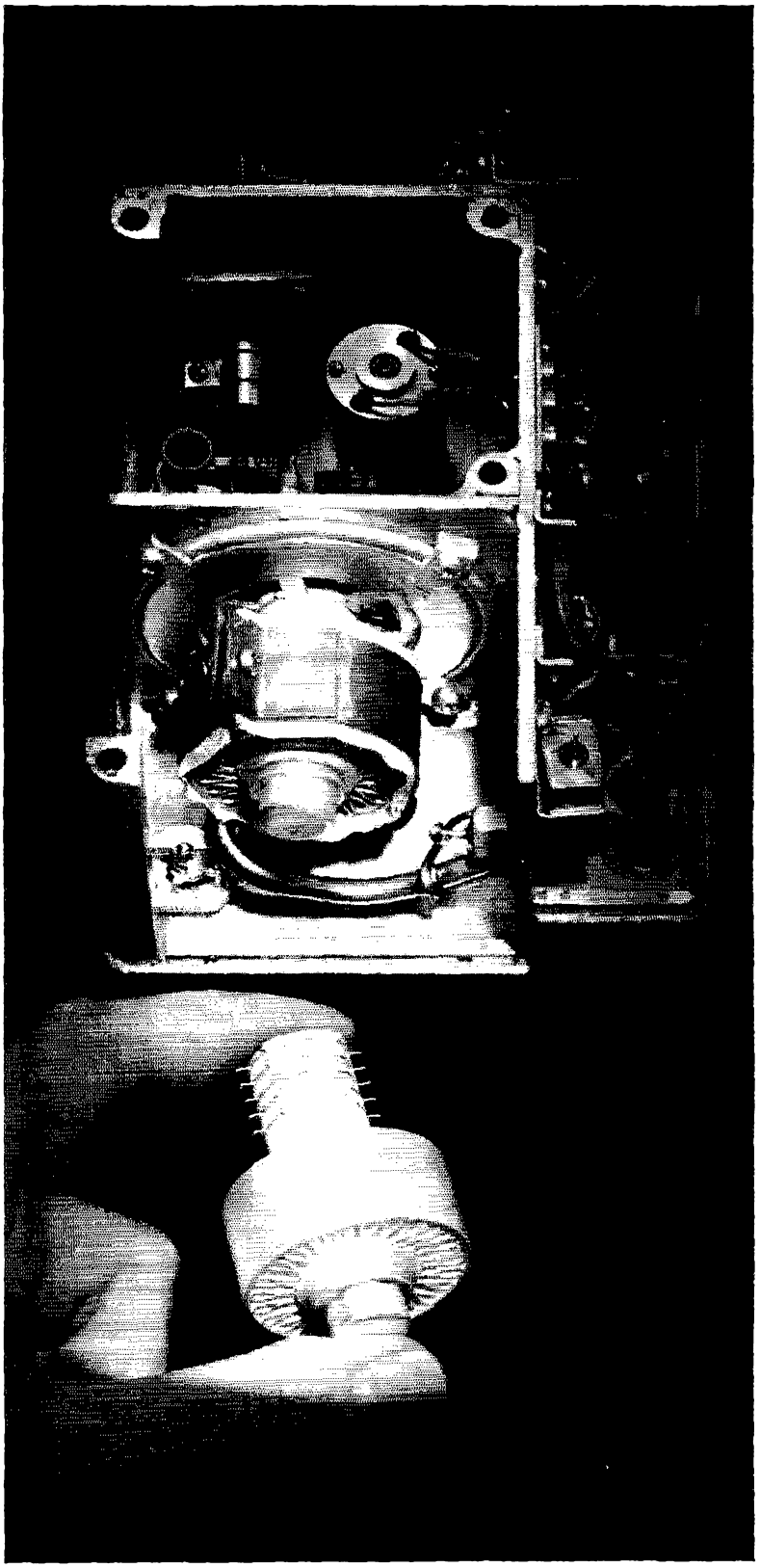

POPULAR AMATEUR TUBE POWERS SPACE AGE TV

The miniature TV transmitter at left has special significance for a space-curious world. It may one day help unravel some of the mysteries of the unknown as it soars, along with a TV camera, through the outer reaches in a sophisticated satellite.

At the heart of this tiny transmitter is an Eimac tetrode, the 4CX300A. This is the same tube so many discerning amateurs have chosen for use in SSB service. The reason: its ruggedness, reliability, exceptional linearity, and long life.

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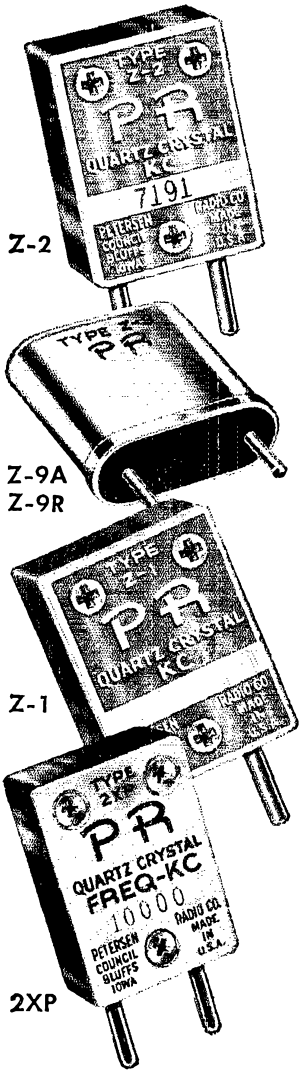

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Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$6.95** Net

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FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225; calibrated to .005%. (Be sure to specify manufacturer of equipment).....$2.95 Net

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To determine band edge. To keep the VFO and receiver properly calibrated.

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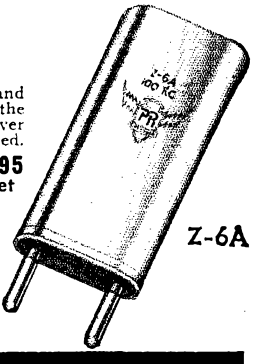

Z-6A

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. OES appointment is available to Novices and Technicians.

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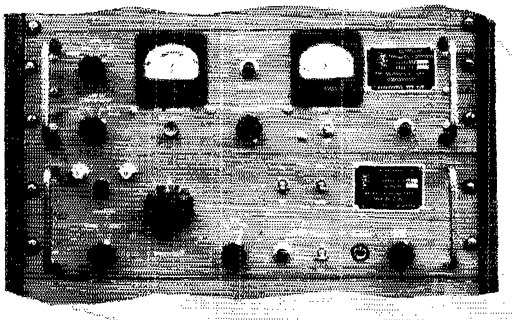
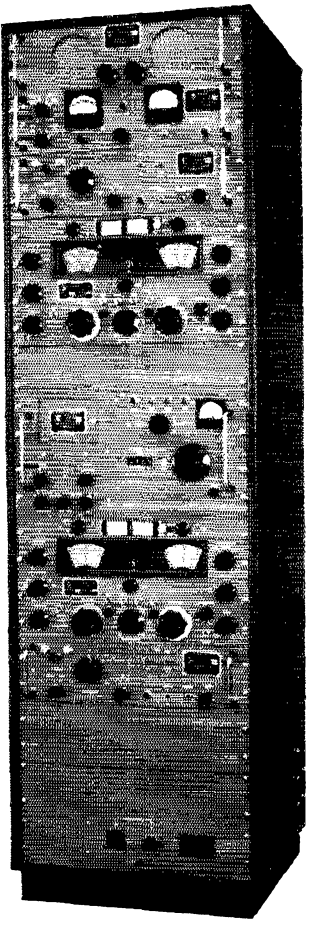
AUTOMATIC FREQUENCY CONTROL

MODEL **AFS-1**





Designed to provide automatic frequency control of less than ±1 cycle error for reception of suppressed carrier sideband transmissions, the Automatic Frequency System pictured, Model AFS-1 consists of two TMC models, the AFC-1, Automatic Frequency Control, and MSR-6, Receiving Mode Selector. In conjunction, the two units will work into any sideband receiving system for transmissions of up to 30 db carrier suppression.

The system will correct for up to ±1000 cps drift at a drift rate of 50 cps per second. In the event of a signal fadeout, a built in memory circuit retains the drift information for a predetermined interval, thus holding the receiving system at the corrected frequency.

TECHNICAL SPECIFICATIONS

MODES OF OPERATION:	SSB—Selectable Sideband, suppressed carrier. With AFC-1 disabled the following are available:
	SSB—Selectable Sideband
	AM—Selectable Sideband
	Exalted carrier AM
	CW—MCW
INPUT FREQUENCY RANGE:	452-458 kc
INPUT VOLTAGE RANGE:	0.01 to 0.3 volts RMS
INPUT IMPEDANCE:	240 K ohms
AVC CHARACTERISTICS:	Fast, Medium, Slow
SIDEBAND SELECTION:	Upper or Lower
AFC CAPTURE RANGE:	±10 cps
AFC LOCK RANGE:	Will maintain synchronism for ±1000 cps drift at a maximum drift rate of 50 cps per second.
OUTPUT:	2 watts, 600 ohms
POWER REQUIREMENT:	105/115/125/210/230 volts, 50-60 cps, single phase, 110 watts

FOR FURTHER INFORMATION WRITE FOR BULLETIN NO. 246

THE TECHNICAL MATERIEL CORPORATION

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IN CANADA: TMC (Canada) Ltd., OTTAWA, ONTARIO

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

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

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

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

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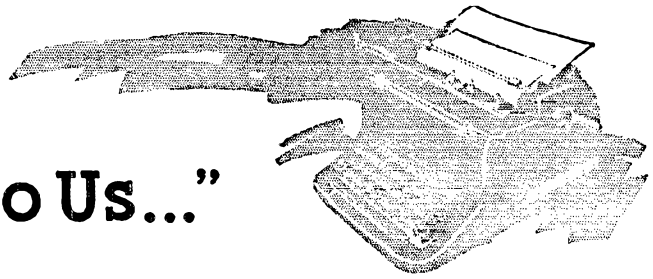


"It Seems to Us..."

UNSUNG SALESMEN

Along with his membership renewal form, an amateur in California recently wrote us concerning his efforts to "sell" a new ham nearby on the importance of belonging to the League. He hadn't quite brought down his quarry, and was calling on us for more ammunition.

There are hundreds, perhaps thousands, more of our members whose dedication to the League qualifies them as "unsung salesmen" — club officers, SCMs and other field officials, code and theory instructors, and just plain interested members — quietly pointing up the importance of unity in the amateur ranks, quietly recruiting new members for ARRL.

It seems to us that this is the principal way membership in our organization should and must grow — one member reaching one nonmember, and then another, here and there and everywhere in our two countries. True, the headquarters mails information on the League to all new FCC licensees, but remember — the new licensee finds his mailbox full of literature from all sorts of people eager to sell him something. Who can blame the neophyte if, without personal stimulation from a club or individual member-friends, he should consider his literature from the League as just another attempt to separate him from his money? With his main interest probably in more station equipment, it is not difficult to see how he might decide, at least for the moment, he'd rather put the five bucks toward new gear. Unless, that is, an "unsung salesman" can personally point out the benefits his $5 investment buys for all of amateur radio as well as himself. It is the enthusiasm of the individual member or club, with a conviction which cannot be matched by the printed word, which can best convince the prospect.

The newcomer may not connect a "subscription blank for *QST*" with the W1AW code practice he listened to on a borrowed receiver, which eased the path to his ham ticket. He may have no idea that the join-ARRL circular he received and the training film he saw at the local club meeting — the one which finally explained, in terms he could grasp, how a vacuum tube worked — came from the same place. Schematics are just beginning to make real sense to him; he hasn't yet fully grasped the scope of technical information coming from the laboratories at 38 LaSalle Road. He may spend a few hours in the Sweepstakes, and thereby increase his operating proficiency considerably, and yet not realize that behind it is "more than a magazine." So it's just another ad, and in the wastebasket it might go, unless some member has given him an inkling of the importance of the League to him as an individual ham.

As a newcomer, he is unlikely to grasp the significance of the League's having fought for ham radio frequencies and privileges at every world conference since 1927, or that after both World Wars the League was instrumental in securing a return of suspended privileges. He has never heard of the case of *Wright vs. Vogt*, one of several in which the League successfully established in court the right of amateurs to erect antenna towers as a normal accessory to the use of residential property. He may join his section net or the local CD communications group, and still not be aware that the League has sponsored and encouraged message-handling nets and emergency communications units since its earliest days. Indeed, the new ham probably doesn't realize that the record built up through these operations, in the "public convenience, interest and necessity", is a basic reason our government continues to provide us with frequencies on which to enjoy our hobby.

That is, he may not be aware of these things unless a ham friend, already a League member, has given him some inkling of the importance of organization to the furtherance of our hobby. Someone who will say, in effect:

"Your Full Membership in the League will strengthen the official voice of amateur radio. The larger and more united amateur radio becomes, the greater will be our productivity, the greater our contributions to the public welfare, and the stronger our position in retaining our operating privileges both domestically and at international conferences. As an ARRL Full Member, you will be supporting this concerted effort to keep amateur radio alive and flourishing and the fascinating scientific avocation it is."

May we have 100,000 unsung salesmen?

QST

Sudden Death

In Nashville, Tennessee, there are four orphans, brothers and sisters, the oldest of whom is only five. Until recently they had parents; then sudden death, tempted by carelessness, struck the happy family.

In early September the call KN4AAD was issued to Robert G. Lorance, age about 30, of 516 Annex Ave., Nashville. On Saturday, September 10, it was raining quite heavily in Nashville, and Lorance and his wife were trying to erect a telescoping mast in his back yard near a 4000-volt high-tension line. The mast apparently broke loose from his control and fell across the high-tension line, electrocuting him instantly. His wife saw him fall to the ground and ran to his aid, putting her arms around his waist to pull him free from the mast. She, too, was killed instantly.

We have had several reports of such accidents in recent years, but this is certainly the most pitiful, particularly because four young children are left without parents. It is all the more tragic because it was so needless.

Another accident, just reported to us, avoided fatal consequences by the barest of margins. K8KSN had been operating in the Ohio Fone Net, and had just secured and stepped outside his trailer home when there was a flash and an explosion from the trailer. What had happened was this. His antenna ran underneath a 6600-volt line. Some boys had kicked a football in such a way that it struck and deflected the antenna upwards, touching the high-tension line and hurling 6600 volts down into the shack. The transmitter and receiver cabinets were welded together and the equipment ruined. Had this happened minutes earlier when K8KSN was holding his mike, he too might have been listed as a Silent Key this month.

How many of you have your antennas running near high-tension lines? If you do, then you are gambling with your life every time you sit down next to your ham rig and every time you make an adjustment to the antenna. And even though you may be willing to risk your own life so foolishly, do you have any right to gamble with the security and happiness of your family?

This could well be a worth-while project for every amateur radio club throughout the land — hold a series of antenna inspection parties at the homes of your members and other hams in the area, and eliminate the safety hazards that are found. Such a project might be the greatest service your club has ever rendered.

Hamfest Calendar

Indiana — The Fort Wayne RC will hold its 40th annual Feast on Saturday, November 12. W9BWI will talk on "Hams in Outer Space." For further information please contact R. Mitchell, W9PEP, 3012 McDonald St., Fort Wayne.

Texas — The Terry County ARC will hold its annual hamfest and swapfest on November 13. For further information contact Irene Lewis, K5LSO, 1004 South 6th St., Brownfield.

Wisconsin — The Fond du Lac ARC will hold its 4th annual banquet at Bernward Hall in Fond du Lac on November 6. Registration begins at 1300 local time. Since only 200 can be seated, all reservations must be made in advance, and prior to Oct. 26. Mobile talk-in on 75- and 6-meter phone. For reservations and further info, contact David R. Witt, K9UZR, Route 1, Ripon.

OUR COVER

Haven't forgotten what Field Day was like, have you? Perhaps this month's cover will remind you. Shown on our cover this month is the Field Day setup at W1PX/1 — the Barnstable Radio Club of Massachusetts. Next month's issue, which will have a cover like you've never before seen on *QST*, will have the full Field Day results — scores, pictures, and the works.

Strays

It was interesting to note the number of sharp-eyed readers who after looking at the cover on the August issue also spotted the Ham-Ad in the same issue.

—···—

Congratulations to 14-year-old K4PVE, who has just become an Eagle Scout.

—···—

We read in the *General Electric News* that "for a satisfactory life, a man needs food, shelter, and something to brag about." What better explanation of what makes a DX man tick!

—···—

K7IQI fed the 60-watt output of his transmitter into a music stand and worked K5GOE on 15-meter phone. Why did K7IQI have to use such a compact antenna? Simple, dear fellow — he's a clef-dweller.

—···—

The first edition of the *Park Service Ham Directory* has just been issued, listing those hams who work with the various State and Federal Parks around the country. If you haven't registered yet, contact Jack E. Boucher, W2PJD, 25 Jackson Ave., Northfield, N. J. Give him the full dope on your ham activities and your park employment.

—···—

Going to be in New Zealand next June? Then plan to attend the 1961 Convention of the New Zealand Association of Radio Transmitters in Hamilton on June 3. Write to ZL1AUV for further details.

More Beef for the "Imp"

100 Watts P.E.P. with a 6DQ5 Linear

BY JOSEPH S. GALESKI, JR.,* W4IMP

W4IMP has come up with an amplifier that will let the popular little "Imp" s.s.b. exciter speak out with more authority. Although shown here as an integral part of a complete transmitter built for shipment overseas, you needn't tear apart your existing "Imp" in order to use it; build just the amplifier and power supply in any reasonable fashion and you're in business.

WHEN the original "Imp" exciter [1] was completed, Myron, W4IYC, suggested that it would be a nice rig to put additional countries on sideband. We decided that a more elaborate version would be desirable and for this purpose should (1) Use fixed crystal frequencies so that the station could be located in the pile-up; (2) Have enough power to be heard from a simple antenna; (3) Be self-contained with power supply. The little rig shown in the accompanying photographs, incorporating an "Imp" exciter, power amplifier, and a.c. power supply, was the end result. It has the following vital statistics:

Size — 7 inches wide by 9 inches deep by 6 inches high.
Weight — 11 pounds.
Power — 100 watts p.e.p. input.
Frequency — 20 meters, u.s.b., crystal controlled.

Except for requirement (1) mentioned above, the r.f. part of the exciter circuit is basically the same as that of the original "Imp" described in May *QST*. Thus there is no need to repeat the circuit discussion, especially since in domestic operation the VXO of the earlier model is a welcome feature and no doubt would be preferred to fixed-frequency operation. Neither is it necessary to duplicate the actual layout; in fact, some changes might be advisable when there is no necessity for making the complete transmitter as small as possible. It is thought, however, that those who have built the "Imp" would be interested in the amplifier and power-supply circuits shown in Figs. 1 and 2.

Power Amplifier

With a little encouragement from *QST*,[2] the 6DQ5 was chosen for the output stage. It gives

* 4318 Hanover Ave., Richmond 21, Va

[1] Galeski, "The 'Imp' — a 3-Tube Filter Rig," *QST*, May, 1960.

[2] Gardner and Gooch, "The 6DQ5 as a Linear Amplifier," *QST*, October, 1959.

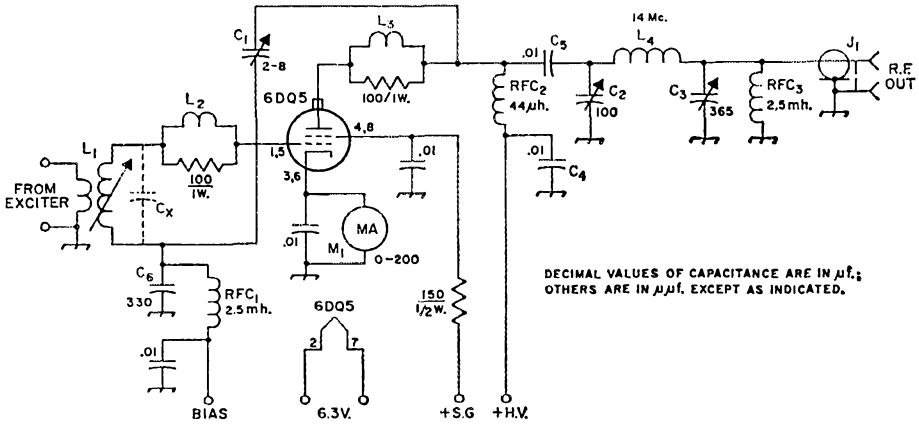


Fig. 1 — Circuit diagram of the 6DQ5 linear amplifier. Fixed capacitors are disk ceramic, 600 volts, except as listed below.

C_1—APC-type trimmer, 5 plates double-spaced by removing plates from regular trimmer.

C_2—100-μμf. variable, 1000 volts (Bud MC-1875 or equivalent).

C_3—365-μμf. midget b.c. type variable (Miller 2111 or equivalent).

C_4, C_5, C_6—Mica.

C_x—Tube and stray capacitances resonating with L_1.

J_1—Coax receptacle, chassis mounting.

L_1—20 turns No. 28 enam. on ⅜-inch diam. iron slug-tuned form (such as Johnson 235-501-1 or Miller 4400). Input link, 2 turns No. 28 at cold end of L_1).

L_2—6 turns No. 18 wound over 100-ohm 1-watt composition resistor.

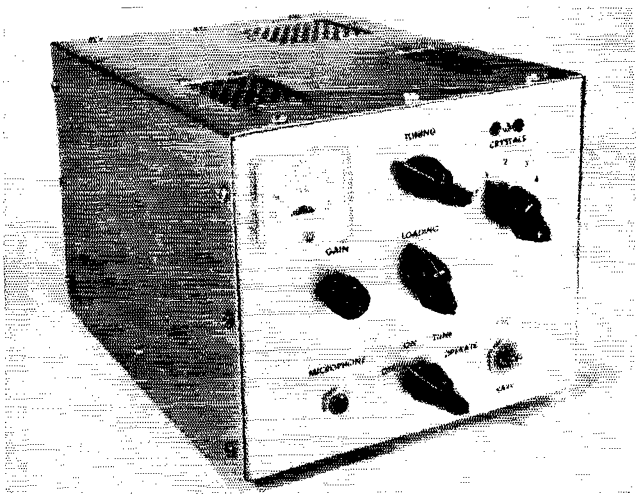
L_3—8 turns No. 18 wound over 100-ohm 1-watt composition resistor.

L_4—12 turns No. 18, 1-inch diam., 8 turns per inch (B & W 3014).

M_1—0-200 d.c. miniature milliammeter (unit shown is 0-1 shunted for 200-ma. range).

RFC_1, RFC_3—2.5 mh.

RFC_2—44 μh. (Ohmite Z-14).



The "export model" of the "Imp" includes not only the original exciter circuit but a 100-watt p.e.p. linear and power supply. In building this one for an overseas friend, W4IMP concentrated on compactness, but the "tight" construction is not an essential ingredient for ordinary use.

high output at relatively low plate voltage in Class AB_1 operation and is quite easy to drive. The circuit is conventional. The grid coil, L_1 in Fig. 1, uses the input capacitance of the tube itself for tuning. The output pi network, $C_2C_3L_4$, will handle a variety of antennas.

Final bias is set so that the static plate current is enough to cause the tube to run at full 24 watts of plate dissipation with no signal. There has been little trouble from instability.

Power Supply and Control Circuits

Size and weight considerations demanded small power-supply components. In some cases values were determined by physical size limitations. For example, the filter chokes had to be two inches or less in the smallest dimension in order to fit under the chassis.

An "Economy" power supply[3], using silicon

[3] Grammer, "More Effective Utilization of the Small Power Transformer," *QST*, November, 1952.

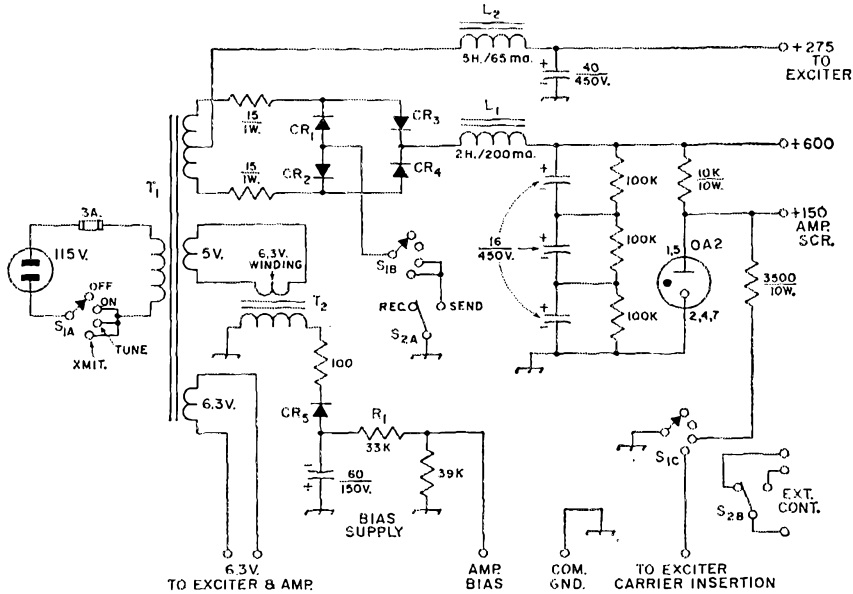


Fig. 2—Power and bias supply. Capacitances are in μf.; capacitors are electrolytic. Resistors are ½-watt composition except as indicated.

CR_1–CR_4, inc.—Silicon, 150 to 500 ma. d.c., 360 to 400 volts inverse peak; use three in each arm of bridge rectifier (Sarkes Tarzian M-150 or M-500, or equivalent).

CR_5—Selenium or silicon, 50 ma., 130 v. r.m.s.

L_1—2 henrys, 200 ma. (Thordarson 26C43).

L_2—5 henrys, 65 ma., to 9 hy., 45 ma. (Thordarson 20C59).

R_1—33,000 ohms, ½ watt (see text).

S_1—Rotary, 1 section, 3 poles, 4 positions, shorting (Mallory 3134J).

S_2—D.p.d.t. toggle.

T_1—Power, 700 volts c.t., 90 ma.; 5 volts, 3 amp.; 6.3 volts, 3.5 amp. (Thordarson 24R04U or equivalent).

T_2—Filament, 6.3 volts, 1 amp.

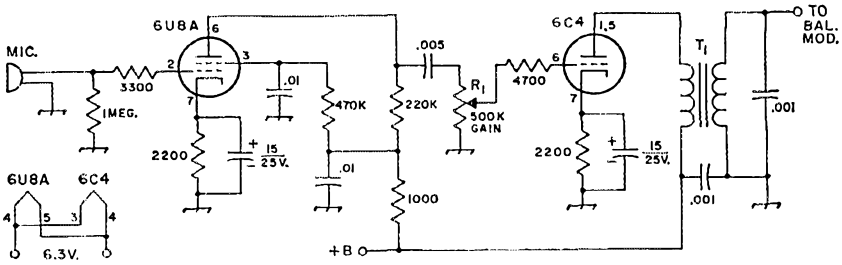


Fig. 3—Revised circuit diagram of the "Imp" speech amplifier. See Fig. 1, page 12, May, 1960 QST for original circuit. The circuit above adds the 6C4 stage for higher gain. Capacitances are in μf.; capacitors with polarities marked are electrolytic, others are ceramic. Resistors are ½ watt.

R_1—0.5-megohm control, audio taper.
T_1—Plate-to-line audio transformer, approx. 20,000 ohms to 500–600 ohms (Stancor A-3250).

rectifiers in a full-wave bridge circuit, provides about 600 volts for the plate of the 6DQ5 and about half that for the exciter. The transformer is a small replacement type rated at 700 volts center-tapped, at 90 ma., 6.3 volts at 3.5 amp., and 5 volts at 3 amp. If it were run continuously at its full ratings, this would represent about 65 watts drain on the transformer. In s.s.b. we can use most of this capacity rating while running with resting final current. The transformer will be overloaded during voice transmission, but underloaded on stand-by because then only the tube heaters take power. Because of the low duty cycle of s.s.b., and the fact that even a DX station has to listen about half the time, the temporarily overloaded transformer has a chance to rest.

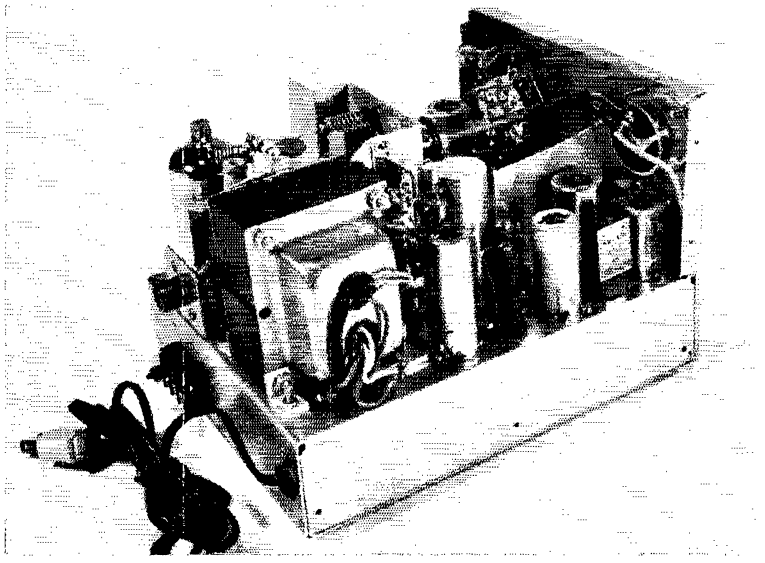
A small 6.3-volt filament transformer used backwards from the 5-volt winding supplies voltage to a silicon rectifier for the bias. The series resistor R_1 (33K) was selected for the tube and voltage conditions. Its value should be adjusted to give a resting current that represents a plate dissipation of 24 watts. The exact current will depend on the actual plate voltage on the tube.

The screen is supplied from the high voltage through a dropping resistor and is regulated at 150 volts. This voltage is lowered to 75 volts in the "tune" position by shunting the VR tube with a 3500-ohm resistor.

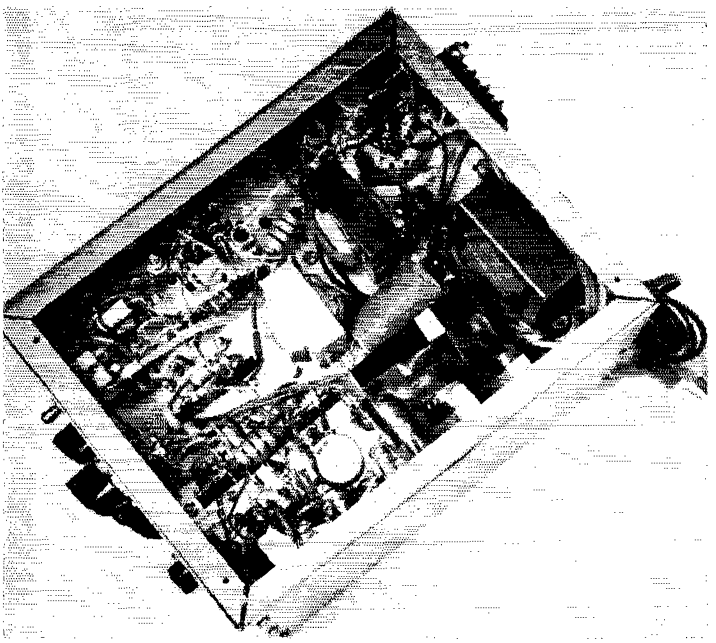
The main control switch is a 3-pole, 4-position unit with shorting contacts. The first pole controls the a.c. line, and the second operates the B+ in the "tune" and "operate" positions. The third pole grounds the resistor across the VR tube in the "tune" position and carrier is automatically inserted; in "operate," the screen voltage is returned to 150 volts and the carrier is balanced out.

The send-receive switch is a d.p.d.t. toggle with one set of contacts brought to a terminal strip on the rear for external control of the receiver or antenna relay.

(Note that there is voltage between the +275 and +600 terminals whether S_{2A} is open or closed, except when S_1 is in the "off" position.)



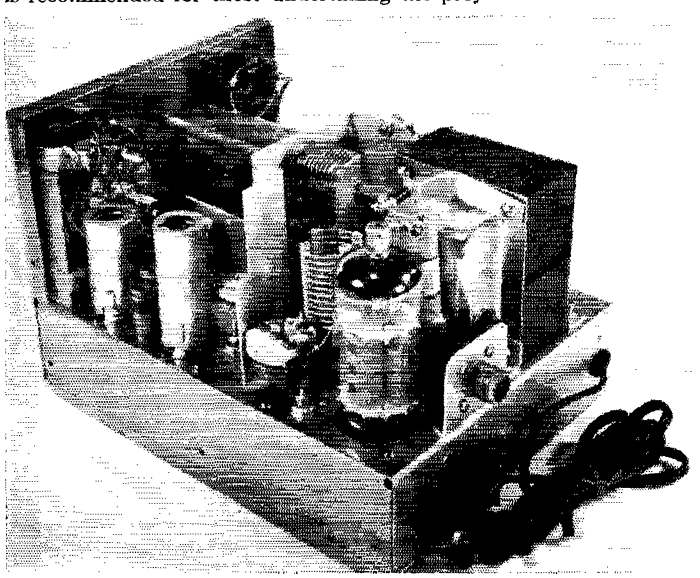
An inside view from the power-supply and audio side. The tube in the shield alongside the power transformer is the voltage regulator. The 6U8A combined speech amplifier and crystal oscillator is close to the panel, with the 6C4 additional speech-amplifier tube at the chassis edge alongside the oscillator crystal.



The r.f. circuit runs along the section of the chassis at the upper left in this view. Audio components and the carrier-balance potentiometer are in the near corner. The transformer in the center is for the bias supply; just above it is the filter choke in the low-voltage supply, and in the upper right corner is the choke for the high-voltage supply. The tape wrapping supports the high-voltage filter capacitors

Audio Modification

A stage of audio was found to be a very worthwhile addition to the original "Imp" exciter and is recommended for those undertaking the project. A 6C4 triode stage, as shown in Fig. 3, provides the extra gain necessary and adds little to the expense or power requirements.



The r.f. side of the chassis. The mixer and amplifier of the original "Imp" circuit are in the section near the panel. Fixed-frequency operation, with different crystals selectable by the rotary switch on the panel, is used instead of the VXO in this model. The 6DQ5 output amplifier and its associated circuit components occupies the foreground in this view. The variable capacitor at the top of the shield partition is the tank tuning capacitor; the loading capacitor is below it, hidden by the tank coil. Band-pass filter crystals are in the compartment immediately under the tank-capacitor shaft.

General Comments

In the course of construction, several different mixers, oscillators, and filter variations were tried. I have come to the conclusion that the original circuit with the added audio stage is about as satisfactory as any arrangement. Good crystal-filter pass bands can be had up to 8.5 Mc. This is probably not the upper limit, but I did not have surplus crystals higher in frequency.

The amplifier and its power supply can be built as a separate unit to follow any low-power exciter. Where more room is available I would recommend a higher value of filter capacitance for the high-voltage supply. The low-voltage and bias filters seem adequate. QST

Editor's Note: W4IMP has a supply of circuit diagrams of the "export model", which as explained in the article uses a fixed-frequency version of the original Imp exciter, and will be glad to mail one on receipt of a stamped, self-addressed envelope.

The Gamma-Matched Ground Plane

Simplified Matching and Construction for a Popular Antenna

BY BENSON BOSS,* K2GHM/W3DAZ

Matching a ground plane can be plenty of work with the methods usually employed, but this adaptation of the gamma match is both simple and effective. Also provided are complete construction details for 10-, 15- and 20-meter ground planes with rigid radials.

THE ground-plane antenna is a good low-angle radiator whose performance is relatively independent of where and how it is mounted. Getting a good match to a coaxial transmission line, however, is not always easy. Such practices as changing the droop of the radials, shortening (or lengthening) the vertical and adding inductance (or capacitance) undoubtedly work but are *difficult*. After all these methods, plus pi and L networks at the antenna, failed to match a 20-meter ground plane to better than a 1.5 s.w.r. (and by then bored with many week ends of up-the-tree adjustments), I decided to try one more thing before returning to the fondly-remembered Zepp.

The gamma match. It works wonderfully for beams — why wouldn't it work for a ground plane? It was simple enough to ground the vertical to the radials, run a No. 4 insulated wire parallel to the vertical and install a variable capacitor at the base of the wire. Then the antenna, although too short, was quickly matched to a low s.w.r. by adjusting the height of the connection between the wire and the vertical element and tuning out reactance with the capacitor. The antenna maintained this match for three years without any touching up.

Fig. 1 is a diagram of the ground plane and

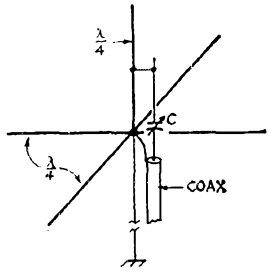


Fig. 1—Diagram of the gamma-matched ground plane. The vertical element and the radials are connected and grounded at the base. Matching is effected by adjusting the tap on the vertical along with capacitor C.

matching system. Fig. 2 shows s.w.r. *vs.* frequency curves obtained with the 20-meter antenna. Both a resistance bridge and a Mickey Match [1] were used for the measurements with almost identical results. Curve 2 in Fig. 2 is for the original shortened antenna. Curve 1 is for a vertical element of correct length, a recent improvement. I think you'll agree that a maximum s.w.r. of 1.3 across the entire 20-meter band is rather good. Without retuning the final, I can shift frequency from 14.00 to 14.35 Mc. with a maximum variation in final plate current of only 15 ma. from 330 at the center of the band.

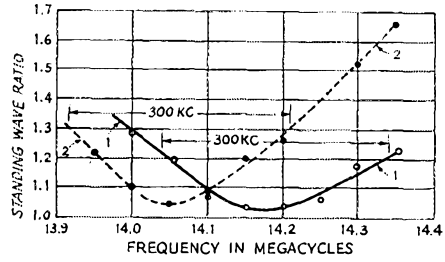


Fig. 2—S.w.r. *vs.* frequency characteristics of a 20-meter gamma-matched ground plane having a 2¼ × 3-inch downspout vertical element and 16.9-foot long, 0.84-inch diameter radials. No. 4 wire was used for the gamma rod. Data for curve 1 was taken with a 16.7-foot vertical element (the theoretically-correct length) and the gamma tap and capacitor adjusted for best match at 14.175 Mc. Curve 2 was made using a 16.0-foot vertical (too short) matched at 14.05 Mc. Note the higher minimum s.w.r. and the narrower s.w.r. bandwidth with the shorter element.

In the summer of 1959, after two solid weeks of adjustments on a three-band trap ground plane failed to even approximate the "typical s.w.r. curves" published by the manufacturer, I built a 15-meter gamma-matched ground plane. Matching again proved easy, and some of the resulting s.w.r. *vs.* frequency curves are shown in Fig. 3. A vertical of resonant length gave the lowest s.w.r. and the best band width. However, almost the same minimum s.w.r. and an s.w.r. of less than 1.4 across the whole band could be obtained with verticals up to 6 inches too long or too short by adjusting both gamma tap and capacitor. At the expense of a slightly higher s.w.r. and narrower impedance bandwidth, the frequency of minimum s.w.r. could be shifted by merely adjusting the capacitor.

Some ground-plane users have suggested that

*Cranbury Road, Princeton Junction, N. J.

[1] Bunce, "The 'Mickey Match,'" *QST*, November, 1958.

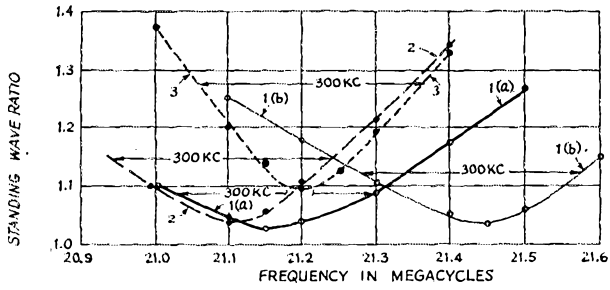


Fig. 3—S.w.r. *vs.* frequency characteristics of a 15-meter ground plane with 1¼-inch elements and a ¾-inch gamma rod. For curve 1 (a), the elements were made the correct length (11.3 feet), and the gamma rod and capacitor were adjusted for best match at 21.15 Mc. Curve 1(b) shows the performance of the same antenna when only the capacitor was used to shift the frequency of best match to 21.45 Mc. Note the slightly higher minimum s.w.r. and the higher s.w.r. over a 300-kc. band width. Curve 2 shows what happened when the elements were made too long (11.86 feet), and the matching system was adjusted at 21.10 Mc. Both minimum s.w.r. and s.w.r. bandwidth are worse than in curve 1(a). This is also true of curve 3, taken with short elements (10.2 feet) adjusted for best match at 21.20 Mc.

the radials be made from 2½ to 12 per cent longer than the vertical, and I have used the first figure with good results. However, the radial length has proven experimentally to be even less critical than the length of the vertical. My recommendation is not to fuss with element lengths but just make all five a quarter-wavelength long at the band center (allowing for their diameters as shown in the *Antenna Book*) and let the gamma match do the rest.

The gamma-matched ground plane has another advantage over the usual model besides ease of adjustment. Construction is easier since there is no need to insulate the base of the vertical from the radials. Indeed, the vertical can be a continuation of the supporting mast. The entire assembly can be solidly grounded for lightning protection. Experiments with both antennas showed that when they were gamma-matched without a ground connection, no change occurred when a ground was added. (Use a ground rod of the same metal as the one at the transmitter or electrolytic action will cause a current through the coax sheath that connects the two.)

Construction

Fig. 4 shows the construction recommended for a 10-, 15- or 20-meter ground plane. This design is very much like my 15-meter antenna, but embodies a few afterthoughts to make in-the-air assembly easier. The vertical and the radials are made of 1¼-inch aluminum tubing slipped over shorter lengths of standard ¾-inch steel pipe. The pipe greatly reinforces the tubing at points of maximum bending moment and also prevents clamps and bolts from collapsing the tubing. Don't substitute rigid conduit; it has a thinner wall than pipe and it has threads with a different taper (same threads per inch, however) which do not fit the pipe crosses as well. The aluminum tubing is available at many radio stores in 12-foot lengths. This is long enough for 10- and 15-meter elements, and 1⅛-inch aluminum tubing extensions can be added for 20 meters.

Aluminum bolts should be used so far as possible since they don't rust or cause galvanic action. Where steel bolts are used, seal the nut with aluminum mastic (sold for sealing joints in aluminum gutters) so that the nut may be removed later without drastic action. Galvanized bolts seem to last all of six months before rusting; better weatherproof them with mastic, also.

The variable capacitor should be double spaced, not for electrical reasons but to prevent shorting by condensation, as is likely to happen if the capacitor is mounted with its shaft vertical. A maximum capacitance of 100 $\mu\mu$f. for 20 and 15 meters and 50 $\mu\mu$f. for 10 meters should be ample. Use a soft plastic box for the rain shield — the hard ones will crack. I used an automobile wastebasket about 3 by 8 by 12 inches high, which is more than adequate in size. Use of a coax feedthrough connector rather than a jack prevents any water that leaks into the box from shorting the transmission line.

The length of the gamma rod will be between ⅛ and ⅓ the height of the vertical radiator if 52-ohm coax is used. Of course, the smaller the rod and the greater the spacing from the radiator, the greater will be the impedance transformation for any given tap height. Experiments showed that ½-inch diameter rod would always provide a match while No. 8 aluminum wire did not always match with a reasonable spacing. In any event, the rod should be used for mechanical ruggedness, and any spacing from 3 to 12 inches will probably work.

To prevent oxidation, the aluminum elements should have at least one coat of spar varnish — except, of course, where the gamma tap is expected — before erection. It is suggested that marks 1 inch apart be filed on the gamma rod with double marks at integral feet from the radials. These marks will be very useful when the matching is done.

Matching

Don't try to check antenna resonance with a grid-dip oscillator. By adjusting the gamma capacitor you can get dips over a wide range of frequency, and the "best" dips won't even approximate the final matching adjustment.

Hook up an s.w.r. bridge at the transmitter end of the coax, and excite it with a low-powered transmitter tuned to the center of the band. Don't try to use the unstable, inadequately-powered g.d.o. for this purpose, either. With a helper at the s.w.r. meter and you up in the air, start with a tap that you think is too high or too low and adjust the gamma capacitor for minimum s.w.r. Then move the tap an inch at a time

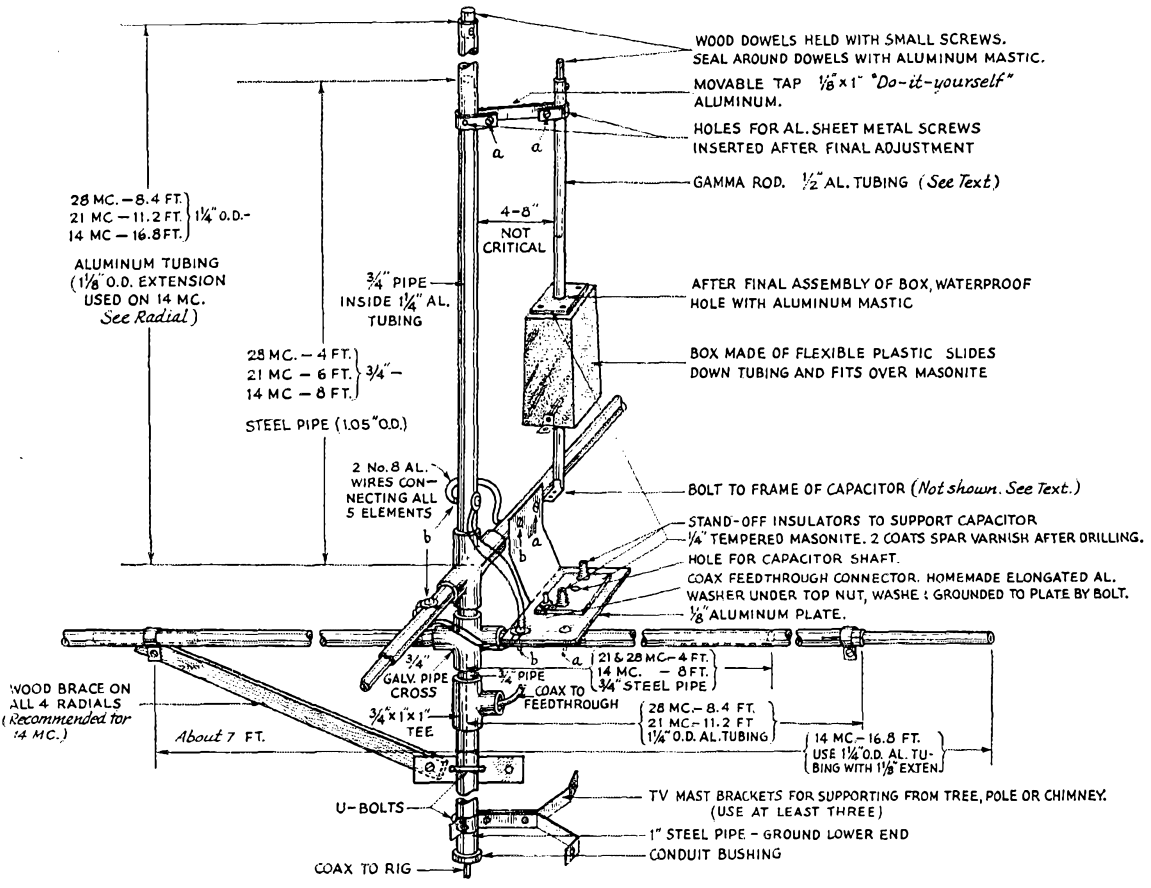


Fig. 4—Construction details for the gamma matched ground plane with dimensions for 10, 15 and 20 meters (28.5, 21.2 and 14.17 Mc.). The basic framework is made of steel pipe fastened together with two pipe crosses and a tee fitting. 1¼-inch aluminum tubing elements slip over the pipes and are fastened in place by bolts which also hold wires to bond the elements together. Fastenings marked "a" are ¼ × 1½-inch "do-it-yourself" aluminum bolts; those marked "b" are ¼ × 2-inch steel bolts equipped with two large aluminum washers.

(with the transmitter turned off), each time adjusting the capacitor. The s.w.r. should drop progressively lower and then start to rise. Try tap positions ¼ inch apart in the region of minimum s.w.r. A position should be found where the meter reads practically zero. The tap height and capacitor settings are quite critical, but the process of finding them is straightforward and easy.

Now tune the transmitter across the band. If the s.w.r. is considerably higher at one edge than the other, the frequency of minimum s.w.r. can be shifted by tuning the capacitor without having to adjust the tap. With some rod spacings and tap heights you may have to *decrease* the capacitance to shift to a lower frequency. This sounds wrong but can probably be explained as follows: The gamma section is a transmission line less than a quarter wavelength long, terminated in an impedance less than its characteristic impedance. At lower frequencies the antenna and the gamma section are electrically shorter. As the frequency is reduced the antenna will reflect increasing capacitive reactance through the section, and the section itself will have decreasing inductive reactance. One would expect that more gamma capacitance (less capacitive reactance) would be required to establish resonance. But, at lower frequencies the radiation resistance of the antenna also drops, and this tends to *increase* the inductive reactance seen at the input of the gamma section. Depending on the impedances of the gamma section and the antenna, this effect may outweigh the expected behavior, and more capacitive reactance (less capacitance) will be required for resonance.

Other experiments showed that elements shorter than the resonant length required a higher gamma tap and less capacitance for optimum matching. The opposite was true with long elements. This agrees with Nose's results using a gamma-matched beam.[2] The shorter elements have lower radiation resistance and require a higher tap for the desired 52 ohms. The

(Continued on page 144)

[2] Nose, "Notes on Parasitic Beams," *QST*, March, 1960.

The Fox Vox Adapter

Sequenced Transmitter-Receiver Change-Over System

BY GRADY B. FOX, JR.,* W2VVC

By proper sequencing of the operation of transmitter-power and antenna relays, arcing at the antenna relay is avoided. As a result, small inexpensive relays may be used even with a high-power transmitter.

For several years I have been using a unique, rather complex transmitter-receiver control device for operation of my s.s.b. equipment. This device was noiseless and did the change-over extremely rapidly. In performance tests, using the "tick" from WWV to actuate the voice control to the s.s.b. exciter, and a receiver to demodulate the s.s.b. exciter output, all 5 cycles of the 1000 c.p.s. wave which compose the "tick" were registered on a scope connected to the receiver output.

Electronic T.R. Systems

Despite the noiseless and rapid performance of this circuit, it lacked one feature necessary for satisfactory voice break-in operation. It did not provide for t.r. operation of the transmitting antenna. Many operators would have been satisfied with the operation of an electron-type t.r. device in this assignment. But the manner in which such devices are used makes the arrangement prone to unpredictable performance with regard to signal loss suffered when QSYing the receiver within a given band, with random final-amplifier tuning adjustments.[1] If one wants the best signal to receiver-noise ratio, it seems that the only really satisfactory antenna t.r. device to date is the old metallic-contact gadget, the s.p.d.t. relay.

Relay Change-Over

On-the-air listening to various s.s.b. signals showed that most relay-operated voice-control systems perform with no noticeable clipping of the first syllable. However, there seems to have been little concern by designers about the timing precision desirable in the sequence of operation of the relays used to control the receiver, change over the antenna, and control the transmitter. Inattention to the relay-sequence problem can result in quite fat arcs at the antenna relay contacts from time to time.

Improving the Relay System

An adapter which will provide improved performance of the usual relay-type voice-control system has been developed and used for several months. It uses three carefully-sequenced relays for receiver control, antenna change-over and transmitter control. The inherent operate time of these relays, in conjunction with their associated time-control components, functions to cause them to operate so that only one relay is in process of change-over at a time. In other words, each relay waits until the preceding one has completed its function. The circuit is beautiful in its precision and electron-tubeless simplicity. The order of operation from listen to transmit is:

1) Turn off receiver.

2) Change antenna from receiver to transmitter.

3) Turn on transmitter.

From transmit to receive, the reverse sequence of events takes place. This is not the order of operation usually obtained when one relay is used to control one or more additional relays.

Causes of Arcing

In the conventional arrangement where relays are operated in tandem, the operator may wonder why he still gets arcs and contact burning at the antenna relay even though he may have interlocked the contacts and done some contact bending in an effort to get the sequence of operation correct. The trouble he is experiencing may be due to antenna relay-contact bounce on make. The antenna change-over contact has simply not stopped bouncing before the transmitter starts delivering r.f. energy to the still-bouncing relay contact. The proposed arrangement takes this contact bounce time into account and delays r.f. output from the transmitter until contact is firmly established between the transmitter and antenna.

Antenna Relays

One advantage of a properly-sequenced control-relay arrangement is the ability to use almost any small relay to do the antenna change-over job. Since the antenna change-over contacts do not switch under power, almost any but the frailest relay contacts will handle full amateur power, if the r.f. switching is done at a low-impedance point as it usually is. The principal restriction on relay selection is that the dielectric on which the relay contacts are mounted be able to withstand the applied r.f. voltage. This requirement is not one of arc-over but that of dielectric heating caused by high-frequency currents. Dielectric heating from the r.f. current can cause insulation breakdown where the same d.c. or 60-cycle voltage would cause no trouble. In particular, relays which have the movable contact connected to

* 545 Wegman Road, Rochester 11, New York.

[1] Campbell, "Variations in TR Switch Performance," *QST*, May, 1956.

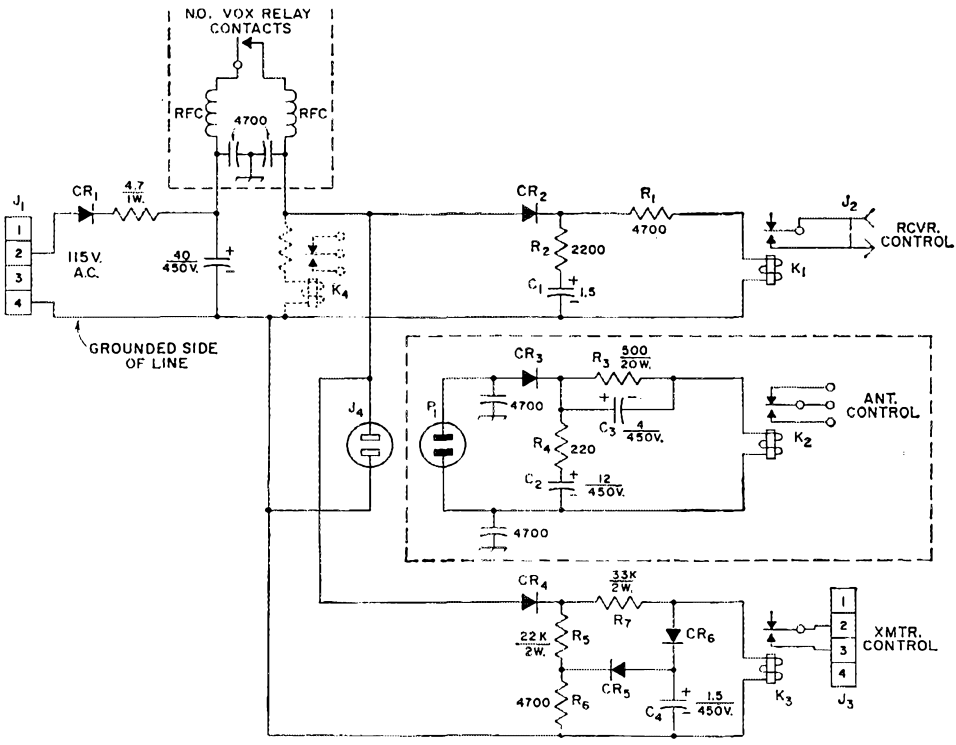


Fig. 1—Diagram of the sequenced control circuit. Resistances are in ohms. Capacitors marked with polarity are electrolytic and capacitances are in μf. (see text in regard to C_1 and C_4); others may be paper or ceramic and values are in μμf. Resistors are 10-per-cent ½-watt unless indicated otherwise. Antenna-control portion (shown within dashed lines) should be installed at the transmitter. Note: pin 4 of J_1 must go to grounded side of line.

C_1-C_4 inc.—450-volt electrolytic (see text).

CR_1-CR_6, inc.—Silicon diode: 360 p.i.v., 200 ma. (Sarkes-Tarzian K-200).

J_1—Chassis-mounting 4-prong male connector (or other connector whose connections may be polarized) (Cinch-Jones P-304-AB).

J_2—Phono connector.

J_3—Chassis-mounting 4-prong female connector (Cinch-Jones S-304-AB).

J_4—Miniature polarized chassis-mounting a.c. outlet.

K_1, K_3—S.p.d.t. relay, 6000-ohm coil (Sigma 11F-6000-G/SIL).

K_2—Antenna relay from ARC-5 antenna-tuning unit, or similar (see text).

K_4—See text.

P_1—Polarized a.c. plug.

R_1—R_7 inc.—See text.

the relay frame are susceptible to dielectric heating. This construction promotes heating of the relay coil due to the effect of r.f. current flowing from the core piece of the coil through the coil insulation to the coil winding.

Two very commonly-available relays have been satisfactorily used as antenna change-over relays in a sequenced control system. Either one will handle any legal amateur power into the usual coaxial cable. My favorite of the two is a little gem which I have wanted to put to work for some time. It is the relay from the BC-442 antenna tuning unit of the ARC-5 and SCR-274 series. There must be thousands of these little beauties which have been relegated to the attic by amateurs who bought tuning units to get the vacuum capacitor and thermocouple meter. They are still available on the surplus market at a reasonable price. This relay is beautifully insulated for high r.f. voltage. It has a set of s.p.d.t. contacts for r.f. switching and a set of normally-open control contacts, one contact of which is at relay-frame potential. The coil of this relay is designed for 24/28-volt d.c. operation. The other relay which has been proven in the antenna change-over circuit is a commonly-available surplus d.p.d.t. relay. Some of these also have a set of s.p.d.t. control contacts. Both Advance and Leach have manufactured a relay of this type. The contacts are insulated with ceramic and the coil is intended for 115-volt 60-cycle operation.

These relays will work well from the same d.c supply voltage as the ARC-5 relay, although experimental readjustment of delay values may be necessary.

The relays used for receiver and transmitter control are miniature sensitive relays manufactured by Sigma and cost less than $2.00 each new. They operate quietly and rapidly.

The circuit of the adapter is shown in Fig. 1. The system is controlled by a pair of normally-open contacts on the VOX relay. K_1 is for re-

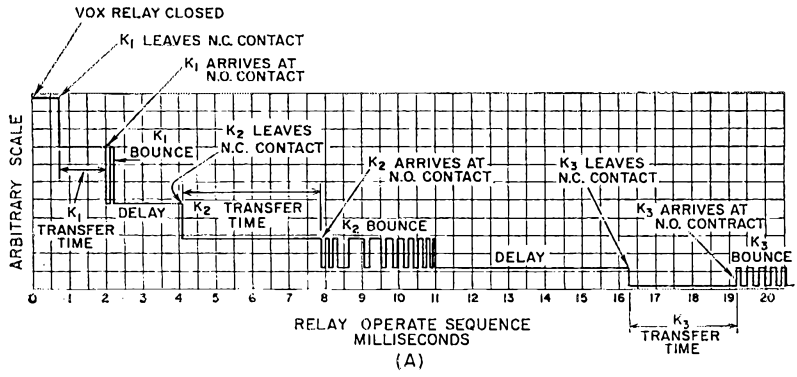
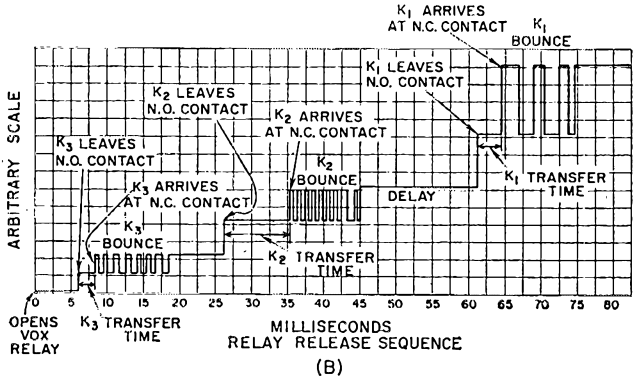


Fig. 2—Graph showing relay sequencing, including relay "bounce" characteristics. A shows the characteristics on "operate" (relays energized), while B follows the sequence on "release" (relays deenergized).



ceiver muting, K_2 for antenna change-over and K_3 for transmitter power control. The contacts of K_1 and K_3 may be used in any desired manner to suit the individual control arrangement, since the adapter system provides proper sequencing, including allowance for bounce, in both directions of the armature travel. However, the relays of the adapter should not be used to control other relays; they should perform the intended function directly to preserve the desired sequencing. This sequencing is illustrated graphically in Fig. 2. Fig. 2A shows the progression in changing over from the receiving condition to the transmitting condition, while Fig. 2B shows the reverse progression in returning to the receiving condition.

No specific circuitry is shown for receiver and transmitter controls, since this will depend upon the equipment in use and the operator's preference. As suggestions, the receiver-control contacts may be used to raise the cathodes of the r.f. and i.f. stages far enough above ground to disable the receiver, or they can supply the required cutoff negative voltage to the a.v.c. line. The transmitter-control contacts may be used to open cathode circuits on stand-by. In cases where additional transmitter-control contacts are desired to provide a cutoff bias to the final amplifier for tube protection or shot-noise quieting, an additional relay, K_4, may be used without delay and connected as shown in dotted lines.

Delay Circuits

As previously stated, in going from receive to transmit, K_1 should close first and as quickly as possible to disable the receiver. When the normally-open contacts of the VOX relay close, approximately 140 volts is applied to K_1 through R_1 which serves to limit the power dissipated by the coil to a safe level. Capacitor C_1 produces an insignificant delay in the closing of K_1, since the series resistance common to C_1 and K_1 is negligible. The resistor R_1 tends to speed up the action of K_1.[2]

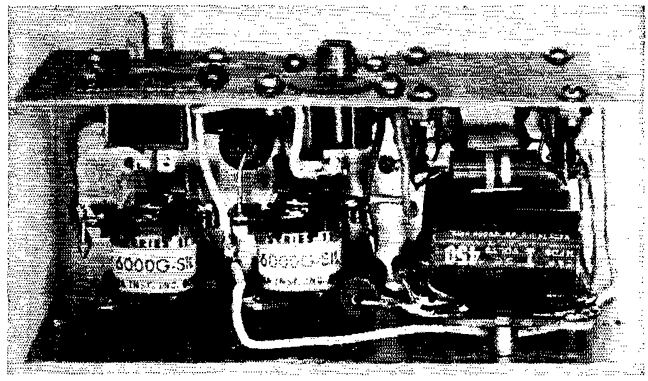
K_2 must wait for K_1 to close and for contact bounce to subside. This necessary delay is an inherent characteristic of the relays recommended for K_2. Therefore no components are needed to delay the operate time of K_2. R_3 limits the power dissipated by the coil of K_2. R_3 and C_3 in series with the coil of K_2 actually act to make the relay operate faster than it would if 24 volts was applied directly to its coil. Nevertheless, the resultant delay is adequate if the suggested relays are used. Again, C_2 has an insignificant effect on the *operate* time of K_2 both because of the negligible common series resistance.

K_3 is inherently fast-acting, so its action must be delayed to permit K_1 and K_2 to operate first. This delay is supplied by C_4 and the common series resistance of R_7. These latter are the only components affecting the operate time of K_2 since, on the receive-to-transmit cycle, the voltage divider R_5-R_6 biases CR_5 to nonconduction to prevent R_6 from affecting the time delay, although CR_6 will conduct. We now have all relays energized with the receiver off and the transmitter on.

From Transmit to Receive

To go from transmit to receive, we first must turn off the transmitter. To do this as quickly

[2] See Stein, "Some Hints on Relay Operation," *QST*, June, 1956.



This unit includes K_1 (center) and K_3 (left). The components are assembled in a 2¼ × 2¼ × 5-inch aluminum Minibox. Note the sponge-rubber relay mounting.

as possible after the VOX relay opens, we should open the K_3 coil circuit. This is done quite effectively by CR_6 which electronically disconnects C_4 from K_3. (CR_6 is so polarized that it will not conduct in the direction of the discharge current from C_4.) CR_5 is now no longer back-biased, so that C_4 is rapidly discharged through R_6. (Discharge of C_4 is necessary, of course, so that C_4 will be ready to provide an accurate delay on the next receive-to-transmit cycle.)

The release of K_2 is delayed by the charge on C_2, and K_1 is delayed on release by the charge on C_1. CR_2, CR_3, and CR_4 are isolators to prevent interaction between the timing circuits.

Receiver Noise Suppression

The r.f. chokes at the VOX relay contacts are used to suppress electrical noise generated by the small arc as the contacts open. Since the receiver is still sensitive for a few milliseconds after the VOX relay operates, any r.f. disturbance of this sort can be picked up by the receiver unless the shielding is very complete in the antenna circuit. The chokes may be omitted and added later if found to be required. In most instances, however, they will be found to be beneficial. They should be installed at the VOX relay contacts with the *shortest possible* leads between the chokes and the relay contacts.

The installation of chokes in the receiver-control contacts of K_1 may also prove desirable. Even the low current switched by these contacts can cause an r.f. disturbance which can be picked up by the receiver in some instances. While not shown in the schematic of Fig. 1, these chokes can be seen in the photograph of the adapter unit.

Capacitors

Electrolytic capacitors are used because of the size problem which paper capacitors would present. Electrolytic capacitors have proven to be entirely satisfactory in this low-impedance application. Because of the manufacturing tolerance associated with the relays and capacitors, it may be necessary to determine experimentally the value of capacitance to provide the correct timing. The final proof of performance of this gadget is its ability to operate without antenna arcing or "pops" in the receiver. The tolerance on electrolytics is none too good, of course, and in the case of the 1.5-μf. capacitors, C_1 and C_4, it will be necessary to make a selection from a group of 1- and 2-μf. units. For this reason, it may be more practical to use tubular paper capacitors in these two positions, if space can be found for them. The desired capacitance can be made up of a 1-μf. unit in parallel with a 0.5-μf. capacitor.

Relay Characteristics

The operate times shown in Fig. 2 are representative of what can be done with the relays used. The over-all design is pretty well dictated by the characteristics of K_2 in this instance, since it is inherently slower-acting than K_1 or K_3.

The total timing period of the release sequence of Fig. 2B is not particularly critical. As shown, it is faster than the normal release adjustment of most VOX systems. As long as the total release timing period does not cause undesirably long "hang-on" of the VOX, the release sequence of the relays can fit into this period in any manner which keeps them from coinciding in operate time. The circuit shown will follow c.w. up to about 15–20 w.p.m. and can be adapted for phone-c.w. operation by means of some additional switching.

It should be emphasized that the operating characteristics of no two relays, even of the same make and model, are identical, and that some adjustment of the delay-circuit values given should be expected. An article to follow will describe a method of accurately timing relay operation.

Reducing ARC-5 Relay Bounce

The very desirable mechanical construction of the ARC-5 antenna relay, which gives it the large contact spacing so desirable for high r.f.-voltage

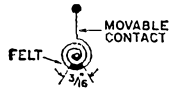
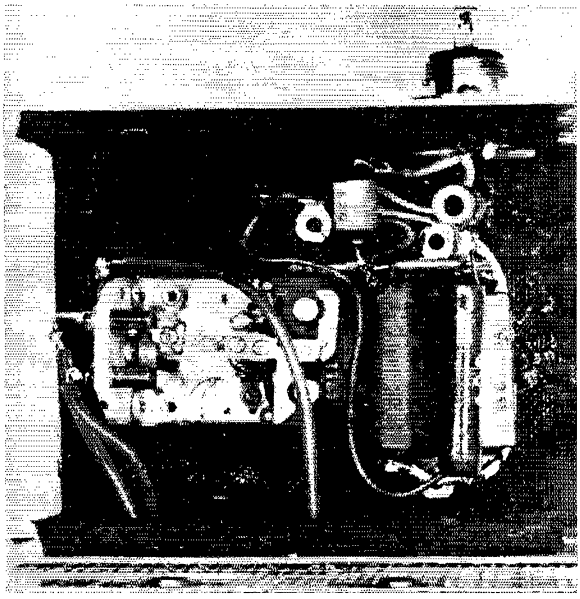


Fig. 3—Sketch showing method of damping bounce in ARC-5 antenna relays.



The antenna relay, K_2, and associated delay components are mounted in a 4 × 5 × 3-inch Minibox fastened to the rear of the transmitter. The box is lined with sound-deadening material.

use, brings about a problem in contact bounce. The long springlike contact of this relay is very prone to bouncing on release as the movable contact meets the normally-closed contact.

A group of four of these relays was checked for contact bounce. The bounce of the movable contact when it reached the normally-open contact was not abnormal, but all four relays showed 35–40 milliseconds bounce time on release when the movable contact arrived at the normally-closed contact. One other ARC-5 relay had a piece of felt inserted between the turns of the springlike movable contact. Tests on this relay showed less than 10–15 milliseconds bounce time on release. Installing a similar piece of felt in each of the four relays showed that bounce time could be cut to less than 20 milliseconds on all relays.

Fig. 3 is a sketch of how the felt was inserted in the contact mounting. The felt is material which can be taken from underneath the cover flaps of the ARC-5 transmitter series and is about 1/16 inch thick. A piece about 3/16 by 1/4 inch is used.

The graphs of Fig. 2 were taken with the felt installed. If no felt were used, C_1 of Fig. 1 would have to be larger to delay K_1 enough on release to allow for the larger bounce time of K_2.

Acoustical Noise Reduction

The ever-present noise of relay operation has been a subject of discussion for years. Nothing new is advanced here toward solving this problem. Its existence is, however, acknowledged. The small Sigma receiver- and transmitter-control relays are mounted on sponge rubber to reduce their operational noise. This rubber serves another important purpose. The movable contacts of these relays are connected to the relay frame, so that it is necessary to insulate the relays electrically. The sponge rubber does both the job of mechanical isolation and electrical insulation. Rubber cement of the type used to cement automobile weatherstripping does the job of cementing the sponge rubber to the chassis and the relay to the sponge rubber. The sponge rubber can be seen in the photograph of the adapter unit.

The antenna relay is much the noisiest of the three. It is mounted at the final amplifier in a Minibox which is lined with sponge rubber. The relay is cemented to the rubber without using any mounting screws which would conduct sound to the box.

These noise-reduction techniques are about 50 per cent effective. Enclosing each of the two chassis inside another rubber- or acoustic-tile-lined box is an idea for further experimentation.

Keying Filter

The graphs of Fig. 2 show that K_3, the transmitter-control relay, bounces quite a bit when the movable contact makes with either the normally-open or normally-closed contact. If this relay is used to key a transmitter for c.w. operation, clicks can result if a keying filter is not used. The usual c.w. click filter, which should be a normal required transmitter accessory, will take care of any tendency of the bounce to cause clicks. QST

Strays

W5SU points out that many hams, both here and abroad, are avid stamp collectors, and so its a nice gesture to use commemorative issues as much as possible. Also, instead of putting a single 25-cent stamp on a piece of foreign mail, use a combination of smaller values.

Getting the Most Gain from Stacked Antennas

Array Design with Optimum Antenna Spacing

BY H. W. KASPER,* K2GAL

Stacking two antennas doesn't** always **result in a 3-db. gain improvement — it all depends on the spacing used. Here's down-to-earth information on putting together multi-antenna arrays complete with universal design charts and examples of how to use them.

IN the April, 1958 issue of *QST*, the author presented an article entitled "Optimum Stacking Spacings in Antenna Arrays." It soon became evident that although basic terms and fundamental equations were used in an effort to attain simplicity, many people did not grasp the meaning of the concepts presented nor were they able to utilize these concepts in a practical antenna design. The following words of wisdom were assembled to assist these people.

The first part of this article is a brief review of the original material, while the second part presents practical antenna designs fashioned in response to various inquiries.

Need for Optimum Spacings

Many amateurs, especially v.h.f. enthusiasts, have become aware that an antenna, no matter how small it is physically, has associated with it a power-gathering area. This area is called "effective aperture," and more often "capture area."

As an example, consider the dipole. The maximum effective aperture of a dipole is approximately the same as an area ½ by ¼ wavelength on a side. The physical significance of this aperture is that the power from the incident plane wave is absorbed over an area of this size by the dipole, and is delivered to its terminating resistance.

With the increasing use of multielement Yagis, it became evident that longer Yagis had larger "effective apertures," and that in order to realize maximum gain when using two stacked Yagis, a spacing larger than the customary half wavelength was needed to insure that the respective capture areas were not "overlapping." The same effect was noted in the case of collinear dipoles, where a center-to-center spacing of approximately ¾ wavelength is needed to achieve maximum gain. It should be noted that the customary half-wavelength spacing is a carry-over from collinear array design where no side lobes are desired. For an amateur striving to achieve maximum gain, an antenna design utilizing half-wavelength spacings between elements can be termed inefficient!

Achieving Optimum Spacings

The presence of a capture area poses two important questions:

1) How does the capture area vary with different antennas?

2) In stacking antennas, how must the individual capture areas to be positioned for maximum efficiency?

The first question can be answered intuitively. The higher the antenna gain, the larger is the capture area.

The answer to the second question cannot be obtained so easily. Although the capture area can be expressed mathematically, its exact geometrical configuration remains unknown. Fortunately, there is a method which enables us to compute the spacings necessary for achieving maximum gain. This method utilizes an important principle of antenna design called "pattern multiplication." It is restated here for the personal edification of those not in the know: "The field pattern (note: field, not power) of an array of nonisotropic but similar point sources (i.e., an array of dipoles, or Yagis, or horn antennas, etc.) is the product of the pattern of an individual source and the pattern of an array of isotropic point sources, having the same locations, relative amplitudes and phases as the nonisotropic sources." A thorough explanation of this statement, plus array patterns for isotropic point sources, can be found in *Antennas*, by Kraus.

Now suppose we have several Yagis and wish to stack them. How do we calculate the proper spacing for maximum gain? The necessary steps are as follows:

a) Determine the field pattern of an individual Yagi (i.e., rotate it and plot the field strength).

b) Determine the proper array factors or patterns for various spacings from *Antennas*.

c) Multiply the two to obtain the field pattern of the array.

d) Calculate the gain for the various spacings from the beam widths (see author's article in April, 1958, *QST*).

e) Calculate the level of the highest side lobe for the various spacings. (Maximum gain occurs at approximately a −13 db. [0.22 in voltage] side-lobe level.)

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Lots of work? You bet it is. The plots and calculations become quite cumbersome, especially when the number of antennas to be stacked becomes large. In order to simplify things, the author assumed "typical" field patterns for antennas having various beam widths. Following the procedure outlined above, a plot of optimum stacking spacing *vs.* antenna beam width was obtained. The results are shown here in Figs. 1 and 2. Figs. 3 and 4 were given by Greenblum[1] in a previous article and illustrate the beam widths obtained from multielement Yagis. By using these charts, we can quickly determine the optimum spacing for a given array design.

Figs. 1 and 2 are similar to the curves shown in the author's previous article, but close examination will show a difference, especially in the maximum gain curves. The reason for the change is as follows: Originally a 10-db. side-lobe level was taken as the point at which maximum gain occurs. However, a little thought on the subject led to the conclusion that a 13-db. side-lobe level would be more appropriate. As shown by Silver,[2] a uniformly illuminated rectangular aperture exhibits maximum gain at a side-lobe level of −13 db., while for a uniformly illuminated circular aperture maximum gain occurs at a side-lobe level of −17.6 db. It can be seen that stacking several antennas will result in an approximate uniformly illuminated rectangular aperture. The approximation is even more exact when a large number of antennas is stacked.

Practical Designs

Stacking Quad Antennas

During recent years, the "cubical quad" or "bi-square" antenna has been enjoying increasing popularity. Here is a typical problem posed to the author by John Knight, W6YY, concerning the stacking of two quads. The quads are to be stacked horizontally and will replace a three-element Yagi.

The following questions were raised:

a) Can one consider the cubical quad when stacked horizontally to behave the same as collinear dipoles in phase for the graphs and calculations given?

b) What is the "best" horizontal spacing, center-to-center, for two quads to produce the best forward gain and directivity with optimum side lobes?

The answer to the first question is affirmative. The optimum spacing curves are universal; i.e., they can be applied to the quad, loop, slot, dipole, or any type of antenna. This is because the calculations were based on beam width, and not on any particular antenna type. The only restriction imposed is that the individual patterns have no side lobes. Actually, the results will hold for patterns with moderate side-lobe levels, since the multiplication process reduces their level.

To answer the second question, let us first determine the spacing for −13 and −20 db. side-lobe levels and then outline the steps leading to a final selection. In order to find out the spacing values we must know the horizontal beam width. Assuming that the horizontal and vertical beam widths are approximately equal, their value can be calculated from the expression

$$\text{Gain (db.) over isotropic source} = 10 \log_{10} \frac{41{,}253}{\theta_h \theta_v}$$

where θ_h and θ_v are the horizontal and vertical beam widths in degrees. A dipole has 2.14-db. gain over an isotropic source (one that radiates energy uniformly in all directions), so a quad with 6-db. gain over a dipole will have 8.14 db. gain over an isotropic radiator. Therefore,

$$8.14 = 10 \log_{10} \frac{41{,}253}{\theta_h^2}$$

and $\theta_h = 80°$.

From Fig. 1 we see that for an 80-degree beam width a spacing of 0.73 wavelength is appropriate for a − 13-db. side-lobe level, while 0.64-wavelength spacing would reduce the side-lobe level to −20 db. The difference in gain for the two spacings would be about 1 db., and this would be hard to detect with most measurement techniques. The final spacing choice is one of personal preference. However, the

[1] Greenblum, "Notes on the Development of Yagi Arrays," Part I, *QST*, August, 1956.

[2] Silver, "Microwave Antenna Theory and Design, MIT Rad. Lab. Series, Vol. 12.

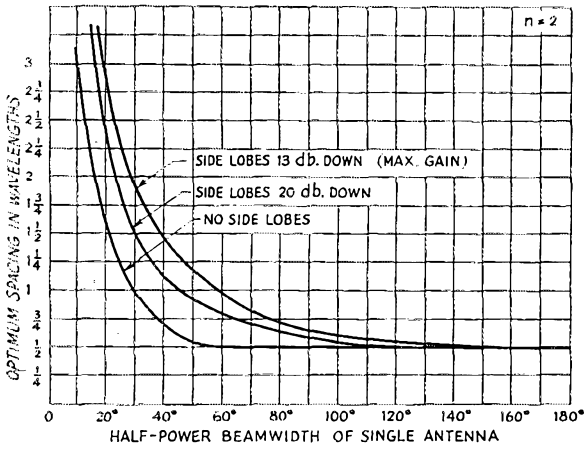

Fig. 1—Optimum stacking spacing for two antennas ($n = 2$). The spacing for no side lobes can result in little gain over a single source, especially with small beam widths.

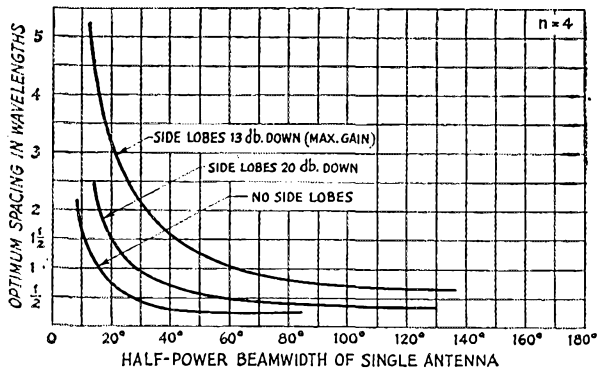

Fig. 2—Optimum stacking space for four antennas (n = 4). Note: Spacings less than ½ wavelength are physically possible only for shortened dipoles in the case of collinear elements or for stacking in the plane perpendicular to the plane of polarization.

following points can be used as guides in making the choice:

a) Lower side-lobe levels reduce interference when the band is highly populated.

b) Smaller spacings require less boom length and are desirable from a mechanical viewpoint.

c) In some cases a large spacing will create physical problems in impedance matching.

The 8-Over-8 for 2 Meters

The 8-element Yagi has become a popular 2-meter antenna. In order to stack two, we proceed as follows: Fig. 3 shows that an 8-element Yagi has a beam width of approximately 37 degrees in the plane of polarization (i.e., horizontal plane for a horizontal Yagi). The vertical beam width is slightly larger, but for all practical purposes the two can be considered equal. For two Yagis ($n = 2$) we see from Fig. 1 that a stacking spacing of 1½ wavelengths is needed in either plane for optimum performance. Using a design frequence of 145 Mc. (free-space wavelength = 81.4 inches) the 1½-wavelength spacing is 10 feet, 2 inches. Deviations from this spacing of a few inches can be tolerated without any noticeable degradation of performance.

Fig. 5 shows two configurations for feeding the Yagis, assuming each Yagi has a feed point impedance of 450 ohms. The spacing in Fig. 5A is optimum, while that in Fig. 5B is a few inches less to facilitate impedance matching. In Fig. 5A an open-wire line of any characteristic impedance connects the two Yagis. Each half of this line is electrically one wavelength long. Using a velocity factor of 0.975 this comes out 79.4 inches. The impedance at the midpoint is half that of each beam or 225 ohms. A 4-to-1 impedance transforming balun connected at this point transforms the 225 ohms to 56 ohms and also provides the change from balanced to unbalanced line. If a balanced transmission line is desired, 300-ohm Twin-Lead can be used between the midpoint and the balun.

Fig. 5B shows a similar scheme which will provide equal performance and uses all coax rather than an open-wire line phasing section. In this method two baluns are used, one being placed directly at the feed point of each Yagi. The 450 ohms balanced is transformed to 112 ohms unbalanced, and the two baluns are then connected through a piece of coaxial line having a half length of 53.7 inches. Again this half length is electrically a wavelength long (using a velocity factor of 0.66). At the midpoint of the coax line the impedance is 56 ohms, and at this point a direct connection can be made to standard RG-8/U or RG-58/U coaxial cable.

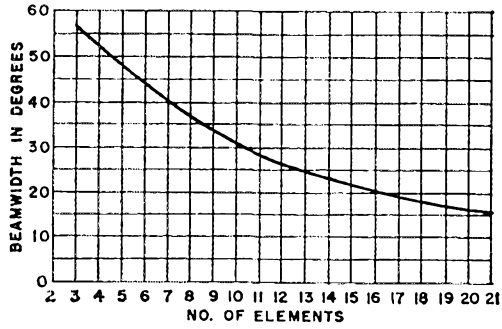

Fig. 3—"E"-plane half power beam width of a Yagi *vs.* number of elements (including one driven element and one reflector). The "E" plane is the plane of polarization of the signal; in this case it corresponds to the plane of the antenna elements.

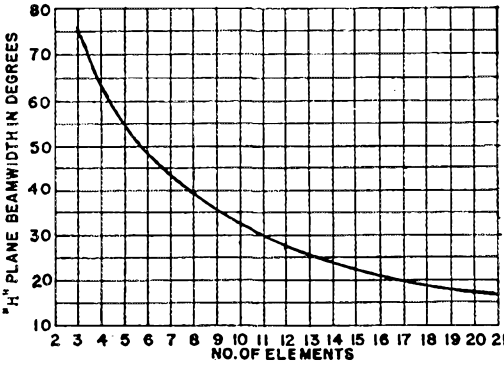

Fig. 4—"H"-plane half power beam width of a Yagi *vs.* number of elements (including one driven element and on reflector). The "H" plane is the plane at right angles to the plane of polarization.

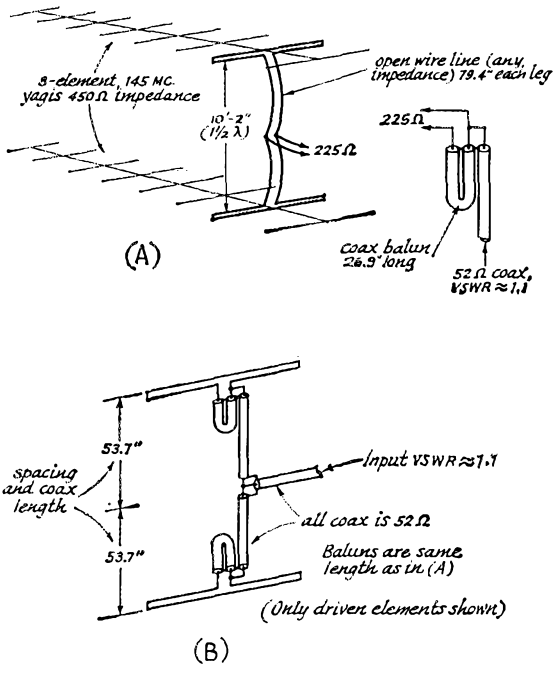

Fig. 5—(A) Two 8-element Yagis for 145 Mc. stacked with optimum spacing of 1½ wavelengths. The open-wire line connecting the antennas is 2 electrical wavelengths long (with a velocity factor of 0.975). The balun and 52-ohm coax can be mounted right at the 225-ohm midpoint, or a 300-ohm transmission line can be used between them. (B) Alternate matching system using only coax. The spacing between Yagis has been reduced slightly to accommodate the 2-wavelength coaxial phasing line (velocity factor 0.66).

The open-wire line used in Fig. 5A minimizes feeder and balun losses. However, actual measured balun losses using RG-8/U ran less than 0.1 db. at 145 Mc., and the use of coax minimizes the chance of feeder radiation.

A Stacked Array for Satellite Reception

Fig. 6 shows two vertical 5-element Yagis stacked horizontally for maximum gain. The lengths and spacings given are for 108 Mc. The beam width of one antenna in the plane perpendicular to the plane of polarization as given by Fig. 4 is 54 degrees. The stacking spacing for maximum gain with two such antennas ($n = 2$) can be taken from Fig. 1 as 1⅛ wavelengths. Notice that we are only concerned here with picking up the satellite signals and not with any phase-comparison system such as Minitrack, which has special spacing requirements.

Each Yagi is connected to a piece of 300-ohm Twin-Lead one wavelength (89.7 inches using a velocity factor of 0.82) long. The two lengths of Twin-Lead are tied in parallel, resulting in a midpoint impedance of 150 ohms if the Yagi feed-point impedances are 300 ohms. A 4-to-1 balun connected to the midpoint will transform this to about 38 ohms unbalanced and can be fed directly with RG-8/U or RG-58/U cable. QST

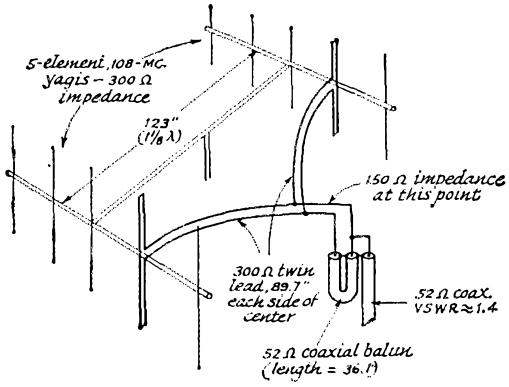

Fig. 6—Matching system for two 5-element Yagis with optimum spacing of 1⅛ wavelengths. Dimensions are for 108 Mc. The Twin-Lead connecting the two antennas is 2 wavelengths long with a velocity factor of 0.82.

Adapting the VXO Principle for V.H.F. Use

A V.H.F. Variable-Frequency Crystal Exciter

BY HENRY J. SABORSKY,* W3KXI

VARIABLE-FREQUENCY operation on the v.h.f. bands, with stability comparable to lower frequencies, is the goal of the serious v.h.f. man. Most v.f.o.s are low-frequency oscillators followed by stages multiplying to the desired v.h.f. band. With great care in construction and a bit of luck, an acceptable sounding signal may be realized, but really T9 signals on 144 Mc. are usually only a fond dream.

A *QST* article on a variable crystal oscillator circuit using inductance to lower the series-resonant frequency of the crystal[1] sounded like the answer to the v.h.f. man's problem. A test circuit was hurriedly put together using the basic variable crystal oscillator as described by W3BWK. The results were encouraging; a good crystal-sounding signal on 144 Mc. with plenty of frequency swing per crystal and excellent reset accuracy.

Considerable thought was given to the eventual application of the basic VXO circuit. The widespread use of 8-Mc. crystals in v.h.f. transmitters dictated the use of this type of crystal in the exciter. Subsequent investigation proved that 8-Mc. fundamental crystals can be swung in frequency sufficiently to provide up to 500 kc. at 144 Mc., depending on the crystal activity and the manufacturing process used in finishing the crystal. In general, any surplus crystal plugged into this exciter will permit a swing of 100 to 500 kc. at the operating frequency.

Rebuilding and debugging yielded a basic variable-frequency crystal exciter that is simple in circuitry, easy to build and stable enough to be used for single sideband. Since no heterodyning action is involved there is no spurious beat problem. The oscillator runs continuously, and at low power level, avoiding the drift so often observed at the start of each transmission in v.h.f. work. Though the exciter was intended primarily for 144-Mc. use at W3KXI, frequencies for 50- and 220-Mc. operation are readily obtainable. Frequency swings up to one megacycle at 144 Mc. are obtainable with specially-processed crystals.

* 633 So. Eighth St., Sharpsville, Penna.

[1] Shall, "A Variable Crystal Oscillator," *QST*, January, 1958, p. 11.

Circuit

The VXO oscillator circuit is shown in Fig. 1. The inductance, L_1, is used to lower the series-resonant frequency of the crystal. The dual-section capacitor, C_1, lowers the oscillation frequency as the capacitance is increased.

The crystal can be a fundamental 8- or 12-Mc. cut, or overtone-type (third or fifth overtone) operated on the *fundamental* frequency. For maximum frequency swing, with high stability, special VXO crystals or fifth-overtone types

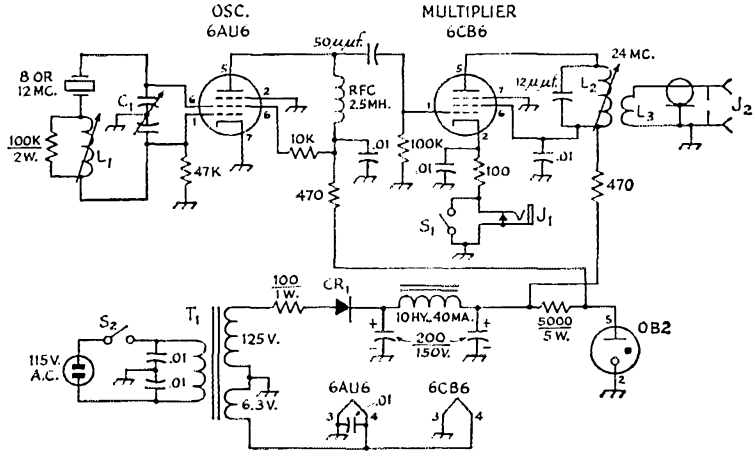

Fig. 1—Schematic diagram and parts information for the v.h.f. VXO. Capacitor values in μf. unless specified. Those marked with polarity are electrolytic; others mica or ceramic. Resistors ½ watt unless specified.

C_1—50-μμf.-per-section split-stator (Hammarlund HFD-50).

CR_1—150-ma. silicon rectifier.

J_1—Closed-circuit jack.

J_2—Coaxial fitting.

L_1—No. 26 enam. close-wound on ½-inch form with h.f. iron slug, winding length 1 inch (CTC PLS7 form, with 20063-K core).

L_2—22 turns No. 26 enam., close-wound on ¼-inch form with v.h.f. iron slug (CTC PLS6 form with 20063-0 core).

L_3—3 turns insulated hookup wire over B-plus end of L_2.

S_1, S_2—Toggle switch.

T_1—Power transformer, 125 v. 40 ma., and 6.3 v. 0.6 amp. or more.

are preferred. The second stage is a frequency multiplier to 24 Mc.

A word about components: the critical part of the VXO circuits is the coil, L_1. In line with good v.f.o. practice, the coil form should be of ceramic material with secure locking action of the tuning slug. The Q should be as high as possible. The tuning slug should be chosen for the frequency of operation, to realize the maximum Q from the coil. Capacitor C_1 can be any good dual-section model of the specified capacitance and plate shape. All other components are noncritical and standard.

Regulation of the plate and screen voltage for the oscillator is a must. The keying jack is included for amplifier disabling during receive periods. Diode frequency multiplication through a hot transmitter with plate voltages off can put a good S9 signal on 144 Mc. This may be good for frequency spotting but difficult for receiving; hence the keying jack and spotting switch.

The power supply is shown for convenience only. To reduce the ripple component in the d.c. output, full-wave rectification is recommended. I used half-wave rectification to suit the power transformer available, but note the large amount of capacitance needed to reduce the ripple to a suitable level.

If the power supply is to be constructed on the same chassis as the exciter, use of the silicon rectifier is recommended from the standpoint of reduced temperature rise. If possible, all heat-producing components should be located on the outside of the chassis. Excessive temperature rise in the box will have an adverse effect on the coil stability. For the more technically inclined reader, the careful study of the articles by W3BWK on the theory behind the VXO principle is recommended.

Construction

A 3 × 5 × 6-inch aluminum chassis houses the exciter. The placement of the coil, capacitor and crystal socket should be such as to give the shortest lead length. If its limited frequency coverage will suffice, the crystal can be soldered permanently into the circuit, eliminating the shunting effect of the crystal holder. This will increase crystal activity and frequency swing.

The dial calibration linearity depends on the crystal activity with maximum plate and grid capacitance in the circuit. The more active the crystal, the less is the effect of the increase in capacitance across the plate and grid on the frequency variation; i.e., less crowding at the low frequency end of the dial.

The series coil, L_1, was chosen to vary over a large inductance range in order to accommodate crystals in the 8- to 12-Mc. range. If 12-Mc. crystals only are used, larger diameter wire can be used for the coil, reducing the number of turns required and improving the temperature stability and Q. In any event, the coil should be wound with the wire under tension, with no cement applied to hold the wire in position. Inductance requirements will vary with the crystal type and circuit layout. A good rule to follow in arriving at the best coil for the particular circuit is to use the least amount of wire necessary to cover the range desired. Use the slug for maximum inductance and Q. A good sturdy coil form is required for this service.

The remainder of the exciter is conventional, with placement of components and wiring in line with good v.f.o. practice. The output circuit can be varied to suit the transmitter with which the exciter is to be used. Recommended circuits are suggested in the *Handbook*.

If the exciter is to be used in conjunction with a high-power transmitter, thorough shielding and filtering of the exciter are recommended for best results. This should include bottom plate, tube shields and even a crystal shield, if a plug-in crystal is used, and power-line filtering that will be effective at transmitter frequency. Excessive r.f. in the exciter can produce weird results.

Adjustment

A grid-dip meter is needed for the initial adjustments of the tuned circuits. With the crystal plugged into the circuit and C_1 set at maximum capacitance, check L_1 for resonance near the frequency of the crystal in the circuit. Resonance should be approached from the high-frequency side, removing coil turns so that resonance is reached with the tuning slug into the coil about three quarters of the way. Next, resonate L_2, to 24 Mc., with the exciter output feeding the v.h.f. transmitter. This completes the preliminary circuit adjustments.

Crystals should be selected on the basis of the highest frequencies to be covered. Example: To cover from 144 to 145 Mc., select a crystal frequency of $\frac{145}{12} = 12.08$ Mc., and add .01 Mc. to allow for overlap and crystal variations. If a continuous calibration is desired, similar crystal types should be used.

Final adjustments as follows:

Turn the slug of L_1 to the minimum inductance position and plug in the crystal. Set C_1 to minimum capacitance.

Apply power to the exciter and check the crystal for oscillation near the calculated frequency, checking the frequency with the station receiver, preferably on the crystal fundamental.

Set C_1 to maximum and note the frequency change.

With C_1 at maximum, turn the slug into L_1 to lower the frequency, checking with the receiver until the lowest desired frequency is reached.

Check tuning range by rotating C_1 to minimum setting, and touch up the L_1 slug if the tuning range is not correct.

Calibrate the dial for each crystal used.

Using the receiver S meter, peak L_2 for maximum output.

Tuning range of 1 Mc. or greater can be obtained on 144 Mc. by the use of special crystals. However, for s.s.b. or other high-stability re-

(*Continued on page 148*)

A Better Way to Install Fittings on ¼-Inch Coax

BY JOHN HOWARD,* K8MME

AMATEUR operators who feed their signals through ¼-inch coaxial cable (such as RG-58/U and RG-59/U) may have shared the author's reservations about the accepted procedure for attaching u.h.f.-type fittings to the cable. Combing the shield braid wires down the outside of the reducing adapter and then screwing the adapter into the body of the fitting raises a question as to how well the fine wires have behaved themselves inside. In the conventional soldering operation, it is nearly impossible to keep the whole assembly from reaching a high temperature and subjecting the small core of insulation around the inner conductor to damage. One often feels the urge to give his handiwork an X-ray examination to learn just what has cooked.

The following procedure is offered as an alternative: Lightly apply a ring of solder to the forward rim of the reducing sleeve. Insert your coax cable through the sleeve and remove the desired amount of insulation (normally 21/32 inch). Disregard the insulation around the inner conductor for the moment. With a large straight pin or other pointed object, comb apart the fine wires of the braid and draw the wires straight out like the petals of a flower. Now solder the wires to the forward rim of the reducing sleeve. Very little heat is required to do this because there is only a small amount of metal involved. Trim back the wires and any superfluous solder flush with the bushing and give the job a final touching up with a fine file. Next, strip ½ inch of the insulation from the inner conductor and tin the conductor. The adapter sleeve with the securely attached coax cable is now ready to screw into position within the body of the fitting. Give the assembly an extra twist with pliers to assure good contact between body and adapter. Complete the assembly by soldering the center conductor.

The author believes you will find this procedure actually faster than the usual one, as well as providing more positive results, and you can apply the cost of that X-ray machine toward a new kilowatt! QST

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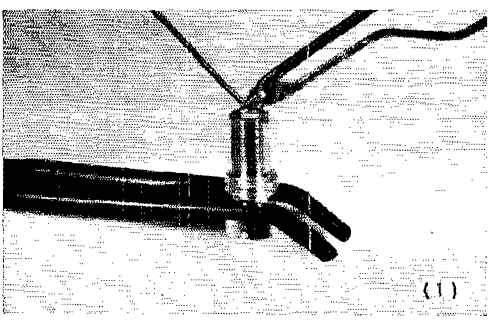
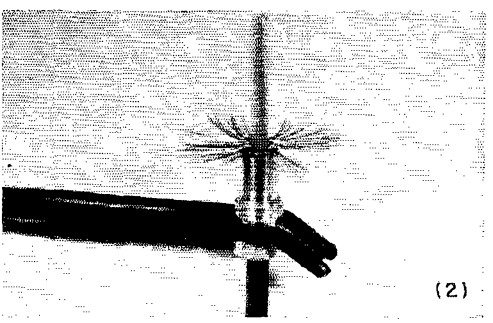
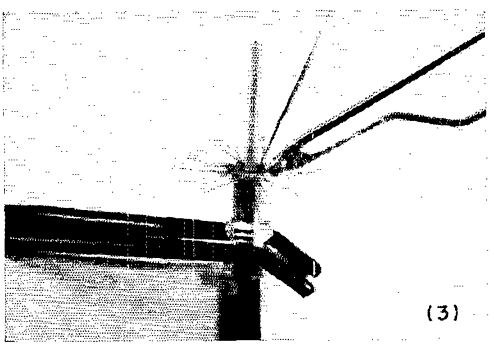


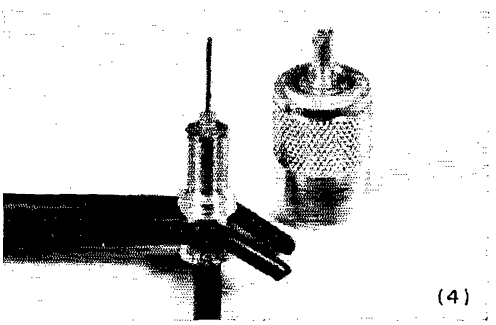
(1) Apply solder to the adapter.



(2) Remove insulation and fan out the braid wires.



(3) Solder the braid to the adapter.



(4) Trim braid back, bare the inner conductor, screw on the plug and solder the inner conductor.

More on Homemade Transformer Design

General Procedure for Constructing High-Voltage Units

BY T. J. MARESCA,* W2VLA

This article was originally submitted as a letter for the Technical Correspondence section of QST *in response to an article by Robert Coats in the September 1959 issue. However, the editors felt that the broader treatment by W2VLA warranted its presentation as a regular article. The author wishes to emphasize the fact that this material was inspired by the previous article by W9ESD.*

THANKS to W9ESD, today's radio amateurs have been introduced to the art of simplified transformer design.[1] His design method and fabrication technique clearly illustrate the relative simplicity of high-voltage transformer construction. Strangely, however, very few people, including engineers, consider themselves adequately equipped to undertake a transformer design job. The reason for this is perhaps due to the fact that the criteria for efficient and economical transformer design have not been clearly established. If cost, minimum weight and minimum volume are not the primary controlling design factors, a simple and conservative step-by-step design procedure can be easily formulated. The author, no expert in the field of transformer design, has recently been required to design and construct small power transformers for developmental airborne electronic equipment. In becoming familiar with the various design parameters, a simple but effective design procedure has evolved. This procedure, while not optimum in the sense of minimum cost, weight and volume, has proven quite satisfactory in the design of those transformers needed for experimental evaluation.

Core Material

At the outset, several design parameters are usually known. These are:

1) Line voltage in volts.
2) Frequency in cycles per second.
3) Load power or volt-amperes.
4) Core material, its normal flux density and stacking factor.

The radio amateur is quite familiar with the first three parameters. In selecting suitable core material, consideration should be given to the peak flux density, exciting current, the ease of applying the windings and the core cost. The best core materials are usually characterized by high peak flux densities and small exciting currents. Grain-oriented silicon steel has few superiors. It is perhaps just as easy to apply the windings to a core consisting of iron laminations as it is to the C core described by Coats. However, when a C core is purchased one does not have to worry about having too many or too few laminations to make up the desired core. Also, the stacking factor, which is the ratio of iron volume to total core volume, is controlled by the manufacturer and is normally as high as practical. As Coats points out, the stacking factor for 12-mil C cores is approximately 95 per cent. The cost of C cores, especially the standard sizes, seems to be quite reasonable.

The grain-oriented silicon-steel C core is available in various sizes from a number of manufacturers, notably the Arnold Engineering Company and the Westinghouse Electric Company. The Arnold trade name is Silectron and the various core sizes are described in their Bulletin SC-107A. The Westinghouse trade name is Hipersil. The descriptive bulletin covering these cores is 44–550. Curiously, the AA-520 C core used by Coats is not a standard size. The next larger core size, AA-523, is less expensive by approximately $1.50 and is a standard core size. The Westinghouse catalog lists an A-520 core which is exactly equivalent to the AA-520 but it, too, is not a standard core size. From the consideration of cost and availability (standard core sizes are usually stocked) the designer should endeavor to use only standard sizes whenever possible.

Core Size

Proceeding now to the step-by-step procedure for transformer design, it is first necessary to compute the r.m.s. primary and secondary currents. This can be found from the formula

$$I = \frac{Volt\ Amperes}{Volts} \simeq \frac{Watts}{Volts} \qquad (1)\ [2]$$

Next, a wire size is selected that will carry the

* Electromechanical Research, Inc., Sarasota, Fla. (formerly with General Electric Co., Ithaca, New York).

[1] Coats, "A Cool Kilowatt Plate Transformer," *QST*, September, 1959. This article should be used as a reference for several of the points discussed here.

[2] This simplified relationship does not include the considerations of power factor and transformer efficiency, both of which will tend to increase primary and secondary currents above the values calculated here. However, the conservative choice of wire size should provide sufficient tolerance. Calculations assume a full-wave rectifier and choke-input filter.

primary current without excessive heating. This can be done by referring to the accompanying table which lists the various wire sizes, the wire area in circular mils (including insulation) and the current-carrying capacity based on 1000 c.m./ampere. As Coats has stated, allowing one circular mil of copper for each milliampere of current is a conservative design consideration.

The next step in the design is to estimate the winding-space factor, K. This factor is the ratio of the total wire area threaded through the core window to the area of the window itself. For a scramble-wound two-winding transformer the winding-space factor of either the primary or secondary (their areas are usually approximately equal) rarely exceeds 20 per cent of the total window area. For high-voltage transformers, where extra layers of insulation must be applied to prevent voltage breakdown, the winding-space factor for each winding may be less than 10 per cent. The designer's ability to fill the core window with as much copper as possible is a direct measure of his transformer winding proficiency.

When the winding-space factor, K, has been chosen the designer can compute the WA product,

$$WA = \frac{(2.74E)\ (A_W)}{(S)\ (K)\ (f)\ (B_M)} \qquad (2)$$

where: W is the window area in square inches,
A is the nominal cross-sectional core area in square inches,
E is the r.m.s. line voltage in volts,
A_W is the cross-sectional area of one turn of primary wire in circular mils, including insulation,
S is the stacking factor of the core material,
K is the winding-space factor,
f is the frequency in cycles per second, and
B_M is the peak flux density in gausses.

For Silectron and Hipersil the WA product times 50 is the approximate maximum power in watts that a core can handle under normal conditions at 60 c.p.s. and 15,000 gausses.[3] The Arnold Engineering catalog lists C cores by increasing order of WA product.[4] The Westinghouse catalog does not observe this convenient convention. Knowing the computed WA product, the designer merely enters the catalog at the appropriate place and selects a core whose WA product, appropriately multiplied, equals or slightly exceeds the desired power rating, keeping in mind that it is economically advantageous to select a standard core size.

Windings

Once the core has been selected, the design proceeds rapidly. As Coats has stated, the number of primary turns is determined from the formula:

$$N_P = \frac{(34.9E)\ 10^5}{(A)\ (S)\ (f)\ (B_M)} \qquad (3)$$

The number of secondary turns is then computed from the formula:

$$N_S = \frac{E_S}{E_P} N \qquad (4)$$

It may be desirable to multiply the number of secondary turns by 1.05 or 1.10 to allow for the transformer regulation.

The primary and secondary wire sizes that will fit in the core window can now be computed from the formulas:

$$A_{WP} = \frac{(1.275)\ (10^6)\ (K)\ (W)}{N_P} \qquad (5)$$

and

$$A_{WS} = \frac{(1.275)\ (10^6)\ (K)\ (W)}{N_S} \qquad (6)$$

where A_{WP} and A_{WS} are the circular-mil areas (including insulation) of the largest size wire of primary and secondary, respectively, that can be accommodated by a window whose area in square inches is[5] W.

As was mentioned before, the choice of K will depend on the type of transformer being fabricated and the ability of the builder to fill the window with as much wire as possible. For low-voltage transformers, where the peak voltage between windings does not exceed approximately 500 volts, the winding-space factor may be chosen as 0.2. In doing so, however, the coil bobbins should be made of relatively thin material and fit the core quite closely. (A method of bobbin fabrication which does not require two material thicknesses is included in the latter part of this article.) The total space factor, K_T, is given by

$$K_T = \frac{N_P A_{WP} + N_S A_{WS}}{(1.275)\ (10^6)\ (W)} \qquad (7)$$

It is the ratio of the total wire area, both primary and secondary, to the window area and in practice rarely exceeds 0.4 for scramble-wound coils. For high-voltage transformers, the total winding-space factor K_T should be chosen as 0.2 or even smaller. This will allow plenty of area for the generous application of high-voltage insulating materials. It should be noted that if the proper winding-space factor is used in determining the WA product, the area of the primary wire just computed will agree closely with the primary-wire area selected at the beginning of the design procedure. When applying the windings to the core, half the number of turns of each winding should be wound on each core leg. This maximizes the coupling between primary and secondary and improves voltage regulation.

Example

To illustrate the design method, consider the following example for the design of a high-voltage plate transformer.

The primary voltage is 115 volts. The second-

[3] The Arnold Engineering bulletin specified a factor of 100 instead of 50 but refers this to a shell-type transformer employing two C-type cores of the type number listed. For the core-type transformer described here, the factor should be 50.

[4] The actual WA product is not given in the Arnold catalog, but is readily obtainable by multiplying together the figures for "Gross Area" and "Window Area." — *Ed.*

[5] Square inches may be converted to circular mils by multiplying by (1.275) (10^6).

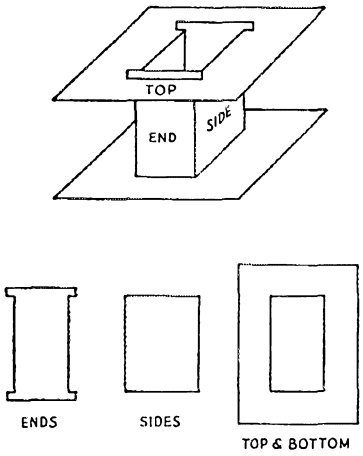


Fig. 1—Sketch showing the self-supporting bobbin described in the text. It should fit the core leg snugly. The top and bottom flanges should have such a width that they extend halfway across the core window opening.

ary voltage is 3000 volts. The frequency is 60 c.p.s. The load power is approximately 1200 watts. It is arbitrarily decided to use a Hipersil or Silectron 12-mil core whose stocking factor is 0.95 and whose normal flux density is 15,000 gausses.

First the primary and secondary currents are computed.

$$I_P = \frac{1200}{115} = 10.4 \text{ amp.} \qquad (1a)$$

$$I_S = \frac{1200}{6000} = 0.197 \text{ amp.} \qquad (1b)$$

Note that twice the output voltage was used in the calculation of the secondary current. The secondary will be center-tapped for full-wave rectifier operation.

Next, reference is made to the wire table. This table is entered where No. 10 Heavy Formvar is chosen for the primary wire. This wire has a cross-sectional area of 11,130 c.m. As this is a two-winding high-voltage transformer the winding-space factor, K, is chosen to be 0.1. Since the maximum primary or secondary space factor for the wire of a two-winding transformer is approximately 0.2, the choice of the 0.1 winding-space factor should allocate sufficient space for all of the high-voltage insulation necessary.

Using formula (2) the WA product is computed.

$$WA = \frac{(2.74)\ (115)\ (11130)}{(0.95)\ (0.1)\ (60)\ (15000)} = 35.8 \qquad (2a)$$

Entering the Arnold Engineering Bulletin SC-107A, page 30, it is apparent that the AA-517 core is the smallest core that meets our design criteria. Selection of the next largest standard core size, AA-518, will permit extra power to be designed into the transformer and will cost less than the AA-517. Fifty times the computed AA-518 WA product is almost 2100 watts[6] so the design is indeed conservative. If the designer becomes expert at filling the core window with wire, smaller core sizes may be selected.

The nominal cross-sectional area, A, of the AA-518 core is 3.81 square inches. The window area, W, is 10.9 square inches.

The number of primary turns is computed from formula (3):

$$N_P = \frac{(34.9)\ (115)\ (10^5)}{(3.81)\ (0.95)\ (60)\ (15000)} = 123 \cong 122 \text{ turns} \qquad (3a)$$

and the number of secondary turns can be computed from formula (3):

$$N_S = \left(\frac{6000}{115}\right)(122)\ (1.05) = 6700 \text{ turns.} \qquad (4a)$$

The number of secondary turns is multiplied by 1.05 to allow for the transformer regulation. This gives a total number of secondary turns of 6700.

Now that we know the number of turns required, we can check back to see how much area the core window allows for each turn with a K factor of 0.1.

Using equations (5) and (6),

$$A_{WP} = \frac{(1.275)\ (10^6)\ (0.1)\ (10.9)}{122} = 11{,}400 \text{ c.m.} \qquad (5a)$$

TABLE I.

Wire Size (A.W.G.)	*Wire Area (Cir. Mils) (Heavy Formvar)*	*Current Capacity (ma.)*
40	14.4	9.61
39	17.6	12.25
38	23.0	16.00
37	29.1	20.25
36	36.0	25.00
35	44.9	31.36
34	56.2	39.69
33	70.5	50.41
32	88.3	64.00
31	108.0	79.21
30	134	100.8
29	169	127.6
28	207	158.8
27	259	201.4
26	320	252.7
25	400	320.0
24	497	404.8
23	620	510.0
22	767	640.3
21	961	812.1
20	1147	1024
19	1489	1289
18	1888	1624
17	2323	2052
16	2894	2581
15	3624	3260
14	4529	4109
13	5670	5184
12	7088	6529
11	8873	8226
10	11,130	10,300
9	13,950	13,090
8	17,530	16,510

[6] Computed as follows: (50) (10.9) (3.81) = 2080 watts. The figure of 4150 watts shown in the Arnold catalog must be modified as mentioned in Footnote 3.

and $A_{WS} = \frac{(1.275)\ (10^6)\ (10.9)}{6700} = 207$ c.m. (6a)

The computed primary-wire area exceeds the wire area of No. 10 wire, proving the choice of this wire size is satisfactory. The wire area of the secondary winding corresponds to No. 28 wire, whose current-carrying capacity, based on our conservative estimate of 1 circular mil per milliampere, is only 158.8 milliamperes. By selecting the next larger size, No. 27, the wire size requirement for the secondary current is adequately satisfied.

As a check, it is advisable to compute the total space factor, K_T, using equation (7).

$$K_T = \frac{(122)\ (11130) + (6700)\ (259)}{(1.275)\ (10^6)\ (10.9)} = 0.223 \quad (7a)$$

This space factor does not seem unreasonable, since it is much less than 0.4. If there are any doubts in the designer's mind, he may choose the next larger standard core size, AA-533. Usually, however, total winding-space factors up to 0.3 are easily accommodated, except in cases where excessive insulation is used or windings are not well fitted.

Making the Secondary Windings

There are several practical suggestions which the writer feels may be useful to the inexperienced transformer designer. Fig. 1 illustrates the construction of a coil bobbin which does not require the use of screws or other fasteners. The bobbin tube is made from four pieces of thin Formica or Textolite, two pieces of which have small ears. The purpose of the ears is to prevent the bobbin flanges from separating from the bobbin tube. If the parts are accurately dimensioned, the bobbin will be almost self-supporting or can be tacked with varnish or glue. The bobbin should fit snugly to the core in order to conserve winding space. The material thickness should be as thin as strength will allow.

In winding the secondary pies, the writer recommends the fixture in Fig. 2. After the primary winding has been applied to the bobbins, the dimensions of the quadrilateral formed by the four screws can be determined by measurement. If the plate is drilled and tapped at the appropriate places, allowing some room for the insulation wrap, snug-fitting secondary pies can be easily fabricated. As a rule of thumb, the number of turns on each pie can be determined by dividing the total secondary voltage by 500 and rounding the result off to the nearest even integer. Then, the number of secondary turns per pie are determined by dividing the total secondary turns by the number of pies. The thickness of the pie winding must be checked to make sure that it does not exceed one-half of the window height remaining after the primary winding is applied. In other words, the pies should not protrude outside the bobbin.

Finishing

To conserve winding space, it is important that the rectangular cross section of the pies be maintained after wrapping. To do this, the bare pie should be soaked with a thin varnish or perhaps an acrylic aerosol spray and then allowed to dry before removal from the pie-winding tool. If carefully handled after removal, the pie should maintain its rectangular cross section during the wrapping operation. To further stiffen the pie assembly the wrapping material should be painted with a good grade of insulating varnish. To prevent the bare pie from sticking to the tool, coat the tool with a thin coat of paraffin or spray it with one of the liquid wax aerosols.[7]

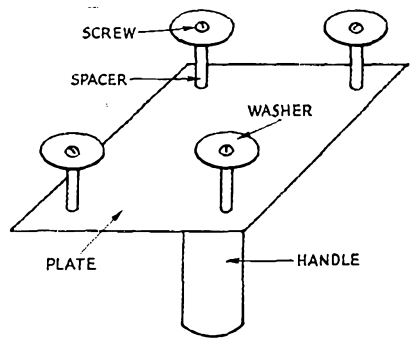


Fig. 2—Tool suggested for winding the secondary pies. The corner posts around which the wire is wound should be spaced so that the finished pie will fit snugly on the bobbin.

A superior pie-wrapping tape is Scotch X-1045 thermosetting electrical tape, which can be baked to a rugged fused coil encapsulation in the kitchen oven. This tape is available directly from the Minnesota Mining & Mfg. Co. in several convenient widths. Suspend the coil by its leads, if possible, and cure for two hours at 250° F. Keep the starting and finishing wires well separated.

Banding

Perhaps the most difficult task facing the amateur transformer constructor is that of adequately banding the core. While TV chimney mounts, pipe straps and adjustable hose clamps may be satisfactory for the job, one should not overlook the possibility of taking the assembled core and coil to a local transformer manufacturer or power company. It is quite possible that these organizations will have the banding straps and banding tool necessary for the job.[8] In addition to the mounting plate illustrated by Coats, a second metal plate banded to the top of the transformer makes a convenient terminal board. Primary and secondary wires can be brought to feed-throughs in this plate. The plate may be either flat or L-shaped depending on whether the terminals are desired at the top or side of the finished transformer.

The ingenious high-power enthusiast can probably save a considerable sum of money constructing high-voltage transformers by the methods

[7] Experimental development of the pie winding, stiffening and wrapping techniques is credited to Mr. Robert Riker.

[8] For preliminary transformer testing, the core may be secured with a C clamp, carpenter's clamp, or vise.

Transistor Preamplifier for Dynamic Microphones

Self-Contained Unit of Small Dimensions

BY ROBERT F. WITTERS,* K6VGA

The rugged character of dynamic microphones makes them well suited to ham use. Their relatively low output, however, usually makes necessary the use of amplification greater than that available in many manufactured and home-built audio sections. The preamplifier described here is a small self-contained unit that may be plugged in between the microphone and the microphone jack of an existing rig.

THE great popularity of the high-impedance, high-output-level microphone, as represented by the crystal and ceramic types, has led the great majority of amateur transmitter builders — both commercial and home-brew — to design rigs adapted to their use. Sooner or later, however, many wish to use the dynamic microphone, well known for its rugged-service record in the face of extremes of temperature and shock. These units are now available in high-impedance models having a frequency response more than adequate for communication service, and at reasonable prices. However, the output specifications of these units may be misleading. If, for example, both a high-impedance dynamic microphone and a crystal microphone have rated — 55 db. outputs, the power outputs are equal but the *voltage* outputs are vastly different. Since $E = \sqrt{WR}$ and W is the same for each type then, assuming typical impedances,

$$E_{DYN} = \sqrt{(W)\ (50{,}000)}, \text{ and}$$

$$E_{XTAL} = \sqrt{(W)\ (5{,}000{,}000)}.$$

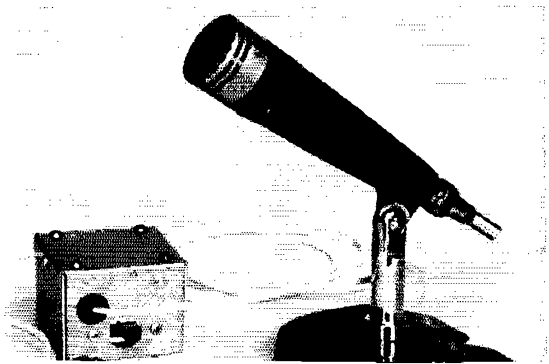
The output ratio is then

$$\frac{E_{DYN}}{E_{XTAL}} = \frac{\sqrt{(W)\ (50{,}000)}}{\sqrt{(W)\ (5{,}000{,}000)}} = \frac{\sqrt{50{,}000}}{\sqrt{5{,}000{,}000}}$$

$$= \frac{224}{2240} = 0.1.$$

It is no wonder, then, that by connecting the high-impedance dynamic microphone to the normal crystal-microphone input channel, low modulation is the result. In the writer's experience, the increased sound level required at the microphone is greater than the vocal cords can deliver. Increased amplification is required but it may not always be possible, or at least desirable, to add the necessary components internally in the rig. The preamplifier to be described is contained in a small external package, complete with battery power supply.

* 4774 Yarmouth St., Encino, Calif.



This complete self-powered two-stage preamplifier is hardly noticeable alongside the dynamic microphone with which it is used.

Circuitry

To keep the unit small and simple, a transistorized circuit is used. To provide a match for the 50,000-ohm impedance of the microphone, the first stage is an emitter follower. This type of transistor amplifier is similar to a tube cathode follower in that it has a high input impedance and a low output impedance. The output of this stage is well suited to driving the second stage which is a common-emitter amplifier. The output impedance of the second stage is approximately 1500 ohms, which reduces hum pickup problems.

R. F. Filtering

Since most antenna systems are not accurately balanced, some r.f. is usually floating around the shack. Any small amount of r.f. getting into the preamplifier cables will be rectified by diode action in one of the transistors and cause feedback. The input filter consisting of the r.f. choke and C_1, and the output filter C_2 reduce this possibility. Due to the low amplifier impedances, the capacitors will not impair the audio response.

Power Supply

Each stage is biased to provide stable operation over a reasonable temperature and battery-voltage range. The total battery drain is approximately 2 ma., giving essentially shelf-life service from the three Z-size pen cells — even for rag-chewing specialists. The switch should be left "off", however, when the station is not in use.

Transistors

The unit shown in the photos uses a transistor made by General Transistor, similar to their type GT-81. This transistor is a p-n-p germanium type and is typical of many available inexpensive

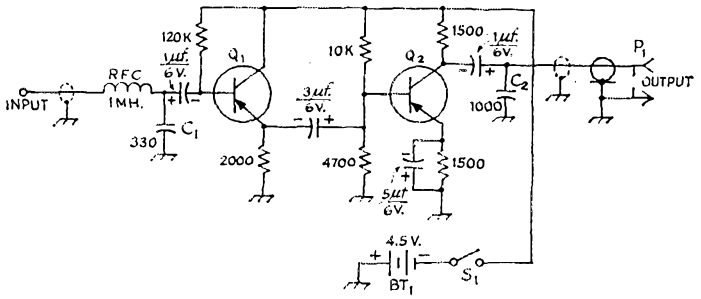


Fig. 1—Circuit diagram of the transistor preamplifier. Unless indicated otherwise, capacitances are in μμf.; C_1 and C_2 are mica; other capacitors are subminiature electrolytic. Resistances are in ohms and resistors are ½ watt.

BT_1—See text.
P_1—Microphone plug.
Q_1, Q_2—See text.
S_1—S.p.s.t. slide switch.

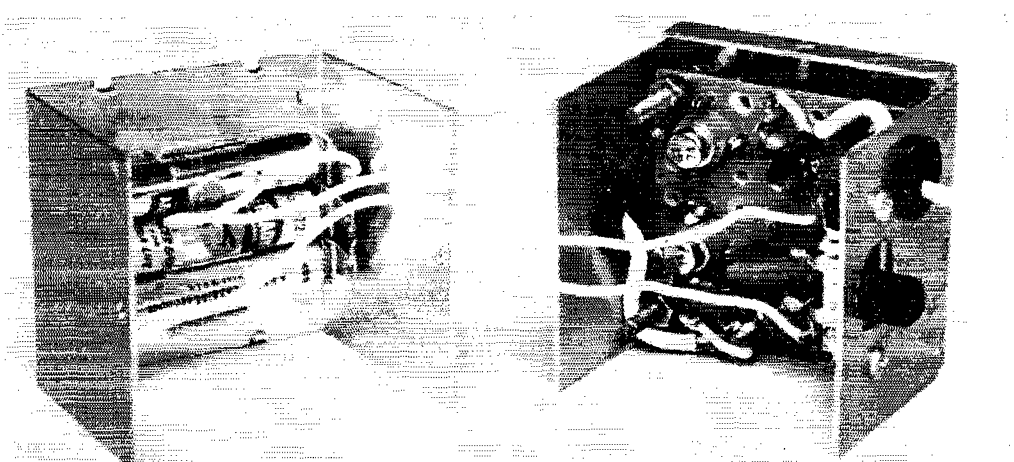
"entertainment"-type transistors. The transistors that may be used in this circuit are too numerous to be listed here; however, a few are: the Texas Instrument 2N369, Raytheon 2N362, RCA 2N408, and GE 2N191. Select one having a nominal beta or h_{fe} between 50 and 100. Circuit changes should not be necessary with any transistor of this general type. N-p-n transistors will work as well, but it will be necessary to change all capacitor polarities and reverse the battery supply. Any of the above transistors will cost approximately $1.50.

Construction

The amplifier and battery supply are housed in a 2¼ × 2¼ × 1¾-inch aluminum box. All amplifier components are mounted on a plastic board that is raised on spacers. Components are located on both sides of the board for convenience. Transistor sockets were used, but are not considered necessary. The transistor leads may be soldered directly, provided that care is taken not to allow the heat to damage the transistor. Keep leads ½ inch long and use a heat clamp during soldering. Component placement is not critical but the input and output r.f. filters should be located as near to the shielded input and output cables as possible. The battery holder is a standard item available at radio and hobby supply houses. Other batteries may be used, including the long-life mercury type. None of the component types is critical and any manufacturers' items may be used for the listed components. Both the input and output cables may be as long as desired, allowing the preamplifier to be located in any convenient position.

Operation

Before placing the preamplifier in system operation, it is a good idea to check the voltages at each transistor emitter. Approximately 2 volts should appear at the emitter of Q_1 and 1.5 volts at the emitter of Q_2. These voltages may vary by 50 per cent and still be normal. The characteristics of transistors vary more widely than those of vacuum tubes. About 40 db. of gain will be obtained from the preamplifier, so you can use that dynamic microphone without shouting into the next district. Mobile fans may find the preamplifier handy when substituting a dynamic microphone for a carbon unit. QST



Exploded view of the transistor preamplifier. Most of the components are mounted on the two sides of a perforated fiber or Formica sheet. The Penlight cells are mounted in the cover of the box which is approximately a 2-inch cube.

Most everyone knows the importance of Q in r.f. circuitry, but few realize it can be measured without expensive laboratory equipment. W7LHZ's method requires only a grid-dip oscillator and an antenna impedance bridge for reasonably accurate measurements up to 50 Mc.

Good Results with Simple Test Gear

BY DOYLE STRANDLUND,* W7LHZ

Measuring Coil *Q*

ONE can't get very far in r.f. circuit work without running into the subject of *Q*. As the books all say, *Q* stands for quality — the quality of a coil or capacitor — and that can be just as important as the amount of *L* or *C* involved. In general, the higher the *Q*s of the reactive elements, the better will be the performance of a circuit. Capacitors have high *Q* built into them, at least up through the h.f. range, but the kind of coil chosen and the way it is made have a lot to do with the losses there. What is needed is a simple way to *measure* coil *Q*, and this article will show how to do it without the usual expensive test equipment. Continue reading for a better idea of what *Q* is, or skip down to the subhead if what you want is the method.

To review briefly, a resistor may appear to be just a resistor to d.c., a.f., and low r.f. currents, but coils and capacitors don't behave so nicely — they don't act like pure reactances. Coils have d.c. resistance and a different a.c. resistance as well as their inductive reactance. Capacitors have a.c. resistance, too, besides their capacitive reactance. The figure of merit, *Q*, was devised to relate these properties and equals the reactance divided by the resistance. It is a ratio without sign, since the sign of the reactance is not used. The resistance and the inductance must be taken at the operating frequency if any of the materials used in construction are frequency sensitive.

For example, a coil rated at 7 microhenrys inductance has about 300 ohms reactance at 7 Mc. This can be found from the reactance charts in the *Handbook* or by multiplying the inductance by $2\pi f$. If the coil had an a.c. resistance of 10 ohms at this frequency, its *Q* would be 300 divided by 10, or 30. The lower the a.c. resistance compared to the reactance, the higher the *Q* and the better the coil will be for most applications.

Commercial *Q* meters use a basic circuit similar to Fig. 1 for measuring *Q*. A small r.f. voltage, E_g, is applied to a series-resonant circuit consisting of *L*, the coil being tested, and *C*, a built-in capacitor. R_C, the r.f. resistance of the capacitor, is negligible compared with R_L, the coil resistance we are interested in, so the latter is what limits the current at resonance. E_g and E_s, the voltage drop across the reactance of the capacitor (same as that across the coil), are measured, and their ratio, E_s/E_g equals the coil *Q*.

This sounds simple, but there are a few things that make it difficult to obtain accuracy with such a hookup on the experimenter's bench. Input voltage E_g may be too low to measure with the usual diode r.f. probes, and the circuit would be detuned considerably if such a probe were used to measure E_s. At the same time, if a grid-dip meter were used for the generator, voltage regulation would be so poor that moving the probe from one position to another would change the voltage as well as the frequency. Therefore, this type of *Q* measurement had best be made with a factory-designed and calibrated meter.

*Route 1, Box 10-D, Libby, Montana.

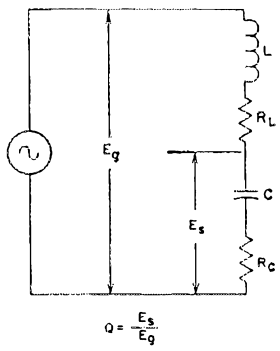


Fig. 1 — Basic circuit used in a commercial Q meter. R_L is the r.f. resistance of *L*, the coil under test; R_C is the resistance of the Q meter capacitor, C.

Using Simple Equipment

Fortunately, there is an easy way out for the ham. Since the value of r.f. resistance is what is wanted, just measure it. How? With an impedance bridge — it is made to measure r.f. resistance. Here's the method: Set up the bridge, feeding it with a grid-dip meter or other low-power source at the operating frequency. Connect the coil to be tested in series with an air-spaced variable capacitor across the "unknown" terminals of the bridge, as in Fig. 2. Adjust the capacitor and the variable element of the bridge until a complete null is obtained. (If a null cannot be found, the variable capacitor will not resonate with the coil or the bridge may not go low enough in resistance.) Take the value of resistance found, and divide it into the reactance of the capacitor to find the actual value of *Q*.

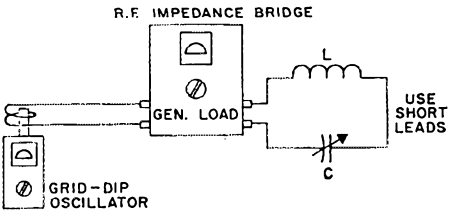


Fig. 2—Setup for measuring r.f. resistance of coil *L* using grid-dip meter, impedance bridge and variable capacitor C.

To find the reactance of the capacitor, remove it from the circuit and measure the capacitance in use (being careful not to change the setting). If a capacitance bridge is not available, use a grid-dip meter and a standard coil as described in the *Handbook* chapter on measurements. The reactance can be found from the *Handbook* charts or the formula $X_C = 1/2\pi fC$. With air-core coils, Q changes rather slowly with frequency, so a fixed capacitor can also be used and the frequency varied until a null is obtained. The value of resistance found when using a fixed capacitor may be different from that obtained at the same frequency with an air-spaced capacitor. This is because the lower Q of the fixed capacitor adds additional resistance to the circuit. For comparing several coils which resonate at the same frequency with the same capacitance, no calculations need be made — the coil showing the least resistance has the highest Q.

In case you wonder why the reactance of the capacitor instead of the coil is used in these calculations, remember that the two are equal but of opposite sign at resonance, and the sign is not used in determining Q. It is usually easier to measure capacitance than inductance because substitute values are handy and suitable bridges more commonly available. If you know the inductance of the coil being checked, it would be easier, of course, to look up or calculate its reactance rather than to determine the resonating capacitance. It makes no difference which is used — the answer is the same.

For best results, the value of the capacitance used each time, and the frequency, too, should be determined as accurately as possible. If many measurements are to be made, it would be well worth the trouble to calibrate a variable capacitor to show the capacitance for each degree of rotation. If all measurements are to be made at one frequency, the variable capacitor could even be calibrated in reactance instead of capacitance.

Any type of impedance bridge may be used if it works at the frequencies of interest and will indicate resistances between about 1 and 50 ohms. If your bridge was built for antenna work, chances are it will have to be modified to measure lower values of resistance. This can be accomplished easily as follows:

In the variable-voltage-divider type bridge, Fig 3A, the unknown is compared to a standard resistor, R. By substituting a resistor 1/10 the value of R for R, the calibration values are reduced to 1/10 their former value — 50 ohms becomes 5 ohms, 10 ohms becomes 1 ohm, etc.

In the equal-arm type, Fig. 3B, resistors R_1 and R_2 form a fixed voltage divider. By reducing R_2 to 1/10 its former value, the dial readings of the variable R_3 are also reduced by a factor of 10 as above.

Noninductive resistors must be used in these changes, of course. It is not necessary to chop a resistor open to find if it contains wire. Just look at the first band of the color coding. If the first band of color is twice the width of the others, the resistor is wire-wound.[1] If the bands of color are the same width, there is carbon inside.

This same setup will work with all kinds of coils, up to about 50 Mc., where the Q of capacitors becomes significant. It will work with audio filter inductors and teletype toroids as well, if the proper capacitances are used for resonance at the operating frequency. The effect of core materials and shielding can be noted quickly. Just try using core material from a rod-type b.c. antenna at 4 or 5 Mc. and see what happens to the Q.

With ordinary ham-shack equipment, plus just a few calculations, a type of measurement that sounds impossible can easily be made with acceptable accuracy.[2] Borrow a capacitance bridge to calibrate a few variables, dust off the antenna bridge, get your g.d.o. back from Friend Jim, and you're in business. QST

[1] This is true of current production, but older wire-wound resistors may not have a double-width band. — *Ed.*

[2] One word of warning — be careful about using this method (or any other Q-measuring technique we know of) in cases where the distributed capacitance of the coil is an appreciable fraction of the external capacitance used for tuning. This is true, for instance, of antenna loading coils used at the lower frequencies. The distributed capacitance acts very much as though it were lumped across the coil terminals and causes the coil to have an apparent Q which is lower than the true value. As an example, if the distributed C is 1/10 the tuning C, the true and apparent Qs differ by 9 per cent.

(*Continued on page 150*)

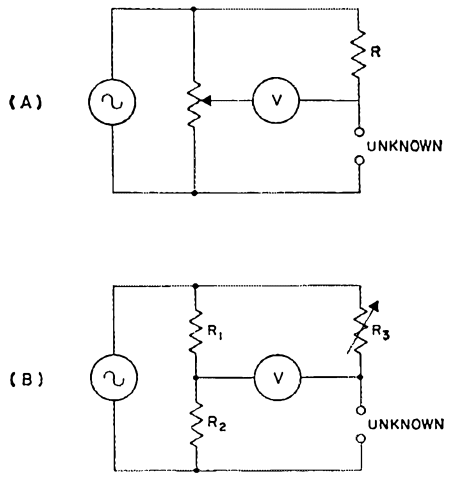


Fig. 3 (A) Basic circuit of variable-voltage-divider-type bridge. In the capacitive divider version of this circuit, a differential capacitor replaces the potentiometer (B) Basic circuit of equal-arm-type bridge.

A High-Pass Filter for the Ham Receiver

Getting Rid of Cross-Modulation from Local B.C. Stations

BY R. E. BAIRD,* W7CSD

ARE you one of those unfortunate amateurs who lives too close to a broadcast transmitter? Before moving last summer, the author had heard numerous complaints about b.c. signals all over the 80-meter band, but usually you don't worry too much about the other fellow's problem.

Then yours truly found himself living within one mile of two 50-kw. transmitters. You guessed it: there were signals on top of signals on top of signals, broadcast hash *par excellence* all over the 80-meter band. In a case like this how can you do any hamming?

First off, it should be clearly understood that all those signals are not really there. One or two may be true harmonics, but the rest are caused by rectification in one of the early stages of the receiver.[1] If this sounds suspiciously like some stories you've heard about amateur TVI, it is no coincidence. The cure is the same, too. If you can build a high-pass filter for a TV receiver, you can build one for any other kind of receiver.

Fig. 1 shows the circuit which cleaned up the trouble at W7CSD. Two L filter sections are used in cascade. The formulas for designing filters of this type are published in *Radio Engineering Handbook*, by Henney.

$$L = \frac{R}{4\pi f_c} \text{ and } C = \frac{1}{4\pi f_c R}$$

where L is the required shunt inductance in henries, C is the series capacitance in farads, R is the terminating resistance in ohms, and f_c is the cutoff frequency in c.p.s. In this case, 3 Mc. was selected as the cutoff frequency, and our receiver was reputed to have an input impedance of 72 ohms. Plugging in these numbers for f_c and R, we can crank out values of 1.9 μh. for L and 370 $\mu\mu$f. for C.

It is not essential that C be exactly 370 $\mu\mu$f. In the original filter 400-$\mu\mu$f. capacitors were used because they were on hand. To find the right size coil for L, first calculate the resonant frequency of L and C from the formula

$$f = \frac{10^9}{2\pi\sqrt{LC}}$$

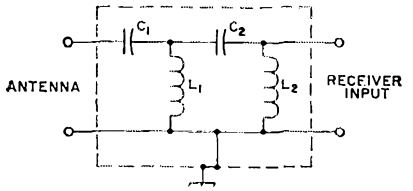


Fig. 1—Circuit of the two-section high-pass filter. Components should be mounted in a grounded metal container. Values shown below are for a cut-off frequency of 3 Mc. and a receiver input impedance of 72 ohms. For a different cutoff or termination, see the design information in the text.

C_1, C_2—400-$\mu\mu$f., mica or ceramic.
L_1, L_2—1.9 μh., 5 turns No. 22 d.c.c. close-wound on 1½-inch diam. form.

f will be in Mc. when L is in μh. and C is in $\mu\mu$f. Connect the capacitor you are using across a coil and check the resonant frequency with a grid-dip meter. Vary the number of turns or the size of the coil until the meter dips at the calculated frequency; 1.9 μh. resonates with 400 $\mu\mu$f. at 5.8 Mc., and the coils specified check out very close to this frequency.

The filter components should be mounted in a shield can which is grounded when in use. A frozen-orange-juice can with aluminum foil secured over the open end makes a suitable and inexpensive shield. Arrange the coils perpendicular to each other to minimize coupling.

Any number of filter sections can be cascaded. Two sections did the job for the case in point and removed all spurious signals from the 80-meter band except for two true harmonics. QST

* Box 2382, Oregon Technical Institute, Klamath Falls, Oregon.

[1] Cross-modulation can also occur in any nearby rectifying circuit — such as a poor contact in water or steam piping in the strong field of the transmitting antenna — external to both receiver and transmitter. The filter described here will clean up only what cross-modulation occurs in the receiver, but even this is an advantage, since it helps fix the blame where it belongs. — *Ed.*

Strays

No comment needed!

• Beginner and Novice

Crystal-Controlled Converters with a BC-455 as a Tunable I.F.

50- and 144-Mc. Reception at Low Cost

BY LEWIS G. McCOY,* W1ICP

THIS article describes a complete receiving setup for 50 and 144 Mc. Basically, the arrangement consists of two crystal-controlled converters working into a BC-455 which is used as a tunable i.f. to cover the 50- and 144-Mc. bands. The primary concern in designing the converters was to make them easy to build and get working. This was accomplished for the most part by using ready-wound, commercially-made coils, which eliminate the problems many beginners have in duplicating homemade coils. In addition, the ready-wound coils are only pennies more expensive than coil forms and wire.

Many newcomers interested in getting on v.h.f. dislike putting a lot of cash into a receiver that is going to be used with converters. The BC-455 is the answer to this. In the event the reader isn't familiar with this particular piece of military surplus, the BC-455 is a 6-tube superhet that covers from 6 to 9 Mc. The cost of these units ranges from five to fifteen dollars, depending on condition. Modifications required for using it with the converters are very simple and can be made in an hour or so. It should be pointed out that the Novice operator also can make use of the BC-455 by itself to cover the 7-Mc. amateur band — in other words, the receiving setup as described here will cover 7, 50, and 144 Mc.

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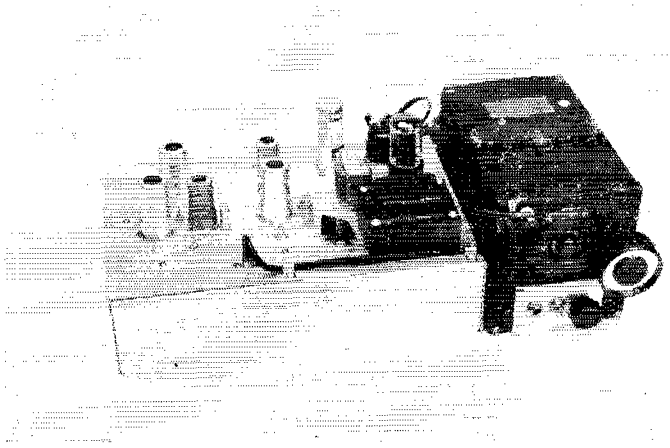
Circuit Details

You'll note that there are three separate circuit diagrams, Figs. 1, 2, and 3, for the two converters and the power supply, although in actual construction all three circuits are mounted together on an 8 × 12-inch piece of aluminum. The reason for showing the circuits separately is to make it easier for the reader to follow. Let's take a look at the circuit of the 6-meter converter, Fig. 1, first.

A 6CB6 r.f. amplifier stage is used, with L_2 in the grid circuit tuned to the 50-Mc. range. The output of the r.f. stage is fed from the tuned plate circuit to the pentode section of a 6U8A which serves as the mixer. A 44-Mc. crystal is used with the triode oscillator portion of the 6U8A. Oscillator injection from the triode to the pentode mixer is accomplished by the coupling between the two units within the 6U8A itself. L_4C_2, which resonate in the 6-Mc. region, form the output circuit of the mixer. Coupling from L_4 to the BC-455 is taken care of by the link L_5. Using the 44-Mc. crystal, the 50-Mc. band starts at 6 Mc. on the BC-455 dial. Actually, the BC-455 does not cover *all* of the 50-Mc. band but tunes to about 53.3 Mc. If complete coverage is required, another crystal, at approximately 45 Mc., would be needed.



As can be seen here, the converter-BC-455 makes a neat, compact package (Field Day here we come!). At the left in this view are the three tubes of the 144-Mc. unit. In the center is the 50-Mc. converter, while the power supply components are grouped along the far right side of the chassis. A short length of RG-58/U coax cable is used to connect the converters to the antenna terminal of the BC-455. The outer braid of the coax is grounded at the screw just above the antenna terminal.

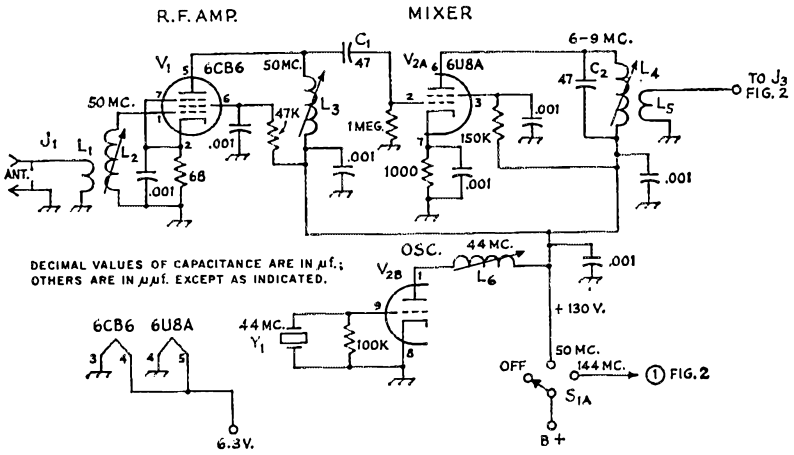


Fig. 1—Circuit diagram of the 50-Mc. converter. Unless otherwise indicated, resistances are in ohms; resistors are ½-watt composition. All 0.001-μf. capacitors are disk ceramic.

C_1, C_2—47-μμf. mica.

J_1—Phono jack.

L_1—2 turns No. 30 enam., wound at ground end of L_2.

L_2, L_3, L_6—0.9-1.6 μh.; 7 turns No. 28 enam., close-wound on ⅜-inch diam. slug-tuned ceramic form, iron core (Miller 4403).

L_4—6.7–15 μh.; 26 turns No. 30 enam., close-wound on ⅜-inch diam. slug-tuned ceramic form, iron core (Miller 4406).

L_5—8 turns No. 30 enam., close-spaced, wound over ground end of L_4.

S_1—Rotary, 2 poles, 3 positions (Centralab 1472).

Y_1—44-Mc. overtone crystal (International Crystal FA-9).

S_1 is a two-pole, three-position switch which in its first position has the power supply (Fig. 3) turned off. In the second position the supply is turned on and plate voltage is applied to the 6-meter converter. In the third position the B plus is switched to the 2-meter converter.

The 144-Mc. Converter

A 6BS8 dual triode is used with the first half operating as a grounded-cathode r.f. amplifier driving the cathode of the second half of the tube (cascode circuit). Output from the plate circuit of the second half is fed to the pentode section of a 6U8A which serves as the mixer. A crystal-controlled 6AF4A triode oscillator is used, operating at 46 Mc. Its output is fed to the triode portion of the 6U8A, which triples to 138 Mc. Injection from the tripler to the mixer is accomplished via the tube capacitances. The plate circuit of the mixer, C_5L_{10}, is resonant in the 6-Mc. region. The output of this circuit is coupled to the BC-455 via the link, L_{11}.

Power Supply

Fig. 3 shows the power supply circuit and the power connections to the BC-455. A choke-input type filter is used for the plate supply. The supply furnishes approximately 130 volts, which is adequate for the converters and the BC-455.

The BC-455 as used in military service has the tube heaters wired for 25.2 volts. T_2 is a 25.2-volt filament transformer, so there is no need to rewire the heaters. Thus the BC-455 can be used just as it comes in surplus; the only additions needed are a gain control, headphone jack, and b.f.o. switch. Connections for these are shown in Fig. 4.

Construction Details

The two converters and the power supply are mounted on an 8 × 12-inch aluminum plate. When completed, the plate mounts on an 8 × 12-inch chassis of either 2- or 3-inch depth. A full-size drilling template is available to those interested in building the unit.[1] It is to your advantage to use the template because the placement of components is important at v.h.f.

When wiring, keep all leads as short and as direct as possible. When soldering, hold the lead being soldered with a pair of long-nose pliers. The pliers will conduct heat away from the associated component, thereby preventing possible damage.

The coils used in the 50-Mc. converter are wound on ⅜-inch diameter ceramic forms. With the exception of L_{10} and the interstage transformer L_8L_9, the coils in the 144-Mc. converter are on 3/16-inch diameter forms, the smaller size being necessary since sufficiently small values of inductance are not available in the larger-diameter series. A coil on a ¼-inch diameter form was used for L_{10}, but if the builder desires there is no reason why the 6U8A output circuits cannot be made identical in the two converters; either set of components ($C_2L_4L_5$ or $C_5L_{10}L_{11}$) may be used in either 6U8A plate circuit.

The input coil, L_7, of the 144-Mc. converter requires a tap which is connected to J_2. Before mounting the coil in place, unsolder the winding from the bottom terminal (the one that will be close to the mounting plate) and carefully unwind a little more than one turn. Scrape the insulating

[1] The template will be sent at no charge to those sending a stamped, self-addressed envelope (4c) along with the request.

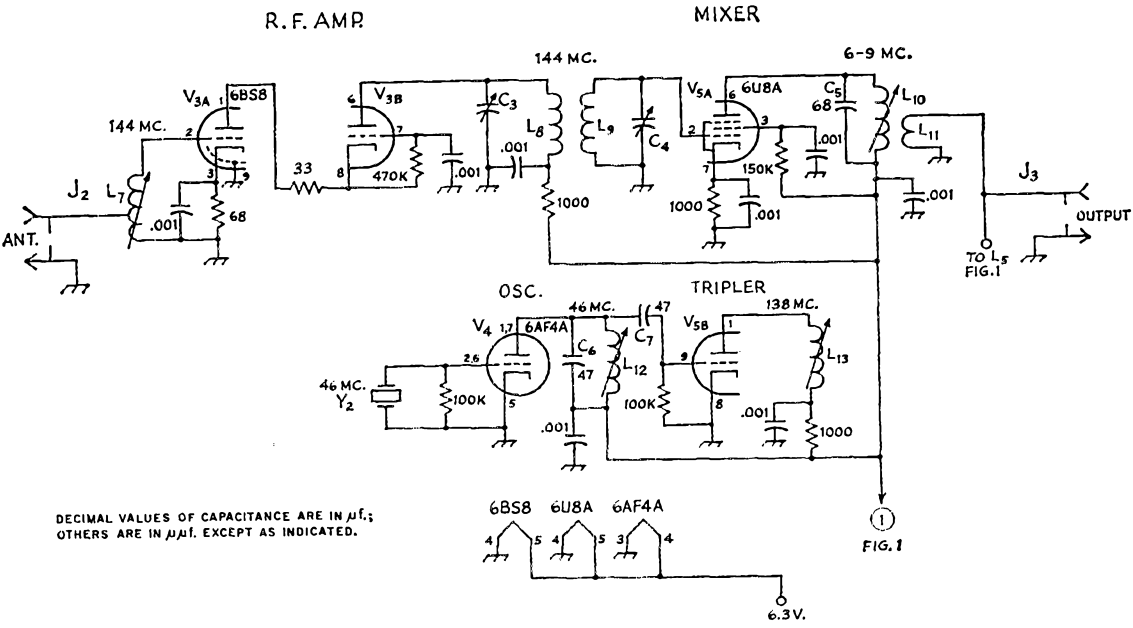


Fig. 2—Circuit diagram of the 144-Mc. converter. Unless otherwise indicated, resistances are in ohms; resistors are ½-watt composition. All 0.001-μf. capacitors are disk ceramic.

C_3, C_4—1-6-μμf. tubular trimmer (Centralab 829-6).
C_5—68-μμf. mica.
C_6—47-μμf. mica.
C_7—47-μμf. mica.
J_2, J_3—Phono jacks.
L_7—0.17–0.27 μh.; 5 turns No. 24 enam., close-wound on 3/16-inch diam. slug-tuned ceramic form, iron core (Miller 4301), tapped one turn from grounded end.
L_8, L_9—3 turns No. 20, ½-inch diam., turns spaced to cover ⅜ inch.
L_{10}—5–9 μh.; 30 turns No. 30 enam., close-spaced on ¼-inch diam. slug-tuned ceramic form, iron core (Miller 4505).
L_{11}—8 turns No. 30 enam., close-spaced, wound over ground end of L_{10}.
L_{12}—0.64–0.95 μh.; 12 turns No. 28 enam., close-wound on 3/16-inch diam. slug-tuned ceramic form, iron core (Miller 4304).
L_{13}—0.27–0.41 μh.; 7 turns No. 28 enam., close-wound on 3/16-inch diam. slug-tuned ceramic form, iron core (Miller 4302).
S_1—See Fig. 1.
Y_1—46-Mc. overtone crystal (International Crystal FA-9).

material from the wire and then solder on the tap wire, which should be about two inches long. You can cut it off to size when the other end is soldered to J_2. Wind the single turn back on the form and solder the end to the bottom terminal.

You'll find it an easier job if you wind the links, L_1, L_5, and L_{11}, before making any connections to the coils. The links should be wound around the bottom ends of the coils. (The bottom end is that part of the winding closest to the mounting plate when the forms are mounted in place.) The links should be wound in the same direction as the other windings.

Note that L_5 and L_{11} have a common connection to J_3. In the test model it was found that connecting the links in parallel did not appreciably affect the performance of the converter. Connecting them in this manner eliminates a switch section, allowing the use of an inexpensive switch for S_1.

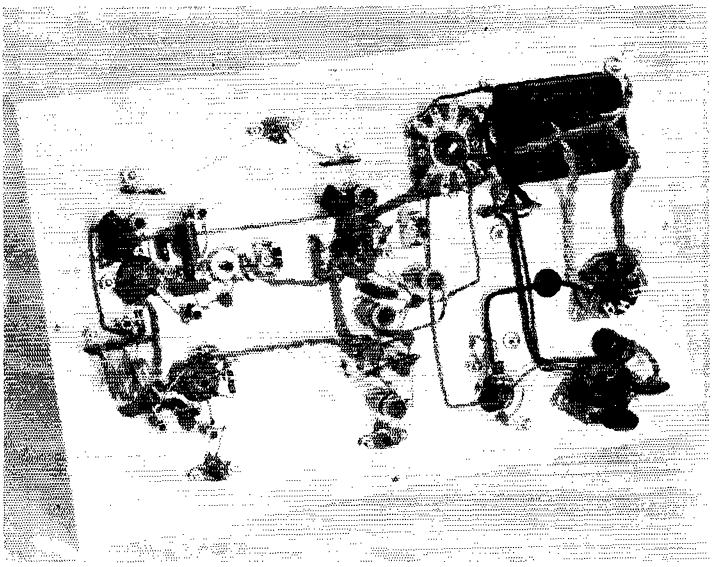
Aside from the links the only coils that are not commercially wound are L_8 and L_9. However, these are quite simple to make. Each coil consists of three turns one-half inch in diameter of No. 20 wire, and the turns are spaced to cover three-eighths of an inch. The coils are mounted on tie points and when mounted are separated by one-eighth inch.

BC-455 Modifications

Figs. 3 and 4 show the connections to the BC-455. In the unit shown, the filament transformer, T_2, was mounted on the rear of the tube cover. Be sure when mounting the transformer to allow for access to the power terminals on the rear deck of the BC-455.

There is a small panel directly below the tuning dial on the front of the BC-455. Take out the four screws and remove the panel. You'll find a small box mounted on the back of the panel; remove it and mount R_1, J_5, and S_2 on the panel, being sure to allow enough room so that the panel can be mounted back on the BC-455 (you'll find it a tight squeeze but the panel will fit with the three components mounted). Connect the three units to the pins as shown in Fig. 4 (the lead length here is not important).

The last step is to make up a cable of four leads to connect the BC-455 to the converter chassis (P_1 to J_4). An octal plug and socket are used for this, although only four connections are needed, because this type is readily available.



Grouped along the left in this view are the components of the 144-Mc. converter. Note how the interstage coils, L_8 and L_9, are mounted on opposing tie points. The 50-Mc. components are mounted across the middle of the plate. The switch to the left of the power transformer at the upper right corner is S_1. At the lower right corner is J_4, with the 0.01-μf. ceramic bypass capacitors mounted on the socket prongs. The line cord goes through a grommet in the chassis just to the right of J_4.

When this job is done you are ready to test the units.

Testing and Alignment

Connect up the units and turn on the power. First make sure the heaters are lighting up; if they don't, you have a wiring error. If you have a voltmeter you can check the B-plus voltage. At the output side of L_{14} the voltage should be approximately 130 volts.

With B plus applied to the 50-Mc. converter, the first step in getting this section working is to check the operation of the oscillator. One way of doing this is to use a calibrated indicating-type absorption wavemeter,[2] which should be coupled to L_6. When the wavemeter is tuned to 44 Mc., the crystal frequency, you should get a reading on the wavemeter, showing that the oscillator is working. If you don't, adjust the slug in L_6. This circuit is an overtone oscillator working at the third overtone of the crystal, and in some instances the crystal may want to oscillate at its fundamental frequency — one-third of 44 Mc., or about 14.7 Mc. Check with the wavemeter — or listen for a signal on this frequency if you have a receiver that tunes to it — and if the oscillator is working at its fundamental adjust the slug in L_6 so that it works only at 44 Mc.

Another method of checking is with a grid-dip meter. (One advantage of using a grid-dip meter is that it can also be used to generate a signal for peaking up the various stages in the converters.) To check the oscillator operation, couple the grid-dip meter to L_6 and use it as an absorption wavemeter; i.e., with the grid-dip meter plate voltage turned off. When tuned to the crystal frequency, the meter should show an indication of oscillation.

When the oscillator is working correctly, you are ready to make the remaining adjustments. You can use the grid-dip meter to generate a signal or you can put an antenna on the converter and listen on the air. In either event, tune in a signal at about 50.1 Mc. (BC-455 tuning at about 6.1 Mc.) and then adjust the slugs in L_2, L_3, L_4,

[2] *The Radio Amateur's Handbook*, measurements chapter.

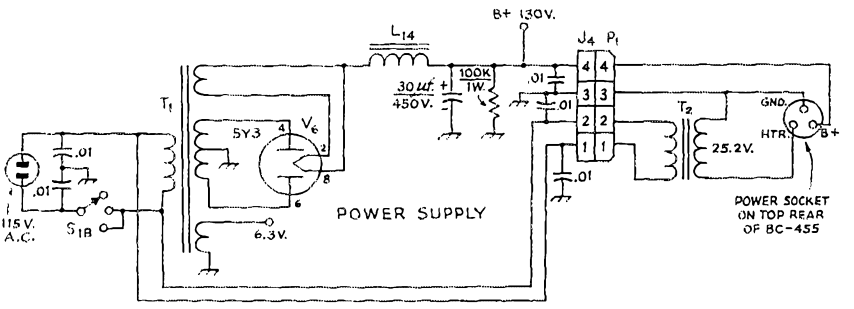


Fig. 3—Circuit diagram of the power supply and connections to the BC-455. All 0.01-μf. capacitors are disk ceramic.

J_4—Octal socket.
L_{14}—Filter choke, 8.5 hy., 50 ma. (Knight 62G136).
P_1—Octal plug (Amphenol 86-PM8).
S_1—See Fig. 1.
T_1—Power transformer, 480 volts center-tapped, 40 ma.; 5 volts, 2 amp.; 6.3 volts, 2 amp. (Knight 62G034).
T_2—Filament transformer, 25.2 volts, 1 amp. (Knight 61G421).

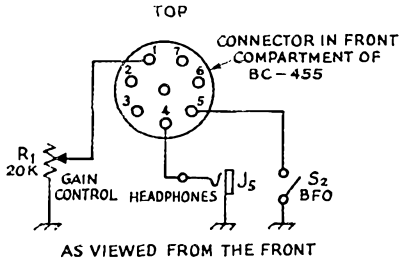


Fig. 4—Wiring of connector in front compartment of the BC-455.
J5—Phone jack, open-circuit type.
R1—20,000-ohm control, audio taper.
S2—S.p.s.t. toggle

and L_6, working for maximum signal strength. Also, adjust the antenna trimmer — the small knob marked "Align Input" — on the BC-455 for maximum signal strength.

In order to judge signal strength with reasonable accuracy, turn on the beat-frequency oscillator of the BC-455 and tune the receiver so you get a beat note of convenient pitch on the incoming signal. Reduce the gain of the BC-455 to give an audio output of moderate strength — well below the point at which a further increase in gain causes no further corresponding increase in audio output. You'll probably have to reduce the gain of the BC-455 as the adjustments make the signal louder.

Once you have all the stages peaked up the converter is ready for use. If your initial alignment has been done with a grid-dip meter as a signal source, it is a good idea to touch up the adjustments on an actual distant signal after the converter is put in service.

For 2-meter alignment, switch the B plus to the 144-Mc. converter and check out the crystal-controlled oscillator, V_4, in the same manner as you did with the 50-Mc. unit. Once the oscillator is working at 46 Mc., adjust the slug in L_{12} for maximum output from the oscillator as indicated by the wavemeter or grid-dip meter. Next, adjust the tripler coil, L_{13}, for maximum output at 138 Mc. Using either a signal from the grid-dip meter or one coming in on the antenna, adjust L_7, C_3, C_4, and L_{10} for maximum signal strength. Also, touch up the adjustment of L_{12} and L_{13} for maximum signal. As mentioned with the 50-Mc. converter, a more precise adjustment can be made with an actual signal than with the grid-dip meter.

The adjustment procedure outlined above will be close enough for all but the most exacting listeners. To get the last drop of performance, however, the best adjustment method is to use a noise generator. The construction of a simple noise generator and the method of using it for obtaining maximum signal-to-noise ratio is described in the *Handbook*.[2]

If this is your first crack at v.h.f. a word or two about antennas might prove helpful. If you are going to take part in net or in civil-defense operation, or just want to rag-chew with your friends, you'll probably want an antenna that will provide omnidirectional coverage. A good antenna of this type, and simple to make, is the "turnstile." Details for making a turnstile antenna were given in a recent issue of *QST*.[3] A turnstile will not provide any antenna gain but has the advantage of general coverage without being rotated. On the other hand, if you want gain from your antenna, then the thing to consider is a beam. A beam antenna will provide gain but for maximum effectiveness should be rotated and aimed at the station you wish to work. Beams can be quite simple to make. Details for building your own can be found in the v.h.f. section of the *Handbook*.

Get your antenna as high as possible for best results. While you can make plenty of contacts on v.h.f. without having the antenna high above ground, you'll make more and get better results if you get your system as high as possible. QST

Other Receivers

The BC-455 was chosen as the tunable i.f. for this setup because of its low cost, as explained at the beginning of this article. However, if you already have a communications receiver that will cover the same tuning range — that is, 6 to 9 or 6 to 10 Mc. — you can of course substitute it for the BC-455. The converters will work with any receiver that has such a tuning range.

Assuming that you do use the BC-455, though, the chances are that after you've got the setup working and have acquired a little experience with it you'll want to add such useful accessories as a.v.c., a noise limiter, and possibly an S meter. How to do this will be described in an early issue of *QST*. QST

[3] Campbell, "Turnstile for Two," *QST*, April, 1959, p. 29.

Strays

This has been mentioned in *QST* previously, but W5PGZ reminds us, — light aluminum is available from service stations in the form of discarded oil cans. A piece about 5 by 12 inches can be obtained from one can, or you can use the can as is for a coil shield or the like.

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How many can qualify for this? A "Worked All W2HJ" certificate will be issued to any amateur who has worked at least five operators at W2HJ, the Amateur Radio Society of the City College of New York. Send the operators' calls, K2RGZ, c/o W2HJ, 139th St. and Convent Ave., New York 31.

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And you can get a Proficiency Award by working 10 members of the Niagara Peninsula Amateur Radio Club after January, 1960. Send the confirming QSL cards to VE3BJR, together with 50¢.

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And for goodness sake, if you want a rather complete listing of available awards, contact K6BX, who is now the maestro for such info.

• Recent Equipment —

Hallicrafters HA-1 Electronic Keyer

IT HAS been said in some circles that c.w. is on the downgrade and that eventually everyone will shift to phone. The current interest in c.w., particularly in the subject of keying, hardly bears this out — if you don't believe it, just take a look at all the articles on the subject that have appeared in *QST* during the last couple of years! One item that has received quite a bit of attention is the electronic keyer, a device that takes over the job of forming the dots and dashes for c.w. transmission.

One such electronic keyer, developed by Jim Ricks, W9TO, has had a great deal of favorable comment, and has been built by many amateurs both in vacuum-tube and transistor versions.[1] The Hallicrafters Company of Chicago, Ill., has marketed a version of the original W9TO circuit which it calls the "T.O. Keyer," designated Model HA-1. The keyer uses digital circuitry, similar to that found in computers, to generate automatic self-completing dots and dashes.

Circuit Operation

The block diagram in Fig. 1 shows the basic functions of the tubes and other major components in the circuit. To comprehend fully how the HA-1 works it is necessary to have a little background on the multivibrator, a type of circuit not too familiar to most amateurs. However, the fundamental operation of the keyer can be understood if you think of the basic multivibrator simply as an oscillator having an output wave shape that is nearly rectangular in form. A multivibrator circuit designed for square-wave output will give the mark-space ratio used in forming the dots and spaces of the code. The HA-1 keyer makes use of two types of multivibrators in its circuit, the "free-running" or continuously-oscillating type for dot generation, and the "bistable" or "scale-of-two" circuit for dashes. The bistable type is really an electronic switch that can be thrown from "off" to "on," and vice versa, by an electrical impulse from an external control source.

Getting back to Fig. 1, when the s.p.d.t. key (not part of the HA-1) is closed on the dot side, the dot keyer tube V_{2A} is turned on, allowing the free-running multivibrator V_1 to form dots. Once a dot has been started, it will go to completion, including the following space, as long as V_{2A} remains on. V_{2A} is held on by a feed-back signal from V_1 (see the loop marked "A" in Fig. 1) even though the key lever may be released from the dot contact. The dot output from V_1 is fed to the relay tube V_{4A} which operates the keying relay K. The relay in turn is used to key the transmitter and to control other circuits associated with the keying action.

To form a self-completing dash the key lever is moved to the dash side, turning on the dash keyer tube, V_{2B}, and thus triggering the dash multivibrator, V_3. The triggering action does not actually start the multivibrator but simply places it in the "ready" condition, the controlling actually being done by the dot generator. In addition to preparing the dash multivibrator, V_{2B} sends a starting pulse to the dot keyer tube, V_{2A}, through the diode CR_1, and V_{2A} starts the dot multivibrator V_1. The dot voltage is fed into an RC differentiator, a circuit that produces a short pulse from the leading edge of the dot square wave, and this triggers the waiting dash multivibrator, V_3. V_3 remains on until another pulse, generated by the leading edge of a second dot from V_1 through the differentiator, turns it off. Although the output of the dash multivibrator, V_3, is short of being a full-length dash by one dot length, this space is filled out by the second

[1] Old, "Transistorized Electronic Key and Monitor" *QST*, May, 1959.

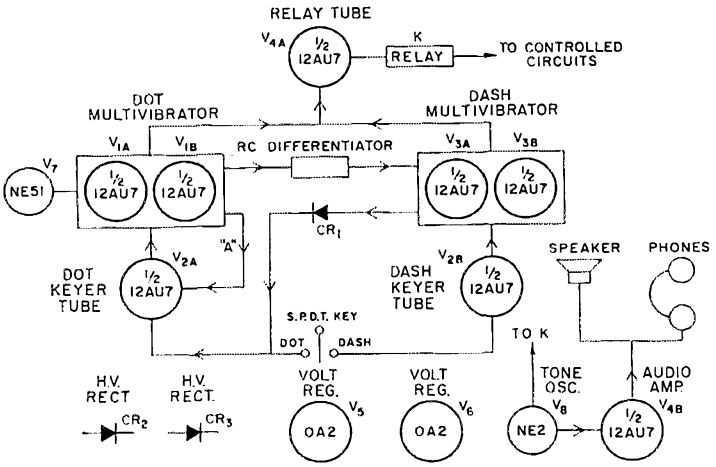


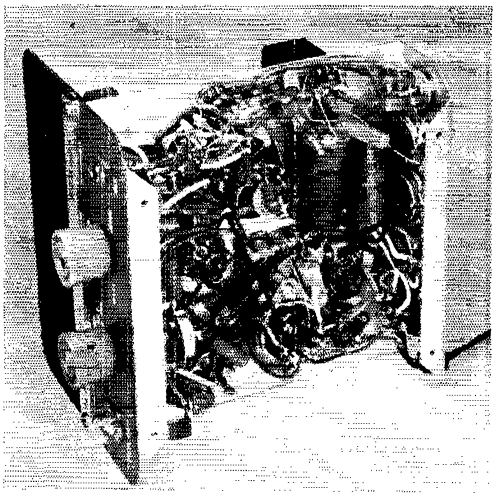
Fig. 1—Block diagram of the HA-1 electronic keyer.

dot (the same one that turned V_3 off) already initiated in V_1. As in the case of dots, the dash output from V_3 (and the fill-in dot from V_1) turns on the relay tube and keys the relay to form a dash. Fig. 2 shows graphically what happens in the various stages in the HA-1 circuit, indicating the period during which each tube is on or off when a single dot or dash is formed.

Constructional Features

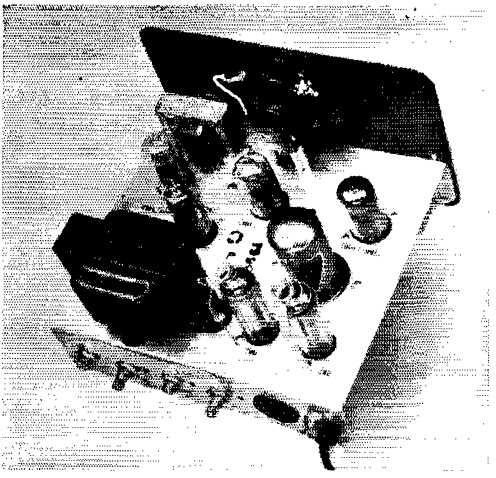
Located on the rear apron of the HA-1's chassis are two controls for adjusting the multivibrator circuits. One control, labeled BALANCE, is used to adjust the gain of the dash multivibrator, V_3. The gain is set at the factory but the BALANCE control is provided in case it is necessary to compensate for component aging or tube replacement. The second, the WEIGHT control, is provided so that the time relationship between a dot and its following space may be adjusted. Although this is usually set for a ratio of 1 to 1, it may be changed to compensate for keying characteristics introduced at the transmitter that would upset the standard ratio.

A front-panel SPEED control allows for regulation of the keying speed. Two ranges are available — 10 to 25 words per minute and 30 to 65 w.p.m. — selected by another front-panel control marked FUNCTION. In addition to the HIGH and LOW speed positions, the FUNCTION switch turns the keyer on or off and has a center position labeled HOLD which closes the relay for transmitter tuning or testing.



It takes quite a few components to make an electronic keyer, as shown by this view underneath the chassis. The front panel, which contains the neon indicator, FUNCTION switch, SPEED control and KEY jack, is also visible in this picture. The black material on the upper half of the panel is fine-mesh perforated aluminum.

The HA-1 circuit includes a side-tone generator and loudspeaker for audibly reproducing the characters as they are formed in the keyer. A



This view of the HA-1 keyer shows the items on the rear apron. From left to right are the PHONES, SIDETONE level, BALANCE and WEIGHT adjustments, control socket, ground post and line cord. Mounted on the front panel is the 2½-inch speaker which reproduces the side tone as the unit is keyed. The two tubes in the foreground are the voltage regulators and directly behind them is the mercury-wetted-contract relay.

neon relaxation audio oscillator, V_8, is keyed by the relay K and the oscillator output is fed into a single triode amplifier, V_{4B}. A SIDETONE level control located on the rear apron allows for adjustment of the side-tone output. Headphone output also is available, the speaker being automatically disconnected when the phone plug is inserted in the PHONES jack at the rear of the HA-1 cabinet.

The HA-1 includes a power supply which shares the same chassis as the keyer circuits. Using two semiconductor diodes, CR_2 and CR_3, for rectifiers, the power supply furnishes both a plus and minus 150 volts d.c. along with the necessary heater power. Two gas voltage regulators, V_5 and V_6, regulate the two voltages at 150 each. Power requirements for the HA-1 are 105 to 125 volts, 60 cycles, at 25 watts.

The HA-1 is housed in a gray wrap-around

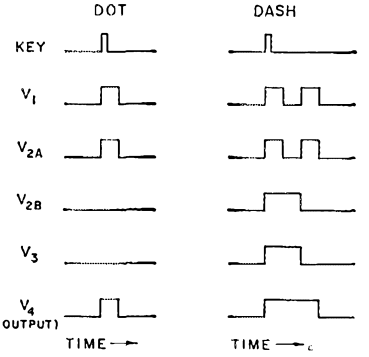


Fig. 2—Time sequence in forming a dot or dash in the various tubes in the HA-1 keyer.

cabinet that measures 5⅝ inches high, 7 inches wide and 7 13/16 inches deep. On the front panel are the FUNCTION and SPEED controls already mentioned and a key jack which takes a standard ¼-inch diameter three-circuit plug. Also on the front panel is a neon lamp, V_7 in Fig. 1, which indicates when the power is on and also acts as a visual keying monitor. It flashes once for each dot and twice for each dash. A perfectly-formed character is indicated by flashes in steady rhythm.

In addition to the PHONES, SIDETONE, BALANCE and WEIGHT controls, the rear apron of the chassis contains the control outlet socket, line cord and ground post. The control outlet is a standard 8-prong octal socket that provides connections to several of the HA-1's circuits, including chassis ground, two connections in parallel with the front panel KEY jack, low-impedance audio output, a lead to the internal speaker for muting purposes, and three connections to the relay *K*. The relay connections provide two relay contacts normally closed to ground, for use in controlling auxiliary station facilities, and a relay contact normally open to ground to key the transmitter. The relay, which is a mercury-wetted type, has a contact rating of about 250 watts, with current and voltage maxima of 5 amperes and 500 volts, respectively. A Relay Contact Protection Chart included in the HA-1 instruction manual gives information on protecting the relay contacts with various loads.

— *E. L. C.*

Heathkit Ten-Meter Transceiver Model GW-30

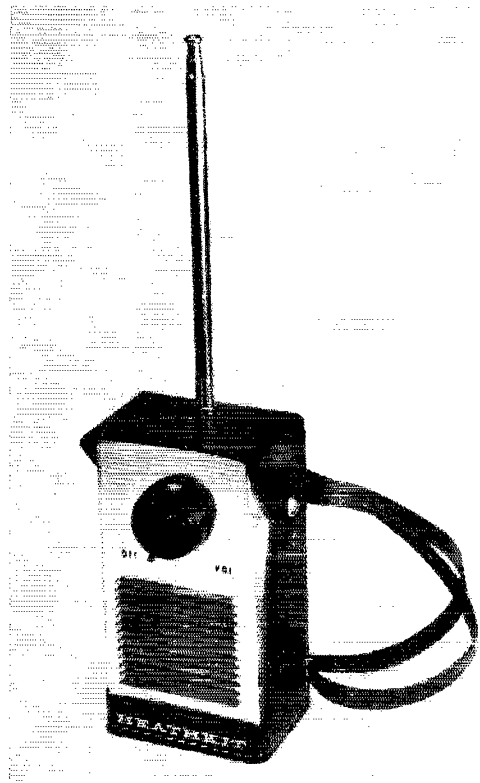
A NEW kit just released by the Heath Company of Benton Harbor, Michigan should fire the imaginations of all amateurs regardless of their special interests in amateur radio. The device is a hand-held ten-meter transceiver, completely transistorized and powered by a single 9-volt dry battery. Its light weight (only 2 pounds), compactness (it measures only 6½ inches high, 3¼ inches wide and 2⅜ inches deep), and low battery drain (slightly over 20 ma. at most) certainly qualify it as a good example of the latest thing in transistor equipment for the amateur.

The first question one usually hears when exhibiting the unit is "How far will it work" or "How's the quality?" Heath claims that under good conditions, that is, away from buildings, trees, and other large obstacles, communication between two units is possible up to one mile. Of course, in the city where there are many obstructions, much electrical interference, and noise, the range is reduced considerably. Using two of the GW-30 transceivers in a test between the roof of the ARRL office and Selden Hill, which is line-of-sight and about two miles away, produced marginal one-way reception. The signals were heard on Selden Hill, but because of local interference in the area of the League office it was impossible to hear the signals from the hill. Contacts of three to five blocks were possible in the business section of West Hartford if both whip antennas were oriented for maximum strength and held stationary, although it was practically impossible to carry on a solid contact if either or both units were in motion.

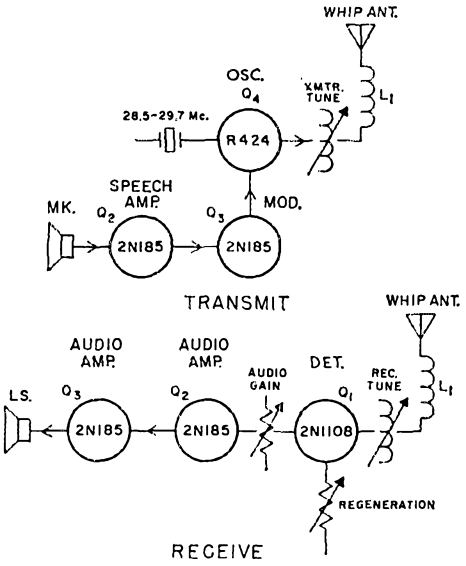
Signal quality is good as long as the operator does not hit the mike too hard, something that is psychologically difficult to refrain from doing with such a small unit. The tendency is to shout when the signal becomes marginal, but this only results in distortion.

When using a single transceiver along with a high-powered mobile or fixed station, the distance is not increased significantly, because of the low power of the GW-30's transmitter. Of course, the receiver section of the unit can pick up signals from high-powered stations at tremendous distances. In fact, when the band is open it is not unusual to copy many out-of-town stations.

Four transistors are used in the GW-30 circuit, two of them performing a dual audio role. The block diagram in Fig. 1 indicates the functions of the transistors. Transistor Q_4 operates as



This view of the GW-30 transceiver shows the completed unit in its leather case. The single knob is used to turn the unit on and off and to control the audio output from the receiver. The grille covers the speaker/microphone.



Block diagram of the Heath GW-30 hand-held 10-meter transceiver.

a common-base crystal-controlled oscillator. A tuned tank in the collector circuit of Q_4 is resonated to the crystal frequency. This tuning, along with the tuning of several other circuits, must be done before final assembly of the unit, since no external tuning controls are provided. Oscillator output is taken from a tap on the tuned circuit, which is coupled to the whip antenna through a loading inductance, L_1. The loading inductance, a miniature toroid, helps to compensate for the short antenna. A 3rd-overtone 10-meter miniature crystal with wire leads (type ML18) is needed to fit the GW-30 crystal socket and is not furnished as part of the kit. Power input to the oscillator runs about 90 milliwatts.

Modulation for the oscillator Q_4 is provided by two stages of audio amplification, Q_2 and Q_3. The microphone, *MK*, also functions during receiving as the loudspeaker, *LS*; actually, it is a small low-impedance speaker that is transformer-coupled to the speech amplifier for transmitting and to an audio-output amplifier in receiving. The audio circuits are designed to limit the modulation of the Class C stage to less than 100 per cent, and even though the circuit is a modulated oscillator, the resulting signal is quite devoid of f.m.

In receiving, signals from the antenna go to a tuned circuit in the collector circuit of the superregenerative detector Q_1. The resonant frequency of this tuned circuit determines the received signal frequency. A regeneration control is provided for optimum adjustment of the detector. The fixed-tune receiver has relatively good sensitivity and is usable with signals as low as 4 microvolts or so. Since the detector is superregenerative, there is some radiation from the receiver which can be detected close by, but it soon becomes negligible as the separation between the units is increased.

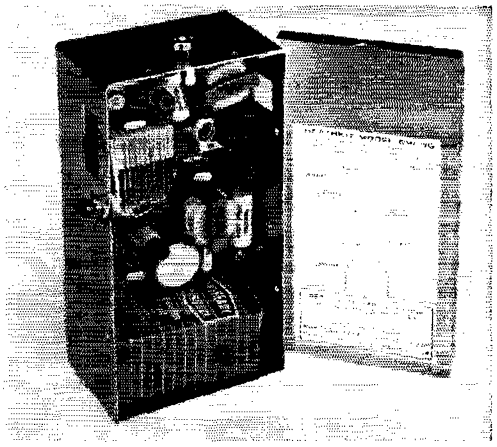
Output from the detector is fed through an audio gain control and then into two stages of audio amplification provided by transistors Q_2 and Q_3. These transistors are the same two that act as speech amplifier and modulator, respectively, when transmitting. Maximum audio output from Q_3 is about 30 milliwatts. The gain control is also linked to a switch which turns the unit on and off. This control and the send-receive switch are the only operating controls on the transceiver.

Switching from transmit to receive is accomplished by a push-button switch that transfers power, audio and the antenna between the transmitter and receiver circuits. The switch is normally in the receive position and must be depressed in order to transmit.

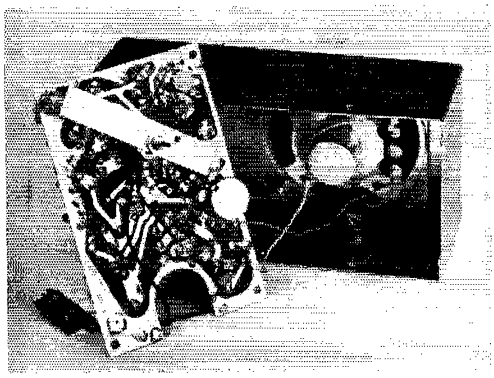
Power for the GW-30 is furnished by a single 9-volt dry battery which has a life of about 75 hours under intermittent use. Drain on transmitting runs about 22 ma. and is about 12 ma. during receiving. A spare battery is included in the kit.

As you can tell from the photographs, the kit is composed principally of a printed circuit and therefore can be put together smoothly and quickly without any particular difficulty. Complete assembly, including preconstruction parts count, wiring, alignment and testing, takes about eight hours.

Final testing of the GW-30 is simplified by several alignment tricks which do not involve the use of any test equipment. To tune the receiver to the same frequency as the transmitter it is only necessary to use the transmitter's crys-



The Heath GW-30 with its cover and leather case removed. The 40-inch collapsible antenna threads into the fitting at the top. The push-button send-receive switch is visible on the side of the cabinet and the 9-volt battery is in the space at the bottom. Other components visible in this view are the transmitter tuning coil just below the antenna terminal, the receiver tuning coil just below the push-button switch, and the miniature toroid antenna loading inductance below and to the right of the antenna fitting. The circular object just above the battery is the speaker magnet.



With the circuit board removed from the cabinet it is possible to see the speaker which also doubles as a microphone. Located on the printed circuit board is the regeneration control at the right and the on-off switch/audio volume control mounted on the bracket. The cable and terminals at the left connect to the 9-volt battery.

tal, by positioning the crystal near the receiver's tuning coil and adjusting the coil until the normal background hiss goes down to a minimum because of "suck-out" at the crystal frequency.

A special low-power lamp is included in the kit for tuning up the transmitter. The transmitter is powerful enough to light the bulb with r.f. (or the lamp is sensitive enough!). After tuning for maximum output, the 40-inch antenna (which telescopes down to 6 inches) is substituted for the lamp load.

All of the GW-30's components are housed inside a steel cabinet, and we noticed a slight detuning effect when the cover plate was placed on the cabinet. However, we drilled three holes (not shown in the photographs) directly above the transmitter tuning coil, receiver tuning coil and the regeneration control, so that final tuning adjustments could be made with an alignment tool after the cabinet was completely assembled. A black leather carrying case is supplied with the kit.

While you've been reading about this little gadget you've probably thought of many practical uses for it. It certainly would come in handy for CD work or for remote antenna adjustments and measurements. Of course, it can be used as a "sniffer" when the going gets rough in a transmitter hunt. But whatever the application, don't be surprised when you're surrounded by curious onlookers who will ask, "How far will it work . . . ?" — *E. L. C.*

Strays

W7WFO mans a fire lookout tower on Powder Horn Lookout in southwest Washington, and keeps skeds with her OM, W7WFP, on 6 meters. She forgot a sked with him one day, but he used a mirror to catch her eye from their home 18 miles away, and she got right on the air. Sure proves that she is a good lookout, even if somewhat forgetful of skeds.

—···—

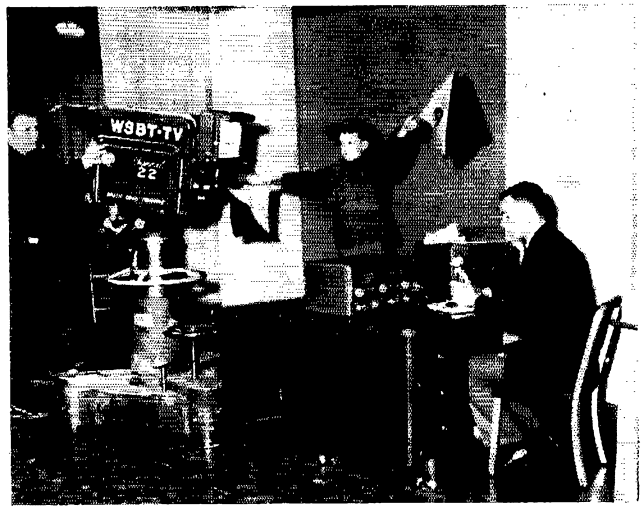
Please, now, who from Culver City wrote a 2-page letter on the subject of public relations, sent it to W6MLZ, but forgot to include his own name and address?

—···—

W1NSE bought himself a new bug and uses this sentence to practice on — "She is 55 es she is his sister."

—···—

The days of barter aren't dead. For a complete mobile station VE1AAH traded a pony and saddle, a .32 Winchester rifle, a .32 pistol, and a chain saw.



Ham vs. Semaphore— South Bend, Ind., Boy Scouts gave a vivid demonstration on TV of the advance of communications in the Scouting movement by showing the old flag system next to an amateur station. Explorer Scout Mike Davis, at far left, ran the TV camera; Boy Scout Gary Schott waved the flags and Bill Butler, K9BQN, handled the radio.

● Technical Correspondence

SCOOP!

2523 N. 57th St.
Phoenix, Arizona

Technical Editor, *QST*:

QST should be proud of the fact that the tunnel diode, currently the hottest thing in electronics, was first announced in its pages — forty years ago!

Of course, it wasn't called a tunnel diode then, but on page 44 of *QST* for March, 1920 there was an announcement that G. W. Pickard had achieved heterodyne reception with a crystal detector. A circuit diagram was given: it showed a biased crystal, tuned circuit, and headphones.

We have no reason to doubt this claim, since Dr. Pickard was a respected worker in the field. He undoubtedly produced a negative-resistance effect in some particular crystal, permitting the tuned circuit to oscillate freely.

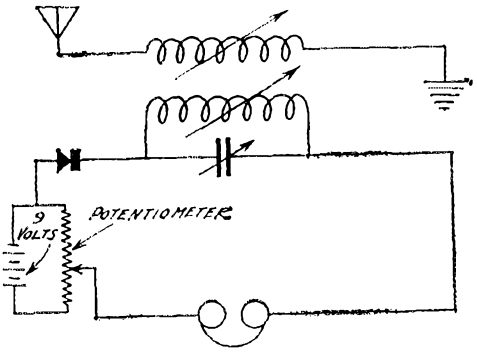
No mention of this item was ever made in any subsequent issue of *QST*, so Dr. Pickard presumably was not able to repeat these experiments. But the effect produced by the biasing was certainly similar to that produced by today's tunnel diodes.

So chalk up another first for *QST*!

— *Harry R. Hyder, K7HQN*

(The diagram and accompanying text are reproduced herewith — *Editor.*)

Did you ever hear of an oscillating crystal? Mr. G. W. Pickard, of the Wireless Specialty Apparatus Co., has done it, and here's the hook-up. The secret is the



nine volts at the potentiometer. CW is received by heterodyne beats in the usual manner. The Editor would like to know what results are had with this hookup.

PLANNED UTILIZATION OF PHONE FREQUENCIES

139 Beekman Road
Summit, New Jersey

Technical Editor, *QST*:

The letter in September *QST* (page 83) from G2HDU, commenting on the voluntary frequency-allocation plan which appeared in the "Technical Correspondence" section of the May issue, discloses several valuable contributions to the idea of using specific carrier or carrier reference frequencies in the amateur phone bands to reduce QRM.

Such a plan must be agreed to on an international basis, as he points out. Second, such an agreement will enable equipment manufacturers to tailor their designs to meet the requirements of such channel separations with better performance at a lower cost to the amateur.

I learned of his proposal for 2.5-kc. separation, which appeared in the *RSGB Bulletin* in January, in a most roundabout way — I received a copy of a reprint of his article from the editor of the *Malayan Radio Society News* in late July!

However, the G2HDU plan will not permit an equivalent number of channels in a given amateur band as it is based upon the concept of using either the upper or lower sideband exclusively in a single amateur band. Also, it makes no provision for a.m. phone, which is well taken care of in the proposal for interlaced sideband and a.m. operation using the 4-kc. separation shown in the May issue of *QST*.

Frequency allocation tables for 40-, 20- and 15-meter operation using 4-kc. separation were omitted from the May letter, but are shown herewith to give the DX boys something to think about. If DXers make a habit "zeroing in" on these frequencies, I am sure communication will improve materially when the bands are loaded with stations trying to communicate with each other or trying to obtain a QSL from that rare DX station. This assumption is founded upon the facts concerning speech distribution shown in the graphs of the May *QST* letter.

There is no reason to assume that amateur radio will not continue to grow in popularity and there is every reason to believe our bands will never be increased in size. Therefore, every effort by thoughtful amateurs and farsighted manufacturers to improve our capability to talk to each other with a minimum amount of QRM will enable all of us to get more enjoyment from our hobby. By giving up our freedom to QRM each other in a random manner when the bands are crowded, we'll all have more completed QSOs.

— *Dana A. Griffin, W2AOE*

Carrier Reference and A.M. Carrier Frequencies To Minimize Sideband Chatter and A.M. Heterodyne Interference
(First 100 Kilocycles)

Channel No.	80 Meters	40 Meters	10 Meters	20 Meters	15 Meters
1	3999 (a)	7299 (a)	29699 (a)	14347 (b)	21447 (b)
2	3995	7295	29695	14343	21443
3	3991	7291	29691	14339	21439
4	3987	7287	29687	14335	21435
5	3983	7283	29683	14331	21431
6	3979	7279	29679	14327	21427
7	3975	7275	29675	14323	21423
8	3971	7271	29671	14319	21419
9	3967	7267	29667	14315	21415
10	3963	7263	29663	14311	21411
11	3959	7259	29659	14307	21407
12	3955	7255	29655	14303	21403
13	3951	7251	29651	14299	21399
14	3947	7247	29647	14295	21395
15	3943	7243	29643	14291	21391
16	3939	7239	29639	14287	21387
17	3935	7235	29635	14283	21383
18	3931	7231	29631	14279	21379
19	3927	7227	29627	14275	21375
20	3923	7223	29623	14271	21371
21	3919	7219	29619	14267	21367
22	3915	7215	29615	14263	21363
23	3911	7211	29611	14259	21359
24	3907	7207	29607	14255	21355
25	3903	7203	29603	14251	21351
26 (c)	3899	7199 (d)	29599	14247	21347

(a) Lower sideband only.
(b) U.s.b. — l.s.b. — a.m.
(c) Corresponds to Channel 1 minus 100 kc.; also Channel 51 = Channel 1 minus 200 kc., Channel 76 = Channel 1 minus 300 kc., etc.
(d) Canadian and other non-U. S. phone.

There are 25 sideband assignments and 24 a.m. assignments per 100 kc. on all bands. With exception of Channel 1 on 80, 40 and 10 meters, each channel can be used for simultaneous upper and lower interlaced sideband transmission, providing 49 effective sideband channels per 100 kc.

Amateur practice in setting up nets and schedules is to specify an operating frequency. To determine operating frequencies in other portions of U. S. and foreign phone-band assignments, use the last two digits of the frequencies shown in the table in any portion of any band open to phone in any country. Channel numbers are not important; they are essentially illustrative. For example, Canadians can now operate on phone on 21,103 kc. while U. S. stations are limited to lower sideband on 21,251 kc. with the lowest preferred a.m. channel at 21,255 kc. QST

Announcing the 27th ARRL Sweepstakes

November 12–14 and 19–21

Since A. L. Budlong, W1BUD, ARRL General Manager, is retiring in December after thirty-eight years of service to the League, the annual trophy donated by W3GJY will this year be known as the A. L. Budlong Distinguished Service Award, to commemorate Bud's long and distinguished service to amateur radio. The handsome 21-inch trophy will be awarded to the highest scoring single-op in the 1960 Sweepstakes.

HEY you! If you never have been in the Sweepstakes before, now's the time to start. You say you don't know anything about it? It's real simple: all you have to do is get on the air during the contest hours and make contacts, swapping contest exchanges. You can get into either the phone or c.w. contest, or both.

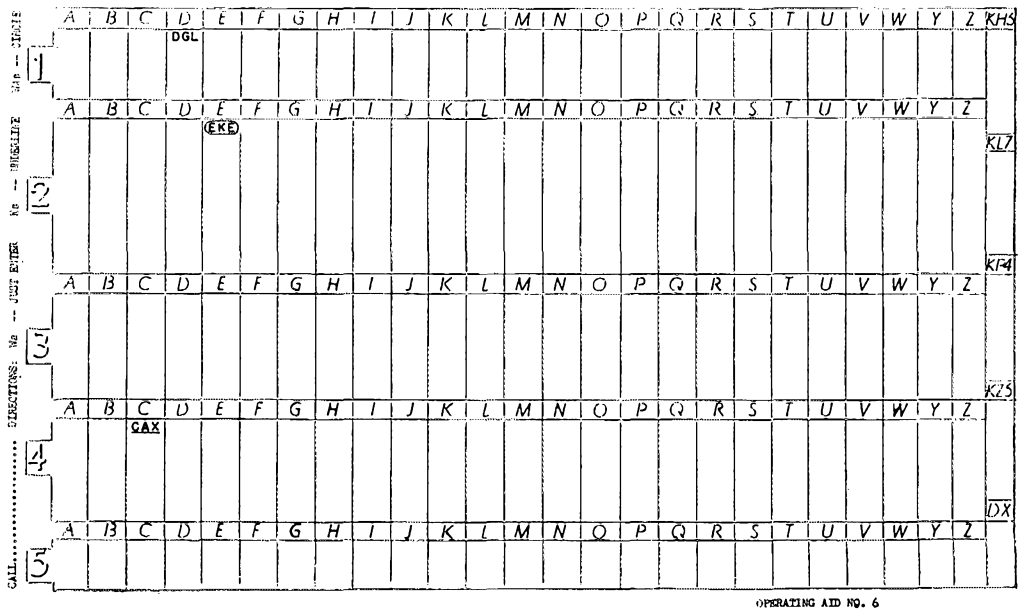
For the two week ends, forty hours is the maximum operating time allowed. The contest begins (dates listed above) on Saturday afternoon and ends in the wee hours Monday morning — for two week ends. The phone and c.w. contests are considered separate, so if you participate in both, send in separate logs.

The rules are the same as last year. One slight change — should a Novice or Technician, after having done an outstanding job, find there are not three entries from his section, he still may earn a certificate. All other awards are the same with a certificate awarded to the top phone and c.w. scorer in each of the 73 ARRL sections. Single-ops also may compete for certificates given to a club's top scorer on both phone and c.w. Club secretaries submit their club aggregate score, thereby putting them in contention for the cocobolo gavel engraved with the name of the club with the highest total score.

To get started merely call CQ SS or answer such a call during the Sweepstakes dates and send the exchange in the form shown in this announcement. All contesters are urged to *use GMT* in the time exchange. Then you won't get all mixed up when working across time zones, and the other guy is sending you some odd-ball time, for everybody will be on the same hour with GMT. Check the time conversion chart on page 81, August *QST*.

ARRL also puts out an *Operating Aid No. 6* (stations worked check list) to keep track of the stations you already have worked. See bottom of page with accompanying caption. All con-

Here's how to keep track of the stations you work, for you just waste time reworking stations; duplicate contacts do not count. This is ARRL's newly revised *Operating Aid No. 6*. When you work a W call, just enter the letters in the appropriate call area; for a K underline the letters, and for a WA circle . . . as simple as that. Below, for example, the three calls entered are W1DGL, WA2EKE, and K4CAX. Call areas through Ø and VEs are entered on the reverse side. Request yours from ARRL and remember to enter your own call letters in the lower left hand corner and submit it with your log sheets to ARRL.



CONTEST PERIODS

Time	*Start*	*End*
	Saturday P.M.	Monday A.M.
	Nov. 12 & 19	Nov. 14 & 21
GMT	**2300**	**0801**
EST	6:00 P.M.	3:01 A.M.
CST	5:00 P.M.	2:01 A.M.
MST	4:00 P.M.	1:01 A.M.
PST	3:00 P.M.	12:01 A.M.

testers are urged to use this revised version and also send it in along with your log sheets. This will help the log checkers. You can get this helpful ARRL form free on request.

For purposes of this contest all VE8s may be considered attached to Yukon; also, VOs as Maritime and Cuba as West Indies.

Check the rules below carefully. Send for your free log forms specifying how many you need. Also ask for ARRL Operating Aid No. 6 to keep track of the stations you work. Logs must be postmarked by December 12, 1960, to be eligible for score listing and awards.

Rules

1) *Eligibility:* The contest is open to all radio amateurs in (or officially attached to) sections listed on page 6 of this issue of *QST*.

2) *Time:* All contacts must be made during the contest periods indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 73 sections. Time may be divided between week ends as desired, but a total of 40 hours must not be exceeded for each entry. Time spent in listening counts as operating time.

3) *QSO:* Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. C.w. stations work only c.w. stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) *Scoring:* Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see p. 6) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either point(s) or multiplier. Apply a "power multiplier" of 1.25 to c.w. entries and 1.5 to phone entries if the input power to the transmitter output stage is 150 watts or less at all times during contest operation.

The final score equals the total "points" × the "sections multiplier" × the "power multiplier."

5) *Reporting:* Contest must be reported as shown in

Sample of report form that must be used by contestants

LOG, 27th A.R.R.L. SWEEPSTAKES

Station..... *C.W. or Phone*..... *Section*.....

Freq. Band (Mc.)	*Time On or Off Air GMT*	*Sent (1 point)*				*Time GMT*	*Date (Nov.)*	*Received (1 point)*				*Time GMT*	*Date (Nov.)*	*Number of Each Different New Section as Worked*	*Points*
		NR	*Stn.*	*CK-RST*	*Section*			*NR*	*Stn.*	*CK-RST*	*Section*				
3.5	On 2300	1	W1AW	589	Conn.	2301	12	2	W3JNQ	589	E. PA.	2302	12	1	2
"	"	2	"	589	"	2303	"	5	W4KFC	589	VA.	2304	"	2	2
"	"	3	"	579	"	2305	"	5	W1BIH	579	CONN.	2305	"	3	2
"	"	4	"	359	"	2315	"		W3GYP						1
"	"	5	"	579	"	2321	"	2	W1DZV	599	W. MASS.	2322	"	4	2
	Off 2325 Time: 25 min.														
14	On 1900	6	"	569	"	1903	13	107	KH6HAA	569	HAWAII	1905	13	5	2
"	"	7	"	569	"	1906	"	208	W9CDP	589	COLO.	1906	"	6	2
	Off 1915 Time: 15 min.														
3.5	On 2105	8	"	549	"	2107	"	198	W1KGJ	599	W. MASS.	2108	"		2
"	"					2120	"	57	W3GYP	599	E. PA.	2120	"		1
"	"	9	"	599	"	2128	"	307	K2DGT	599	N. Y. C.	2130	"	7	2
"	"	10	"	569	"	2137	"	316	W9YFV	569	ILL.	2137	"	8	2
	Off 2140 Time: 35 min.														

Total Operating Time: 1 hr. 15 min. 3.5 and 14 Mc. used. 8 Sec., 20 Pts. 145 Watts Maximum Power Input

Assisting person(s), name(s) and call(s).....

Claimed score: 20 points × 8 sections = 160 × 1.25 (145 watts input) = 200

Type transmitter (tube line-up if home-built).....

Receiver..... Antennas.....

Participation for Club Award in the.....
(Name of Club)

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge.

Signature.....

Number different stations worked..... Address.....

EXPLANATION OF "SS" CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the.....NR		*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest serial numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (RST report of station worked)	Your ARRL section	Send time of transmitting. **GMT recommended.**	Send date of QSO
Sample	NR 1	W1AW	589	CONN	2301	NOV 12

the sample form. Printed contest forms will be sent free on request. Indicate starting and ending times for each period on the air. All Sweepstakes reports become the property of ARRL and none can be returned.

There are no objections to one's obtaining assistance from logging, "spotting" or relief operators, but their use places the entrant in the multiple-operator class, and it must be so reported.

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously is not allowed. Contest reports must be postmarked no later than December 12, 1960, to insure eligibility for *QST* listing and awards.

6) *Awards:* Certificates will be awarded to the highest c.w. scorer and to the highest phone scorer in each ARRL section. A c.w. certificate will also be awarded to the highest scoring Novice or Technician in each section where at least three such licensees submit c.w. logs; similarly, a phone certificate will be earned by a Novice or Technician in each section where a total of three such licensees submit phone logs. A certificate also will be awarded to the highest scoring Novice and Technician from sections of less than three entries . . . that in the opinion of the Awards Committee displayed exceptional effort. Only single-operator stations are eligible for certificate awards. Multiple-operator scores will receive separate *QST* listing in the final results.

A gavel will be awarded to the highest club entry. The aggregate scores of phone and c.w. reported by club secretaries and confirmed by the receipt at ARRL of contest logs constitute a club entry. Segregate club entries into phone and c.w. totals. Both single- and multiple-operator scores may be counted, but only the score of a bona fide club member, operating a station in local club territory, may be included in club entries.

The highest single-operator c.w. score and the highest single-operator phone score in any club entry will be rewarded with a "club" certificate where at least three single-operator phone and/or three single-operator c.w. scores are submitted.

7) *Disqualification:* Failure to comply with the contest rules or FCC regulations or the necessity for avoiding interference with channels handling amateur emergency communication shall constitute grounds for disqualifications. In all cases of question, the decisions of the ARRL Contest Committee are final. QST

HOW TO SCORE

Each preamble sent and acknowledged counts one point.

Each preamble received counts one point.

Only two points can be earned by contacting any one station, regardless of the frequency band used.

For final score: Multiply totaled points by the number of *different* ARRL sections worked; that is, the number in which at least one bona fide SS point has been made. Multiply c.w. scores by 1.25 and phone scores by 1.5 if you used 150-watts-or-less transmitter input *at all times* during the contest.

Strays

W6DYQ has an excellent piece of advice for the active amateur. Never plant a lawn larger than the XYL can take care of.

—•••—

Here's the November schedule for the Eastern Technical net of the Air Force MARS, meeting on 3295, 7540, and 15,715 kc. on Sunday at 1900 GMT.

Nov. 6 — Report on a trip to the Soviet.
Nov. 13 — Further reports on a trip to the Soviet.
Nov. 20 — Electromagnetic compatibility.
Nov. 27 — Applications of Ultrasonics.
Dec. 4 — Principles of guidance and navigation, and inertial devices.

—•••—

Third Army MARS announces the following training program at 0000 GMT on 5850 kc. Note that these dates are GMT.

Nov. 5 — History and purpose of MARS.
Nov. 12 — Net procedure.
Nov. 19 — Message handling on MARS.
Nov. 26 — Converting a MARS message to the amateur format.

Here's something for the Navy men. Any naval reservist in the Connecticut area interested in joining a special communications division should get in touch with W1IKE.

—•••—

Shortwave listeners will be interested in a new book *DXing Horizons*, devoted entirely to radio and television DX reception. Its editor, K6EDX, labels it as the DXer's equivalent to *QST*. For further information, write directly to K6EDX at Box 3150, Modesto, Calif.

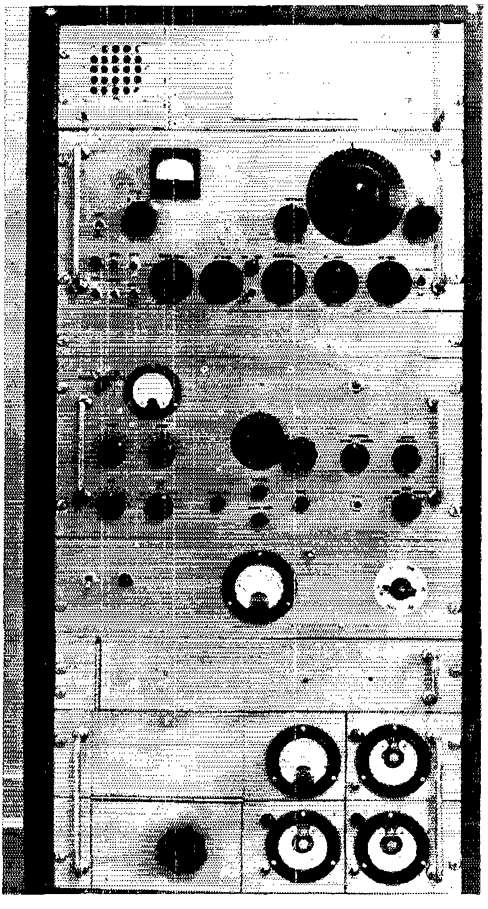
—•••—

Congratulations to K4ODS who, although blind, has been awarded a four-year scholarship to the University of Florida, where he will study electronics. He has been a regular NCS on traffic nets and has made BPL several times.

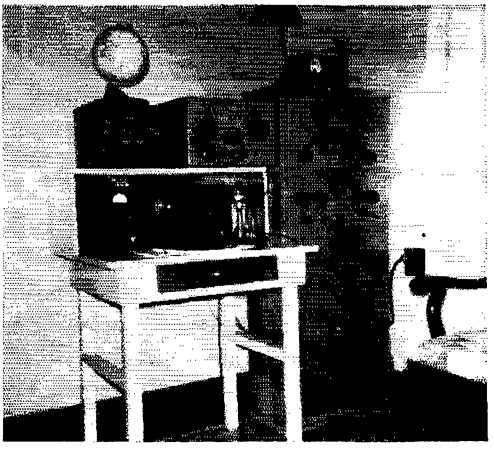
—•••—

A W5 asked a suspiciously-loud UM8AT how come he said his beam was 60 feet high when only an hour ago he had told another QSO that the beam was 50 feet high. Said the UM8, "Crank-up tower."

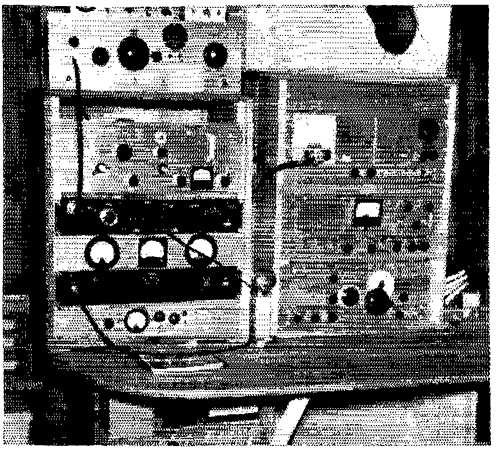
Home-built Stations



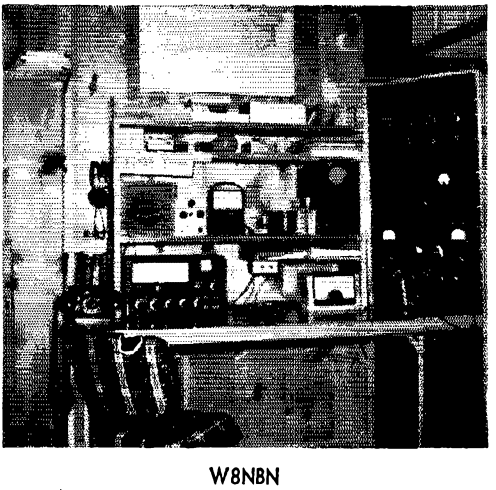
W5IUR



VE5CX



W1SUZ



W8NBN

Here's another batch of ham stations in which all the gear is home built. If you have a station in which you have put together all the equipment, how about sending along a photo. Above is the 1-kw. sideband station of W5IUR, with the receiver covering 80 through 10. Top left is VE5CX, who has a pair of 6146s in the final and a 12-tube double-conversion receiver. Currently his exciter is a Meissner which has been extensively reworked, but he'll join the ranks of the simon pure when he finishes his s.s.b. exciter. Center right is W1SUZ, who is a v.h.f. man. At the right in his station is a tunable i.f. for 7–11 Mc., with crystal-lattice filter. Separate crystal-controlled converters feed this for operation on 50, 144 and 220 Mc. Transmitting gear is at the left, currently ending up with a 6146 but with higher power on the way. Bottom right is W8NBN, whose receiver is the now-famous HBR-16. The transmitter ends up with a 7094, modulated with a pair of 811As. Everything in the station was built either from *QST* or the *Handbook*. W8NBN started as a Novice about 10 years ago, and obviously has come a long way since then.

Hints and Kinks For the Experimenter

APACHE TRANSMITTER MODIFICATION

SOME time ago I acquired one of the Heathkit Apache TX-1 Transmitters. I had a kilowatt final and wanted to use the Apache as a driver (both audio and r.f.) while still retaining its original status as a self-contained medium-power transmitter. The diagram in Fig. 1 shows my modification.

In order to have a simple yet compact switching arrangement, I selected a Centralab index assembly type P-273 and two of their ceramic wafers type RRD. These were chosen instead of the preassembled-type switch since the assembled type has a metal shaft. Phenolic material is used in the "do-it-yourself" switch and is preferable in order to withstand the high audio voltages developed.

Prior to assembly, the wafers must be modified to prevent arcing between rotary pole sections. This is a simple operation, easily completed in a few minutes. The end of each semicircular rotor strip opposite the contact tab is bent back on itself at the edge of the mounting rivet. A small screwdriver or knife edge will serve to lift the contact end slightly, allowing it to be readily grasped with a pair of needle-nose pliers. This gives another sixteenth of an inch clearance at each end, once all four contacts are so bent. With the contact ends bent, the switch should not be rotated to its extremes, since it will force the bent portion up against the pole contacts with possible damage resulting. Although the switch has five positions available, only two are required for this purpose.

Remove the jumper between *JW-2* and *JS-5* as well as between *JW-1* and lug 1 of the h.v. filter capacitor *JY*. Now wire the switch into the circuit as shown in Fig. 1. Use sufficiently well-insulated wire with leads long enough to permit positioning the switch in a hole drilled in the chassis to the right side of the coax antenna receptacle. It is recommended that several strips of plastic insulating tape be spread along the side of the chassis nearest the switch contacts to prevent accidental shorting.

The 500-ohm audio output is brought out via a dual-connection female microphone receptacle mounted in a hole drilled directly above the coax antenna receptacle. Two small v.h.f. chokes and a couple of small bypass capacitors are used for TVI suppression.

Prior to operation of the transmitter it is advisable to check the wiring. Before replacing the cabinet, it will be necessary to drill and file or ream two holes to allow the protrusion of the switch shaft and audio connector. With this modification r.f. and audio excitation can be obtained when high power is desired without affecting the original circuit in any way.

— *Stephen C. Taber, W2ITD*

PRINTED CIRCUIT DUMMY LOAD

AN anonymous Canadian amateur sent in the novel low-power dummy load shown in the accompanying photograph (Fig. 3). All that's required for construction are six pilot lamps, wire, and a small piece of copper-clad printed circuit board. Mount the bulbs and wire as shown in the photograph. Solder all the lamp shells to the copper lamination on the phenolic board. To connect the lamps in series cut a series of slits in the copper material (but not through the phenolic) as shown in the sketch in Fig. 2.

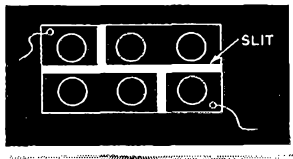
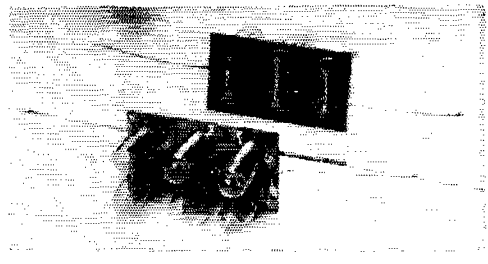


Fig. 2.—(left) Slit pattern.

Fig. 3—(below) mirror photo of completed dummy load.



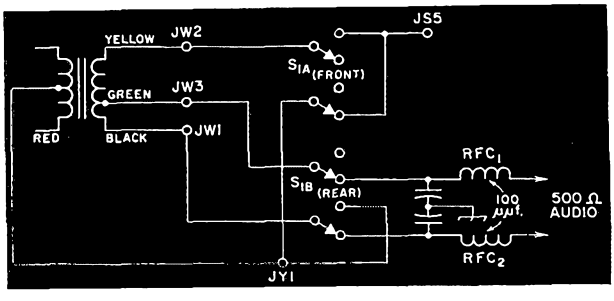


Fig. 1—(left) W2ITD's Apache transmitter modification.

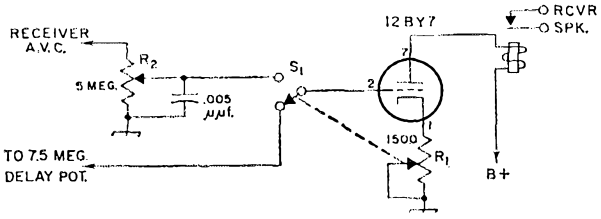


Fig. 4—Squelch circuit for Heathkit VX-1.
R_1—1500-ohm potentiometer.
R_2—5 meg-ohm potentiometer.
S_1—S.p.d.t. switch on R_1 wired so that the arm is at minimum resistance when in the VOX position.

ADDING SQUELCH TO THE HEATHKIT VX-1

FIG. 4 shows the arrangement I use to add squelch to the Heathkit Electronic Voice Control unit. The 12BY7's cathode resistor is replaced by a potentiometer, R_1, and is adjusted to allow the tube to conduct and close the control relay. A.v.c. voltage from the receiver is applied through another potentiometer, R_2, to the 12BY7 grid. When a signal is present, a.v.c. voltage is applied to the grid, cutting off the plate current and releasing the relay. The relay is used to control the station speaker circuit.

To operate the squelch, switch the transmitter to standby and the VX-1 to vox. Adjust R_1 so that the relay closes when there is no signal present. Adjust R_2 so that receiver background noise does not trigger the system. The unit is now ready for squelch operation. Rotation of R_1 to the off position restores normal VOX operation.

I mounted R_1 to the lower left of the time-delay control and R_2 directly below R_1.

— *Robert L. Wilcox, K8OMS*

USING THE JOHNSON VIKING VALIANT V.F.O. ON SIX AND OR TWO METERS

SINCE my Valiant is used quite often as a power and modulation source for the Johnson 6N2 transmitter, I decided to modify the 11-meter portion of the v.f.o. for operation on six or two meters. The coax lead and fitting normally used for s.s.b. input on the Valiant can be used as the connection for the v.f.o. output. To make the modifications the following step-by-step procedure should be followed:

1) Remove the side cover plate and the U-shaped shield box on the v.f.o. Do not remove the four screws or top plate.

2) Locate C_4, the 11-meter band padder capacitor, and carefully solder a 20-μμf. NP0 capacitor across its terminals. This will change the original frequency coverage of the 11-meter band for use on six meters. If 2-meter coverage is desired, place an NP0 capacitor of 35 μμf. across C_4.

3) Replace the U shield and the side cover plate on the v.f.o.

4) Place the Valiant band switch in the 11-meter position and turn the oscillator switch to zero.

5) Listen on a suitable receiver tuned to 50 Mc. for the v.f.o. signal. Set the v.f.o. pointer to the extreme counter-clockwise position and tune capacitor C_4 until the 50-Mc. signal is heard. This will allow a full 2-Mc. coverage with 180-degree rotation of the v.f.o. dial.

6) Make a 1-inch loop with 6-inch leads out of No. 18 or 20 plastic-insulated wire. Tape or glue the loop to the cold end of the buffer coil, L_5. Bend the leads of the loop to bring them down to switch *SW4-C*.

7) Lift resistors R_{10} and R_{54} from terminal 12 of *SW4-C*.

8) Cut away ¼ inch of the outer vinyl covering of the coax lead that connects to terminal 4 of switch *SW4-C*. Connect one of the leads from the loop to terminal 4. Connect the other loop lead to the coax shield.

If the final r.f. amplifier filament circuit is opened it will isolate this stage and allow the v.f.o., power supply and modulator to be used with the external 6N2 transmitter. To make this modification:

1) Lift the gray lead from terminal 2 of *TS33* and tape it aside.

2) Lift the green lead that comes out of the laced cable from tube *XV8* and tape it aside.

3) Lift the longer green lead from terminal 3 of tube *XV6* and tape it aside.

4) Run a lead from terminal 2 of *TS33* to terminal 4 of *XV8*.

5) Run a lead from terminal 1 of *TS18* to terminal 2 of *TS6*.

6) Connect a jumper from terminal 1 to terminals 7 and 8 on the jumper plug, *P8*.

When *P8* is inserted in its receptacle, the filaments of the r.f. amplifier will be connected. When using the Valiant with the 6N2 remove the plug to disconnect the r.f. amplifier filaments.

— *Antonio G. O. Gelineau, W4LEQ*

10-MINUTE TRANSMISSION REMINDER

THOSE who have 24-hour digital read-out clocks with plastic number wheels will note that the wheel which shows minutes has ten sides and makes one revolution every 10 minutes. By arranging a pair of fingers made from shim stock or other similar material against this wheel and then pasting a very thin narrow strip of the same material across one of the faces of the wheel, contact is made between the strip and the two fingers once each 10 minutes. This contact can be used to control a light, bell or buzzer to remind the operator that a 10-minute period has passed. In my case it actuates a small solenoid which taps a glockenspiel bar and gives a musical tone.

— *Graham H. Hicks, W5IHP*

Planning Ahead

BY JOHN G. TROSTER,* W6ISQ, ex-W2ISQ

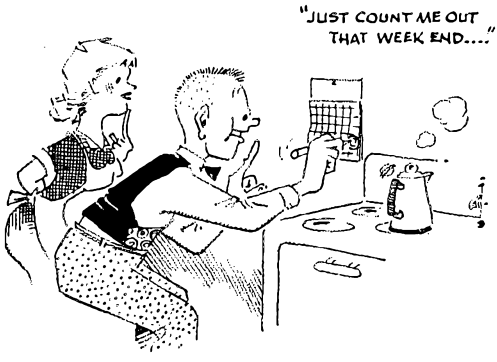
REALLY! I did just like they advised in the articles on how to influence scores and win contests. I made all those charts on QSO's per hour versus time, frequency versus time zebra, sunspot cycle *vs.* temperature, etc. etc. And, I suppose they would have helped too — if I'd had a chance to use them. But something went wrong. Because, not only did I not win — I was lucky to get in the contest at all.

It all started about six weeks before The Big Contest. This time I was going to be prepared; so, I reread all available literature on contest operating and plotted all those charts they talked about. Then I began a systematic check-out of the rig, and even polished up the rotary so it sparkled like new, just like the man said in the article.[1]

Then, just to make sure of complete and cooperative domestic tranquility and understanding, I decided it would be wise to prepare the XYL for my forthcoming week-end hibernation. This was to be a little strategic planning ahead. But alas, t'was my undoing.

My ill-fated campaign of preparing the XYL psychologically for The Big Contest began one evening when I took a large red grease pencil and circled the date of The Big Contest on the kitchen calendar. "This is the day," I announced. "Just count me out that week end because I'm going fishing — ha — for DX that is. Maybe you'd like to go over and spend that week end with your mother so you'd have someone to talk to because I'll be Very Busy during The Big Contest."

"Yes, dear," she smiled.



Every few days, I repeated my admonition. "There's that Big Contest getting closer all the time. I'm really going to be busy that week end!"

"Yes, dear."

"I just happened to pass a florist and I know how you like roses. I won't have time to get you anything during The Big Contest, soooooo —"

"Yes, dear."

"How about going to the show tonite? Won't be able to take you during The Big Contest, you know. And we can stop and have a soda afterwards too, if you like."

"Yes, dear."

"Our anniversary is only four months away and I know you like candy — it's a four-pound box too, and —"

"Yes, dear."

Well, comes the day of The Big Contest. The XYL certainly ought to be in line by now. This date on the calendar is colored almost solid red. Most everything is done except the lawn. I'll get that this morning. Then de-flea the hound. Then wash the car — she'll want the car looking nice when she goes to her mother's.

Now that I have the XYL polished up, it's time for a little care of old Number One! After all, I'll probably be up most of the night. Let me see. Light lunch. Then, by golly, I think I'll relax just a little before The Big One!

Ahhhhhhhh — this is the life. Still a few hours to go and here I am stretched out for a short snooze. Last contest I was still on the roof with that blinkity antenna when the contest started. Not this time. Boy, this planning ahead is the stuff. Now just to relax and think about nothing but all those beautiful DX stations just waiting to work ole Dad. Can almost hear them calling now — ahhhh.

* * *

Whoops — hit the deck! The Big Contest is about to blast off. Don't rush, don't rush. Make that planning ahead campaign pay off. Be nonchalant. Warm up the rig. Take a walk around the yard. Get a little air — good for the constitution. Say, that rotary looks mighty fine. Don't hurry. Wait for the coffee to perk. Another minute or two won't make any difference.

Check the charts. Frequency versus time, QSO's versus sunspot cycle, and all the rest — OK, 20 it is. Now let's see. Hmmmmmm — band sounds good. South America coming in OK. Yes, Asia is there. Ahaaaaaaa. Europe and Africa now, too! Wow, this band is hot as a pistol! They're coming from all directions! Unbelievable. Who shall I go after first? VS6, LX, HC8? Relax, lots of time. Start slowly and work into this one.

Hold it now — what's this one? Yipes, an AC3! He's a good solid S7. Get the xtal on him so you won't lose him in the "crash." OK, he signed — flip the switch — look at those beautiful blue rectifiers — AC3! here I come —"

"John, aren't you ready yet?"

"I hope to work an AC3 I'm ready. This band is like a fire cracker. Never heard the band open up like this. The whole world blasting right here in the shack. Yes, maaam, I'm ready. Been waiting for this for six weeks. I'm calling this fellow in Sikkim and —"

"Well, if you don't hurry up the Smith's will

* 45 Laurel St., Atherton, Calif.

[1] Troster, "What's Up Top?" *QST*, June, 1960, p. 38.

be calling up from eight blocks away and they won't need a radio. We were due over there an hour ago. I thought you were getting ready. I'll phone them and say we will be there in ten minutes. Now hurry up."

"But, Marge. This is the day of The Big Contest. I've been telling you about this for six weeks. Remember the flowers, red calendar, candy, show?? No! Absolutely not! I'm not going to the Smith's or anyplace else. I'm not going to leave this chair except to get another cup of coffee."

"I'm glad you took that nap this afternoon. You might stay awake long enough to bid intelligently for a change tonite."

"No. I'm staying right here, and that's final — Yes, dear. Well — we're not going to stay more than an hour. Yes, dear, I'll get the car."

"Good evening, we've been looking forward to this evening for six weeks. Sorry we're so late. John was taking a rest so he could play better —"

"Your deal."

"One spade."

"Two clubs."

"Two no trump."

"Three AC3's."

"What was that?"

"Oh, I pass. Ahhhh, what's the time?"

"It's only midnite, and we haven't finished the fourth rubber yet —"

"One o'clock, you said? Really we've got to go — wonderful time — do it again some time — come on Marge — wonderful time."

"You take cream, John? And how would you like them? Fried or Scrambled? Two kinds of cake."

"KS4 with the coffee and a VQ2 with ice cream."

"What on earth are you mumbling about, John? You know, you're probably working too hard. You ought to relax. Plan ahead a little for these week ends so you can take it easy and enjoy yourself. You ought to get a good hobby or something. Oh, you say you have a hobby? — radio? — You mean like crystal sets? You know, I used to make crystal sets. Did I ever tell you I got Pittsburgh on a set I made once? Boy, you should have fooled around with radio in the old pioneering days. You know people used to stay up late at night just to hear some of those stations. Isn't that ridiculous. I stayed up till about two A.M. that night I got Pittsburgh!

"OQ5, FL8, HS1, AC3, RST599x."

"Oh yes, I recognize those numbers — names of those old radio tubes aren't they?"

"Yes, yes — been a lovely evening. Wonderful, wonderful. Should do this more often — about every six weeks — you must come over and see us soon —"

"Slow down, John, you almost drove across that lawn — Johnnnnnnnn."

"No, officer, really. I've been playing bridge. No really, only coffee. You don't understand, Officer O'Malley. There's this fellow in Dublin been a wantin' ta talk to me, b'gorry, an —"

"Now slow down, John. Just because you talked your way out of that one don't think the next officer will let you off."

Ahhhhh, at last. Now, let's see. My gosh! That AC3 is still in there. Maybe a little weaker. Unbelievable. Oh boy, oh boy. What a pile up. Oh, oh, — what's this? He's not working W6's any more. He's probably sick of W6's or we're all QRMing each other out of existence. Oh well, give the fellow a blast and walk away. Where is he now? Can't hear him in that pile any more. Oh well, do like everybody else. Zero in on the center of the pile and sign 24 times or until everybody else quits — that's the way — hi. Wear 'em out. Wow, what a pile up. Blast again. Oh well, maybe I can work him some morning before work.

Let's tune around here — yep, few Europeans still coming through. Let's see now. Oooooops — who's calling me? What a sig! Oh, its Gus on the other side of town. "W6ABC — what's up, Gus? How u doing? — Why didn't I go back to whom? — The AC3? — He called me? — S9 plus? — loudest sig on the band? — couldn't hear any other W's? — Ohhhhhhh me —"

* * *

"John, John — for goodness sake what's the matter? What are you thrashing around for? You must have been having a wild dream or something. How can you have such wild dreams in the middle of the afternoon? All that lawn mowing and car washing, I guess."

"Marge. My gosh. Dreaming? Hey, what time is it? Five minutes to go before The Big Contest? I really didn't miss it after all? Ohhhh, what a dream, There was this AC3 and I was the loudest W and — oh well." Be calm, boy. Don't tighten

(Continued on page 144)

The Amateur and the Army

BY EARLE F. COOK,* W4FZ

THE article "Use Your Amateur License in the Naval Reserve"[1] certainly presented a clear picture of one channel of opportunity in the Armed Forces for young amateurs. The interest expressed by K4QET in his letter in Correspondence[2] indicates that some hams are getting the message loud and clear. It would seem that we in the military might well emphasize to the amateurs of our country the many additional and varied opportunities military service does offer.

I am reminded of the U. S. Army's real interest in amateur radio by the recent entry in my log confirming the QSO between 9Q5US and my own station W4FZ. Here is an example in which the Army included a complete amateur station in the communications equipment sent to Leopoldville (Congo), during the recent trouble in that area.

This is only one recent illustration of amateur activity in the Army. There are many added opportunities which you as a ham might have in the U. S. Army.

Perhaps the most significant program is the Military Affiliate Radio System, commonly known as MARS. This is an organization of and for the licensed amateur radio operator who is interested in military radio communication.

During World War I about 4000 amateurs contributed their skill and ability to either the Army or the Navy. (The Air Force didn't come into being as a separate service until after World War II).

After the war it was only natural that friendly relations should exist between the Army, the Navy and the amateur. These relationships increased in the next few years and grew into cooperative activities. This resulted in the establishment of the Naval Communications Reserve and the Army Amateur Radio System. MARS is the latest outgrowth of the Army Amateur Radio System and is sponsored jointly by the U. S. Army and the U. S. Air Force.

Anyone 16 years of age or older who has a valid amateur radio license issued by the Federal Communications Commission and who possesses a station capable of operating on at least two MARS frequencies is eligible for membership. This is a voluntary membership. The volunteer agrees to participate in at least six hours of MARS activities each three months, usually at the rate of one hour a week. Certainly this is an easy requirement for any active ham to meet. This is not a substitute for military service in the Armed Forces, however.

What then would a MARS membership mean to you as a volunteer member?

You will receive a MARS certificate to aid you in obtaining military communications assignments upon enlistment in the Armed Forces, if you desire such an assignment. And you will receive credit for MARS activity towards promotion and retirement in the Reserve Military Program if you are a member of the Military Reserves.

You will receive excess and obsolete equipment and supplies for experimentation, for modification and cannibalization. You have no doubt read some of the many excellent articles in *QST* and other publications on modifying military equipment for ham use. These articles speak most favorably concerning the value of this equipment. Its applications are too numerous to mention here.

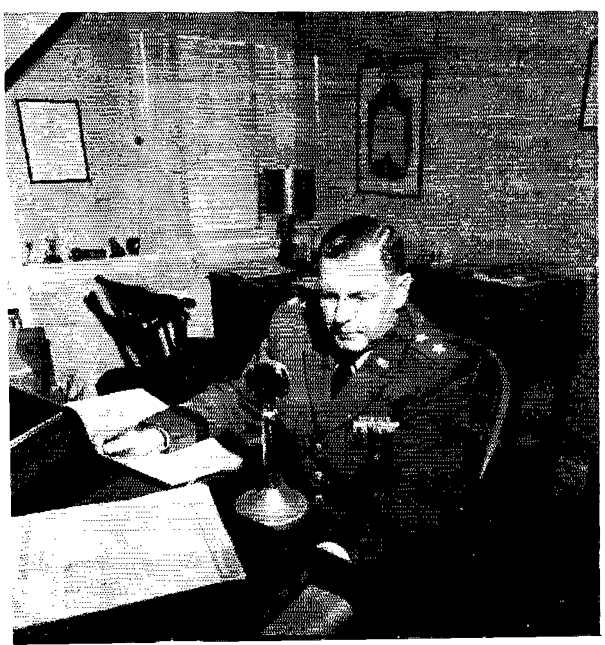
You will become eligible for electronic extension courses of the U. S. Army Signal Corps School or the U. S. Air Force Institute. Typical courses are: mathematics, electrical fundamentals, a.c.-d.c. power supplies and regulation, theory of application of electron tubes, fundamentals of radio, a.m. radio receivers and transmitters, television, cathode ray tubes and associated circuits, r.f. transmission lines, electronic test equipments, fixed station radio fundamentals, wave propagation and antennas, higher frequency techniques, frequency modulation, and frequency prediction.

Six months of active membership are required for you to be eligible to enroll in the extension courses or to receive equipment and parts. This certainly is not a hardship to you. Yet it does protect your Government's investment, and your

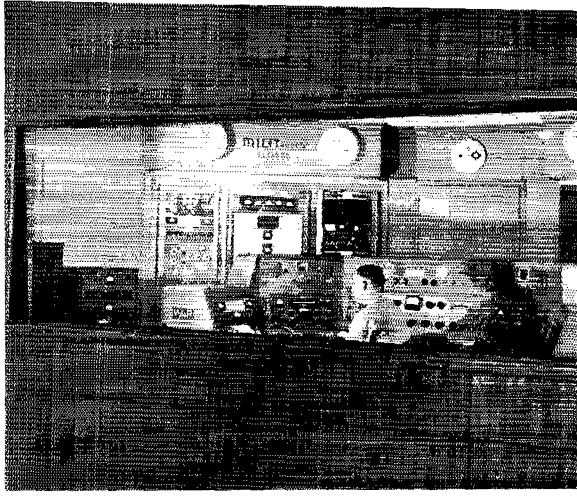
* Major General, U. S. Army, Deputy Chief Signal Officer, U. S. Army, The Pentagon.

[1] *QST* Feb., 1960, W5PYU.

[2] *QST* Apr., 1960, p. 74.



W4FZ is an active ham, despite the demands on his time because of his assignment as Deputy Chief Signal Officer of the U. S. Army. Here he logs some operating time at his home station in Arlington.



K4USA, the MARS station in the Pentagon, is a modern, well-equipped station. Visitors are always welcome.

membership will give you greater responsibilities than you may have thought about.

As a member you will be using certain military frequencies set aside for MARS. Through this you will be representing the Army and your country. You will be watched by other amateurs who will not only expect but will have the right to expect professional techniques to be used on MARS frequencies.

But perhaps the most important benefit to you will be a realization that you are a part of an emergency organization, prepared and ready. In this respect the record of MARS is outstanding. Every MARS member is proud of his part in national preparedness.

Just a few happenings in which MARS members played a major role are: February 1958 Operation MARS BRAVO — conducted by Second U. S. Army. This was not an emergency but volunteer members participated in an exercise to determine an atomic radiation fall-out pattern,

December 1958 — Fires in the Los Angeles Area — this was the Sixth U. S. Army Area,

July 1959 — Hurricane CINDY in the South Carolina, Georgia area — this was in the Third U. S. Army Area,

July 1959 — Hurricane DEBRA — this was in the Fourth U. S. Army Area involving Texas MARS stations, and

May 1960 — Tidal Wave Alert operations in Hawaii.

With respect to emergency readiness General Lyman L. Lemnitzer, Chief of Staff of the U. S. Army, recently stated that the Army must make itself ready for major aspects of civil defense in case of nuclear war. This could be a job — a really vital and worthwhile job — for you as a MARS member.

Practically every military station has an active MARS station. Here you will always be welcome either in uniform or as a civilian to share the comradeship of other MARS members. And a visit to a nearby MARS station may be just the thing to arouse your interest in the program. Your ham ticket will open the door.

And surely among your ham friends are MARS members. Talk over the program with them and be present during one of the drill periods in which they participate.

You will have noticed by this time how similar the MARS program is to the program discussed by W5PYU. Moreover this program begins at the age of 16 and extends to all ages without limit. An amateur does not even have to be in the Armed Forces at any time to join the program. You might even be physically incapacitated by blindness or injury, and still be a most valuable member.

And the YL or XYL should not be excluded. Assuming she has that ticket, she is also eligible. Listen in on any MARS frequency and hear the YLs holding their own with the OMs.

Any ham knows that his hobby has dozens of appealing variations: set-building, traffic handling, DXing, rag chewing, antenna experimentation. All are variations of being a radio ham. The wide *range* is really what makes the hobby so attractive to so many.

Have you ever given a thought as to the variety in the communications-electronics field *alone* in the Armed Forces? Chances are many haven't. Yet the variety can satisfy nearly any particular personal interest. Consider this list: radio relay, telephony, power sources, drone control, surveillance devices, television and communication satellites, frequency measuring devices, automatic data processing equipment, telemetry, avionics, weather, radar.[3] These are only a few of the technical areas directly related to U. S. Army Signal Corps activities.

I purposely put radar last in the list of communications electronics field items because every time I put down the word *radar*, I am reminded of a recent demonstration at the U. S. Army's Electronic Proving Ground. A photographer from one of the newspapers had crammed a great number of flash bulbs in the pockets of his trousers. He then walked in front of one of the operating demonstration radars. He went through quite a dance as the flash bulbs went off one by one! At the time, since there actually was no casualty and a good "press" tinged with humor resulted, all was well. There is danger, though, where such concentrations of r.f. are involved. You are aware of this r.f. danger and know that the problem is real in this technological era.

Equally extensive technical areas exist in almost every branch or technical service in the Army. In effect, nearly everything military today involves some application of electronics. In each case, there is every opportunity for you to learn and use all the latest techniques once you are in the service. Of particular value to you is the fact that you can choose your Army field of technical interest before you enlist.

The number of communications-electronics equipments has multiplied several times since

[3] See *QST*, June, 1960, for a history of some of the accomplishments of the U. S. Army Signal Corps.

World War II. For many of you who are now approaching the age where you must consider military service this comparison is undoubtedly vague. Perhaps some figures may be impressive and more meaningful.

We recently became interested in the question of what would happen if all or much of the communications-electronics equipment in a field army were operated at one time. This could be the case where we might be conducting an offensive or where the enemy might have launched a major attack. We first had to determine how many and what kinds of equipment had to be considered.

We established that in an area roughly 100 miles by 100 miles (the area normally occupied by a field army) there would be some *75,000 electronic devices operating.* Some of these devices may be in fields entirely unfamiliar to some of you.

Although I have listed the major fields in which radiating devices are to be found, there are other unlisted radiation devices which cause considerable trouble from time to time. One example is the historically accurate account of how one of our radio circuits was 'jammed' during World War II. The QRM sounded like 40 meters on a Sunday morning during an SS contest. But the interference defied analysis. The troops finally determined it came from a mess hall where a new electric potato peeler had been installed! There were no suppressors on the motor.

Let us assume that, once in the Army, you wanted to stick to the communications field. Also since you are of age where military service applies, you'll be interested in education for your future. The few paragraphs following will suggest what the U. S. Army has to offer in this area.

The scope of U. S. Army military teaching embraces every phase of Army organization and many levels of instruction. Thousands of new soldiers each year are taught basic combat techniques and advanced individual or specialist training. Not only does the U. S. Army train recruits, but the schools range from courses for the lowest grade specialist to the requirements for the intellectual and professional development of senior officers.

The Army's educational system embraces some 35 schools and extends from West Point to the Army War College with a wide variety of technical and specialist schools in between. Some 500 courses are taught from which roughly 140,000 students graduate each year. Thousands of active duty and reserve component soldiers also continue at home or in off-duty time their military studies by participating in the Army Extension Courses.

The Army instructs in military and technical subjects and at the same time has great concern for the person who, for various reasons, has never been allowed to finish his basic education. Each year a number of young men who have never completed fourth grade primary education are drafted or enlist. These men are put into classes, and during duty time, raise their educational level so that as a minimum, they can read and write and thus become better soldiers, and eventually better informed citizens. Though this does not apply, of course, to everyone, this opportunity gives an appreciation of the extent of the Army's educational interest in the youth of the country.

In addition to the schools conducted by the Army the resources of the civilian school system are extensively used. Throughout American universities today there are officers in training in fields ranging from bacteriology and business administration to guided missiles and electronics. In a recent school semester over 500 officers were enrolled in studies in over 40 fields in 48 American and 4 European universities. How many young men have ever given thought to the Army as offering them such an educational opportunity?

Soldiers who leave the Army carry with them important skills of high dollar value acquired in military training. Industry and business recognize the value of these men and do much to attract them away from a service career. The Army is proud of the fact that it returns men to civilian life improved by military service.

You can make your hitch in the military very rewarding to yourself — as rewarding as you care to make it. Just as your code speed will increase with practice so your progress in the military will depend on how you work at making progress. There will be some aspects of the military life that may not appeal to you. But this is true of any field of endeavor.

Most important to you amateurs, during your service you need not give up ham radio. In my 29 years I have been licensed in the Canal Zone as K(Z)5AK, in Germany as D(L)4AFR, in Hawaii as KH6AAX. I have enjoyed having the overseas calls together with calls in the 3rd, 4th, 5th, 7th and 8th districts of the United States. And everyplace I have been, the ham has been regarded as a real contact with home. Those overseas phone patches have been worthwhile.

Since so much in the Army today is dependent directly on communications-electronics you might well consider the Army as a career. Surely the Army will be just as good and as motivated as the people in it. Such a career offers adventure, travel, professional improvement, and a challenge. That challenge carries with it great responsibility which can be yours to share at an early age. And you have something (a demonstrated technical ability) which you can use to contribute to our national security.

Unless you are one who passively accepts the minimum as sufficient and military service as something to get behind you, I suggest that your ham ticket in the military can open the door for you for an enlivened career. As you apply yourself, the opportunity for advancement to noncommissioned officer and even to commissioned officer will be available to you. How far you go depends on *you.*

There are worse choices that you could make, but consider some of these total advantages and I doubt that you will find many *better* ones!

QST

Strays

I was a visiting faculty member for the summer at the U. of Conn. and was driving through West Hartford in my 1935 Ford with a center-loaded whip for 75 meters when I was stopped by a police car. When I asked what was wrong, the policeman said nothing really, but that he was attracted by the antique car with such a large antenna and then he thought he saw a "dollar sign" on the license plate, and that did it. What he referred to, of course, was the "Ø" in my call. — *WØICF*

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Come on, you *QST* advertisers, let's get on the ball! WØAOY (3915 E. 26 Ave., Denver 5) is real sad. He had had his ticket for 55 days when he wrote us (early fall) but had not received a single piece of mail from any of the radio supply houses or manufacturers. No guarantee that he'll buy, but he does want mail!

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KNØVCK worked KN8RQW in Detroit and asked him to deliver a message to some relatives. It turned out that these people were also relatives of KN8RQW. And so KNØVCK and KN8RQW learned that they were cousins.

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The Army is now using an expensive electronic machine called an Automatic Articulation Tester in the development of radio equipment which must deliver messages sharply and clearly through noise, natural radio interference, and enemy jamming efforts. Guess they never heard of 75 phone, eh?

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Certificate Hunters! If you participate in a 30-minute roundtable QSO with at least three of the charter members of the Okinawa Cotton Pickers Club, you can get another piece of wallpaper. Look for KR6CR, KR6IC, KR6ID, KR6DZ, KR6GR, KR6KF, and KR6HS.

K9AUB challenges all comers for length of service obtained from a single 1626 tube in an ARC-5. He recently replaced one which had 15,000 hours service. The tube tested good even though it chirped in its oscillator circuit.

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KN7MEG points out that a good buy for the Novice is the *Dictionary of Electronic Terms* that is available from Allied Radio for 35¢.

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A master cooperative interference committee has been formed in the Spokane, Wash., area to bring together representatives of all the various services using radio communication. This committee will provide a pool of technical knowledge to help locate and resolve various radio interference problems as they arise. Among the officers elected at the first organizational meeting were W7YOP, W7NV, and W7ZNN.

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The Tufts University Amateur Radio Society (W1KN), organized some time in 1911 as the Wireless Society, will soon be celebrating its 50th anniversary. Because its early records are sketchy and incomplete, the Society would appreciate hearing from anyone who can contribute information on any activities of W1KN between 1911 and the present date. The Society is particularly interested in material on operating, locations, QSOs, members, alumni, equipment records, QSLs, etc., etc. If you have any info, please send the details to W1KN, 40 West Hall, Tufts University, Medford 55, Mass.

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K5FIO and K5LSR met via 75-meter phone, courted on 75-meter mobile, and were married on August 6, 1960. Eight hams were at the wedding.

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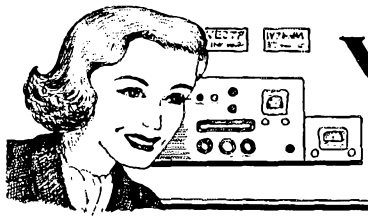
K8RVJ is R. F. Watts, and he's an electronics technician at North American Aviation.

At a recent meeting of the Armed Forces Communications and Electronics Association in Washington ARRL Director Ray Meyers, W6MLZ, had a chance to get in some licks for ham radio with some of the armed forces communications chiefs. Left to right in the photo are Maj. Gen. R. T. Nelson, Chief Signal Officer of the Army; Mr. B. H. Oliver, jr., president, AFCEA; Maj. Gen. H. W. Grant, Director, Communications & Electronics, Air Force; Mr. Ray Meyers, W6MLZ, Director Southwestern Division, ARRL, and a regional vice president of AFCEA; and Rear Admiral Frank Virden, Director, Naval Communications.



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

FD 1960

For the GAYLARKS of Texas, 15 inches of rain — for PARKA YLs on Adak in the Aleutians, unusually balmy weather. The fortunes of Field Day are, as always, unexpected.

Round the U. S. A. many YLs operated in the individual portable station or home station class and had the usual good time doing so. Our 1960 FD story following consists largely of reports from YL clubs.

In California the BAYLARCS accredited themselves nicely under the call WA6MAO. Under Operations Chairmen W6QYL and WA6JGR the Bay area YLs made 175 contacts on 15, 20, 40, 75, and 80 and 132 contacts on 6 and 2 meters for a total score of 2463 points. Down Mexico way the San Diego YLRC set up two stations at the mountain QTH of WA6EVU near the W/XE border. In Chicago, using the club call W9DEQ, the Chicago YLRL had its first FD. Using four transmitters running 30 watts, club members K9s CQF, GUB, JDE, JVL, LIW, UHD, and W9GME scored 855 points.

The Polar Amateur Radio Klub of Alaska reported "great fun and small score — as usual." Thanks to the U. S. Army Security Agency the club was supplied with a 5-kw. generator, complete with Volunteer Army personnel to man same. Resulting tally was 62 contacts totaling 585 points. Operations were again based at the Girl Scout Day Camp in Anchorage.

In the Aleutians Ev, W4VCB/KL7 and her OM W4UTB/KL7 and Tee, W1WTQ/KL7 were three of ten members of the Bering ARC who spent FD atop Mount Moffett on Adak Island. Using four transmitters on single sideband with a 15-kw. generator, the group operated from the site of an abandoned Alaska communications system. "Saturday evening," Ev reports, "the XYLs trudged up the mountain with steaming hot dishes of delicious food. You never saw a happier bunch of hams. Who said XYLs didn't like ham radio!"

From Texas Harriett, K5BJU, tells her own tale of what happened to eight little GAYLARKs who set out for FD and were beset by odds that were unreasonable to expect.

"Our third annual all YL operator FD was a much better test for a real emergency than we've ever experienced. We followed our usual procedure of going to our FD site prior to the operating dates and erected three 64-ft. masts for 2 doublets and a tri-band beam and even dug our cooking pit.

You've heard about the best laid plans of mice and men — well, include YL ops too! Include too in future FD rules that operators must carry giant economy-size sponges for possible mop-up operations!

June 25 and 26 found 15 inches of rain at our FD site. Instead of operating from tarp-covered operating positions in a beautiful pasture, we took refuge in an abandoned farm house that had been used for hay storage the last ten of its seventy-five years. Rather than the FB antennae we had previously prepared, we had rain-drenched doublets thrown out the windows, drooping, crossing each other and oriented at quaint angles. Every imaginable variety of crawling and flying insect reluctantly shared their QTH with us. Another cooking pit had to be dug. Seeing two of them full of filthy rain water and decomposed animal and vegetable matter made the hungry tummies ache a little harder. Our chow was served raw by our GAYLARK Auxiliary — our OMs. In all the rain, hungry palates, and stench was enough to drive us home — 90 miles away. Our radio gear was becoming water-logged, the roof was leaking, and the wind whistled down the drafty old chimney. By daylight Sunday, the rain having continued to pour down upon us heavily and steadily throughout the night, we decided to load up and get out, and good that we did. After pushing our cars out of the mud, we slipped and slid down the mired country road to pavement. Shortly after we travelled the road back to Houston it was closed to through traffic. Home looked good but wet too — 16 inches of rain had fallen on it! Next year here's to sunshine and QSOs, with lots of both.

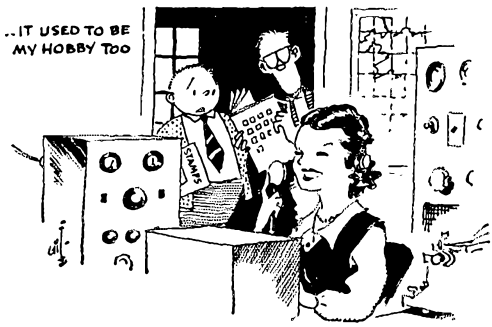
Unaccounted for on the FD summary sheets but often the hero of many a FD expedition is that loyal creature, the XYL. Despite her spirited devotion to seeing her OM through the skirmishes of FD, an XYL may reserve opinion of the whole affair. In fact for some the blooming week end may be chalked up as strictly a labor of love.

Witness the following thoughts of the famous Mabel of *Florida Skip* — they may not be too untypical of the specie!

Dear Gladys,

Just had to write to tell you about my idea for Field Day. You know, in the past several years I have thought the emergencies that took place must be unusual. After this last one I've about decided that all Field Days are like ours. Twenty-four hours of small injuries, annoyances and calamities.

It should make us all respect those poor pioneer women. On second thought, a Comanche warrior can't be any



* YL Editor, *QST:* Please send all news notes to W1QON's home address: 318 Fisher St., Walpole, Mass.

worse than a mad ham. Gladys, as sure as I'm sitting here he *did not* tell me to bring his soldering gun.

But as I started to say, I think it's time we girls got better organized for all future Field Days. We ought to gather hints and suggestions from each other to make it easier for ourselves instead of floundering around in the brush like we do.

For instance, I've found a flyswatter is an absolute necessity. Bug bombs make the coffee taste funny. And there is nothing like a fast fly-swatter to bring order among the harmonics. Also, I make sure to keep a small, clean spoon handy to fish the bugs out of the coffee as I fill the cups. You girls on the night shift can use any old spoon. Or forget the whole idea. The little nicities disappear around midnight.

We ought to have a special First-Aid book for us XYLs to use, too. We could have a chapter on how to treat bites from red ants, chiggers, wasps, tired children, and those green spotty bugs that I've never seen except on Field Day. I think they bite enough that one day to last them until the next year.

We need instructions on care for cuts, bruises, saddle-sores, (our c.w. operators suffer greatly from these) charley horses, indigestion, san spurs, and foundering (that's what Grandmaw calls it. It means eating so much you get sick. C.w. operators suffer from this, too).

Then there's rashes, burns, contusions, and double vision. ("We worked them." "We did not." "Yes, we did, look up here." "That's not them." "Yes, it is. I know because I wrote it." "What were you writing, Roman numerals?"

We generally have to treat sunstroke, sprains and rabies. The symptoms of rabies are staggering gait, glazed eyes, slight frothing at the mouth and snarling. (C.w. operators are born with it.)

Well, what do you think? Can we all get together and help each other? Or should we organize a great big nation-wide canasta party next Field Day and let the boys shift for themselves?

Love,

Mabel

(Reprinted from *Florida Skip*, Aug. 1960 issue, courtesy W4IYT, Editor)

YLRL ELECTION RESULTS

Congratulations to the following new officers of the Young Ladies Radio League who have been elected to serve for a one year term, commencing Jan. 1, 1961:

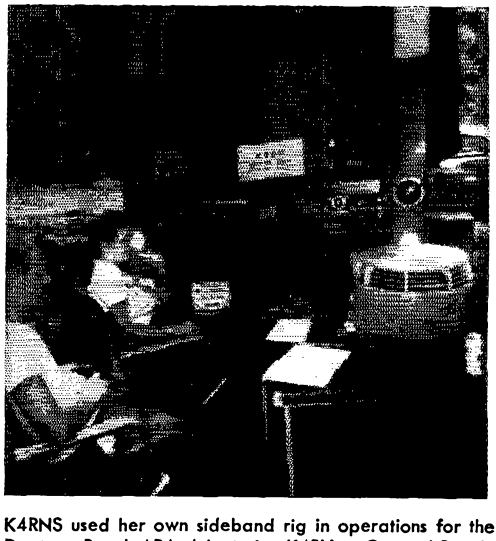
President — Doris Anderson, K5BNQ
Vice President — Onie Woodward, W1ZEN
Secretary — Blanche Randles, K1IZT
Treasurer — Jean Kincheloe, K6OQD

District Chairmen: Helen Harris, W1HOY; Helen Yankaskas, WA2DBG; Elizabeth Zandonini, W3CDQ; Betty Dennison, W4EER; Bernice Jack, W5WXY; Claire Hogeweide, K6ZCR; Helen Maillot, W7GGV; Maxine Hill, K8DTD; Evelyn Cudia, K9EMS; Martha Wessell, KØEPE; Louise Bostwick, KH6AFL; Evelyn Wikoff, W4VCB/KL7; Ethel Williamson, VE3DTW.

YLRL members issue a vote of thanks for a job well done by out-going officers President Gladys Eastman, W6DXI; Vice President Lillian Beebe, W5EGD/3; and Secretary Connie Hauck, K6EXQ. Wanda Gluck, K6ENK, has regretfully resigned as *YLRL Harmonics* editor for reasons of health. A replacement editor will be announced.

Custodians of the various awards offered by the YLRL are appointed and serve an indefinite term. Present custodians are as follows: YL Century Certificate — Katherine Johnson, W4SGD; YL Worked All States — Grace Ryden, W9GME; YL Worked All Continents — Barbara Houston,

Well-known by most mobile operators in the Minneapolis, Minn. area is WØNZT, Beulah Kreger, according to her OM, WØQXL. Beulah works the mobileers mainly on 75 phone from her kitchen station.



K4RNS used her own sideband rig in operations for the Daytona Beach ARA club station K4BV at Ormond Beach, Florida. Marge is President of the Floridora YLs.

OM W4HMG calls K4OVS, Nancy Leaman, of Greenwood, S. C. the "pride and joy of the Carolina Sideband Net." Blind since birth, the 16-year-old YL has recently been acting control station on the net that comprises over 100 stations. Using a receiver with braille dials, a transmitter with a special tuning device, and a braille typewriter, Nancy efficiently handles net procedures. Licensed as a Novice in 1959 and as a Conditional Class operator in May of this year, Nancy has been aided in her ham career by local OMs K4sJVV, MKX, OVR, QMY, QMZ, QWQ, and VIA. *(Photo by K4JVV)*

A mode of transportation devised to keep lower appendages dry. W5HUX gallantly totes his XYL, W5CXM.

Bertha Watson, W5JCY, received DXCC #960 in 1957, and she believes that she is still the only Oklahoma YL to be DXCC. Licensed in 1941 as the second YL in her state, Bertha has numerous certificates earned while working mainly 10 and 15 meter phone. She is currently YL editor for *The Monitor. (Photo via W5ERY)*

Had they but known! W5ERH, K5YTT, and K5YIT eagerly laid pre-FD plans.

Chicago YLRLers ready for FD business. Left to right: W9GME, K9JDE, K9UHD, K9JVL, and K9GUB.

Buckets, bare feet, bad water, but cooking remained the bailiwick of GAYLARK Auxiliary members W5VWF, W5HUX, and W5ULZ. *(GAYLARK photos by W5KFD)*

Despite distressing developments the GAYLARKs claimed a score of 1512 points with 252 stations worked on 20, 40, and 75 phone and c.w. Wearily K5YIT carried on at the 20 meter SSB position, while K5PFF logged.

K5YIB; DX-YL Award — Maxine Willis, W6UHA. Vada Letcher, W6CEE, is YLRL Librarian.

New Award

Now the great grandmothers are doing it too! When one great-grandmother ham contacts another great-grandmother ham, she is eligible for a special certificate, the Great-Grandmother's Award. Applications should be sent either to W6TCN, Mary Peffly, P.O. Box B, Pine Valley, California, or to W7GWG, Grace McCormack, 1428 E. 20 Ave., Eugene, Oregon, both duly qualified great grandmothers.

YLs who have attained the state of simple grandmotherhood (not yet "great") are reminded of the Grandmother's Certificate, which is issued to any amateur who contacts 10 or more YLs who are grandmothers. Send a list of the stations worked, with frequencies and dates, to Mary Meyer, W9RUJ, 16520 Patricia Lane, Brookfield, Wisconsin. QSLs not necessary.

Miscellany:

OM CX2AM writes that he was somewhat surprised to learn that he was listed as the head of the household of a VP8 ham family in the photo that appeared in the May 1960 column. He believes that VP8BN is more rightly responsible for the paternal honors. Apologies to CX2AM and his wife, CX3CU.

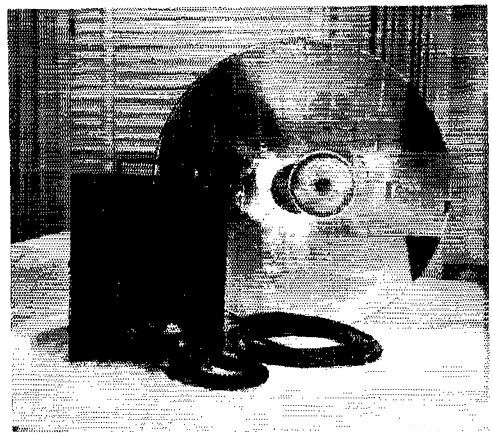
A correction is due W8RIR for her 1958 YLRL Anniversary Party score. Beth's c.w. score of 1856 was listed as a phone score in the results published in the March 1960 column. YLRL President W6DXI has sent W8RIR a certificate for winning high c.w. score for the eighth district in the contest.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS*, WIFZJ

Among the many problems encountered in the 1296-Mc. moon-bounce project, one of the most interesting was that of frequency control *vs.* receiver bandwidth. The lower frequencies, due primarily to the more stringent requirements of single sideband techniques, have in the past few years undergone a complete renaissance of frequency control, both in the transmitter and receiver. Unfortunately, except for a small spillover, this trend towards greater stability has not carried over on the v.h.f. bands. This doesn't necessarily mean that the frequency control at v.h.f. is not as good as at lower frequencies in terms of parts per million, but it does mean that a part per million, at 144 Mc. for instance, is much less precise in terms of cycles than it is at 1 Mc. Equipment which will read out one kilocycle accuracy at 14 Mc. when multiplied to 144 Mc. will read out to an accuracy of only 10 kilocycles. A .01 per cent accurate 8-Mc. crystal, therefore, will put you on the two-meter band somewhere within 14 kilocycles of where you expected to be. On 1296 Mc. it will be somewhere within 130 kc. of where you expected to be. As long as it ends up in the band, you don't have to worry and you can always establish what the frequency really is rather than what it says on the crystal. However, the same mechanism which gave you the original uncertainty of what the frequency was, gives you the same multiplied frequency drift as the crystal and its associated circuitry warms up. In the moon-bounce project we put our crystals in ovens which held the fundamental crystal frequency within something better than a cycle. Unfortunately, a cycle at 8 Mc. is 162 cycles at 1296. And now we come to the receiver bandwidth part of the problem. If the receiver is using 1 kc. selectivity, a slight yooping of the transmitter of 100 cycles or so is not really too objectionable. However, a signal which is even with the noise in a 1-kc. filter will be ten db. above the noise in a 100-cycle filter and 15 db. above the noise in a 30-cycle filter. Problem — how do you keep a signal which wanders 160 cycles or so tuned in on a 30-cycle filter. The answer is, you don't; and the 15 db. gain that you expected to get with your narrow-band filters is lost simply because you cannot keep the signal centered in the filter. Do not be misled into thinking that this is a problem peculiar to moon bouncing. Quite the contrary. It is a problem which exists on any communication circuit where weak signals are encountered. For instance, how many people wish they had a kilowatt limit on 420 Mc. because they can't work far enough with 50 watts? And of these people, how many have considered getting the extra decibels by narrowing the passband of their receivers and using more stable transmitters? This path lies open to anyone and requires no special legislation; only a little work. And not, I might point out, by any means as much work as is required to generate a 700- or 800-watt carrier on 432 Mc. In view of the tremendous amount of work which has been done in the past few years in the field of decoding weak signals, it is amazing to me that so many amateurs still consider 500 cycles the ultimate in selectivity. A good old-fashioned crystal filter at 456 kc. is capable of producing a bandwidth on the order of 100 cycles. Inexpensive components in the audio system can knock this down to 30 cycles or less. And this additional selectivity over a 500-cycle filter is equivalent to having a fellow on the other end raise his power from 50 watts to 1000 watts. Now I'm not against running 1000 watts by any manner or means, I'm merely trying to point out that if you haven't gone the whole road on the rest of the equipment, you really shouldn't be complaining about the power limitation.

We have the case of the two-meter DXer who is running a kilowatt input, has a 20 db. or better antenna, a 2 db. or better receiver, and a so called "good location." This gentleman can make contacts with an adequately equipped station at 450 miles night and day, summer and winter. Signals are weak but always there. However, another equally adequately equipped station at 550 miles



1215 Mc. APX-6 taken to Catalina by W6MMU.

*P. O. Box 334, Medfield, Mass.

cannot be worked without the assistance of a little tropo opening. Now it is an established and well-known fact that scatter loss increases approximately 10 db. for each additional 100 miles. The station in question has been carrying on satisfactory schedules at 450 miles using a 500-cycle filter; if he wants to work 550 miles, he needs 10 db. more and the 10 db. is sitting right in his junk box waiting to be used — provided there is adequate stability in the transmitters and receivers.

Now it is certainly true that a receiver using a 50-cycle or a 30-cycle or a 10-cycle filter is almost impossible to tune. New techniques for tuning signals are required as well as new techniques for hearing the signals. I will be the first to admit that a weak c.w. signal coming through a 30-cycle filter is about as audible to the ear as a pin dropping in the middle of a cat fight. But, does being radio amateurs mean we have to receive signals by our ears? Isn't it possible that some newer developments would make it possible to detect a signal electronically which our ears are unable to detect? The answer is "yes, of course there is." Even the simple system of using a well-damped audio meter to observe changes in level is capable of producing remarkable results when slow speed c.w. is used.

A pen recorder is a slightly more elegant scheme of producing the same results as well as producing a permanent record of the QSO. The fact that these, more or less, crude methods of detecting signals are many, many db. away from the ultimate now available, should give rise to some thought. Surely the day has not come when amateur radio must bow to superior knowledge of commercial enterprises.

On the other hand, we should certainly not ignore the advances made in our own art. Whether we like it or not, the majority of the receiving equipment in use on the v.h.f. bands today is about as antiquated as a spark gap in a DX contest. However, the first step of making use of modern receiving techniques is to apply modern frequency controlling techniques to both the transmitter and receiver. When we ran into a stability problem on the moon-bounce project, we got hold of old Freddy Mauer, HB9MS, and talked him into transistorizing a crystal oscillator for us. This little transistorized, hand-made oscillator is quite stable and if its temperature can be held is extremely stable. The problem of holding its temperature is solved in a simple manner; one which is available to any amateur operator who lives where there is bare ground. The transistorized oscillator, complete with crystal, is mounted in a small fruit-juice can and soldered shut. The fruit juice can was mounted in a large-mouth vacuum bottle and sealed shut with bee's wax. The output from this device was in the form of a 10-foot length of teflon coax cable. The r.f. came out the cable and the d.c. went in the cable. This whole device is buried in a hole approximately 6 feet deep where temperature varies not at all the year round. The oscillator is battery powered, thereby making it independent of variations in line voltage and the extremely precise temperature regulation provided by mother earth at the depth of 6 feet or so provides an oven that no money could buy. As both the receivers and the transmitter are treated in the same manner, a stability on the order of 1 cycle at 1296 Mc. is now available. Total cost of this project, not counting Freddy's time and my time and the hole digger's time (the latter two are one and the same) was about $15.00; far below the price of even a moderately good crystal oven. Now the absolute frequency stability is dependent on many things such as crystal aging etc., but the short term stability is determined only by the temperature of the oscillator and the condition of battery which supplies the power to the device. Our short term stability measurements, comparing two of these standards, indicates an accuracy of something on the order of 10 to the −10th. You might compare that figure with the published accuracy of WWV while you're digging your 6-foot hole.

W1TQZ's 16-foot home-made parabola mounted on polar mount and ready to feed.

KL7FLC

A request made in this column, August 1960, regarding reception of signals from KL7FLC has paid off with numerous reports. The following is a simplified listing of the stations either hearing or working KL7FLC:

8/17/60	KL7DKN	Hrd	9:00–9:30	GMT
	VE4TX	Wrkd	0707	GMT
8/19/60	KL7AUV	Wrkd	0800	GMT
	KL7CDG	Hrd	0800	GMT
	W7RT	Hrd	0745	GMT
	VE6OH	Hrd	2330	MST
	KL7CDG	Hrd	0830	GMT
8/20/60	VE8BY	Hrd	0620	GMT
8/21/60	VE8BY	Hrd	0700	GMT
	VE4TX	Hrd	0522	GMT
8/28/60	VE4TX	Wrkd	0620	GMT
8/29/60	VE7AFB	Hrd	2305	PST
8/30/60	VE6OH	Hrd	2350	MST
8/30/60	VE4TX	Hrd	0609	GMT
8/31/60	VE4TX	Wrkd	0628	GMT
9/3/60	VE4TX	Wrkd	0425	GMT
9/3/60	VE8BY	Hrd	0435	GMT
9/3/60	W7RT	Hrd	0622	GMT
9/4/60	W7INX	Wrkd	2354	PST
	W7EMX	Wrkd		
9/5/60	W7RT	Wrkd	0700	GMT
	W7RDY	Wrkd	0754	GMT
	W7EMX	Wrkd	0645	GMT
9/6/60	W7PUA	Hrd	0615	GMT
	VE4TX	Wrkd	0647	GMT
9/7/60	VE4TX	Wrkd	0632	GMT
9/9/60	VE4TX	Wrkd	0415–0715	GMT

	VE8BY	Wrkd		
	WØGNS	Wrkd	0415	GMT
	TV Channels up to 5 heard at KL7FLC			
9/13/60	VE4TX	Hrd	0518	GMT
9/14/60	VE4TX	Hrd	0445	GMT

W7PUA, Eatonville, Wash., listened whenever possible for KL7FLC. On Sept. 5 he noticed aurora from about 0600 to 1000 GMT, but no sign of KL7FLC. On the 6th aurora signals came in about 0000 GMT, staying in until 1100. Between 0345 to 0430 good c.w. signals were heard from W1 2 3 8 and 9. These were almost steady, with no sign of buzz. W3TDF was worked. Nothing nearer than Michigan and Indiana was heard, and strongest signals were from the East Coast. At about 0615 KL7FLC appeared, running his tape. At the time he called a CQ, 0645, he was steady, readable, and would have been readable on phone, according to W7PUA. Equipment at Eatonville, Washington, consists of 800 watts to a 4-400A, ten-element Sterba curtain on KL7FLC and crystal-controlled converter into an NC240D.

From Seattle, John, W7RT reports that on August 19 when he heard KL7FLC, there was what seemed to be a peculiar aurora-like modulation. The signal faded and despite turning his 16-element array, there was no change in signal strength. The signal stayed in for five minutes with John calling frantically for the next three hours. He needed only Alaska for WAS 50. On August 20 a schedule was arranged with KL7FLC via land-line and KL7AUV ($$$$), but no contact was made that night. While listening for KL7FLC that night John heard California, Arizona and Nevada off the back of his beam. John did make the contact with Alaska on September 4, and later that same night worked VE6OH. Both KL7FLC and VE6OH had similar "ring" to signals, not like common aurora signals. W7RT is now the proud holder of the first 50-state 50-Mc. WAS to be made from W7.

Another Washington 50-Mc. man worked Fletcher's Ice Island was W7EMX, Jerry Ostrer. Jerry reports the aurora of September 4. All call areas except KH6 and W6 were copied at his QTH, and he worked K7AAD, Oregon; W7EGN, Montana; W7INX, Oregon; VE4TX, Winnipeg; VE6OH, Alberta, and KL7FLC. Signals at the beginning were 5 5 9 with no flutter, later going down to a 3 4 with auroral flutter. The post-auroral opening to the eastern seaboard was the strongest opening Jerry has heard to date, following an auroral disturbance.

In Oregon Ken Matsen, W7INX worked KL7FLC during that same auroral opening at its peak, with his beam due north. Washington, Idaho, Montana, VE6 and KL7 were heard with auroral Buzz with the beam either north or northeast. VE4, W1, 2, 3, 8, 9 areas were heard with the beam east, T9 notes but with flutter.

An early contact with KL7FLC was made by Cliff, VE4TX, after he spotted an auroral patch in the northwest on August 17. When he turned on his rig at 0616 GMT August 18, he heard a weak signal which soon built up to 5-9-4 and turned out to be KL7FLC. At 0707 contact was made. On the 16th Cliff heard W1GEF calling KL7FLC, and about a week previously heard W3FTY calling him. Both stations on phone. On August 9 contact was made with VE3CJN and with VE2AIO, the first time Cliff had heard a VE2; also worked New York, Illinois, Michigan, Ohio and Indiana. At 0506 VE8BY was heard calling CQ and although Cliff gave him a call he first came back to K8MHN, then VE4HW. When Cliff's turn came it turned out that Pete's (VE8BY) oscillator was on even when receiving and he could not hear signals too close to his own frequency. This might be the cause of others being unable to contact Pete. VE4BI joined this QSO to make it a 3-way. On August 16 a two-hour opening to W8 and W9 call areas. When KL7FLC was heard on August 21 at Cliff's QTH his signal was RST 3-3-9 at best, coming through during a good aurora. During Cliff's August 28 QSO with KL7FLC, the aurora was widespread overhead, but none toward the north. Signal was 5-9-9X with little QSB. Best opening of the season in Manitoba was the one of September 3. On September 5 at 0140 GMT auroral signals started coming in from the northeast. First station identified was KØYBF in Minneapolis, Minnesota; a rare state in Manitoba. Next Cliff worked VE3CJN, direct path, after which he worked stations in Pennsylvania, Michigan, Wisconsin, Missouri, Illinois and Iowa; heard VE6DB, Tennessee, Texas, Oklahoma, New York, Colorado and VE2AOM off the back of his beam. W7RT and W7INX were also worked during this opening, ending up the session with a thirty-minute QSO with VE8BY.

VE4CV, VE4SH, VE4WL, VE4YW. and K5RXT/VE4 were active and stations were heard calling VE5GI.

Final word from Cliff, VE4TX, gives out with the word of a three way contact between himself, KL7FLC and VE8BY on 50 Mc. on September 6 at 0657 GMT.

Another side of the above story comes from Pete, VE8BY who heard KL7FLC at 0620 GMT on August 20th. Although Northern Lights were in view at the time there was no flutter on the signals and the beam had to be pointed due west to pick him up. Southeast for KØUDZ. Up until August 20, Pete's score in areas worked is VE5, 4, 3, and WØ, 8, 7, 3, 2, with a five-element beam fifty feet high. On August 21 when Pete heard KL7FLC his beam was to the southeast; on turning it west signals were no better, 2/3 to a 5/7 in each case. On September 3 when he heard Bob northern lights were in evidence and with beam southeast report was Q5 S7 with slight increase on turning the beam west.

On August 19 Otto, VE6OH, heard KL7FLC Q5 S6 aurora with his beam pointed northwest. Called Bob but no response. Also heard him on August 30 at 2350 MST once again with good aurora signals. On this same date Otto also worked VE7AFB, and W7RDY with beam to the northwest. Beam northeast for WØENC. Best heard (but not worked) on aurora is W1GEF.

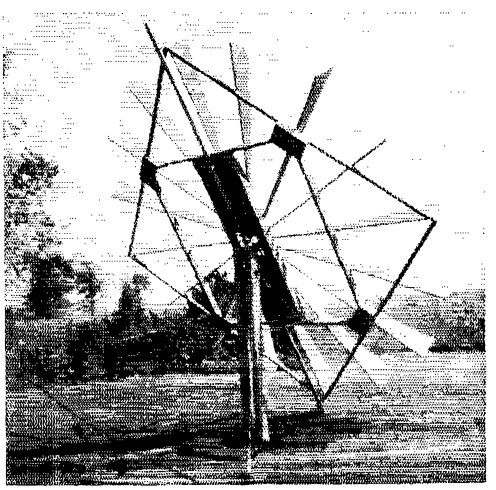
VE6DB, VE6FF and VE6OH are all active and monitor 50 Mc. all the time. They've had some good openings but not many of them and to date VE6DB has fifteen states, while VE6OH has seven states.

James Fraser, VE7AFB reports reception of KL7FLC at 2305 PST on August 29. Signals peaked RST 559 in British Columbia and faded out after about five minutes. Note was clean with no auroral buzz but with some flutter. Shortly after this Jim worked VE6OH and heard W7ESN.

In Alaska, Bob, KL7FLC, was heard in Anchorage on August 17 by KL7DKN at 0900 to 0930 GMT. On August 19 KL7AUV worked him at 0800 GMT with signals peaking S9 with slow QSB. W7RT was hearing KL7FLC just before this QSO.

The following information was received from Ray, W1PHP. "KL7FLC, operated by W1IJD and W1FVY on the Ice Island, has been in QSO on six meters with W7RT 5-9-9, September 5 at 0700Z: W7RDY 5-5-9, September 5 at 0745Z; W7EMX 3-3-9, September 5 at 0645Z, W7INX 4-4 Aurora, 0752Z, September 5. On September 9 they QSOed VE4TX and VE8BY for a two-hour 3-way. They also worked WØGNS at 0415Z with a 5-9 signal. They have been hearing TV stations in Regina and Winnipeg."

From the Province of Quebec, via VE2AIO, we hear that skeds on 50 Mc. between himself and W1HDQ finally paid off on August 27 and 28. On the 27th Geoff's s.s.b. was readable, although original contact on each date



Jerry (W9QXP) and Dave (K9CNN) produced this 16-foot parabola. Antenna is located in Jerry's back yard at Wheaton, Illinois. All they need is a feed line and a feed.

was made on c.w. For Geoff conditions were good toward New England on August 17, 18, 19, 20 and 21 when he had QSOs with either W1HDS or K1IZM or both usually after 2200 EST. He is particularly happy that the East Coast boys are looking up that-a-way and is now building a high-power linear hoping to keep some of the beams looking his way.

During the September 4 aurora, Gary, K9LJN, heard VE8BY with signals in and out of the noise level, but did not manage to nab him. Also heard W7RT and WØIC and an unidentified phone station on 50.010. On August 12 and 13 WØKMV was listening on 50 Mc. at the time the satellite passed over his area, and heard several signals bounce in from the northeast sounding much the same as meteor bounce. These signals were not present before or after the pass of the "Moon." He will be on 50.024 each evening as the satellite passes and will be keying and sending "V" and his call. Will listen after one minute of keying.

A *TE* opening on Sunday, September 11 between 1700 and 1830 PST is reported by Gib, W6BJI. Although he heard half a dozen signals at any one time, the only station identified was LU4DOZ. According to Gib, the unusual part of the opening was that it lasted three times as long as any he had heard in the past and was accompanied by back scatter from stations presumed to be from the 5th district. They were too weak to positively identify. *TE* signals averaged about S3 but came up to S6 quite often.

Clubs and Nets

The Mid-South VHF Club in Tennessee handled communications for the third annual 1000 Mile Ski Marathon at McKellar Lake. It lasted approximately thirty hours beginning August 10 and ending August 11, with UPI carrying hourly reports on it. The club operated four portable stations, a Gonset was used as one of the control stations, a second station was operated from a Coast Guard Cutter (also a Gonset), and in the two first aid rescue boats a Communicator and a walkie talkie were used. This is the second year that the club has participated in communications for the Marathon.

The North Carolina 6 Meter Net staged their annual summer picnic on Saurtown Mt., North Carolina on July 31 with over thirty-five members attending and guests from Virginia. Russ, W4ZXI, came from Fort Worth, Texas, to attend the picnic and advised the group that he will be operating from Swan Island in November on six and two meters and has been issued the call KS4AA.

Strange Signal Reports

On July 24 at 1300 EST and again on August 20 at 1316 EST VE2AIO heard PEGJ calling PCH94 on 50.196 Mc., each time for a period of about thirty minutes and peaking S9 with deep fading. Slow c.w. at about 15 w.p.m., T7. Careful checking by Geoff eliminated i.f. feedthrough or spurious in his receiver. These 4-letter calls are ships, radiating harmonics in the band, which suggests the possibility of an *E*s hop from some point off the Atlantic Coast.

144 Mc.

Thursday, August 18, marked the inauguration of the Atlantic seaboard 144-Mc. relay system. Test messages originating in Key West and Miami, Florida, destined for Canada, reached the branch-out point, Chatam and Richmond, Virginia, in less than an hour. Apparently the fellows in the northeastern part of the states are not well enough organized into a relay team to guarantee immediate delivery of these messages. Anybody north of Virginia interested might contact any of the established relay points, such as W4RMU, W4AIB, K4EUS and W4KDH.

A tropo opening the night of August 25 and 26, resulted in S9 signals both ways from stations on the east coast as far north as New Hampshire to stations in the western Pennsylvania and central Ohio area. W1AZK was receiving W8KAY with S9 signals. As usual, K8AXU portable 8 in Elkins, West Virginia was on the ball loud and clear. However, this little tropo opening was paled to insignificance by the aurora of September 4 and 5. According to Lee, K9AAJ, it was the best aurora ever heard there. He worked W4AIB at 1732 EST and then left for work; however, when he returned at 0200 EST on Monday morning things were still going strong. He found the aurora from his QTH bounded on the west by WØMOX in Boulder, Colorado; on the north by VE3DSU; on the east by W1AZK in New Hampshire, and on the south by W4EQM in Alabama. All in all, Lee heard seventeen states plus VE3 at one sitting. W4AIB provided a new state for both K9AAJ and Box, W2RXG. And wonder of wonders, apparently the auroras are moving farther west because old Art, W5PZ, picked up a new one when he contacted WØMOX in Colorado on the same widespread aurora session. As Pres, W3BYF, says "If I had only waited to get on 144 Mc. until the night of September 3, I could have worked everything I have up to now." This means that Pres heard 25 states and 7 call areas, and out of this picked up one new state, WØBKV in Missouri.

One of the most common complaints from stations active during this aurora was put nicely by Bill, W4UVP. Bill was hearing all districts east of W9 land and managed one contact with W9PBP. "Heard only one or two of the W4s doing any good at all; the rest of us called and called." It would seem that this was almost the obvious result of many stations and small frequency allocations. With only about 100 to 150 kilocycles available for use on aurora sessions, it just isn't possible to separate all the stations who are active. If there were just some way to convince two-meter operators that W8KAY does not mark the high end of the two-meter band, it is quite likely that this severe overcrowded condition could be eliminated. A few penny (?) postcards to the more active stations in the states you are looking for, advising them of a non-QRM crystal frequency which you will religiously use during aurora sessions, would be a giant step toward eliminating QRM. Everybody, for instance, knows where to look for W8KAY or W1AZK, but do they know where to look for you? And if you're underneath a kilowatt, do you think they'll find you anyway?

Perseids Meteor Shower Results

Ernie, W4FYZ, managed new contacts during the August Perseids shower with W1REZ, W2AZL, W3TDF, WØMOX, W7LEE and W7RUX. These were solid QSOs with all the necessary data exchange plus a little extra. These contacts represent five new states for Ernie and has convinced him that m. s. is a satisfactory method of working people. Louie, WØMOX, managed W4HHK, W5JWL and W5FYZ. Louie's contact with Ernie is probably the first Colorado/Louisiana contact on 144 Mc. In addition to the states on meteor scatter, Louie took his wife to the hospital on the 10th of August and was presented with a new son for his efforts.

Rex (W5RCI), brought his states worked total up to 35 during the Aquarids and Perseids. WØMOX on July 27 gave him number 34, and WØENC on August 14th, number 35. Incidentally, Rex is back on 220 Mc. and is looking for some m. s. schedules with his new 500-watt final and 15-foot Yagi.

220 Mc. and Up

Results from APX-6 Conversion

Conversion of APX-6 units for 1215 Mc. use (September *QST*, p. 31) was a summer project for quite a few Connecticut Valley hams. Around Springfield, Mass., W1QWJ, W1WFL, W1RVW, W1STR and W1VNH are going strong. Connecticut is represented by W1CUT, Simsbury; K1CJX, Granby; W1YDS, West Hartford; and W1HDQ, Canton. Demonstrations of the APX-6 and antennas to go with it, at

This is what a "polar mount" looks like close up. Parabola is W8LIO's 20-footer at Dorset, Ohio.

50 Mc. WAS

1 WØZJB	20 W6TMI**	39 WØDDX	58 W1AEP*
2 WØBJV	21 K6EDX	40 WØDO	59 W5LFH
3 WØCJS	22 W5SFW*	41 K9DXT	60 W6NLZ**
4 W5AJG	23 WØORE	42 W6ABN**	61 W7MAH
5 W9ZHL	24 W3ALU	43 W6BAZ	62 W8ESZ
6 W9OCA	25 W8CMS*	44 VE3AET	63 W2BYM
7 W6OB	26 WØMVG	45 W9JFP	64 W7ACD
8 WØINI	27 WØCNM	46 WØQIN	65 K6PYH*
9 W1HDQ	28 W1VNH	47 WØWWN	66 W4HOB
10 W5MJD	29 WØOLY	48 K9ETD	67 KØJJA
11 W2IDZ	30 W7HEA	49 WØFKY	68 K6RNQ**
12 W1LLL	31 KØGQG	50 W8LPD	69 W9QWT*
13 WØDZM	32 W7FFE	51 WØZTW	70 W6EDC**
14 WØHVW	33 WØPEP	52 W6GCG	71 K6VLM**
15 WØWKB	34 W6BJI**	53 W2RGV	72 K6GOX**
16 WØSMJ	35 W2MEU	54 W1DEI	73 WØEDM
17 WØOGW	36 W1CLS	55 W1HOY	74 W9JCI
18 W7ERA	37 W6PUZ	56 W6ANN	75 WØLLU*
19 W30JU	38 W7ILL	57 W1SUZ	76 W7RT**

* 49 states ** 50 states

VE7CN	45	EI2W	37	LU3DCA	27	SM5CHH	20
KL7AYV	44	CO2XZ	36	LU3EX	27	LA7Y	20
VE1EF	42	ZS3G	32	ZE2JV	26	VQ2PL	18
VE4HS	41	SM6ANR	30	LU9MA	26	JA8AO	18
XE1GE	39	CO2ZX	30	CO2DL	25	JA8BU	17
VE2AOM	38	SM7ZN	29	CT1CO	24	JA1AAT	17
KH6UK	37	PZ1AE	28	CO6WW	21	JA1AUH	16
		SM6BTT	28	LA9T	21	VP5FP	7

the first fall meetings of the Hampden County and Hartford County Radio Clubs, should result in more APX-6 units on the air soon.

Coverage has been better than expected, and antenna experimental work has provided much interesting work. Corner reflectors are easy to make, and their performance seems to be better than anything else of equal simplicity. To everyone's surprise, however, collinear arrays pioneered by W1QWJ and W1RVW have extended the range and improved signals markedly. Several screen-reflector collinears with 16 driven elements have been put up, and a mass-production job on arrays with 32 driven elements is currently underway in Springfield. Coax is universally used, and though the loss figures are formidable, getting the arrays up over the trees and buildings always seem worthwhile.

W1CUT and K1CJX are set up for portable and mobile operation. These two and W1HDQ sprang a surprise on the Springfield contingent by driving up there during the regular Monday-night 1215 Mc. workout, and providing the first mobile contacts. Using a simple horizontal dipole held aloft by an assistant operator, W1CUT/mobile made contacts at distances up to ten miles over open paths. Multiple reflections make antenna orientation extremely critical and mobile flutter is terrific. W1QWJ and W1VNH said it sounded as much like 50-Mc. aurora as anything!

Portable work from various high spots in and around the valley has added spice to the 1215 Mc. program, and probing with the highly directive antennas has turned up some interesting reflection paths. W1CUT to W1HDQ is a distance of some 5 miles, over low hills. A nearly vertical ridge one half mile back of the W1CUT location provides a fine reflector, and a return is also observed from an observation tower atop the ridge. Signals are S8 over the reflection path; S2 to 3 direct.

Heavy foliage knocks off 1215 Mc. signals much more than those on 144 or 220 Mc., and atmospheric effects show up markedly on even these local circuits. Comparison with 144 Mc. shows, in a general way, that if good signals are obtainable over a path with 2 watts and simple antennas on 144 Mc., there will be a usable signal on 1215 Mc. with two APX-6s and 20-inch, 60 degree corner reflectors.

In case there is thought in some quarters that New England has a "corner" on using converted APX-6s; seems that W6MMU did some 1215 Mc. operating recently from Catalina Island using an APX-6, (converted) a twenty-one inch fiberglas parabola with aluminum tape on the face. Five stations were worked during the week including July 11 through July 15 — W6HIT, Pacific Palisades; WA6EWV, Bel Air; W6PCQ, Santa Monica; W6DQJ, Pico-Rivera — all signals were S9 both ways.

The Palos Verdes Hills, nearly 1000 feet high, blocked the line of sight in most cases. Distances ranged from thirty to sixty miles. This was the first amateur operation on any frequency above 144 Mc. from Catalina Island.

A little over a week of scheduling between Rex, W5RCI, and Tom, W4HJQ, on 432 Mc. paid off on September 11 with a good contact, and having caught the opening Rex went on to work W8TYY. Distance to W8TYY from W5RCI is about 580 miles. This little scheduling effort gave Rex two new states bringing his total up to 8.

George, W3FEY, is back on 220, 432, and 1296 looking for schedules. He is presently keeping nightly schedules with K2CBA at 2130 EDST. He comments, "Observations on 220 Mc. aurora signals indicate that the possibilities have been greatly under-estimated. Band was open on aurora with signals from Ohio, New York, Pennsylvania and Massachusetts." George is operating 220.15 Mc. and notes that no one ever tunes that high.

Jack, W8PT, is maintaining a Monday, Wednesday and Friday night schedule on 220,052 kilocycles with his beam on W1AZK and points east. The time is given as 2200 EST (which is really 0300 GMT). Bob, W2LWI, has a 5894 fired up into a seven over seven on 220 Mc. So far he has 34 different stations in 12 states. Says he is meeting lots of his old two meter friends and suggests looking for W1AZK

2-METER STANDINGS

W1REZ	32	8	1300	W5SWV	10	3	600
W1AZK	28	8	1205	W5UNH	6	3	1200
W1KCS	24	7	1150	W5YYO	4	3	1330
W1RFU	23	7	1120				
W1AJR	23	7	1130	W6WSQ	14	5	1390
W1MMN	21	7	1090	W6NLZ	12	5	2540
W1HDQ	21	6	1020	W6DNG	9	5	1040
W1IZY	20	7	1180	W6AJF	6	3	800
K1CRQ	19	6	800	W6ZL	5	3	1400
W1AFO	17	6	920	W6MMU	3	2	950
K1AFR	17	5	450				
				W7VMP	15	5	1280
W2NLY	37	8	1390	W7JRG	13	4	1040
W2CXY	37	8	1360	W7CJM	5	2	670
W2ORI	37	8	1320	W7LHL	4	2	1050
K2GQI	33	8	1200	W7JJP	4	2	900
W2AZL	29	8	1050	W7JU	4	2	253
K2IEJ	27	8	1060				
W2BLV	27	8	1020	W8KAY	38	8	1020
W2AMJ	25	6	960	W8SDJ	35	8	990
W2DWJ	23	6	860	W8PT	34	8	985
K2HOD	23	7	950	W8IFX	34	8	980
W2PAU	23	6	753	W8LOF	33	8	1060
W2ALR	23	7	960	W8SFG	33	8	1040
W2RXG	23	8	1200	W8RMH	32	6	910
W2SMX	23	7	1090	W8SVI	30	8	1080
K2CEH	22	6	940	W8EHW	30	8	860
K2LMG	21	8	1160	W8LPD	29	8	850
W2LWI	21	6	700	W8WRN	28	8	680
W2BSX	20	6	750	W8BAX	29	8	960
W2WZR	19	7	1040	K8AXU	27	8	1050
W2UTH	19	7	880	W8NOH	26	8	975
W2RGV	19	6	720	W8DX	26	8	720
K2RLG	17	6	980	W8ILC	25	8	800
				W8JWV	25	8	940
W3RUE	33	8	1100	W8GFN	23	8	540
W3GKP	31	8	1180	W8LCY	22	7	680
W3SGA	30	8	1070	W8BLN	21	7	610
W3TDF	30	8	1125	W8GTK	17	7	550
W3KCA	28	8	1110	W8NRM	17	7	550
W3SGA	27	7	700				
W3EPH	22	8	1000	W9KLR	41	9	1160
W3HYF	25	7	900	W9WOK	40	9	1170
W3LNA	21	7	720	W9GAB	34	9	1075
W3NKM	20	7	730	W9AAG	32	8	1050
W3LZD	20	7	650	W9REM	31	8	850
				W9ZIH	30	8	830
W4HJQ	38	8	1150	K9AAJ	27	8	1070
W4HHK	36	9	1280	W9LVC	27	8	950
W4ZXI	34	8	950	W9EQC	27	8	820
W4LTU	34	8	1160	W9PBP	27	8	820
W4AO	30	8	1120	W9OJI	26	8	910
W4MKJ	28	8	850	W9ZHL	25	8	700
W4UMF	28	8	1110	W9BPV	25	7	1030
W4VLA	26	8	1000	K9AQF	24	7	900
W4EQM	25	8	1040	W8LF	22	7	825
W4WNH	24	8	850	W9KPS	22	7	690
K4EUS	24	6	765	W9CUX	21	7	800
W4JCJ	23	6	725	W9OEV	20	7	850
W4VVE	21	6	720	W9PMN	19	6	800
W4RMU	20	7	1080	W9ALU	18	7	800
W4TLV	20	7	1000	WØBFB	32	9	1180
W4IKZ	20	6	720	WØSMJ	29	9	1075
W4OLZ	20	6	720	WØIHD	28	8	1030
W4AIB	21	7	880	WØQDH	24	9	1300
W4CPZ	18	6	650	WØRUF	23	7	900
W4RFR	18	7	820	WØINI	21	6	830
W4MDA	17	6	750	WØTGC	21	7	870
K4YUX	16	8	830	WØRYG	20	8	925
W4LNG	17	7	1080	WØIC	19	7	1245
				KØAQJ	16	6	1120
W5RCI	35	9	1215	WØIFS	16	6	1100
W5AJG	29	9	1360	WQAZT	9	4	900
W5DFU	28	9	1300				
W5LPG	25	7	1000	VE3DIR	30	8	1330
W5PZ	27	8	1300	VE3AIB	28	8	1340
W5FYZ	23	9	1250	VE3PQN	19	7	790
W5KTD	23	8	1200	VE3DER	17	8	1340
W5JWL	19	7	1150	VE3AQG	17	7	1300
W5ML	16	5	700	VE3HW	15	7	1350
W5FSC	12	5	1390	VE2AOK	13	5	550
W5HEZ	12	5	1250	VE3BPB	14	6	715
W5CVW	11	5	1180	VE7FJ	2	1	365
W5NDE	11	5	625				
WØVY	10	3	1200	KH6UK	1	2	2540

220- AND 420-MC. STANDINGS

220 MC.

W1AZK	9	3	412
W1HDQ	11	5	450
W1OOP	12	4	400
W1RFU	15	5	480
W1UHE	11	4	385
W2AOC	13	5	450
K2AXQ	8	3	220
K2CBA	10	4	325
K2DIG	4	3	140
W2DWJ	15	6	740
W2DZA	12	5	410
K2KIB	10	3	300
W2LRJ	10	4	250
W2NTY	10	4	200
K2PPZ	11	4	190
K2QJQ	13	5	540
W3AHQ	4	3	180
W3FEY	8	4	296
W3KKN	10	4	255
W3LCC	8	5	300
W3LZD	15	5	425
W3RUE	9	5	450
W3UJG	13	5	400
W3ZRR	5	4	112
K4TFU	8	4	400
W4UYB	7	5	320
W4UMF	11	5	420
W5AJG	3	2	1050
W5RCI	8	5	700
W6N1Z	3	2	2540
K6GTG	2	1	240
W6MMU	2	2	225
K7ICW	1	1	250
K8AXU	10	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8NRM	8	4	390
W8PT	10	5	550
W8SVI	6	4	520
W6AAG	9	4	600
W9EQC	11	5	740
W9JCS	5	2	340
W9JFP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
KØDGU	5	3	425
KØITF	6	3	515
KH6UK	1	1	2540
VE3AIB	7	4	450

420 MC.

W1HDQ	8	3	210
W1MFT	4	3	125
W1RFU	7	4	410
W1OOP	10	3	390
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
W2DWJ	9	4	196
K2CBA	5	3	225
W2DZA	5	3	130
W2NTY	3	2	100
W2OTA	6	3	150
K2UTR	7	3	175
K3EOF	6	3	250
W3FEY	5	2	225
W3RUE	2	2	96
W4HHK	3	3	550
W4VVE	6	4	410
W5HTZ	3	2	400
W6GTG	1	1	180
W5RCI	8	3	600
W7LHL	2	1	180
W8HCC	3	2	355
W8HRC	3	2	250
W8JLQ	4	2	275
W8NRM	3	2	390
W8RQI	4	2	270
W9GAB	9	4	600
W9AAG	5	3	375

nightly at 0100 GMT if you need New Hampshire. W3UJG pushed his total up to 13 on aurora contacts with W4ZXI and W8CSW. Don, W1AZK, suggests a little more publicity on operating times; beam headings, frequencies, etc., would be a big help when you are looking for a new one. Don also points out that no one will hear you if all you do is sit there and listen. (*Amen*) The 432-Mc. meteor scatter skeds carried out by W9OJ1 and W2BLV had disappointing results. No pings, bursts or otherwise were heard. At least it wasn't for want of trying. John, W6NLZ, says that 432 Mc. activity in the Los Angeles area has reached QRM proportions. Naturally this prompted John to move up to 2700 Mc. He is running 70 watts output to a c.w. magnetron. In addition to heating up RG/8-U cable in a hurry, it almost blows W6PUZ off his hill.

OES Notes

K1CXX — Activity on 50 Mc. Worked K3KCG, W3PGV, K5RBN and VE3CIK. Activity on 144 Mc. Worked first aurora, WA2DIR and W3BYF.

K1GQK — On 50 Mc. heard channel 9, WMUR-TV audio very strong. First time this happened.

K1KUY — Few openings on 50 Mc., heard Newfoundland.

W1LMZ — Hears Montreal nightly and K1KKP in Peru, Vermont, on 144 Mc.

W1NKA — All activity on 50 Mc.; heard a VO2, also aurora sessions.

K2BGU — Sporadic *E* in on 7/2, 3, 10, 11, 15. Not much else.

K2JWT — 144-Mc. openings to W. Virginia, Ohio and Michigan. Worked Nova Scotia.

K2LMG — C.w. schedules held nightly on 144 Mc. with K2GQI, W2WZR, W4LTU, W5PZ, W4EQM. Aurora contact on July 15 with W4MKT and W8CYX.

K3JHE — Heard K5RAE, W5UW, W4KII, K4RZI and many others on 50 Mc.

K3KUD — Openings on 50 Mc. to Florida, Georgia, Illinois, Iowa, Virginia and North Carolina.

W3ZRR — 50 Mc. activity to south and southwest few days in July. 220-Mc. activity increasing.

W4CIN — Hold schedule with K4VTA at 0600 EST. No unusual openings on 50 Mc.

K4EUS — All activity on 144 Mc.; Perseids skeds with WØMOX, WØQDH, W5FYZ and WØTJF. Aurora: W1AZK, W1CRN, W8GGH and W9ZIH. Few transmissions at "Echo".

W4FWH — 50 Mc. short skip activity. 144 Mc. activity in South Carolina, Alabama, North Carolina. Aurora recorded twice, 7/1 and 7/15. Relay station in process on 144 Mc.

K4IQU — Cuba 15-minute QSO. Nothing else of interest.

W4KDH — 3 good openings on 50 Mc. Normal conditions on 144 Mc. Good tropo openings with VE3DIR. Nightly contact with W4AIB, South Carolina. Also hear W4RMU and W2ESX quite often.

K4KYL — Many openings on 50 Mc. Experiment on "Echo 1" completed. Call CQ on 145.01 Mc. nightly at 2100 EST and 2200 EST beaming East, North, West, South.

W4UCH — Designing new high-power 50-Mc. amplifier.

WA6EEO — Preparing for Echo II. (What band?)

K6HCQ — Worked a few VE6s on 50 Mc.

K6SIX — Band opening on the 4th of August but only copied regular 6-meter stations. (Receiver troubles?)

K7BBO — Not much DX on 50 Mc; worked W6NLZ on back scatter.

K7GGJ — Few openings to the Midwest on 50 Mc. No v.h.f. activity on in Yakima except for K7GGJ. (Good grief!)

K7HKD — Worked W7QDJ on 144 Mc., also New Mexico and Oklahoma.

KN7LQA — Anybody interested in joining the North-West Two Meter Net contact KN7LQA or W7DZR.

W7ZVY — Was on Mount Rainer for September QSO party.

W8BFF — 50 Mc. opening. Aurora visible, no signals.

K6BGZ — 144-Mc. openings in Nebraska, Iowa and Kansas. Worked WØBTG, WØIAY, WØEMS and W3YLR.

W8NOH — Openings on 144 Mc. to Missouri, Iowa, Minnesota, Kentucky and New York. Heard W8PT on 432 Mc. with make-shift converter and discarded radar bedspring antenna.

W8PT — Activity on 220 Mc; 144-Mc. aurora openings. Quite a bit of activity on 144 Mc. Official broadcast on Monday, Wednesday and Friday.

K8PUT — 50-Mc. ground wave very good with some aurora. Aurora openings W1s and W2s. Everybody trying to get on 144 Mc.

W8WRN — Good opening 144 Mc. on September 2. QRM even above 145 Mc.

K9HWC — Looking for stations who want to work extended ground wave on 50-Mc. c.w.; located 25 miles west of Chicago and looking for stations 200 to 250 miles away.

K9PGK — 50 Mc. excellent *E* skip during August. Local 50 Mc. activity increasing.

W9PNE — 50 Mc. Heard WØTAF of Missouri on August 18, W5s and WØs heard. August 22, W4s and W8 from Ohio. On aurora heard K2EVJ and K8BJC.

K9TMG — Club stations with the call K9ONA operating on both 50 and 144 Mc.

KØBWQ — Wants more local activity in the Kansas City area. (You gotta flail the bushes!)

KØDUO — New receiver under construction almost completed.

K9OXY — Looking for scatter schedules on 50 Mc. Operating frequency 50.03 running 50 watts input to a five element beam 30 feet high.

K1CRN — Running nightly schedules with W4RMU in Florida on 144 Mc., 0530 to 0630 EDST. His frequency 144.1, K1CRN's frequency 144.138.

Strays

Want to run high power? Take a page from Eimac's design notebook and duplicate a high-voltage power supply they are putting together for experimental and developmental work. It will put out 282 kilovolts at 12 amperes, which figures out to be about three million watts. However, since it uses some oil-filled transformers weighing from 5 to 15 tons each, it would hardly be the sort of thing you'd consider for Field Day use! Eimac hopes to have it functioning by early 1961.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whoa:

> WANTED: Young, skinny, wiry fellows not over 18. Must be expert riders willing to risk death daily. Orphans preferred. . . .

So went a newspaper ad of a hundred years ago, seeking DX talent for the Pony Express. Rugged qualifications for $25 a week! In their wildest dreams these "skinny, wiry fellows" and their employers hardly could have visualized posterity seated comfortably in eastern parlors chatting directly with San Francisco via private wireless for a few pennies per conversation. Those old-timers surely did it the hard way.

Defying raging nature and the Indian gantlet, encountering incredible adventures and hairbreadth escapes that render today's TV-western plots pale by comparison, the 80-odd riders of this American preradio relay league logged 616,000 miles in 308 runs somewhere between St. Joseph, Missouri, and booming Sacramento.

There were 190 relay stations along the original 2000-mile route. Each rider tired several horses in covering his allotted 70- to 100-mile stretch. It was normally a ten-day run, but word of Lincoln's election reached the coast in a record seven days. Best single-operator DX record? One magnificent stripling named William Cody raced 384 miles without rest when his relief rider was erased by Indians. (Young Cody, you know, went on to immortal fame as Buffalo Bill.)

This is essentially a traffic man's yarn, we suppose, and yet there's a tangy DX flavor to the tale. In 1861, after eighteen furious months, a heroic moment in communications history gave way to more scientific keys and sounders. Radio amateurs can certainly observe this year's Pony Express centennial appreciatively, for hams — DX men in particular — still find in the art of communications a spirited adventure.

What:

In all that excitement the Pony Express lost only one pouch. (Jeeves ought to lose his.) But we digress. . . . After a surprising August our DX bands turned somewhat soft in September and October. Enough strong spells do come along to keep our "How's" Bandwagon rolling, however, so let's cross-check results at random points here and abroad. Remember that such listings as "CR1ØAD (95) 4" mean that the station was observed 95 kilocycles above the lower band-limit (14,095 kc. if the paragraph deals with 20 meters, for instance) around 0400 hours GMT.

10 phone stays with us on a part-time basis but the quick-DXCC-with-an-807 days are numbered now. Reporters **K**1s JUR LNC, W2FGD, WA2s EGK IGW, W4LJV, K4s GSD TEA, K5VTA, WA6DNM, K8s JCB QEX, K9SPO, KØRNK, EL4A, ZD2JKO and s.w.l. D. Edger mention recent success with **C**Es 1AGI 3AG 3PY, CN8MT, **C**Rs 4AX 6CA (450) 17, 6CZ 7CR, **C**Ts 1IQ 1KJ 1SX 2AH, **C**Xs 6AF 7AR 7BH, **E**Ls 1N 2C 4A 4M (498) 18, **F**Fs 7AB 8AP, **H**Cs 1DD (810) 17, 4IE, HH2V, **H**Ks 1IT 2GO 4AY 7AB ØAI, JA3AD, a bunch of KZ5s, OA2B, OE1CS, **PJ**3s AI AK, **T**Gs 5HC 9CD, **TI**2s CMF JAP OE, VE8RH, **V**Ps 2GAQ 5BL 6TR, VQs 2EZ 2JS 2NRE (the Kitwe exhibition), 2WR, VS9AJW, XEs 1H 3AF, YN1WW, YVs 1VW 3BD 5AEV 5AKM 5ANE 6BC, **ZB**1HC, **ZD**1AW, **Z**Es 1JA 1JJ 2JA, ZP9AY, ZL1RI, ZS3s D L (490) 17, 5As 2TD 5TA, 6O2GM and 9Q5CT.

10 c.w. may be coming up for the third time m.u.f.-wise, so WA2EGK, K2UYG, K3CUI, K6s CJF ROU, K8JCB and K9SPO pulled out **CE**4EI, **CX**2BT (80) 17, some Gs and DLs, **HK**ØAI, **LU**s 5DEL (60) 23, 7AU (80), **PY**2s AJK BBP, **VQ**2HT, XE1H, **ZE**6JG, **ZL**2AUM, **ZS**s 1UL (70) 18, 4IO and 6AWY or 6AYW (50) 18.

15 phone followers welcomed fall confidently, especially W1BDI, K1JUR, K2s KVII TDI* (asterisks indicate single-sideband users hereafter), K3LJZ, W4s LJV UWC*, K4s LRA MPE TEA, K5VTA, WA6DNM, K8s JCB QEX, W8KML, K8SRR, VE3PV, EL4A, ZD2JKO, D. Edger and A. Rugg who logged such desirables as **C**Es 2MG 3WU*, CN8s CS EF EN HX* JO, **CO**8s JK OK (235) 23, **CP**5s EH EL*, **CR6CA*** (446) 0, **CT**s 1EY 3AE, **CX**s 4AW 9BA*, **DM**4BN, **E**Is 8AE 9BC, **EL**s 2Q 2U (244) 22, 4A 4C* 4L*, **ET2VB**, **FF**s 4AB (260) 23, 4AC 7AB (280) 23, 8CK (245) 0, **FQ**8s AQ AX, **GB**3LY just England, **GD**3s ENK* UB, **HH**2s GR LD, **HP**1s CC LB, **HR**s 1HP* IUA 2HA, **HZ1AB***, **KC4USB***, **KG**4s AD AK, **KV4BM**, **KW6CL***, **OA**4s AA H, **OA8M***, **OD**5s BU CN, **PJ**3s AD AJ, **PX1RC**, **PZ**1s AW (265) 3, AY (280) 23, SM2BCS, **SP**s 5XM 8CR 8HR, **SV**s 1AB* ØWT, **TG**s 5HC 9FI, **TF2WFF**, **TI**s 2AB (227) 3, 2OE 2WA* 5AX* 5RV, **UA**s 1DZ* 4KED, **VE8RX**, **VP**s 2LS 2SI* 5AK 5BB of Turks, 6WR 9FR, **VQ**s 2AB* 4DT 4FK (280) 21, 4RF* (397) 21-0, 5GF, **VR2**s AS BC DE DS, **VS**s 1GQ 1KD 9ADL (248) 23, 9AJW, **VU2BK**, W7AIIW/**KG6***, XE1s galore, XEs 2PY/m 2SO 3D, YN1s AA* EDR LB (225) 3, WW, **YS1HM***, **YU**s 3OV 3VV 7LAA, **YV**s 1CS* 3DL 3TT 5AMI 5ANK, **ZB**1HC, **ZD2JKO** (170) 22, **ZE4JN***, **ZK1BS**, one **ZM6AM**, **ZP6BB***, **ZS3X**, **4X4IK** (225) 23 with a 10-watt 6AQ5 rig, **6O1TUF** (176) 21, **9G**1s BA (223) 20, CQ (248) 22, DP (215) 21, **9Q**5s HF HZ/VQ5/m KY LI YM* (235) 23, **9U**5s FW (200) 23, KU (255) 19 and VN.

15 c.w. investigators W1s BDI OPB, WA2ASM, K3s CUI LJZ, K4s MPE (81/52 worked/confirmed), TEA, K5VTA, W6RCV, K6s, CJF ROU, WA6DNM (31/22), W7s DJU POU, W8KX, K8s JCB QEX, K9s ORC (102/69), SPO SRR UCR UKM, EL4A, IER, ZS2U, ZD2JKO and A. Rugg have dossiers on CIAAK (22) 18 of Peking ("the home of true communism," he ad-libs), **CE**4EC, **CN8AN** (68) 20, **CR**s 5AE 7 BC (68) 17, **CX**4BC, **DM**s 2AQB (54) 18, 3NML (51) 17, 3RB (28) 19, **DU**1FM 15, **EA6AM** (38) 19, **EI**s 8AE 19, 9AG (50) 22, **FB8XX**, **FF8**s BF CK of Mali, **FK8AH**, **FQ**8s HD HR of Congo, **HA**s 2CV (36) 19, 5KAG (41) 23, 8CI 9KOV (55) 18, HC2IU, HH2JV (63) 23, **HK**s 3TH (80) 17, 7ZT (45) 19, **HP**1s AC (93) 20, SB (180) 4, **JA**s 5FQ 7KX 8AQ, **KG1**FD (22) 23, **KR6LJ**, **KV4AA** (82), **KX6CA** (75) 20,

*7862-B West Lawrence Ave., Chicago 31, Ill.

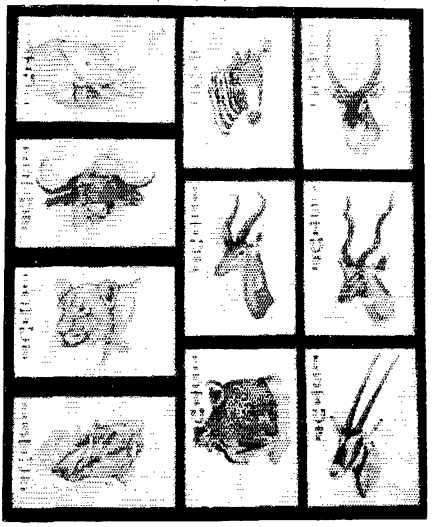
LX1DW, LZ1KNB, MP4s BBL BCV, OAs 3D (60) 4, 4HK (34) 23, OX3GN, PJ2ME, PZ1BR, SL5AB of Sweden, ST2AR 15, TFs 2WFF 3M4B, TI2s CMF (37) 20, DL IT WA, UA9VB, UG2s BB KAC (37) 16, UJ8KAA, UL7FA, UO5AA, VK9XK, VPs 2VA 5LT 9BO 9EH 9QQ, VQs 1AM 2IE (33) 18, 2MS (74) 19, 3HZ (79) 19, 4GQ (55) 19, VR3D, VS6BJ, VU2JA, WH6s DNF DNG DSE, XEs IH ØNHD, YA1BW (60) 17, YOs 2BU (55) 14, 2CD (48) 20, 6AW, YVs 5ANI 6BS (51) 20, ZBs 1FA (75) 23, 2AD, ZC4s AK (47) 17, KV, ZDs 1AW 2ATU 22, 2GUP 2JKO (38) (38) 19-20, ZE3JO (45) 19, ZP5s AW (28), LS, ZSs 3D (49) 18, 3X 7R (92) 18, 3V8CA, 4X4FU (20) 23, 5As 1TN (76) 17, 2CV 5TA, 6O2s AB (39) 19, GM (50) 19, 7G1A (55) 19, 9G1CW and 9Q5US.

15 Novice dispatches, still at low ebb, come from KNs 3LJZ 5CKD 7KXG and 9UIY concerning good luck with CEs 1DC 4EC, Gs 2HDR 8KS, LU1AD, K4CDZ/VE8, KH6UL, KP4ATQ, KZ5s BBN MQN, WP4s AUL AVF and YN1 CRU.

20 c.w. brings us to the business portion of this meeting, and business is *great*. So say W1s BDI OPB (125/103), K1JFF (82/66), W2JBL, K2s TDI UYG, WA2s ASM (73/50), EFN KMY (98/65), K3s CNN CUI LJZ, W4KEP, K4s LRA TEA (151/127), K5s STL (40/10), VTA WWC, W6s JQB RCV, K6s CJF (112/94), ROU STZ, WA6s FCX GUY, W7DJU, W8KX (191/180), K8s JCB (130/115), QEX, W9JJN, K9s PYB SRR UCR UHH UKM, EL4A, H1ER, KH6AHZ, ZE2JKO and ZS2U with s.w.l. A. Rugg auditing. Customers include AP2s AC Q (17) 15, BV1US (50) 13, CEs 1AD (60) 23, 1DN (73) 1, 3DH (53) 0, 4AD (55) 3, 4GU 0AD (60) 5, CM8RM (53) 18, CNs 8MB (90) 23, 9CK (15) 0, COs 2AD 2CO 2CT 2DJ 7HQ 0, 7NR (82) 7PG (45) 5, CRs 4AH 4AX 6AP 7BC 14, 7CI 9AF 9AH (35), CT1TT, CX8 2BT 4CZ (7) 0, 5BH, DL8CM (66) 22, DMs 2AMG (87) 23, 2AUJ 2WHN 3ICK (80) 0, 3WHN 3WL (91) 23, DUs 1OR (59) 2, 7SV (3) 23, EA8s BW (83) 23, CG (60) 2, CP (44) 3, EL4A, EPs 1AD (18) 3, 5X (7) 3, ET2US, FA8TT 22, FB8s CE (37), CJ 14, XX 13, ZZ 13, FG7s XA (9) 23, XG 22, FM7s WK WX (26), FQ8s AE AG HO HW, FY7s YF YI 22, HAs 1KSA (29) 23, 5KAG (22) 23, 6NC 7PZ (85) 23, 8KWG (72) 23, HCs 1IT (14) 3, 1LE (66) 1, 2CS (30) 4, 2IU 5CN, HH2OT, HL9KT, HKs 1HV (61) 0, 3TH (5) 3, 4JC (64) 0, 7ZT (20) 3, HP1SB (8) 1, HRs 1NX (90) 13, 2FG (5) 2, HS1R (25), HZ1AB (35), IS1DKL 21, IT1s AGA (15) 1, GO (63) 0, JAs 4EE (85), 4HM 4OO (32), 5AF 5AI 7AD 7BN 9AA 9FU 9GO ØBD, JT1s AC (60) 15, KAC 17, JZ0PO 14, K0SLD/KW6, KA2s JL JM KC KS (36) 6, KCs 4USB 6JB, KGs 1BB 1BX (84) 3, 4AB 4AD 6AAY 13, 6AFA (36) 12, 6AJT (75), KM6s BI BV 5, KR6s KU LJ 13, QW, KV4AA (81) 20-21, KX6CA, LZ1s a-plenty, LZ2s KSK (53), KST (29) 23, MP4BBL, OA4s AJ KF (60) 2, OR4TX, OX3s JI UD, OY7ML, PJs 2AE 2AW (43) 0, 3AD (30) 12, PZ1s BE (50) 3, BP (10) 0, ST2AR (52) 1, SU1IM (90) 0, SVØs WI (20) 0, WO, TFs 2WEZ (46) 12, 2WFF 3AB, TG3LA (89) 0, TI2s DL DN, UA9s AA DB (30) 1, KOA (19) 12, VB, UAØs CI CK EC EH EQ FE FR 19, KCA KFM 19, KID (40), KKD (40), LS LU OK 16, RV 17, UB5s ES JO KAB MF NM UW, UC2s AD (11) 5, KAR, UD6s AM (15) 0, KAB, UF6FB (70) 21, UG6AW, UH8s BI 19, DA (60) 22, UI8s AK AN 20, UJ8s AC KAA, UL7HB, UM8s KAB KAD (65) 23, UN1s AB AH (27), UO5BM, UPOL9 'way up north, UP2AS, UQ2s AN AU AX DB (15) 4, UR2s AQ BA KAE (24) 5, UT5BK (52) 0, UW9AC 17, VEs 8AP 8RW (13) 3, ØNI atloat, VO2s AW WW, VKs 1JE 9XK (20) 12, VPs 2AU 2BR 2SX 3RS 3YG 22, 4VS 5BL (84) 23, 7NT (82) 0, 9CX 9KU 9QQ (87) 10, VQs 2VS 4HT (65) 22, 4IA (80) 3, 8BC 17, 9HB 18, VRs 1B (17) 11, 1D (150) 6, 2DK 3KD (70) 12, 3L, VSs 1AB 1GZ (92) 15, 1JV (50) 12, 1JW (65), 6BJ 9AAC 9OA, W2AYN/EP (7) 3, WA2ARB, VE8 7, XEs 2BDL (83) 23, 3BL (15) 4, XZ2TH (36) 16, YN4AB (13) 0, YOs 2BH 2KAG 3FD 4WE (73) 23, 7DZ 9IF (59) 23, YS1O, YVs 1EM (30) 12, 1EQ (27) 2, 3CD 4AC 4AU 4BE 5ABF 5ACP 5ADP 5ANI 5IIT, ZB1HC, ZCs 4AK (35), 4SS (56) 0, 5AE 17, ZDs 1AW (90) 0, 1CM (80) 23, 2GUP 2JKO (11) 1, 2JM 8SC 9AM 17, ZE3JJ/ZD6 (55) 15, ZE8JD, ZL4JF (155-181) 5 due for N.Z. return from the Campbells, ZK1s AR BS, ZM7AA, ZP5s LB LS, ZSs 3AZ 19, 3E 19, 3HT (8) 23, 7M (70) 14, 3V8CA, 4S7EC 17, 4X4s FU KL LQ YI all 1-2, 8J1AB of Japan's antarctic effort, 9M2s FK and FS 17. Got 'em all? QSLd, that is?

20 phone accommodates W1BDI, W2DY, K2TDI*, WA2EFN, K3LJZ, W4LJV (98 on phone this season), K5s VTA WWC. K8s JCB* QEX, EL4A, KH6AHZ, ZD2JKO, Messrs. Edger and Rugg in their efforts to deal with AC5CQ, AP2CR*, CE2s CC* CO* (194) 1, CRs 6CA* 9AH*, CTs 1CL* 3AV*, ELs 2C 4A, ET2US*, FR7ZD* (310) 3, GC3LXK*, HC1s FG* RB* (346) 1, HH2s JK 3, OP* (310) 13, HL9TR*, HZ1AB*, K6CQV/KS6 2, KA8RB*, KC4s USB USH USN USV (all 265-310) 3-4, KGs 1BP* (306) 1, 4AA 4AB 4AM* 6FAE* 2, KM6-BU, KW6CGA, KX6DA, OAs 3P* (305), 4AN, OH0NC*, PJ3s AE* AJ (190) 4, PZ1AX* 21, TG9TI, TIs 2PI* 8WTC 0, UAs 3KGG 9CM*, UB5FJ*, VPs 2AR 6 of Nevis, 5AB*, VQs 4RF* 5FS*, VR1D* (315) 3, VS1JV*, VU2NR*, XE1s DDX* SN*, XZ2SY*, YNs 1TAT* (345) 1, 6HH 20, 9MQ 3, YS1s MS* O, 4X4JT*, 7G1A*, 9N1s CJ* GW* and SM*. The asterisks, as usual, gor for s.s.b.ers.

40 c.w. hounds, particularly K1JFF, WA2ASM, K3CNN, W6RCV, K6CJF, WA6GUY, W7s DJU LZF, K8JCB, W9JJN, K9UKM, EL4A and Mr. Rugg, frolic with CM2s CZ WS 4-6, COs 2BG 8EM, DU7SV 9, EL4A (7) 6, FG7XG (4) 1, GD3UB, HC2VT (12) 4-5, I1ZRM/mm, IT1AGA (16) 1, JAs 4YC 5SL 5TM 7AB 7ADD 7IH 7MJ 9CQ ØAA ØMV ØQA ØRC ØTA ØVZ ØZC and a slew of JA1-2-3-6-8s around breakfasttime out west, KA2KS, KR6s KV (5, 40), LJ 10, LU1HRM 0, PYs in all call areas save the 9th, PZ1s AX 4, BV (2) 3, TI2LA 6, UA0s FF KID 7, curious UK1AD 8, VK9XK (12), VP3RS (11) 2-3, VR2DK 8, XE1AX (6-10) 1, YVs 4AC (12) 2, 4CI 6.



I5TUF, now 6O1TUF, distributes a colorful series of Somalia confirmations, watercolors of local fauna reproduced by a Mogadiscio mission. W4LJV noticed a variety of I5TUF QSLs among DX buddies and obtained this complete set.

5AL 5HL 3-4, ZD2GUP (4) 23, sundry VKs ZLs and ZSs . . . . . KN7KXG has the 7-Mc. Novice slant on KH6UL VK3XB, WL7s DNK and DNL. Good work!

40 phone comes last but not least, for W8GKB turns in your "How's" Report of the Month. Jon ably demonstrates what can be done DXwise on 7-Mc. voice by way of CO2DB* (296) 1, DJ1BZ* (130) 0, DL4VL* (127) 23, F3NB (10) 2, FG7XR (100) 9, G3s BSR (5) 6, NUG* (90) 6, GD3UB (60) 3, HKs 1XD (203) 10, 7MM (270) 8, JAs 1AEA* (96) 10, 1AWO (10) 9, 1BMT* (96) 10, 1CWS* (96) 9, 2KJ* (96) 9, 8AH (10) 9, 9BV* (90) 10, K6CQV/KS6* (203) 9, KG1BA* (296) 5, KH6s and KP4s in quantity, PYs 2QT* (296) 3, 8SD* (296) 8, UA1DZ* (90) 22, VKs 2AP (16) 8, 2EL* (130) 10, 3AHO* (145) 9, 3HG* (130) 9, 3IW (25) 9, VPs 2DQ 2LS 2LX all 10-11 (240), 3VN (245) 11, 4LQ (240) 10, 6TR (240) 10, 9BN (230) 12, XEs 1BBN (170) 8, 2SG (22) 7, YNs 1BS (220) 10, 9MQ (210) 11, YV5s ACM (20) 1, ANS* (203) 23-0, AW (280) 0, ZLs 1ATQ* (145) 10, 3ID* (130) 10, 3US (20) 9, ZSs 5JY* (145) 23, 6AMV* (145) 0, 5A2TZ* (296) 5 and 9G1CN* (50) 22. The stars twinkle for two-way sideband QSOs; other contacts were s.s.b.-to-a.m. or s.s.b.-to-c.w. (frequency gives good idea which) . . . . . K4GSD adds HH6DH and KG4AD with his potent 25-watter. Are *you* missing a ball of forty phone?

Where:

Asia — Authorizational progress on the Korea amateur front reported by KARL: "The prefix for Korean nationals is changed from HL to HM as of August 1, 1960. HL9TA, the headquarters station of KARL, becomes HM0HQ. HL9 is still used by Americans. HL2 remains assigned to experimental stations who are forbidden foreign contacts. Seven stations, HM1AA through HM1AG, have been licensed as the first individual [private] Korea ham stations and you will be hearing many more HM calls hereafter. HM9A is the portable station of KARL headquarters for use in special expeditions, exhibitions and emergencies. We celebrated the initiation of Korean individual ham licenses by operating HM9A on Cheju Island from August 5th to 14th." Prefixes from HM1 through HM5 represent geographical areas in South Korea, while HM6-7 is reserved for North Korea upon reunification; HM8 will be a Novice-

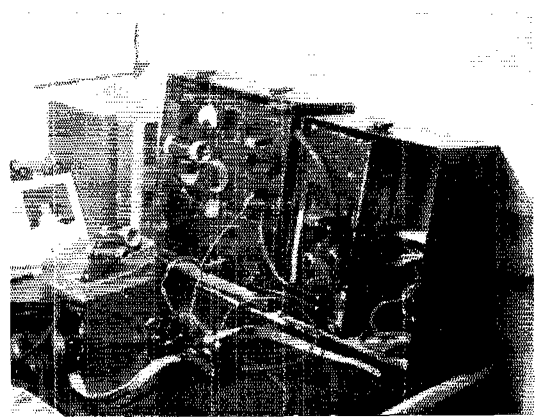
type prefix. HM9 is the portable indicator, and HMØ is a clubs label. "As of January 1, 1961, KARL, Central Box 162, Seoul, Korea, will handle QSLs for HM stations." . . . . . Noting much ado about TA3US, W8MGD writes from Turkey: "I am the MARS director for the Turkey and Greece areas and I must sadly report that there are no legal amateur stations in Turkey. I have been trying to obtain permission for myself and other amateurs here to operate on ham bands but I have had no success so far. Apparently the refusal is based on lack of monitoring capabilities by the Turkish government." And scratch TA1DB, too . . . . . "We've been receiving cards intended for KAØIK," writes KG6IVB (K2IVB) of Iwo Jima, "but there is no such animal here. Our club station formerly signed KAØIJ but is now KG6IJ." . . . . . HZ1AB, in QSO with W4MLE on 20 c.w., promises to answer all cards as quickly as possible from the usual APO 616. W7AMM (ex-DL4YK-DL4QV-DL4HE-DL6FB-PY7QE) writes from Taif, Saudi Arabia, that he may be able to help confirm 1955-'56 HZ1AEH QSOs. Interested parties should write SFC E. F. Diehl, jr., U. S. Army Element, Taif Det., USMTMISA, APO 616, New York, N. Y. . . . . K6CQM hurrahs in NCDXC's *DXer*: "Just received a 7-Mc. QSL from VU2-RM via W3KVQ for a QSO thirty months ago. *Never* give up!" . . . . . AP2AD discloses, "Information obtained from licensing authorities here shows that the call AP4M has never been issued, also that AP5B ceased operation many years ago." Two bad . . . . . EP1AD (K4ORQ), expecting his new Apache to handle more pile-ups, assures WGDXC interviewers of thorough QSL response upon defrayal of return postage.

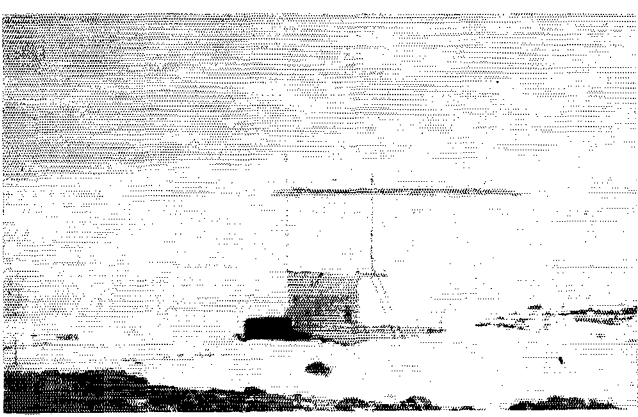
Africa — Southeastern DX Club, Box 10821, Station A, Atlanta, Ga., will try to satisfy QSL demands concerning the current Indian Ocean swing of Ws 4BPD ØAIW ØMAF and ØUQV. VQ7-8-9-etc. action from Seychelles, Agalega, Aldabra, Astove and other delights is intended, suffixes so far undetermined. VQ9AIW/mm is expected to represent the party aboard SS *Kampala* outbound and 50-foot schooner *Marsouin* on the homeward leg. More on this DX-travaganza in "Whence" . . . . . "The QSL manager for ZD2 now is ZD2JKO, Michael Dransfield, Regional Research Stn., Ministry of Agriculture, Samaru, Zaria, Nigeria," writes retiring ZD2DCP to W2CTN. "Mike offered to take on the task after I returned from leave. I was pleased to hand it over after doing the job for the past eleven years." By the way, Don disclaims responsibility for the relay of cards to ex-ZD1GM. "I have made repeated efforts to contact ex-ZD1GM at Enugu. Investigation shows that he has never had QSLs printed and is not interested in receiving the cards I hold for him." ZD2DCP will hang onto those ZD1GM-bound QSLs, however, hoping for a change of heart . . . . . W8UTQ, now 3V8CA, writes K9OKD: "Pass the word around that there is no bureau here, so all cards come to me direct. I just found out that QSLs arriving for me from June 24th to September 6th may have been either returned to sender or destroyed." Syd and his W8UTQ/3V8-3V8CA QSL manager, W4YWX, are preparing for 100-percent QSL for all QSOs . . . . . From ZD2JKO: "Ex-ZD2HJG tells me that a large parcel of cards sent from the ZD2 bureau to his last known address failed to arrive. He requests stations who worked him and who have not yet received cards to QSL again direct to his U.K. address [which follows] or via ZD2JKO." Mike also notes that, to this writing, ZD2JM is the only legit two-letter ZD2 . . . . . CR5AR's log-transcript liaison with K3AMH has bogged down. The latter is doing the best he can and requests patience . . . . . W2CTN assumes QSL managership for the September c.w. spree of VQ1s HT and SC, self-addressed stamped envelopes required from W/Ks . . . . . The 9Q5YM address to follow has been augmented by suggestions to QSL via DL4YM or W8TMA — take your pick . . . . . K2QXG may be able to help you with ZS1OU/ZS8-ZS1RM/ZS8 QSLs, s.a.s.e. required . . . . . VERON's *DXpress* hears that the next mailboat for Gough's ZD9AM won't arrive till February or March.

Oceania — "I now have the contest logs of ZK1BS for the c.w. portion of the ARRL DX Contest, February 21-22, 1959," notifies W7ZAS. "Those needing deserved cards should send me QSLs and s.a.s.e." . . . . . Ex-KH6DMP-KA8KW welcomes QSL inquiries at his new Stateside QTH (see list), promising unique confirmations in return . . . . . "As of August 1, 1960, all QSLs for ZK1AR should go to K4LRA," states the latter, calling attention to his new Florida address in the following roster. "Cards, bearing time in GMT, should be accompanied by the usual s.a.s.e." . . . . . WGDXC understands that VS5GS wants no QSLs but will respond with an airmail card if sent a slip of paper with QSO data plus one International Reply Coupon . . . . . K2UYG hears that VKØPM will clear his Davis Base QSL obligations on return to Australia next March . . . . . OVARA's *Ether Waves* has it that G3CCN still holds his VS1BB/ZC5 records and will QSL deserving applicants who defray return-postage expense . . . . . Ex-K6QPG/KW6, now working her DX from the short end of the DX stick as K6QPG, still has a few QSLs left for unconfirmed Wake contacts. Mary QSLd 100 per cent, however, so repeat applicants should be few. Same goes for her OM, ex-KW6CQ, now W6PEU.

Europe — ARRL Assistant Secretary W1UED is advised that Austria's bureau address has changed to: OeVSV QSL Bureau, Box 999, Vienna I/9. Also that the SM bureau now answers to: Sveriges Sandare Amatörer, Enskede 7, Sweden . . . . . "I agree with W1TS that Yugoslavians are the world's best QSLers," says K4ZYI. "I have 58 YU QSLs

VKØTF, now VK8TF at Darwin, is well depicted by these photos at Davis Base, Antarctica. Lower left is a view of Ted's layout in Davis quarters, lower right shows the main radio shack with Gardiner island in the background, and at right the OM hunts seal on four feet of ice a few miles off shore.
(Photos via W8KX)





from 61 worked." Wayne adds that EI6X continues to QSL 100 per cent via bureaus . _ . _ . The extensive Russian selection in the QTH catalog to follow comes through the research and generosity of veteran s.w.l. LeRoy Waite, 39 Hannum St., Ballston Spa, N.Y., editor of the Newark News Radio Club *Bulletin* amateur section. Some of those "U" addresses have appeared in *QST* previously, but none within the past six months . _ . _ . W7LZF encountered one *UK1AD* who gave Archangel as his QTH.

Hereabouts — LPRA (Panama) QSL manager HP1AC is inundated by undesired QSLs for one HP9FC. He declares that Panamanian call areas run only from HP1 through HP7, plus an occasional special HPØ authorization. K1AJQ may have your answer to this one . _ . _ . "I now handle QSLs for KP4VB," states W7ZAS. "All QSLs must be accompanied by s.a.s.e. or IRCs." Until Larry took a hand, KP4VB has been forced to forego answering W/Ks to avoid incurring a prohibitive QSL problem . _ . _ . The new *DX QSL Newsletter* of K6BX should be getting around to subscribers by now. Clif's publications list QSL managerships by the hundreds, so the serious DXer can hardly afford to be without it. Ex-W3RPG, K6BX's predecessor as editor of the *Directory of Certificates*, now is K8VNR at 3300 Sciotangy Dr., Columbus 21, Ohio . _ . _ . Again it's time we presented the full list of DX stations whose QSL chores are handled by goodfellow W2CTN: CN2BK, CR4s AH AV AX, FG7XF, FK8s AI AT AW, FM7s WP WU, HR2FG, JZ0s DA HA PO, KW6s CP CU, OQ5s BC IG, OX3s DL RH, TG9AL, TI2s CMF WD, VKs 2FR 2PA 9GK 9NT 9RM, VPs 2KH 6PJ 8AI, VQs 1HT 1SC 2EW 3CF 3HH 4AQ, VR2s DA DK, YS1IM, ZBs 1FA 2I, ZD2DCP, ZP9AY, ZS7M, 9G1BQ, 9Q5s BC and IG. Jack's ability to keep up with such an assignment depends upon receipt of s.a.s.e. and/or IRCs plus concise and complete QSO data . _ . _ . K8QEX finds W3GJY still awaiting *log* details for FG7XC's March QSO outburst. Hang on . _ . _ . K4SCT seeks QSL/QTH tracers for 1956 QSOs with HC1KD, HZ1HZ, UA9DN, VQ3TL, VS6CT and VU2HF, plus LU9ZT worked in '55 . _ . _ . FY7YC/FM7 writes WA2-ASM that he hasn't been active in French Guiana since 1958, recent evidence to the contrary notwithstanding . _ . _ . Now let's see what W1s BDI UED, W2s DY JBL JEG, WA2s EFN KMY, K2s QXG TDI UYG, K3CUI, W4s MLE SIB, K4s HNA TEA, K5STL, W6RCV, K6s CJF STZ, W7s LZF UVR, W8KX, K8s IXZ JCB QEX RCD, W9JJN, K9s OKD ORC PYB, VE3PV, KH6AHZ, KL7DKG, KP4RK, ZD2JKO, D. Edger, A. Rugg, Far East Amateur Radio League, International Short Wave League, Japan DX Radio Club, LABRE (Brazil) *QTC*, Newark News Radio Club, Northern California DX Club, Malaya Amateur Radio Transmitters Society, Universal Radio DX Club, VERON (Holland), West Gulf DX Club and WIA (Australia) offer in the line of specific "Where" suggestions:

AC5CQ (via W4ANE)
AP2AD, Ahmed Ebrahim, P.O. Box 65, Lahore, W. Pakistan
AP2Q (via AP2AD)
CIAAK, c/o Radio Peking, Communist China
CE4GU, Box 20, Rancagua, Chile
CN8GO, P.O. Box 2175, APO 30, New York, N. Y.
CT2AK, J. M. Raposo, P.O. Box 143, Ponta Delgada, San Miguel, Azores
DJ0LU (via DJ2RY)
DL4LE (via W1DBN)
DL5BN, Box 863, USAF, APO 175, New York, N. Y.
EA8CG (via K1DCL)
EI9AG (via G3ZY)
EP1AD, H. B. Leith (K4ORQ), ARCI, P.O. Box 951, Tehran, Iran
EP5X, Cmdr. B. F. Borody (W2AYN), c/o Interpol, Tehran, Iran
ET2US (via W4YWX)
ET3AZ, Box 3142, Addis Ababa, Ethiopia
FB8AA (via FB8BC)
FM7WX (via REF)
FQ8HR, Box 2013, Brazzaville, Republic of Congo
FQ8HV, P.O. Box 2225, Brazzaville, Republic of Congo
FY7YF (via W2FXA)
HC1LE (via W2MUM)
HC2VB (via W8EWS)
ex-HE9LAC (to HB9VW)
HK3RQ, W. Elasmar, Box 4468, Bogota, Colombia

HK4KZ, E. Forsten, P.O. Box 970, Medellin, Colombia
HK5IJ, Dr. G. Angel, Apartado Aereo 7868, Cali, Colombia
HK7ZT, A. Novales, Apartado Aereo 283, Bucaramanga, Colombia
HM1s AA through **AG** (via HMØHQ; see preceding text)
HM9A (to HMØHQ)
HMØHQ, Headquarters Station, Korean Amateur Radio League, Central Box 162, Seoul, Korea
HP1AO (via K4ASU)
HS1R, P. Rose, USARELM-JUSMAG, APO 146, San Francisco, Calif.
ex-HZ1AEH (see preceding text)
I1MOC, Box 361, Rome, Italy
I1TC, T. Tuscani, P.O. Box 144, Cremona, Italy
IC1IN (via W4TO)
IC1STP (to I1STP)
JT1AC, Box 369, Ulan Bator, Mongolian Peoples Republic
JT1KAB, P.O. Box 639, Ulan Bator, Mongolian Peoples Republic
JT1KAC, Box 708, Ulan Bator, Mongolian Peoples Republic
JZ0PO (via W2CTN)
KG6IVB, S. Goch, 1956-1 AACS Det., APO 815, San Francisco, Calif.
ex-KH6DMP-KA8KW, Col. G. Branch, Box 336, Griffiss AFB, N. Y.
KP4VB (via W7ZAS)
PX1EP, QSL to Gen. Mola 49, Zaragoza, Spain
RA1ZFF, Murmansk, North U. S. S. R., U. S. S. R.
RA2AAB, Kaliningad, U. S. S. R.
RA3VGR, Rudolf Sheshin, Ivanovo, U. S. S. R.
RA6JAB, North Caucasus, U. S. S. R.
RA6JAV, Yura, Caucasus, U. S. S. R.
RA6LDB, Rostov-on-Don, Caucasus, U. S. S. R.
RA6LDL, Rostov-on-Don, Caucasus, U. S. S. R.
RA6XAA, V. Mahlauk, Malchik, Caucasus, U. S. S. R.
RC2AFA, Moldodechno, Byelorussian S. S. R., U. S. S. R.
RD6KAR, Radio Club, Baku, Azerbaijanian S. S. R., U. S. S. R.
RI8AAZ, Tashkent, Uzbek S. S. R., U. S. S. R.
RN1AT, V. Shevdov (ex-RN1AAB), Karelskaj St., Apt. 19, Sortavala, Karelia, U. S. S. R.
RQ2AAG, 8 Smilchu St., Flat 4, Daugavpils, Latvian S. S. R.
RQ2AN, B. J. Greiza, Riga, Latvian S. S. R.
RR2RCK, Endel Pauksi, Kehra, Estonian S. S. R.
ex-TF2WBU (to W2FGD)
UA1AB, G. Junkovsky, Leningrad, U. S. S. R.
UA1BE, B. K. Altynow, Leningrad, U. S. S. R.
UA1CK, V. Cuploon (ex-UG6AF-UAØSB), Leningrad, U. S. S. R.
UA1DG, Ul. Communa 15-1, Leningrad-Petrodvorets, U. S. S. R.
UA1s FE FT (to UA1DG)
UA1GF, Constantin N. Popov, Leningrad, U. S. S. R.
UA1KBB, Radio Club, Electrotechnical Institute, Leningrad, U. S. S. R.
UA1KBW, Radio Club, Leningrad, U. S. S. R.
UA1NA, B. K. Inkow, Leningrad Region, U. S. S. R.
UA3BW, A. Shadsky, Poste Restante, Moscow K9, U. S. S. R.
UA3DR, L. Sharapov, P.O. Box 111, Moscow, U. S. S. R.
UA3EG, J-51, Izmolova St. 19.2, Moscow, U. S. S. R.
UA3GI, E. Kondratiev, P.O. Box 491, Moscow, U. S. S. R.
UA3KAH, Radio Club, Electrotechnical Institute, Moscow, U. S. S. R.
UA3RM, Tambov, U. S. S. R.
UA3YI, E. Razbitnov, Ul. Dzerzhinskoga, Dom 78, Kaluga, U. S. S. R.
UA4FE, V. G. Zhelnov, Penza, U. S. S. R.
UA4KAB, A. Perhuto, Radio Club, P.O. Box 19, Stalingrad, U. S. S. R.
UA4KYA, Radio Club, Cheboksary, U. S. S. R.
UA4LE, Anatol Orlov, Ulianovsk, U. S. S. R.
UA6KOB, Radio Club, Rostov-on-Don, Caucasus, U.S.S.R.
UA6KOD, Radio Club, Taganrog, Caucasus, U. S. S. R.
UA6LI, P.O. Box 15, Rostov, Caucasus, U. S. S. R.
UA9AA, Radio Club, Chelyabinsk, U. S. S. R.
UA9CM, North Tagil, U. S. S. R.
UA9KOT, Radio Club, Novosibirsk, Central Siberia, U. S. S. R.
UA9OM, A. F. Zenevich, Novosibirsk, Central Siberia, U. S. S. R.
UA0KKB, Radio Club, Vladivostok, E. Siberia, U. S. S. R.
UA0LA, P.O. Box 29, Vladivostok, E. Siberia, U. S. S. R.
UA0LO (to UAØLA)
UA0RE, P. Euelyanow, Yakutsk, E. Siberia, U. S. S. R.
UA0SB (to UA1CK)
UB5FG, Odessa, Ukrainian S. S. R., U. S. S. R.
UB5KAB, Radio Club, P.O. Box 27, Stalino, Ukrainian S. S. R., U. S. S. R.

VQ4ERR, one of Africa's best known DXers, used his communications know-how to serve effectively with fellow amateurs in spontaneous Congo-emergency networks this summer.

(Photo courtesy Raytheon and Hallicrafters via W1VG)

QST for

ZS3s DM and FF, left and right, are fast with QSOs and QSLs from Windhoek. *(Photo via K9VRV/4)*

UB5KBA, Radio Club, Lvov, Ukrainian S. S. R., U. S. S. R.
UB5KCA, Radio Club, Odessa, Ukrainian S. S. R., U. S. S.R.
UB5KIA, Radio Club, Polytechnic Institute of Communications, Ulitsa Leontovicha, Kiev 30, Ukrainian S. S. R., U. S. S. R.
UB5LV, A. Provalov, Kharkov, Ukrainian S. S. R., U. S. S. R.
UB5UW, V. N. Bushma, Kiev, Ukrainian S. S. R., U. S. S. R.
UC2AA, V. K. Benzar, Minsk City, Byelorussian S. S. R., U. S. S. R.
UC2AD, D. Korolenko, Minsk, Byelorussian S. S. R., U. S. S. R.
UC2AX, Minsk, Byelorussian S. S. R., U. S. S. R.
UC2KAB, Radio Club, P.O. Box 71, Minsk, Byelorussian S. S. R., U. S. S. R.
UD6KAB, E. Muradjan, Radio Club, Baku, Azerbaijanian S. S. R., U. S. S. R.
UF6FB, S. Kidnadze, Tbilsi, Georgian S. S. R., U. S. S. R.
UG6AG, L. Tomasian, Radio Club Ul. Teriana 73, Ereyan, Armenian S. S. R., U. S. S. R.
UG6AW, Erevan, Armenian S. S. R., U. S. S. R.
UI8AD, Tashkent, Uzbek S. S. R., U. S. S. R.
UI8AK, Radio Club, Tashkent City 31, Uzbek S. S. R., U. S. S. R.
UL7FA, Pavlodar, Kazakh S. S. R., U. S. S. R.
UL7GP, Alma-Ata, Kazakh S. S. R., U. S. S. R.
UL7KBH, Radio Club, Petropawlousk, Kazakh S. S. R., U. S. S. R.
UL7KBK, Radio Club, Petropawlousk, Jazakh S. S. R., U. S. S. R.
UN1KAA, Radio Club, Petrozavodsk, Karelia, U. S. S. R.
UO5AA, V. P. Glushkov, P.O. Box 1, Kagul, Moldavian S. S. R., U. S. S. R.
UO5PK, G. A. Pozdernik, Tiraspol, Moldavian S. S. R., U. S. S. R.
UP2AS, S. Uzdavinys, Kaunas, Lithuanian S. S. R., U. S. S. R.
UP2KCB, Radio Club, Pedagogical Institute, Shaulay, Lithuanian S. S. R., U. S. S. R.
UQ2AN (to RQ2AN)
UQ2CL, Riga, Latvian S. S. R., U. S. S. R.
UR2AO, T. Y. Tomson, Pussi, Estonian S. S. R., U. S. S. R.
UR2BU, K. Kallema, Oblast 091, Tartu, Estonian S. S. R., U. S. S. R.
UR2CX, J. Tuur, Tartu, Estonian S. S. R., U. S. S. R.
UR2KAA, Radio Club, Tallinn, Estonian S. S. R., U. S. S. R.
UR2KAE, Radio Club, Tartu, Estonian S. S. R., U. S. S. R.
VK9BW, W. Holland, P.O. Box 187, Rabaul, T. N. G.
VKØRH, QSL to R. Harvey, 20 Princess St., Canterbury, Sydney, N.S.W., Australia
VP3RS (via W4CAA)
VP5AB (via W4VPD)
VQ1s HT SC (via W2CTN)
VQ8BC, Royal Navy Radio, Vacoas, Mauritius
VQ9AIW (see preceding text)
VQ9TED, QSL to Box 1313, Nairobi, Kenya
VR1E, Capt. F. Strong, RAF, Tarawa, Gilberts
VR1F, QSL to 17 St. Albans Ave., Mt. Eden, Auckland, N. Z.
VR3KD (via K5ADQ)
VR3L, Christmas Island Radio Club, c/o RAF Det., Hickam Field, Honolulu, Hawaii
ex-VS1BB/ZC5 (to G3CCN)
ex-VS1EA (to G3KHT)
ex-VS6EE (to ZC5AE)
VS9AAC, R. W. Cake *(G3MOJ)*, c/o Block 1, Bottom West, RAF Khormaksar, BFPO 69, Aden (or via RSGB)
VS9ADL, Sgt. Leese, Sdqn. A. Royal Signals, BFPO 69, Aden (or via RSGB)
ex-W8UTQ/3V8 (see 3V8CA)
WØANJ/VE8, 926th AC&W Sqdn., Box 17, APO 446, New York, N. Y.
XEØALP, T. Fraser, P.O. Box 14, Los Mochis, Sinaloa, Mexico
YA1AC, J. A. Cole, USOM, U. S. Embassy, Kabul, Afghanistan
YI1RK (via RSGB)
YV5AKP, E. Stiassni, Av. Arboleta, Edif. San Jorge, Apto. 4, El Bosque, Caracas, Venezuela
YV5AMP, J. Mazzini Paiano, P.O. Box 2285, Caracas, Venezuela
ZC5AE, D. Phillips, RAF Det., Labuan, Br. No. Borneo
ZD2GUP, E. Howell, Nigerian Maintenance Svc., V.H.F., P&T, Ilorin, Nigeria
ex-ZD2HJG (via RSGB)
ZD2RFB, R. Brown, Mgr. Electrical Contractors Store, CFAO, Box 160, Lagos, Nigeria
ZK1AR (via G. Kratz, K4LRA, Box 85, Kendall, Fla.)
ZK1BS (via W7ZAS; see preceding text)
ZP5ET, c/o U. S. Embassy, Asuncion, Paraguay
ZS3HT, Box 2107, Windhoek, Southwest Africa
3A2BT (to G3FPK)
3A2BW (via W4TO)
3V8CA (via W4YWX)
4S7EC, Postbox 907, Colombo, Ceylon
ex-4S7KD (see VR3KD)
9N1SM (via K3KJF)
9Q5AV (to DL4AV)
9Q5FV, QSL to T. Irwin, 2501 Grayswood Av., Nashville, Tenn.
9Q5YM, c/o Embassy, Leopoldville, Congo Republic
9U5FW, P.O. Box 45, Kisenyi, Congo Republic

NOTE: Nothing necessarily accurate nor "official" about the preceding QSL suggestions. Might work, though.

Whence:

Europe — Next month the popular RSGB 21/28-Mc. Telephony Contest comes off, 0700 GMT the 3rd of December to 1900 on the 4th, wherein DXers world wide will chase down G GC GD GI GM and GW colleagues with a vengeance. Main requirements are that one must be single-operator on 10- and 15-meter phone to exchange RS-plus-QSO-number serials (47001, 58002, etc.) with the U.K. chappies. Each completed contact with a British Isles station scores five points; in addition, a bonus of 50 points can be claimed for the initial QSO with each numerical prefix – G2 G3 G4 G5 G6 G8 GC2 GC3, etc. — and a further 50-point bonus is yours for each additional ten G3s worked. Entries must (a) be clearly written or typed on one side of each sheet; (b) show date, band, GMT, call of station worked, exchanges sent and received, QSO and bonus for each contact; (c) be addressed to the Contests Committee, RSGB, New Ruskin House, Little Russell St., London, W.C. 1, England, postmarked no later than December 19, 1960; and (d) be accompanied by the signed statement, "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was —— watts." Certificates of performance will be available to country leaders and top scorers in VE VK W/K ZL and ZS call areas. Have fun! . . . . . Finland scored more points than Sweden, Norway and Denmark together in the 1959 Scandinavian Activity Contest. SSA (Sweden) now is hard at work handling entries for this year's affair . . . . . K8IXZ, stationed at Lajes Field in the Azores, visited CT2s AC AI AJ AK and BO. "All run about fifty watts on 3.5 through 28 Mc., phone and c.w. CT2AI is buil ling an 813 final. CT2AK has receiver troubles, and all have a rough time with a mains supply that swings from 130 to 75 volts under nighttime loads." K8IXZ can be reached at 1936th AACS Sqdn., APO 106, New York, N. Y. . . . . W1UED sends along word of something new in the certifications field from Hungary's Central Radio Club, P.O. Box 185, Budapest 4. It's called "Game of Rummy in the Ether" and requires data exchange with a certain combination of HA stations. *Very* tricky — check with the preceding address for particulars . . . . . A. Rugg learns REF (France) DUF diplomas have been is-

sued 1887, 1231 and 889 times in the first, second and third classes, respectively . . . . . K4TEA reports that W4-BPD's DX tour got under way with a 3A2BW kiloQSO, about 700 IC11N contacts, and another fine bag at W4-BPD/M1 . . . . . HB1TU/1 (HB9TU) tallied 600 QSOs (450 with W/Ks) and 65 countries in ten days of Liechtenstein single-sideband work in July. An SB-10, homemade 807s final, 75S-1 and triband quad really did a job. Albert recently entered W1WPO's Hq. DXCC files . . . . . PX1PF (DL9PF & Co.) ran off 4712 Andorra QSOs this summer, topping last year's PX1PF output by a considerable margin. "We'll open another rare spot next summer, but it's too early to talk about it." It's *never* too early, Walter — M0ON? . . . . . The "DXCC 2" of ex-11KN (No. 32) resulted from a successful files search even though the OM has been QRT since 1956. Now someone else holds his old call but Dr. Grossi hopes to return to the DX game soon with a fresh suffix . . . . . K9AJW had a pleasing visit with OK1LM in Europe this summer. W1TQS similarly hobnobbed with SM5CCE and opines: "Many of us in the U. S. do not enjoy the real pleasure of a DX QSO. Too often we are content with a mere three-minute contact and a promise of QSL." . . . . . Ham bibliophiles will be interested in the *International Radio Amateur Year Book, 1960–'61*, edited by G3MWZ. Covers a lot of DX ground.

Asia — "HM9A will be operated November 11th-30th from the Fifth National Science Exhibition in Seoul," advises the Korean Amateur Radio League. "We hope to contact many stations on 7-, 14-, 21- and 28-Mc. c.w. and phone." . . . . . K6BX and others are distressed by the apparent tardiness of JARL (Japan) correspondence concerning QSLs and certifications . . . . . "Just received my ticket as VS9AAC," writes G3MOJ from Aden. "I shall be here for two years, active on all bands 3.5 through 28 Mc. with 14-Mc. c.w. my favorite. I hope to give many W/K/VEs their missing VS9 QSLs." . . . . . EP5X, alter ego of W2AYN/EP, vies with EP1AD (K4ORQ) in satisfying world-wide DX appetites for Iran . . . . . KA2ZZ of HZ1AB-KG6ICD fame now goes back to W7YBI, the first chance he's had to use his U. S. call after holding it five years. "Some preparation is being made for another trip to Marcus island in the near future." . . . . . HZ1AB news via Ws 4MLE and 6NZL: W6NZL leaves HZ1AB for assignment in Spain where he can be reached at 1286th AACS Sqdn., APO 284, New York, N. Y., and writes, "A new arrival at club station HZ1AB is WA6CAD (ex-KZ5FZ), the new MARS director. The DX gang can expect a lot of c.w. activity from Jack on 7017.5 and 14,035 kc. To date he claims 45 fast countries with a mere fifteen watts input. His usual operating hours are 0400–0700 and 0100–0300 GMT. There are about fifteen active hams at HZ1AB now, so watch for plenty of s.s.b., a.m. and c.w. QSOs on 10, 15, 20 and 40 meters. The thought of little or no activity for me for the next three years on my EA-land assignment sets me back a bit, especially after thirteen lively months at HZ1AB. But getting together again with the XYL and harmonics should make up for it." W7AMM, newly stationed at Taif, Saudi Arabia, claims that authorization for another HZ station is being sought. The last activity at Taif is believed to have occurred some years ago under the call HZ1AEH . . . . . Radiogram via W6LGG, K9s GDQ and OZM: "KR6KV is now on 7005- and 7040-kc. c.w., 7070-kc. a.m., with sideband coming up. My home call is K9IKP." . . . . . W4PLL keeps an eye and ear on Cyprus after hearing that a new treaty will result in a British base *à la* KG4 . . . . . Club Asian notes courtesy FEARL/M and MARTS: KAs 2JI, 2RE 8CK and 8PB are new arrivals on DX bands. . . . KA2s BW and IE outfitted VU2KM with a crystal mike, a volt-ohmmeter and other oddments that improve Karta's signal significantly. . . . VS1EA's 100th country was worked on the night he closed down for return to G3KHT.

Africa — "With ZS9 activity scheduled by ZS6IF this month, the long-coveted AAA certification will be within the reach of today's DX generation, yours truly included." W8KX refers to the ZS61F/ZS9 c.w. eruption due November 5th-14th on 7005, 14,010 and 21,015 kc. W4PLL learns that Lambert may encounter some postponement . . . . . From former VQ6AB via W1WPO: "After becoming 6O2AB I worked 38 quick countries on 14 and 21 Mc. I may be leaving here by late December. VQ6LQ already has departed, and 6O2LG (ex-VQ6LG) will be leaving soon for England. VQ6GM now signs 6O2GM at Berbera and should be very active for some months to come." . . . . . VQ4GQ & Co. enlisted a v.f.o. 50-watter, HRO receiver and prefabricated ground-plane for their late-summer Zanzibar probe as VQ1s HT and SC. At his home station VQ4GQ likes 14 or 21 Mc. around 1900 GM.T, according to W2CTN . . . . . VQ4ERR reports via Raytheon and W1VG: "The Congo 'SOS' flap now is over and my house is free of reporters, consuls, secretaries — life is returning to normal again. My station was chosen to route messages directly to Belgium because of the solid punch of an HT-32 on s.s.b. Every message I got for Belgium was delivered within minutes to a network of Belgian amateurs who were operating 24 hours a day accepting traffic from Africa." . . . . . Excerpts from EL4A's informative Liberian journal: "W4BEQ has joined the staff here and will be signing EL4B, mostly 15-meter sideband. Bev and Mary, 13-year-young ladies, sign EL4s G and M, respectively, on 10 and 15 phone around 1700. They'll be on the lookout for other YLs, especially teen-agers. EL4E is back at Placeka with a Valiant and 510-foot rhombic on 20 phone. EL5A has a DX-35 going. I had only 740 QSOs at EL4A in August but the log will be on the upswing next month with improved conditions and contests in the offing." . . . . . Nigerian news thanks to ZD2JKO (G3JKO): "ZD2KHK will be starting up from Mubi, Cameroons Trusteeship Territory, this month or next, and hopes to use s.s.b. ZD2s KHP and PJB are new licensees in the eastern region, both interested in sideband work. Here in the northern region ZD2s AMS ATU BRG GUP JKO and RJO keep the flag flying; ZD2s GUP and RJO have no mains supply and must rely on generators for their not-too-frequent appearances on DX

IS1ZUI does very well with 35 watts and a long-wire in Cagliari, receiving with a BC-348. Sardinia-seekers can often find Paolo on 20 c.w. around 2200 GMT. *(Photo via KP4RK)*

bands. ZD2s DCP FNX HHT and JM represent the western region. . . . Most FQ8s are in French Congo but FQ8s HO and HW are quite active from Tchad. Amateurs in the French republics are to be found chiefly on 14-Mc. c.w. around 2000–2300 and 0500–0800 GMT, also 21- and 28-Mc. phone from 0600 to 1900. Most do not speak English and prefer to be called in French. Say, just heard news from Kaduna that the northern region of Nigeria has formed a commercial TV company. TVI looms ahead!" ZD2JKO's QSL from MP4BCV gives him 100 countries confirmed, seven months and 5300 QSOs after Mike fired up as a ZD2. QSLs from 53 additional countries are still awaited. ZD2JKO adds, "The Congo Republic (9Q5) now is practically denuded of amateurs except for some American missionaries. ON4TT keeps a 24-hour watch on 21,300 kc. for 9Q5 traffic. The whole Congo situation would have been much more chaotic if it were not for amateur radio." Neighbor ZD2DCP writes W2CTN from Ikeja, "Have been on 14 and 21 Mc. lately with some good openings to the U. S." . . . . . K9OKD hears from 3V8CA (W8UTQ): "I'm on daily from 1500 to 2300 GMT using 21,050, 14,050 or 14,285 kc. W4YWX and I hold frequent schedules on 21,050 at 2130." . . . . . K6BX has CR6CA's favorite DXpeditionary frequencies as (c.w.) 14,075, 14,100, 21,075, 21,100; (phone) 14,197, 14,247, 21,247 and 21,447 kc. Joao was aiming for early operational visits to Sao Thome, Annabon, Togoland, Nigeria and Gabon, you know . . . . . ZS2U calls attention to the Golden City Award available to W/K/VEs and others who confirm contacts with fifteen different Johannesburg ZSs since May 30th of this year. Check with Awards Mgr., P. O. Box 2327, Johannesburg, S. Afr., for complete GCA specifications . . . . . WGDXC reports that K2HWT/ZD8/mm, anchored off Ascension, recently shook up the 14,350-kc. sideband crowd. So near and yet! . . . . . NNRC has W4BPD's November DXpeditionary itinerary as Farquahar isle, Madagascar, Glorieuses, Astove, Aldabra and the Comoros. Next month, if all goes well, come Tromelin, Reunion, Mauritius, St. Brandon, Tanganyika, Kenya, Uganda, Somalia and French Somaliland in that order. After the first of the year Gus will try for Kamaran island (VS9) before heading back to Carolina. W0s AIW MAF UQV and others down that way intend to join W4BPD on some of these stopovers . . . . . According to VERON, ZD9AM replaces ZD9AF on Gough isle, favoring the 14-Mc. c.w. approach.

Oceania — ARRL Director W6MLZ, host W6RO and a news clipping from KL7PI record this year's U. S. visit by famed VR6AC and XYL. Floyd's slide collection enthralled a meeting of the Associated Radio Amateurs of Long Beach in early September. It was way back in 1790 that Floyd's great-great-grandfather, HMS *Bounty* boatswain William McCoy, settled on tiny Pitcairn with others of the crew and several Maori folk. Pitcairn's 148 inhabitants now keep themselves very busy agriculturally and artistically.

(Continued on page 146)

• New Apparatus

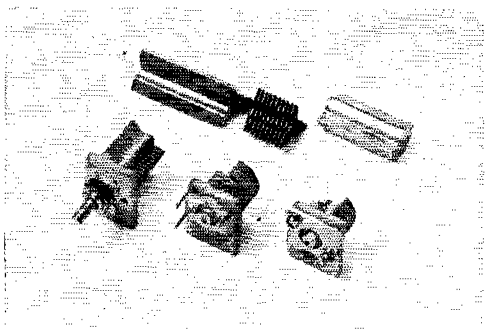
New Miniaturized Variable Capacitors

THE three variable capacitors shown in the photograph represent three styles of miniaturized variable capacitors recently made available by the James Millen Mfg. Co. of Malden Massachusetts. The one with the extended ⅛-inch shaft has a maximum capacitance of almost 36 $\mu\mu$f., yet it measures only about $\frac{9}{16}$ inch wide, ¾ inch high and $\frac{25}{32}$ inch deep. The surprising thing about the construction of these small capacitors is that their rotors and stators are machined from solid bars of extruded brass. The photograph also shows some extruded brass stock. This method of construction simplifies alignment problems and insures reliability and high *Q*.

Electrical connection to the rotor is made by a lug that projects out from the capacitor assembly. However, the stator connection is made by connecting a lead to a hole (or holes) in the stator itself. This low-inductance connection makes the capacitor a "natural" for v.h.f. applications.

The insulation of the capacitors is either Teflon-base material or steatite. The capacitors available through distributors will have steatite insulation.

In addition to the single-hole mount extended



⅛-inch shaft series (series 25000-E) there is the screwdriver slot series which is mounted by two 2-56 machine screws (series 25000-S). Also available is a screwdriver slot series mounted by four turn-down tabs (25000-T) which should not only find application in conventionally-constructed equipment, but also in printed-circuit gear.

Each series of capacitors is available in three maximum-capacitance values of approximately 16, 25 and 36 $\mu\mu$f., with corresponding minimum capacitances of about 2, 3 and 4 $\mu\mu$f., respectively

— *E. L. C.*

FEEDBACK

In the circuit diagram of the PHJ-1 receiver in the September issue, the 0.01-μf. capacitor at the grid of V_{1B} should be connected to ground instead of the cathode.

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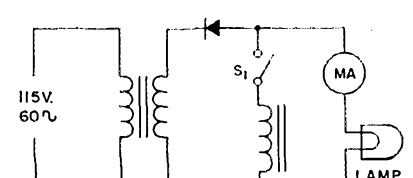
Only the author has spotted this so far, but there should be a 470K resistor across the 1N34 in Fig. 3 on page 35 of March, 1960, *QST*. (S.S.B. Exciter Circuits).

Quist Quiz

Clifford Buttschardt, jr., W6HDO of Santa Barbara, submits this sneaky one for the quiz kids:

In the circuit below, the d.c. milliammeter reads full scale and the lamp glows dimly. What happens when S_1 is closed?



Strays

W2EKM was making a long trip by auto one night and encountered extremely heavy fog on a mountain road in Pennsylvania. Visibility was perhaps 30 feet, and driving was, of course, hazardous. But W2EKM partially solved the problem by using a radar of sorts. He turned on his mobile 6-meter receiver and was able to hear the ignition noise of approaching cars several minutes before they became visible in the fog. After a little practice he was able to estimate the range of the approaching cars and trucks quite satisfactorily.

—•••—

WA2GGB (14 Capitol Place, Huntington Station, N. Y.) wants to make a little contribution to the fraternity in the form of tags with one-inch lettering for the fellows who have mobile rigs in the car but no call letter plates to indicate they are hams and not deputy sheriffs or hot rodders. If you want one of these free tags, send WA2GGB your name, call, address, and a 4¢ stamp. Overseas stations should send equivalent first-class postage.

—•••—

Ode to W2MXJ (See page 164, Sept. *QST*)

To get more drive on ten you must
Install the rig in car.
And when you hit the open road
You'll get more drive by far. — *K2GFG*

Happenings of the Month

Election Results
VE Phone Expansion
Army Use of 144, 220 Mc.

VE PHONE EXPANSION

Effective September 15, voice bands in Canada were expanded to the following figures:

7150–7300 kc.
14,100–14,350 kc.
21,100–21,450 kc.
28,100–29,700 kc.

Shortly after the change in the U. S. 14-Mc. phone band, some 1500 Canadian amateurs signed petitions seeking expansion of their 7-, 14- and 21-Mc. voice bands and submitted them not only to the Department of Transport but also to Parliament. In the various official discussions which followed, Messrs. Reid (VE2BE) and Eaton (VE3CJ), then director and vice-director of the ARRL Canadian Division, submitted a compromise proposal calling for only one-half the number of new kilocycles sought for phone in the petitions. The Department of Transport then undertook a poll of opinion of VE amateurs, seeking an expression of preference for the petition proposals, the current sub-bands, or the Reid-Eaton compromise. The 28-Mc. band was added to the poll postcard, though no "compromise" figures were here involved. The results were as follows:

Band	*Petition*	*Existing*	*Compromise*	*Total*
7	1243	867	905	3015
14	2001	811	1029	3841
21	1612	887	1189	3688
28	1925	1305	x	3230

In consideration of the results, the Department of Transport then acted to expand the voice sub-bands.

A simultaneous action removes the restriction to the use of only French or English; now any language may be used, provided a notation is made in the log to that effect, including the name of the person speaking, and provided that station identification is still transmitted in either French or English.

ELECTION RESULTS

In the current elections for director and vice director taking place in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions, two incumbent directors and one present vice-director were declared re-elected by the Executive Committee, being the only candidates found lawfully nominated and eligible for their positions.

Morton B. Kahn, W2KR, will start his second term as director of the Hudson Division on January 1, 1961. **Raymond E. Meyers, W6MLZ,** also was re-elected, having completed two years as director of the Southwestern Division. **Philip E. Haller, W9HPG,** continues as vice director of the Central Division for his second term.

The Hudson Division gets a new vice director, **Harry J. Dannals, W2TUK,** of Huntington, N. Y. Harry is well-known to most amateurs in the metropolitan area, having served as an assistant director of his division since 1953 and as SCM of the New York City — Long Island section since 1955. W2TUK is a past president of the Nassau Radio Club, and is currently president of the Hudson Amateur Radio Council. He currently holds appointments as ORS, OPS, OO and OES, and is a member of AREC, and of the A-1 Operator Club. The new vice director earns his living as a senior engineer with the Sperry Gyroscope Company at Great Neck.

All other offices in the eight divisions are contested, and ballots have been sent to the Full Members of those divisions. The full text of the Executive Committee meeting minutes can be found at the end of this department.

10- KMC. RADIOLOCATION

Recently Tellurometer, Inc., a radiolocation service operating mainly in the area of the Gulf of Mexico, sought from FCC permission to oper-

W80LJ/MM is now in full operation aboard the hospital ship *Hope* in the Pacific, operating mostly sideband on 14,345, 21,445, and 28,650 kc. for the purpose of handling personal traffic between medical personnel aboard ship and their families and friends back home. The station has special temporary permission to use 14-Mc. maritime mobile on the high seas outside Region 2 until December 31.

ate in the band 10,000–10,500 megacycles. The Commission has granted the request, subject to the following conditions: (1) c.w. emission only (no pulse); (2) no harmful interference shall be caused to either the amateur service or the Government radiolocation service; (3) the non-Government radiolocation service must accept any interference it experiences from either amateur or Government operations; and (4) the non-Government radiolocation service is limited to survey operations using transmitters with a power not to exceed one watt into the antenna.

MINUTES OF EXECUTIVE COMMITTEE MEETING
No. 276
SEPTEMBER 26, 1960

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met in West Hartford, Connecticut, at 9:38 A.M., September 29, 1960. Present: President Goodwin L. Dosland, in the Chair; General Manager A. L. Budlong; Directors John G. Doyle, Milton E. Chaffee, Morton B. Kahn and Raymond E. Meyers; Vice-President F. E. Handy; and Treasurer David H. Houghton. Assistant General Manager John Huntoon and Assistant Secretary Perry Williams were also present.

The Committee proceeded to examine nominations in the director elections. The Committee made findings and ordered actions as detailed below, all by unanimous action. The views of First Vice-President W. M. Groves, expressed by telegram, were in concurrence.

CENTRAL DIVISION

For Director:
John G. Doyle, W9GPI, was found lawfully nominated and eligible. A petition was found for Harold Sever, W9FM, but with some question as to its timely arrival due to the use of the registered mail service; on motion of Mr. Doyle, unanimously VOTED that the petition is found valid. The Committee then ordered both names listed on ballots to be sent to Full Members of the Division.

For Vice-Director:
Philip E. Haller, W9HPG, was found lawfully nominated and eligible. Being the only eligible nominee he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice-Director of the Central Division for the 1961–1962 term without membership balloting.

HUDSON DIVISION

For Director:
Morton B. Kahn, W2KR, was found lawfully nominated and eligible. Being the only eligible nominee he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Director of the Hudson Division for the 1961–1962 term without membership balloting.

For Vice-Director:
Harry J. Dannals, W2TUK, was found lawfully nominated and eligible. Being the only eligible nominee he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice-Director of the Hudson Division for the 1961–1962 term without membership balloting.

NEW ENGLAND DIVISION

For Director:
Milton E. Chaffee, W1EFW, Robert Y. Chapman, W1QV, and Ernest A. Coons, W1JLN/W1FOE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice-Director:
Bigelow Green, W1EAE, and Jeffrey I. Weinstein, W1JMN, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

NORTHWESTERN DIVISION

For Director:
William H. Bennett, W7PHO, Harold W. Johnston, W7PN, and R. Rex Roberts, W7CPY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

Federal Communications Commission
Washington 25, D. C.

Public Notice
September 15, 1960

Temporary Use of Amateur Frequencies for Army's Exercise *South Wind* Not Expected to Cause Interference

The Federal Communications Commission has been asked by the Department of the Army to cooperate in arranging for temporary use of certain frequencies on a non-interference basis to the Amateur Service in the 144–148 Mc. and 220–225 Mc. amateur bands. The request is for the period October 17 to November 12, 1960, and is based on the fact that the U. S. Army Radio Frequency Engineering Office has exhausted all available Government frequencies in the 135–400 Mc band for radio relay operations needed to support a large Army field exercise (EXERCISE SOUTH WIND) which will involve 100,000 troops in the Eglin, Florida, area. The specific amateur frequencies are:

144.25 Mc.	220.75 Mc.
144.75 Mc.	221.25 Mc.
145.25 Mc.	221.75 Mc.
145.75 Mc.	222.25 Mc.
146.25 Mc.	222.75 Mc.
146.75 Mc.	223.25 Mc.
147.25 Mc.	223.75 Mc.
147.75 Mc.	224.25 Mc.
220.25 Mc.	224.75 Mc.

Although this type of operation would not normally be conducted on amateur frequencies, it appears that the proposed temporary military use of these eighteen frequencies, as requested, would not cause any undue hardship to amateurs in the area. Because of the locations involved and the directional antennas employed, it is believed that any interference to amateurs will be unlikely, but in the event it does occur, it is understood that the Army will take immediate remedial action.

Because of these considerations, the Commission has offered no objection to the proposal and, on behalf of the Army, requests the voluntary cooperation of radio amateurs within interference range of the maneuver area. Such cooperation will not only contribute toward the success of *Exercise South Wind* but will also further enhance the excellent reputation which radio amateurs have established over the years.

For Vice-Director:
Robert B. Thurston, W7PGY, was found lawfully nominated and eligible. A petition was found for Elizabeth H. Taylor, W7NJS, but with some question as to her membership continuity; on motion of Mr. Kahn, unanimously VOTED that Mrs. Taylor is found eligible. The Committee thereupon ordered both names listed on ballots to be sent to Full Members of the Division.

ROANOKE DIVISION

For Director:
A petition was found for Thomas Kincaid, K4JLW, but was declared invalid because it contained less than the required signatures of ten Full Members. P. Lanier Anderson, Jr., W4MWH and Bannie L. Stewart, W4CE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice-Director:
Joseph F. Abernethy, W4AKC, and Lacy P. Wicker, W4ACY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

ROCKY MOUNTAIN DIVISION

For Director:
Charles M. Cotterell, WØSIN, and Carl L. Smith, WØBWJ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

(Continued on page 152)

Correspondence From Members-

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

MOON BOUNCE — BRAVO!

¶ Bravo for the moon-bounce experiment! It is refreshing to be reminded again that somewhere beneath the rubbish of commercialism that now dominates our ham fraternity there still burns a small fire of creativity, ingenuity and determination that in the not-too-far-distant past was the very essence of our hobby. — *Arthur S. Gillespie, jr., W3JHT, New Kensington, Pennsylvania.*

WELL DONE!

¶ The members of the Jefferson Barracks Amateur Radio Club wish to express appreciation for the fine job W1HDQ has done in the past twenty years with his v.h.f. column. We also wish to extend our best wishes and success to Ed's successor, and hope he continues the fine job. — *William Armstrong, KØKWJ, Secretary, Jefferson Barracks Amateur Radio Club, St. Louis, Missouri.*

¶ I just finished reading "The World Above 50 Mc." in *QST* for September. I've been reading that column *first* for seven years now, . . . Ed Tilton's column has made life both pleasant and rewarding for me and, I should say for the whole v.h.f. gang. I'll be looking forward to the technical articles by "EPT". — *Bob Mulholland, WØTGC.*

¶ As a Novice-turned Tech-turned General, v.h.f.-born and v.h.f.-bred, I've followed W1HDQ's column since s.w.l. days, and never failed to be fascinated by "6 and Down." The timely "editorials" and reviews (plus talks I've caught at Syracuse, Albany, etc.) have, as far as I'm concerned, always hit the spot and been tops in the commentary field. If the column continues half as good as it has been, I'll be genuinely satisfied. — *Bruce Steinberg, K2VDR, Long Island City, New York.*

¶ Sorry to read in Sept. *QST* that Ed Tilton is giving up the "World" column but sure glad to know he will continue in the v.h.f. field.

The column has always been my first reading in *QST* and W1HDQ's various construction articles have been most helpful. — *Nat Stinnette, W4AYY, Umatilla, Florida.*

¶ . . . Please convey to your staff my hearty endorsement of the recent increase in your v.h.f. group. In this era of "storebought gear", "net-type operation", etc., on the low frequency bands, it is good to see more emphasis on v.h.f., the only frontier left to the amateur experimenter. — *Alan T. Margot, W6FZA, Porterville, Calif.*

COMPLIMENT

¶ *QST* has been an aid to pleasure and education for me. It has been a readily available reference to look to as my interests change from one part of amateur radio to another. — *B. F. Gallagher, K6BFJ, Santa Barbara, Calif.*

VERSATILITY

¶ About Ken Glanzer's article in August, 1960, *QST* on inverted V-shaped dipoles:

There are probably many similar antennas in operation — not by design, but because the center of the dipole is attached to the highest available place. Unless the poor ham is lucky enough to have a tree or two as high as Ken's, the ends of the dipole must slope downward, thereby forming the inverted V. Experience here at WV2JTK confirms Ken's conclusions: element length is somewhat longer than the *Handbook* calls for; directional properties are not pronounced and signal reports are generally higher than expected. Also the inverted V is cheap and easy! — *Philip L. Crank, WV2JTK, Saugerties, New York.*

STATUS QUO AT KR6

¶ The membership of this Club have for several months been beseiged by amateur radio operators who want to know why the Okinawa stations crowd into 14.325 to 14.350 Mc. when the band is open to the States.

A ruling of the Tri-Service Amateur Radio Board in the Ryukyu Islands published a directive dated 1 October 1959 as follows:

"All 3A3a (single sideband) radiotelephone stations operating in the 14-Mc. band are restricted to that portion of the band between 14,325 kc. and 14,350 kc. while handling message traffic."

It will be noted that double sideband and amplitude modulated signals are not so restricted. KR6 stations are also restricted from use of the 20-meter band between 14.2 Mc and 14.3 Mc.

The Okinawa Amateur Radio Club passed a resolution to the Tri-service Amateur Radio Board asking that these restrictions be rescinded. This request was summarily refused. At present that is the *status quo*, which is Latin for the mess we're in. — *George F. Kendrick, KR6IM, Secretary, Okinawa Amateur Radio Club.*

QGT?

¶ Isn't it high time to adopt a single time designation for all of us throughout the world? I have seen several comments about it recently, and it does seem to make very good sense. GMT would, of course, be the common zone due to its relationship to the date line. I would like to add a suggestion that the term "GMT" be omitted and that wherever time is indicated it would be understood to be GMT. Reference to it might be made as a "Q" signal: "QGT" or "QGT?" in our lingo. — *John B. Morgan, WØRA, St. Paul 5, Minn.*

BO PEEP SUPERCODE

¶ Rod Newkirk's Bo Peep supercode (p. 71, July) which he describes as "landwire-like" might better be "waterwire-like". Under the name of Cable Morse or Three-Position Cable Code it has been in use for many years on manual and non-synchronous-automatic cables. Current going one way is a dot, the other way a dash; no current is a space. While not as efficient on the cable as a synchronous code, it allows the connection to a manual radio or land line circuit to be made with a standard reperforator rather than a complex translator. This can be rather important in out-of-way corners of the world.

The code is described briefly on pp. 507–8 of the third edition of the Federal Telephone and Radio Corporation's *Reference Data for Radio Engineers.* — *Norman H. Williams, W6BHI, San Francisco, Calif.*

MIKE IN HAND . . .

¶ In looking thru June *QST*, I noticed pictures of the League appointees and contest winners showing them with microphones in their hands, and in no case is there a key even in sight. To make matters worse, in looking through the YL pictures, I found not a mike in sight. Does this mean the real operators are now all female?

Along these same lines, the whip antenna is no longer a symbol of the mobile amateur, probably because of the many other communications services and the current Citizen's Band activity; but a whip antenna on a car with a ham call that does not recognize dit-dit-dit-dit dit-dit is a sad state of affairs.

With so much grumbling on the bands indicating that we need more frequencies, I would like to suggest a different solution: Suppose the FCC were to randomly select amateurs and give them a one-day notice to appear for re-examination of their code proficiency. I believe this would make more space on the bands without any more frequencies being required! — *G. S. Van Dyke, jr., W3ELI, Philadelphia, Pa.*

(Continued on page 148)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, W1DGL, Ass't. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

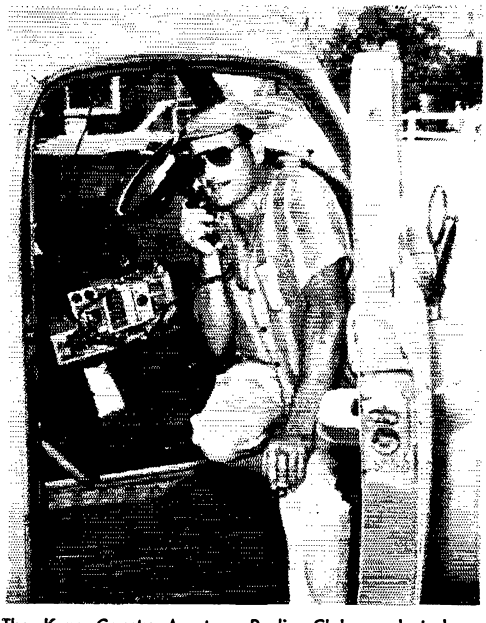
Greenwich Mean Time. In August *QST* this column explained Greenwich Mean Time and passed along an ARRL Board recommendation that to conform to best communications practice and avoid confusion, especially in radio work beyond one's home town or state, we use GMT in setting up schedules, in making reports and in our station logging. The use of a 24-hour system of designations is a desirable first requisite to logging in GMT. That was explained. We included a *complete conversion table* for ready reference.

Using GMT avoids arguments and misunderstandings which are all too common with localized time differences. Now that we have discontinued Daylight (or summer) time, it is a good idea for the radio man to get station logging arrangements and the station clock set to use Greenwich in all radio operations. If you post such a table as we presented in August *QST*, it need only show your U. S. A. time and Greenwich at a glance. The advantage of GMT is that any radio references are a common language, *the same time everywhere.* (You can cut the conversion chart from page 81, August *QST* or make your own.)

Time Designations. More than one amateur has wondered about the letter suffixes that are noted in some traffic preambles that carry a military style date-time group, such as 051800Z. The first two figures always refer to the date in the current month; the next four digits denote the 24-hour time designated, an I the letter identifies the time zone A date-time group ending in Z refers to GMT; R time refers to EST; S to CST; T to MST; U to PST; Q to AST; and W to HST, etc. The above example illustrates such a group where the date is the 5th and 1800 GMT the time. To quote a military service instruction coping with the time problem: "Zulu Time will be used exclusively to avoid confusion." Wise words, indeed.

Gaining Confidence in Operating. Overconfident amateurs often call CQ or make lengthy calls, when they could do better for themselves by listening, calling other stations and exercising more judgment. Then we have many good new men who want to be operator-perfectionists, but at first are apprehensive and fearful, proceeding with shyness and trepidation. Some of these lads become the builders who construct, but operate little, thereby missing a full amateur operating life. To every newcomer and amateur who would also become a versatile and skilled operator, a hearty welcome!

Our advice, to make the most of amateur radio, is not to be brash, but to have you not hesitate in *operating.* Don't be afraid to throw the switch and work your fellow amateurs, or afraid to (1) report that first time into a net, (2) take traffic when offered, (3) try NCS, (4) originate a mes-



The Kern County Amateur Radio Club conducted an emergency test using only emergency power. The picture shows K6MWW operating on 10 and 2 from the truck used to house the emergency power supply, cable and antennas.

sage, or (5) speak before the radio club. True success and enjoyment in ham radio come from making a start, observing closely and improving technique as we go along. Use the opportunities available. Each can be a stepping stone to greater things. Pity the short wave listener who depends on vicarious experiences, and so accomplishes little. Get with two-way operating in ham radio and experience direct accomplishments instead of second hand ones.

To gain confidence and operator ability don't stand on the sidelines. ARRL offers three basic station type SCM-appointments. The Official Experimental Station post is for the Novice or Technician propagation-reporter and v.h.f. traffic handler. Official Relay Station or Official Phone Station appointment similarly recognizes the consistent trafficker supporting nets or skeds, on c.w. or phone respectively. Published standings, traffic reports, Station Activities, and ARRL certifications such as BPL, CP, WAS, RCC, and DXCC, will help you spell out personal progress in operating results and ability, as your station participates. By taking part in *organized* amateur radio you get more. There's AREC and RACES enlistment too. These all give recognition to each operator, and also increase the ability of amateur radio itself to do essential communicating *within our amateur radio.* Don't stand on the sidelines.

Shall We Have More Slow Speed Section Nets? A good number of slow speed nets showed up in the ARRL Net Directory issued last December. There's no better or more pleasurable way to get code and procedure experience up fast than to belong to a regular net. Novice and other nets have demonstrated this. Amateurs interested in a slow c.w. net should report their activity and desire to the appropriate SCM. His address is given on page 6 of this *QST*. SCMs can help, either by telling you of existing nets or assisting in getting one on the air. Our ARRL operating booklet gives the basic know-how on setting up nets and running them. The Net Directory will give you the time of operation of all nets so many can be monitored to see how nets function. We shall welcome all reports on the organization of slow-speed traffic nets so we can arrange to list them. If not re-registered for the new net directory ask for CD-85 for this purpose as you get organized.

Further FCC Suspensions. (1) Accepting Compensation. (2) Working Off-frequency and Failing to Answer FCC. (3) Using General Privileges before Receiving General Class License. In the first instance the suspension was for violating the rule which prohibits amateur stations from handling formal or informal communications for hire (or for material compensation, direct or indirect, paid or promised). This license was suspended for the full remainder of the license term. In the third action reported below note that the 75-watt limit was exceeded in addition to unauthorized change of call and use of other than the Novice frequencies.

(1) FCC took under consideration the suspension of the General Class Amateur Radio Operator License of Arthur S. Arroyo (K6QZM) San Diego, Calif., *it appearing* that on numerous occasions, Sept. 1959 to Jan. 28, 1960, the licensee used his amateur radio station for the transmission or receipt of messages for hire, or for material compensation, direct or indirect, paid or promised, transmitting communications for hire, for numerous members of the crew of the vessel "Elsie A" on which his amateur station was installed; *it further appearing* in addition to the above violation of Sec. 12.102 of FCC rules, that the licensee also violated Sec. 12.94 (b) which provides that amateur mobile stations shall be separate and independent of ship or aircraft equipment, by using a radio receiver and antenna belonging to the National Marine Terminal Company which was part of ship radio telegraph station WIHC aboard the same vessel. The Federal Communications Commission ordered (June 24, 1960) that the General Class Amateur Operator License of Arthur Arroyo BE SUSPENDED for the remainder of the license term, that is, until March 5, 1961. This action was effective from July 23, 1960.

(2) FCC took under consideration the suspension of the Extra Class Amateur Radio Operator License of Raymond D. Balch, (W8ZVL) Detroit, Mich., *it appearing* that on June 11, 1959, W8ZVL was operated outside the 14–14.35 Mc. amateur frequency band (measured deviation of 10 kc. low) and at the same time besides this violation of Sec. 12.111, he violated Sec. 12.133 of FCC rules (rough modulated emission) in his operation; *it further appearing* that his June 23, 1959 answer to the official notice transmitted by the Anchorage, Alaska FCC office was not satisfactory, and subsequent letters dated July 1, July 22, and August 7, though received, were not answered by him; this failure to answer official correspondence violated Sec. 12.155 and 1.61 of FCC rules. The Federal Communications Commission ordered (Dec. 30, 1959) that the Extra Class Amateur Operator License of said Raymond D. Balch, BE SUSPENDED for three months. This action was effective from Aug. 1, 1960.

(3) FCC took under consideration the suspension of the General Class Amateur Radio Operator License of Larry K. Reynolds (WA6GKK) Redlands, Calif., *it appearing* that on Feb. 20, 1960 while holder of Novice Class License WV6GKK and before issue of General Class License WA6GKK later in the month, licensee operated his station in the 28, 21, 14, 7 and 3.5 Mc. frequency bands, using A-1 emission, contrary to the terms of his license, violating Sec. 12.23 (e) (2) and 12.28 of the FCC rules; *it further appearing* that licensee at the time used a plate input power in excess of 75 watts and that he transmitted call letters not assigned by proper authority to his said station, a violation of Sec. 12.158. The Federal Communications Commission ordered (Apr. 18, 1960) that the General Class Operator License of Larry K. Reynolds BE SUSPENDED for a period of three months. This action was effective from Apr. 26, 1960.

The November "SS"! The ARRL Sweepstakes is our top operating event, to climax the year. Don't miss this chance to give your rig a *real* workout. All U. S. and Canadian amateurs are invited to participate. QSO results are obtained easily with *low power*, as well as high, and the chance for all to go far toward the WAS award has probably accounted in some measure, for the great popularity of this event.

See the full announcement and rules for this year's "SS" (to be held November 12–14 and November 19–21) on page 50 in this issue. Two separate week ends are allowed to minimize the effect of any short period of poor radio conditions, and also to make it possible for some to work all 50 states. One hint concerning the SS "exchanges" required or as used in message preambles too for that matter. It's *just as fast*, more explicit and definite and avoids confusion to give NOV 12 instead of the word "date." CU in the SS, we hope. —*F. E. H.*

MEET THE SCMs

Glancing up from the rig and wearing that broad smile is Rhode Island SCM, John E. Johnson, K1AAV, New England Division Assistant Director and member of the Associated Radio Amateurs of Southern New England. He enjoys operating with the club station, W1AQ, with portable equipment during hurricane and other emergencies, and teaching Morse Code to the Boy Scouts; John also holds classes for future hams in his home QTH.

SCM Johnson has been a licensed amateur since 1956. K1AAV's ye olde rig, located on the second floor of an old colonial cottage, consists of an Apache TX-1 for 80 to 10 meters and a Sixer HW-29 for 6 meters. Receivers are an HQ-170 and S-102; antennas are an 80-meter center-fed half-wave, 80 through 10 Hy-Gain 18HT vertical and 20-, 10- and 6-meter beams. Eighty and 6 meters are his pet bands.

Other hobbies are photography, in which he has received awards for his outstanding work, and stamp and coin collecting; his favorite sports are hiking, camping, swimming and fishing. He is employed by the Gorham Mfg. Company as a design engineer.

Your SCM is the backbone of organized section activity.

R.I. SCM, K1AAV.

DX CENTURY CLUB AWARDS

HONOR ROLL

ZL2GX....300	W1ME....296	W2BXA....293
W1FH....300	W9YFV....295	W7AMX....293
W9NDA....299	W6EBG....295	W4DQH....292
W3GHD....299	W7GUV....294	W6ADP....292
W8HGW....299	W6IENV....294	CE3AG....292
W6AM....299	W5ASG....294	W8UAS....292
PY2CK....297	W8DMD....294	W5ADZ....292
W4BPD....297	W8BKP....294	W6DZZ....292
W8JIN....297	W9RBI....294	ZS6BW....292
W2AGW....297	W7GBW....294	W6NNV....291
W2HUQ....297	W3KT....294	W3BES....291
W8BRA....297	ZL1HY....294	W6TT....291
W6BYG....297	G3AAM....293	G4CP....291
KV4AA....297	G2PL....293	W4TM....291
W6CUQ....296	W1GKK....293	LU6DJX....291
W3JNN....296		W8KIA....290

Radiotelephone

PY2CK....297	W3RIS....289	W8KML....286
VQ4ERR...292	W1FH....289	W6AM....286
ZS6BW....292	W8HGW....288	4X4DK....285
W8GZ....292	W9RBI....288	W7PHO....285
W8BF....290	W6YY....287	CX2CO....284
W3JNN....290	W8PQQ....287	W9NDA....283
	ZL1HY....287	

From August 1, to September 1, 1960 DXCC Certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W9HLY....162	W2NSJ....108	KØPEF....101
KZ5LC....156	K1LST....107	WØWRO....101
JA6MW....153	K3DKD....106	W2ECU....100
DL9EH....128	DJ2VK....106	W2EPZ....100
G3BFA....125	UA6FD....105	K2IZA....100
DL9PT....123	W4BHG....104	K2YGN....100
W9MES....118	W6GRX....104	K5LEU/4....100
W9IVG....116	VE7ADR...103	W9WEN....100
F9TE....115	UL7HB....103	ZC4BC....100
ZE2JH....113	UA4HP....102	ZS1RK....100
K4EHO....111	K4JEY....101	

Radiotelephone

W9WCE....134	I1ZLW....108	W8QGT....101
K6AKS....119	SM5UF....108	KZ5LC....101
G3CCN....119	K4KTR....105	K2TDI....100
CE3RC....113	DL6EN....105	K6IPV....100
DL4AS....113	I1UZ....105	KØTJW....100
EA7IR....113	DJ4YH....104	DJ2SP....100
VE2WY....111	WØPGI....103	GB2SM....100
WØBMW....109	KR6JR....103	HS1B....100
VP2DA....109	TG7JD....103	KP4KD....100

Endorsements

W7AC....283	W2CTN....250	PAØTAU....230
K6ENX....280	W2SSC....250	ZL1PV....226
W8MPW....280	W4GRP....250	W1BGW....223
W4GD....273	K5LIA....250	W3BQA....222
W4EPA....271	W3RNQ....248	K2QXG....221
W2ZX....270	W1BGA....240	K2SHZ....221
W4AAU....270	W9FVU....240	W5BUK....221
W8CLR....263	VE3ES....236	KZ5WZ....221
W9GRV....260	W2DGW....235	W6BYB....220
WØVBQ....258	G6XL....232	W8UMR....220
ZL2HP....252	W1ELR....230	W3BCY....219
W5HDS....251	K6KII....230	W8SZS....219
WØPGI....251	K9AGB....230	K6EDE....215

W2CKY....213	W2QQ....170	LA3SG....141
W2CGT....210	K4IEX....170	ZS6APQ....141
W4DKP....210	K9IYW....170	W4MCM....140
W4YWX....210	DL1IA....166	W4REZ....140
ZL1AJU....210	VE3IDC....164	W9PWM....140
W4BWP....206	W1KXP....163	K5MZD....139
W9DWQ....203	DL6EN....163	ZL1AMO....136
K4AIO....202	W7BTH....162	K9HOL....134
K4DRO....201	DJ1VS....161	K5ESW....133
W1OOA....200	W1ALK....160	W2AAU....132
W4COC....200	W8DWP....160	W4FUI....132
W6ZMX....200	W8KAE....160	K5ABV....131
W3KA....199	KH6IDKA...160	K6AKS....131
W4COO....199	K9ALP....160	K5KES....130
W4FID....199	DL1YQ....160	WA6AMZ....130
VQ4KRL....199	ZS1FD....160	W8GMK....130
W2PTD....196	W9CII....159	W9MAK....130
I1FO....195	W3QMG....158	VE3AGC....130
W8LY....194	W7LEV....156	DL3LB....130
KØDQI....193	VE5TK....154	W6OAZ....129
VE3IR....191	W3PN....152	DJ3QX....129
K2MGR....186	W9UKG....152	VE8TO....127
W1JTD....185	W1YRO....151	W6CQW....126
W1FQA....184	W6WQT....151	KA2DE....125
W7MCT....183	G3CXM....151	K4TEA....124
K1JDN....182	W1EKO....150	JA5AF....124
W5QN....182	HZ1AB....150	K2DJD....123
W4HZZ....181	PY2AJK....150	W1DGJ....122
W4QT....181	SP6FZ....150	WA2GWF....121
W3TXQ....180	KH6CQS....149	W2HDW....121
KL7PIV....180	K5JCC....147	W4NYF....117
W1MIJ....179	G5OO....143	W1NVB....116
W4BEY....179	SP9RF....143	DJ2XP....111
WØDGH....178	W6CBE....142	UA9CL....111
OH3NY....175	WØWAN....142	K2OUS....110
W2CDP....174	W2YLS....141	W4UG....110
KICCA....171	W3JW....141	WØCVZ....110

Radiotelephone

ZP5CF....252	VQ4KRL....163	W2GRY....123
I1AOF....250	W4DWN....162	K4STY....122
W9HVX....246	PA0WWP....160	VE3DYB....120
SM5LL....237	K4CYF....159	XE1SN....120
OZ7FG....236	ZS6UR....158	YV5AIP....120
ZP5ET....223	W3QMG....153	G5OO....115
W2CXY....210	W1FAB....152	WØZVM....113
W4BWP....203	W8UMR....151	DJ2MM....113
W4GRP....198	I1TBU....151	W1NVB....112
ZL1PV....187	W3QD....144	W2HXG....112
W9MKJ....185	VE3ES....141	W5VWF....111
WØMLY....181	T12PI....140	VE3IR....111
W4VZU....171	K4CZK....137	YU2DB....111
W9JUV....171	K2QXG....136	W2PTM....110
W8SZS....168	W4ASW....134	K4ZAJ....110
VE7SB....165	CT1JG....134	K8AEK....110
W2AYN....163	W9BUJ....133	K9EMG....110

U.S.-Canada Area and Continental Leaders

KH6CD....261	VO1DX....230	VE6NX....256
KL7PI....231	VE2WW....276	VE7ZM....285
WØELA....288	VE3DIF....260	VE8AW....195
VE1PQ....252	VE4XO....195	4X4DK....288
	VE5JV....200	

Radiotelephone

W2BXA....274	WØAIW....270	VE4RP....102
W4DQH....273	VE1PQ....151	VE5RU....178
W5BGP....260	VO1DX....110	VE6TF....160
KH6OR....254	VE2WW....220	VE7ZM....267
KL7AFR...190	VE3KF....224	G2PL....266
	VE3QA....224	

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Nov. 18 at 2130 Eastern Standard Time (0230 GMT, Nov. 19). Identical texts will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6OWP only will be transmitted Nov. 3 at 2100 PST (0500 GMT, Nov. 4) on 3590 and 7129 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST (0230 GMT). Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text sometimes is reversed. To improve your fist, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date Subject of Practice Text from September *QST*

Nov. 1: *Coast to Coast* . . . , p. 10
Nov. 8: *Amateur Color Television*, p. 13
Nov. 10: *A Simple Wavemeter* . . . . , p. 16
Nov. 16: *The "Ultimatic"* . . . , p. 27
Nov. 29: *The "Budget" Vertical on 20 Meters*, p. 36

In this column in July *QST* we raised the question of the practicability of the present National Calling and Emergency Frequencies and presented a proposal by W6RIL for changes. Since then, comments have been drifting in sporadically as *QST* readers stumble across this column and decide to put in their two cents worth. So far, we have received 21 comments. In reading them over, it's often hard to determine whether the writer is in favor of W6RIL's proposals, against them, or has no opinion. Most of those commenting without expressing an opinion are making entirely new proposals, so we suppose they ought to be counted "against." However, we break down the comments as follows: In favor, 5; in favor but with qualifications (i.e., "I agree, *but* . . ."), 5; against, 7; comments without opinion, 4.

If we wanted to be arbitrary, we could say that this hardly constitutes a strong affirmative vote and drop the matter. But we don't want to do this. W6RIL's proposals were good and logical ones and even though they didn't strike everyone favorably they did evoke some thinking on the subject. We'd like you to go on thinking about this and to continue to give us the benefit of your thinking. We can't answer all your comments, or even acknowledge them, but they'll be kept in a separate file in some kind of classification order and will receive continued study.

You might be interested in some of the comments already received, so we'll outline the salient ones as briefly as possible. WØJUR likes W6RIL's idea but thinks there should be NCE frequencies on both ends of the 6 and 2 meter bands. W8GIU also agrees but thinks the DX men would not like using the high ends of 15 and 20 meters. K2MGM feels that all that is needed is more publicity rather than frequency change. KH6ARL buys the proposal for phone only but thinks the c.w. frequencies should remain in the c.w. segments. K2OPI wants the 6 and 2 meter frequencies located where novices and technicians can use them. WA2GWF disagrees, thinks that national frequencies should be at 100-kc. points and not too close to band edges because that invites out-of-band operation. W6AM thinks the band edges should be left for QSO channels, especially for high powered stations. KØSEV says leave the NCE frequencies as they are. K6DXW agrees with 3995 and 7295 but feels that frequency stability is too big a problem on other band edges. W5VPQ is against band edges, thinks NCE frequencies should be in 100-kc. multiples or set aside for emergency calling use only — such as a 6-kc. channel using 3 kc. from the c.w. band and 3 kc. from the phone band (e.g., 7197–7203 kc.), preferably on a mandatory basis. WØNWX proposes that NCE frequencies be set 100 kc. inside each band edge except where band is not that wide, and that these frequencies be used as the regular operating frequencies for W1AW — specifically (c.w.) 1805/1995, 3600, 7100, 14,100, 21,100, 28,100, 50,100, 144,100 and (phone) 1820/1980, 3900, 7250, 14,300, 21,300, 28,600, 50,200, 144,100. WA2CRH agrees with W6RIL but reminds that there are two band edges in each band and that c.w. NCE frequencies should be placed inside the low ends. WV2JIY thinks the low end of the phone bands would be better for matching antennas.

So there you have it. We won't be able to print all comments, but each one will be read and considered in any final decision made, even if that decision is to make no change, as it very well might be. If you are interested let us hear from *you*. — *W1NJM*

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A police call to K7IRY on June 21 at 2100 brought Nampa, Idaho, amateurs out in force to help search for a missing two-year-old girl. *W7s* IGY GPM ZRQ and *K7s* HYI LML assisted the searchers with communications until 0300, when the child's body was found. Without the assistance of the amateurs, the search would have taken much longer. — *W7GGV, SCM Idaho.*

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Possible extensive damage to a factory in Peoria, Ill., was averted on Aug. 16 when W9UCW witnessed an explosion and fire as he was passing the building. He immediately sent out a QRRR call which was answered by W9YYF, who notified the fire department and fire apparatus was on the way before the occupants of the plant knew what had happened. As a result of the speedy communication, firemen were able to confine the blaze to the exterior of the factory and prevent its spreading.

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Amateur mobiles planning a transmitter hunt at a hamfest at Big Springs, Idaho on Aug. 6 were pressed into service by the highway patrol to assist in running down three youths who had stolen a car and abandoned it after having committed a number of other crimes. Amateur mobiles fanned out through the area and worked each other and a central control station on 75 meters. The boys were flushed out by W7IRM/mobile, who gave chase, but they forded a creek and hitched a ride on a produce truck. However, this was their undoing because the truck stopped at a road block and the boys were apprehended. This was better than a transmitter hunt, and it was for real! EC W7DHL lists the following participants: *K7s* ATT IMB KIM OHM BJH GHK IHE BKJ VJH GKA BCE, *W7s* HHF VFY GPM DDR OIO OHM CQP PDJ HAU RKH. Operation of the base station was under the direction of W7DUP, W7DHL and K7BCE. The group received some excellent publicity. — *W7DHL, EC Fremont County, Idaho.*

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On Aug. 8 at 0720 a fuel truck and freight train crashed at Powderly, Ala., causing an explosion that claimed four lives and closed all roads in Powderly. W4DFE, Jefferson County RACES officer, alerted key stations and furnished communications needed at the scene. Stations actively participating were *W4s* DFE FSW, *K4s* AAU OVE MQN HAG DSO UMD. — *K4AOZ, SCM Alabama.*

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Some time in July, K9AFB/mobile witnessed an accident involving a truck and road grader near Calumet City, Ill. An immediate call for help on six meters and was answered by K9HDE and K9PPN in Chicago. The former called state police and the latter called Chicago police, and within five minutes help was at the scene.

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WA6AXH was testing out his new mobile installation near Los Angeles on Aug. 1 when two cars collided head-on a short distance away. Driving to the scene, he found that there were serious injuries. By informing K6UGQ, with whom he had been in contact, of the situation, he was able to summon the highway patrol to the scene within a very few minutes. Thus WA6XH was at the right place at the right time and did the right thing — *K6UGQ.*

On July 17, K6RPZ in Lafayette, Calif., heard a distress call from K7ERE in Arizona indicating that lightning had struck in the forest and started a fire. K6RPZ contacted W7GRU in Phoenix and the authorities were notified and the fire was extinguished before it had gained enough headway to become a major conflagration. These amateurs were credited with having prevented a serious outbreak.

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During the week of July 17, several members of the Boise Valley 2-Meter Net responded to a request by the sheriff's office to provide additional communications during a serious forest fire near Idaho City. The request was made at 2345 and within an hour four mobiles were at the fire, with a base station set up for relay into Boise. K7BJH and W7YLX reported to Thorne Creek. W7FTJ and W7YAD were first into Idaho City, followed by K7HYI and W7NPI. W7OHM and W7OCR set up the base relay. The activity continued until 0400, when adequate commercial facilities were restored in the area. — *W7GGV, SCM Idaho.*

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On July 23 at 1155, W7PGY/mobile came upon a very bad accident on Highway 2-A enroute from Monroe to Seattle, Wash. He immediately called for assistance and was answered by W7SYS in North Bend and W7BSE in Olympia. The former notified the state patrol, which arrived on the scene in 12 minutes. Both W7BSE and W7SYS kept the channel clear until the police had arrived. — *W7PGY, SCM Washington.*

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A series of dry lightning storms set hundreds of forest fires in Eastern Oregon on July 10, precipitating an emergency condition which lasted about ten days. Amateurs were called upon to assist the Forest Service with communications and a net was set up on 3825 kc. by W7GWS with K7AWJ as net control, W7HTL at the LeGrande warehouse and *W7s* GWS UHL ZTC and K7LKY at the four fire camps. During the next six days this net handled over 80% of the traffic between fire camps and base stations. The original operators stayed at their posts over 20 hours per day until relief operators could be rounded up. Traffic consisted of orders for food, personal messages for fire fighters, weather reports and orders for replacement parts for equipment. Amateurs directly connected with the operation were *W7s* DRG EJS GPV GWS HTL LWM MEZ NOB QYS RLG RLH ROA SGV WKP UHL ZTC, *K7s* AWJ CJC CLU CLV DSW IBB IPS KRP KZP LKY, *K9s* PRG/7 PRH/7. Other amateurs participating were *W7s* AZD BID FSU IGI MW UQI, *K7s* DFU ADI. — *W7UQI, SEC Oregon.*

A.R.R.L. ACTIVITIES CALENDAR

Nov. 3: CP Qualifying Run — W6OWP
Nov. 12–13, 19–20: Sweepstakes Contest
Nov. 18: CP Qualifying Run — W1AW
Dec. 7: CP Qualifying Run — W6OWP
Dec. 19: CP Qualifying Run — W1AW
Jan. 5: CP Qualifying Run — W6OWP
Jan. 7–8: V.H.F. Sweepstakes
Jan. 14–15: CD Party (c.w.)
Jan. 20: CP Qualifying Run — W1AW
Jan. 21–22: CD Party (phone)

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Nov. 5–6: RTTY Sweepstakes, RTTY Society of Southern California (p. 66, last issue).

Dec. 3–4: 21/28 Mc. Telephony Contest, RSGB (p. 77, this issue).

Dec. 10–11: New England Christmas QSO Party, Connecticut Wireless Assn.

Jan. 14–15: New Mexico QSO Party, Sandia Base Radio Club.

Jan. 28–29: Kansas Centennial QSO Party.

Emergency stations are set up where you find room for them. During the Oregon forest fires in July, K7KZP/7 used a couple bales of hay for a table.

On Sept. 4, amateur scouters W5EJT and W5HHE maintained the only communication between Devil's Sinkhole, near Rock Springs, Texas, and San Antonio when an explorer scout was killed at the former location. Contact involved handling arrangements for notification of parents and scout leaders and was maintained for five hours until camp was broken and the group returned to San Antonio. Assisting at the San Antonio end were K5OPT, K5VCR and W5VPQ. — *W5VPQ.*

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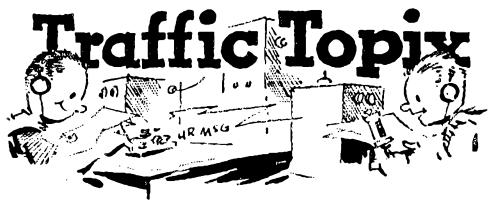
July reports were received from 29 SECs, representing 11,051 AREC members, again a sizable increase over the same month last year. Iowa submitted a report for the first time this year, bringing the total sections heard from in 1960 to 40, well over half. We're getting there! Other sections reporting for July: E. Fla., NYC-LI, S. Dak., Ala., Utah, Ohio, N. Texas, Minn., Nev., Mich., Ore., N. Mex., San Joaquin Valley, Kans., Wash., E. Bay, Wyo., Me., S. Texas, E. Mass., Ga., Ind., Ont., La., E. Pa., Santa Clara Valley, Colo., Ill.

RACES News

The comprehensive RACES organizations of the Los Angeles, Calif., area continue to show the way in extensive drilling for emergencies. On August 14, the RACES of the L. A. County Disaster Authority in conjunction with RACES nets of all c.d. areas in L.A. and Orange counties conducted a joint test of hospital coverage, designated "Operation Medic." The operation covered 2800 square miles over terrain ranging from sea level to 10,000 feet elevation. A total of 89 major hospitals were provided with facilities for direct contact with the Command and Information Center of L. A. County. Each hospital originated a message indicating the number of doctors and nurses on duty and beds available, and a limited amount of command-type traffic was handled. RACES channels on all bands were used. Mobile units were dispatched from local Area or District control centers. The progress of the operation was reviewed at C.I.C. and in local communication centers by plotting contacts on maps, showing the location of the hospital involved, frequency used, call sign of the mobile and a message summary. Deployment time of mobiles for the entire operation was 90 minutes, well within the predicted period and judged to be excellent. Within 60 minutes, 80% of the hospitals had reported.

While "Operation Medic" was a relatively minor effort, it was most important in demonstrating the use of RACES in the specialized field of medical disaster relief. In addition, RACES organizations in the L. A. area again forcefully demonstrated their ability to coordinate independent communications facilities into a single integrated command. Area and District radio officers deserve the biggest share of the credit for the success of "Operation Medic." — *W6QJW.*

Traffic Topix



This column is for traffic men. But what is a traffic man? Naturally, you'll say, a traffic man is an amateur who handles traffic. But how *much* traffic? If an amateur handles one message a year, does that make him a traffic man? Of course not! One a month? Heck, no! One a week? Well, not really. One a day? Now we're getting somewhere. Is it fair to say that a traffic man is one who makes traffic his major amateur interest? Maybe, but you'll be eliminating a lot of traffic handlers if you do this; and we need them all.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for August Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	334	2964	2513	421	6232
K2UTV	108	2460	2400	53	5021
WØLCX	12	1248	1173	75	2508
W9IDA	17	1006	992	1	2016
VE2AZI/W1	39	953	917	25	1934
WØLGG	624	593	545	49	1811
WØBDR	152	764	629	17	1562
W7BA	16	754	704	50	1524
K6BPI	41	734	652	82	1509
WØSCA	21	597	583	4	1205
W6WPF	31	548	512	28	1119
W4PL	12	555	502	29	1098
W9DYG	28	505	426	44	1003
W6GYH	241	360	340	13	954
W9DO	21	396	130	287	834
WØTUS	47	297	384	96	824
WA2CIG	25	390	387	3	805
W7DZX	2	393	364	23	782
K4AKP	24	365	348	15	752
KØBCH	28	387	324	6	745
W6RSY	23	374	216	99	712
K4SJH	207	260	200	21	688
KØONK	102	292	276	8	678
K6EPT	3	337	164	170	674
KØCLS/6	45	340	263	19	667
W1JXD	3	328	307	4	642
W3VR	64	291	280	6	641
K1CIF	287	184	145	9	625
WØPZO	12	314	272	20	618
K6LVR	10	304	291	4	609
K2THC	6	299	297	2	604
K2UFT	22	299	162	100	583
K4EHY	26	279	227	28	560
W5ZHN	61	248	175	73	557
W8DAE	47	280	157	70	554
W7IST	10	269	236	32	547
W9TT	12	275	95	153	535
K5WIC	3	260	200	65	528
K6LKD	8	268	243	5	524
W1SMU	3	271	239	2	515
W7ZB	12	250	216	30	508
Late Reports:					
K2UTV (July)	272	2172	2102	63	4609
WA2CIG (July)	8	647	633	15	1303
VE2AZI/W1 (July)	43	394	348	22	807
K5WIC (July)	20	269	191	71	551
W1JXD (July)	8	268	248	3	527

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6MCA	69	721	708	12	1510

BPL for 100 or more *originations-plus-deliveries*

W4SHJ	243	WA6EEO	122	KØORK	104
W4ZDB	163	K4EBT	119	K3IPK	103
W2EW	162	KP4APJ/1	119	K6ZCR	101
K9GDQ	141	K9UBK	117	KØEXN	101
WA2CCF	139	K1PGQ	116	K4AVU	100
WA2GPT	139	K1HZT	111	Late Reports:	
KØUKN	134	K2DEI	108	K1PGQ (July)	128
W3TN	131	K2SFS	106	KP4APJ/1 (July)	119
W9DGA	131	W7QMU/VE8	105		
W4ZMH	124				

More-Than-One-Operator Stations

KØHEA 269 K7AWJ 256

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: W1TXL, W4ZMH, KØORK.

The BPL is open to all amateurs in the United States, Canada, Cuba and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours or receipt, in standard ARRL form.

So far as we know, the species *Hammus Trafficus* has never been specifically defined — nor need it be. The amateur who handles traffic is a traffic man while he is doing so, and most of our traffic nets are more than willing to accept him on that basis. Although traffic handling as an amateur radio activity is bigger and better than it ever was, we no longer enjoy the high percentage we used to have in the thirties, when *Two Hundred Meters and Down* mentioned traffic handling as "perhaps the principal activity of transmitting amateurs." It is far from that now. Today, we are a minority. Yes, even a small (but significant!) minority. There are too many phases of amateur radio today for any particular one to be *the* principal activity. And as amateurs in general divide themselves into c.w. groups, phone groups, s.s.b. groups, RTTY groups, and v.h.f. groups, traffic amateurs in particular tend to divide themselves into the same groupings. Then, to make things more confusing, amateurs who are "hipped" on some mode specialty try to sell us traffic men on handling traffic by their mode, which obviously, they contend, is far superior to any other mode.

The really dedicated traffic man is one who will study each mode of operation in the light of its traffic-handling capabilities and possibilities — the object being the efficient handling of traffic, not utilization of a particular mode. There are, alas, very few amateurs in this category. Most of us know only one way of handling traffic, and that's the way we *want* to handle it — *all* of it. Thus, our traffic-handling minority is split into even smaller minorities, and our over-all influence on the destiny of amateur radio is proportionately diminished.

It seems to us that this is a problem to which we traffic men should give sober consideration. Which mode of emission, which type of operation, which frequency range, is best suited to which kind of traffic work? Never mind what we prefer individually — what will give us the best public service values?

Space does not permit us to go into a detailed study along these lines in this column, but perhaps a few examples would illustrate the method of approach. Take v.h.f.: here is a type of operation that is restricted in coverage to local areas and would be best suited to traffic distribution within a large city area or county or even a small state (like R. I.). RTTY has advantages in passing large wads of traffic in a short time. Phone in general is most suitable to local or medium range coverage simply because of the vast number of phone operators. C.w. is best for long haul relays because of its characteristic distance capabilities with moderate power and modest antenna systems.

This kind of thinking is a switch from what usually precedes organization of a traffic net or system. Ordinarily, a group of amateurs get together and set up an island empire of their own, dedicated primarily to their own convenience and common interests. This is natural, and besides there's nothing wrong with it. But is it progress? Shouldn't a modicum of consideration be given to the over-all objectives of handling traffic? A *modicum*, did we say? Nay, let's consider the mode as a means to an end, not an end in itself. — *W1NJM*

August net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
Eastern Area Slow	31	141	81
N. E. States Traffic	12	196	190
20 Meter SSB	23	613	2469
Tri-State Novice	4	...	2
7290 Traffic	46	1227	471
Mike Farad E & T	53	484	722

National Traffic System. At last "daylight saving" time is over, and we're all more or less back to normal. Each year the advent of DST has caused the time schedule of NTS to go completely haywire, and each year we have been at a loss as to what to do about it. At first we thought it would be simple — simply ignore DST and run the entire system on standard time. Although some areas have gone along with this, most of those using DST have advanced their net meeting times one hour to comply with local time, and so the NTS time schedule has gone to pot. Then, in some areas, we have had a knock-down-drag-out brawl about whether to use "daylight" or standard time. It has all been very silly, useless, frustrating and inimical.

A number of solutions to this dilemma have suggested themselves, but before we go into that we ought to examine

how our schedules stack up in terms of *standard* time, before the milder weather hypnosis sets in. How many, or what percentage, of our NTS nets meet at the times prescribed in CD-24, or within a near approximation of those times?

Using the 1959 year-end net directory as a guide, we find that of 100 nets registered as NTS section-level nets, 40 have sessions at 1900 (allow 15 minutes leeway), which is just 40% and 3 operate at 2200 (3%). At region level, 11 nets registered of which 9 have sessions at 1945 (82%) and 6 have sessions at 2130 (55.5%). At area level, all three nets meet at the prescribed time of 2030 standard.

This is not too bad, considering the options available in CD-24 at section and region level, but it is also not too good. When "daylight saving" time comes along, the whole system goes haywire. Even one of the area nets adjusts its meeting times to try to accommodate the changes arbitrarily made at other levels.

An Emergency and Traffic Bulletin issued recently to leaders in the emergency and traffic fields makes a number of proposals, but we think probably the best one is the proposal to compromise half way between fast and normal time — that is, in those areas which adopt fast time, the NTS schedule will be moved a half hour later; and for those which remain on standard time it will be moved a half hour earlier. Thus, in standard time areas it will be section nets at 1830, region nets at 1915, area net at 2000, region nets at 2100 and section nets at 2130. In "daylight saving" time areas, it will be section nets at 1930, region nets at 2015, area net at 2100, region nets at 2200, and the late section net, if any, will be moved to the next morning or late the next afternoon.

This will have the advantage of minimizing the inconvenience to any particular net and also of maintaining the NTS time schedule, which is very important. Note we say *minimize* the inconvenience, not eliminate it. When you are trying to operate on a nationwide time schedule and suddenly scattered parts of the country move their clocks it is bound to cause inconvenience to someone. The question is, are you NTSers willing to put up with some inconvenience in order to achieve system? Are you willing to meet half way, to compromise with those who do not do as you do? On the answers to these questions will depend the success of any proposal to eliminate the summer snafu. Let's try it, next year, and if it works out we'll make it standard procedure and incorporate it in CD-24.

August reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN.....	31	446	.399	14.4	90.7
2RN.....	62	868	.682	14.0	99.0
3RN.....	62	503	.323	8.1	93.5
4RN.....	58	667	.314	11.5	95.5
RN5.....	62	852	.517	13.7	95.5
RN6.....	59	1084	.402	18.4	88.6
RN7.....	62	413	.269	6.7	29.2
8RN.....	60	308	.174	5.1	81.7
9RN.....	43	1127	.676	26.2	77.3
TEN.....	90	1130	.629	12.5	49.0
ECN.....	16	49	.141	3.1	64.6[1]
TWN.....	30	296	.323	7.3	60.6[1]
EAN.....	31	1236	.796	41.2	96.7
CAN.....	31	1318	.861	45.1	100.0
PAN.....	31	1078	.603	34.8	100.0
Sections[2].....	1245	7045		6.1	
TCC Eastern..	102[3]	560			
TCC Central..	93[3]	1051			
TCC Pacific...	121[3]	960			
Summary.....	1973	19991	CAN	8.9	CAN/PAN
Record.....	1320	19767	.895	14.8	100.0
Late Reports (July):[4]					
2RN.....	62	771	.648	12.4	93.2
Sections[5].....	161	868			
Summary[6]....	1695	17233	EAN	8.7	PAN
Record.....	1710	20350	.795	15.2	100.0

[1] Region net representation based on one session per day. Others are based on two or more sessions.

[2] Section nets reporting: HNN, CCW & CEPN (Colo.); GSPN & NHN (N.H.); VFN (Va.); GSN (Ga.); BUN (Utah); SCN (S.C.); MDDS (Md.-Del.-D.C.); NJN (N.J.); SCN (Calif.); NEB (Nebr.); NJQ, S. Dak. 75 Evening & SDN (S. Dak.); Tenn. C.W.; OQN (Ont.-Que.); AENP, AENP Morn, AENO & AENB (Ala.); TLCN (Iowa); QKS (Kans.); WSSN, WIN & BEN (Wis.); EMN (E. Mass.); ILN (Ill.); CN & CPN (Conn.); MSPN Eve, MSPN Noon, MSN & MJN (Minn.); WSN (Wash.); PFN (Pa.); KPN & MKPN (Ky.); QFN, GN, TPTN & FPTN (Fla.).

[3] TCC functions reported, not counted as net sessions.

[4] Received prior to normal Oct. *QST* deadline but after moved-up vacation deadline.

[5] Section nets reporting for July (add to those reported in Oct. *QST*): NJN (N.J.); QKS (Kans.); HNN (Colo.); WSN (Wash.); MKPN (Ky.); SGN (Me.).

[6] Summary data adjusted to addition of late July reports. These data supercede those shown in Oct. *QST*.

Wow! These tables get complicated at times. We do not normally run "late reports" on section nets, but in August we moved up the deadline a few days so we could get our copy in before going on vacation. Those included in the "late" summary above would have made it but for this. This is to remind all concerned: our deadline is the fifteenth of the month. Sometimes we're late and can include items received after that; but don't count on it. If you slip your net report in the mail not later than the tenth, it's a cinch to reach us in time.

W1EMG reports for W1BVR on 1RN while the latter grabs some vacation; incidentally, 1RN is having a merry tussle trying to run a session on 75 meter phone. A 2RN certificate has been awarded to WA2EDG. W4SHJ is taking leave of 4RN for a vacation in foreign climes; a new manager will be appointed. TEN's third session at 1700 CST is building up; a TEN certificate has been awarded WØDUA. TWN is finding the going rough on both its 40 and 80 meter frequencies, but is changing back to 3570 with 7060 as alternate. PAN certificates have been awarded to W5ZHN, WA6ATB, *W6s* QMO RSY WPF, W7DZX, KØCLS/6, KØEDH and WØANA.

Transcontinental Corps. W1SMU announces TCC certificates awarded to *W1s* AW NJM OBR WEF, VE2AZI/W1, *K2s* SIL SSX, WA2APY, W2FEB, W3WG, K4KNP, *W9s* DO DYG. Central and Pacific area TCC go along about as usual, with all rosters nearly filled and most functions successfully performed.

August reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern.....	102	89.2	1045	560
Central.....	93	87.1	2238	1051
Pacific.....	121	98.3	1893	960
Summary....	316	92.1	5176	2571

The TCC roster: Eastern Area (W1SMU, Dir.) — *W1s* AW EMG NJM OBR SMU WEF, K1GRP, VE2AZI/W1, *W2s* FEB OPB, *K2s* SIL SSX UFT, *WA2s* APY COO, W3WG, K4KNP, W8ELW. Central Area (WØBDR, Dir.) — K4AKP, W4ZDB, *W9s* DYG CXY DO ZYK, *WØs* BDR LCX SCA. Pacific Area (W6EOT, Dir.) — W4DNU/6, K5IPK, W5ZHN, *K6s* LKD TPL GID LVR, *W6s* EOT ELQ HC WPF QMO, *WA6s* ATB NCE, *W7s* GMC ZB DZX, *KØs* EDH EDK CLS/6, *WØs* KQD WME.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *phone* — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

W1AW OPERATING SCHEDULE

(All times are in Greenwich Mean Time — GMT)*

W1AW will return to its Fall-Winter operating schedule on October 30. General operation covers all amateur bands on which W1AW has equipment. Novice periods include operation on 3.5, 7 and 21 Mc. (see footnote 2 in box below). Printed master schedules showing complete W1AW operation will be sent to anyone on request.

Operating-Visiting Hours:

Monday thru Friday: 2000–0800 (following day).

Sunday: 0000–0730 and 2000–0330 (Mon.).

Exception: W1AW will be closed from 0800 Nov. 24 to 2000 Nov. 25 in observance of Thanksgiving Day, and from 0730 Dec. 25 to 2000 Dec. 27 in observance of Christmas.

A map showing how to get from main highways (or from Hq. office) to W1AW will be sent to amateurs advising their intention to visit the station.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

Frequencies (kc.):

C.w.: 1820, 3555, 14,100, 21,075, 28,080, 50,700, 145,800.

Phone: 1820, 3945, 7255, 14,280,** 21,330, 29,000, 50,700, 145,800.

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibration purposes.

Times:

Monday thru Saturday: 0100 by c.w.; 0200 by phone.

Tuesday thru Sunday: 0430 by phone; 0500 by c.w.

General Operation: Use the chart (below), for times and frequencies for W1AW general contact with any amateur.

Code Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Tuesday, Thursday and Saturday, and at 5, 7½, 10 and 13 w.p.m. on Monday, Wednesday, Friday and Sunday are made on the above-listed frequencies (except 1820 kc.). Code practice starts at 0230 each day. Approximately 10 minutes of practice is given at each speed. On Nov. 18 and Dec. 19, instead of the regular code practice, W1AW will transmit certificate qualifying runs. On Nov. 17, W1AW will transmit a frequency measuring test in place of code practice.

* W1AW schedule is shown in GMT per recommendation of ARRL Board of Directors that use of GMT for amateur communications be encouraged. For AST subtract four hours; for EST subtract five hours; for CST subtract six hours; for MST subtract seven hours; for PST subtract eight hours; for Alaska time (central part) and Hawaii subtract ten hours. Don't forget to change the *day* (to previous day) when subtracting takes you through 0000.

** Single sideband.

NET DIRECTORY

This list includes nets registered up to and including Sept. 22, 1960. Registrations received after that date will be included in the January *QST* listing if received prior to Nov. 15. If you have not yet registered your net for the 1960–61 season, see page 90, Sept. *QST*, for complete instructions.

The complete cross-indexed net directory is scheduled for distribution Dec. 1. However, *no automatic mailing will be made.* Copies of the directory will be sent only upon request. There is no charge. The best way to get on the mailing list is to send a postcard requesting this only.

Nets which do not show a public service purpose in their registration information are not included in the net directory. Nets are registered only upon request and receipt of the minimum basic information given below.

Important note: QST net listings and those in the printed net directory are for *information only.* Insofar as possible, net information is listed exactly as received, with certain common abbreviations used to save *QST* space. Listing in *QST* or the printed directory does not signify that these nets have any official status, does not entitle them to exclusive or prior right to the frequency or frequencies on which registered, and is in no sense a form of copyright.

Abbreviations used in net names are those commonly used for place names and certain common words. These abbreviations are *not* used in the printed net directory unless the net name was registered that way. All net times are in Greenwich Mean Time (GMT). Days of the week are abbreviated as follows: Dy-Daily; M-Monday; T-Tuesday; W-Wednesday; Th-Thursday; F-Friday; S-Saturday; Sn-Sunday. When net operation occurs on consecutive days but not daily, the days are connected by a hyphen (e.g., M-F means the net meets each day Monday thru Friday). When net operation occurs less often than once per week, this is indicated by a numeral and slant mark (e.g., 1/Sn means the first Sunday of each month; 1/3Sn means the first and third Sunday of each month, etc.).

Name of Net	*Freq.*	*GMT*	*Days*
Ala. Emerg. Net "B" (AENB)*	3575	0100	Dy
Ala. Emerg. Net "G" (AENG)	29,560	0130	M
Ala. Emerg. Net "H" (AENH)	29,560	1900	Sn
Ala. Emerg. Net "I" (AENI)	3885	1930	Sn
Ala. Emerg. Net "J" (AENJ)	3900	1930	Sn
Ala. Emerg. Net "L" (AENL)	3970	2000	Sn
Ala. Emerg. Net "O" (AENO)	50,550	0115	TThS
Ala. Emerg. Net "P" (AENP)	3955	2400	Dy
Ala. Emerg. Net "R" (AENR)	50,550	0115	WF
Ala. Emerg. Net "S" (AENS)	3825	1930	Sn
Ala. Emerg. Net "X" (AENX)	51,150	0115	W

W1AW GENERAL-CONTACT SCHEDULE
(Effective October 30, 1960)

W1AW welcomes calls from *any* amateur station. Starting October 30, W1AW will listen for calls in accordance with the following time-frequency chart:

GMT	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0030–0100	.....	.....	7255	.....	7080	.....	7255
0120–0200 [1]	.....	.....	7080	3555	7080 [2]	3555 [2]	7080
0210–0230 [1]	.....	.....	3945	50.7 Mc.	145.6 Mc.	3945	3945
0330–0430	.....	.....	3555	3945	7080	1820	3555
0440–0500 [1]	.....	.....	3945	14,280	3945	14,280	3945
0520–0600 [1]	.....	.....	3555 [2]	7255	3555	7080 [2]	3945
0600–0700	.....	.....	14,280	14,100	3555	14,100	.....
0700–0800	.....	.....	7255	3945	7080	3945	7255
2000–2100	.....	.....	14,280	21/28 Mc. [3]	14,100	.....	.....
2100–2200	.....	14,280	21/28 Mc. [3]	14,100	21/28 Mc. [3]	21,330	.....
2200–2300	.....	14,100	14,280	21,075 [2]	14,280	14,100	.....

[1] General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.

[2] W1AW will listen for Novices (on Novice band indicated) before looking over the band for other contacts.

[3] Operation will be conducted on one of the following frequencies: 21,075; 21,330; 28,080; 29,000 kc.

Ala. Emerg. Net "Y" (AENY)	50,250	0200	WS
Ala. Post Office Net	3920	2345	Th
Ala. Teenage Net (AENT)*	3905	2230	Dy
All Service Net (ASN)	7270	1800	Sn
A.R.E.C. Net	50,850	0330	T
Ariz. Post Office Net	3855	0045	T-S
Ark. CW Net (OZK)*	3790	0100	T-S
Ark. Post Office Net	3860	0200	T
Badger Emerg. Net (Wis.) (BEN)*	3950	2400	Dy
Beehive Utah Net (BUN)*	7272	1930	Dy
Benzie Co. Emg. Net (Mich.)	3880	0100	F
Boston Region Post Office Net	3893	2315	M-F
Broome Co. Regional AREC Net (N. Y.)	50,400	0200	S
Calif. Civil Defense Net (CCDN)	3501	0300	T
Calif. Post Office Net	3695	0330	W
	3835	0300	W
Colo. Post Office Net	3920	0200	T-S
Columbia Basin Net (CBN)	3960	0330	Dy
Conn. Phone Net (CPN)*	3880	2300	M-S
		1500	Su
Delaware Post Office Net	3905	2400	T
Finger Lakes Net (N. Y.)	145,350	0300	S
First Region Net (1RN)*	3605	0030	Dy
		0230	Dy
	3830	2215	Dy
Fla. Amateur Sideband Traffic Net	3910	0030	T-S
		0130	T-S
Fla. Post Office Net	3820	2300	F
Gator Net (Fla.)*	7115	1330	Dy
The Germantown Radio Club Net (Pa.)	29,200	0100	Th
Grey-Bruce Net (GBN) (Ont.)*	3645	2330	MWF
Hawkeye Emerg. Net (Iowa)	29,600	0130	TF
High Noon Net (HNN)*	7240	1900	M-S
"Hit & Bounce" Net	7125	2230	M-S
	7140	1230	M-S
Ill. Central Emerg. Net (ICEN)	3825	2330	M-F
Ill. Weather Net	3873	1335	Sn
		0200	W
Indiana Post Office Net	3657	2230	T
	3865	2230	F
Interstate Phone Net (IPN)	3980	2100	M-S
Iowa Post Office Net	3900	1400	Sn
Jefferson Radio Club Emerg. Net (JEN) (La.)	3950	1500	Sn
Kansas CW Net (QKS)*	3610	0030	Dy
Kansas Post Office Net	3600	2400	T
	3935	1130	T
Kent Co. Emerg. Net (Mich.)	50,550	0100	T
		0200	Th
Kentucky CW Net (KYN)*	3600	2300	Dy
		0100	
Kentucky Phone Net (KPN)*	3960	0130	Dy
Kentucky Post Office Net	3775	0100	F
Knox Co. 6-Meter Emerg. Net (KEN) (Tenn.)	50,440	2400	M-F
Louisiana Post Office Net	3807	1300	Sn
Madison Mobile Net (MMN) (Wis.)	29,620	2400	T
Manchester, N. H. Emerg. Net	29,000	2400	F
	50,400		
	145,270		
Md-Del-DC Slow Speed Net*	3650	0130	TF
Metropolitan Net (San Diego)	50,150	0315	T
Michigan Post Office Net	3830	1400	Sn
	7120	2400	M-S
Michigan (QMN) TFC Nets*	3663	2300	Dy
		2330	Dy
Minnesota Post Office Net	3820	1830	Sn
Mission Trail Net, Inc.	3654	0400	Dy
	3854	0300	Dy
Missouri Post Office Net	3540	0100	W
	3550	2200	TW
	3900	1830	M-F
Missouri Traffic Net (MON)*	3580	0100	T-Sn
Montana Post Office Net	3955	1345	Th
Montgomery Co. AREC Net (MCA) (Ill.)	145,500	0130	W
Morning Ky. Phone Net (MKPN)*	3960	1330	M-S
		1400	Sn
Muskegon Co. Civil Defense & Red Cross Amateur Radio Network	29,610	0200	WS
Nebr. Morning Fone Net*	3980	1330	Dy
Nebraska Post Office Net	3980	0015	T-Sn
The New England Weather Net	3900	1045	M-S
New Hampshire Net (NHN)*	3685	2330	M-S
New Jersey Net (NJN)*	3695	2400	Dy
N. J. Post Office Net	3625	2400	M-S
	3873	2400	TWF
NJ 6 & 2 Emerg and tfc Net	51,150	0400	ThSn
	147,750	0100	W
New Mexico Post Office Net	3980	0330	Dy
New Orleans Emerg. Net	3825	1300	Sn
New York Post Office Net	3710	2400	W
	3825	2400	F
	7100	2400	M
New York State Net (NYS)*	3615	2400	Dy
Nine, Jacks and the Queen Net (South Dakota) (NJQ)*	3870	1815	M-S
North Carolina Post Office Net	3509	0200	S
	3905	0130	T
North Dakota Post Office Net	3860	2300	Sn
N. Texas Traffic Net (NTTN)*	3960	2330	Dy
Novice Hurricane Net (NHN) (Fla.)	3725	1230	Sn
Ohio Post Office Net	3870	1200	Sn
		2300	M
Okla. Central 6 Meter Net	50,250	0230	T
Okla. Phone Emerg. Net (OPEN)	3860	1400	Sn
Oregon Post Office Net	3960	0315	T-S
Penna. Phone Net (PFN)*	3850	2300	M-F
Phila. Area 6 Meter Traffic Net	50,850	0130	F
Regional Post Office Net	14,090	0145	T-S
R. I. State Phone Net (RISPN)*	50,600	2330	Dy
San Diego CD-Hospital Net	145,680	0330	T
San Diego City Area Net No. 1	29,545	0330	T
Second Region Net (2RN)*	3690	2345	Dy
		0045	Dy
75M Monitoring Net (San Diego)	3991	0300	T
Shore Emerg. Net (N. J.)	21,110	0100	W
Show-Me Net (SMN) (Mo.)*	3580	2200	Sn
South Carolina Post Office Net	3845	1100	T
		2400	T
South Carolina SSB Net	3915	0100	T-S
South Dakota CW Net (SDN)*	3645	0100	TThS
South Dakota Post Office Net	3890	0015	T-Sn
So. Dak. 75 meter am phone net*	3870	0030	Dy
South Texas Emerg. Net (STEN)	3860	0015	T
(CW)	3790	0230	T
(SSB 80M)	3810	0200	Th
(SSB 40M)	7210	0100	T
(Zone 1)	3860	1330	Sn
	50,300	0130	T
(Zone 2)	3860	0015	F
(Zone 3)	3860	2400	W
	50,400	0130	W
(Zone 4)	3860	2000	Sn
(Zone 5)	3815	0100	W
Steuben Co. A.R.E.C. Net (Ind.)	52,525	2330	M
Susquehanna Emerg. Net (SEN)	3910	1300	Sn
Tar Heel Emerg. Net (N. C.)*	3865	0030	T-S
10 Meter AREC Net (Calif.)	29,500	0300	W
Tenn. Post Office Net	3675	0030	T-S
	3835	1230	Sn
Texas Post Office Net	3935	1130	M
	7260	2200	MS
Tri-County Emerg. Net (TCEN) (Calif.)	3815	1800	Sn
Tri-State Novice Net (TSNN)	7160	2300	Th
		1400	S
The Tri-State Traffic and Emerg. Net (TTEN)	29,100	0100	Dy
Twelfth Regional Net (TWN)*	3570	0100	Dy
		0300	Dy
Tygart Valley Emerg. Net (TVN) (W. Va.)	3910	1900	Sn
United Trunk Lines (Eastern) (UTL)	3568	0200	Dy
Virginia Phone Net (VPN)*	3835	2400	Dy
Virginia Post Office Net	3855	1930	Sn
Va. Slow Speed Net (VSN)	3680	2330	M-F
Washington Post Office Net	3960	0230	T-S
Washington Section Net (WSN)*	3535	0300	T-S
West Va. Post Office Net	3905	2230	MWF
Western Mass. Net (WMN)*	3560	2400	M-S
Wisconsin Post Office Net	3630	2400	W
	3860	1815	Th
		0100	WS
Wyoming Post Office Net	3655	0200	W
	3885	0200	Th

* Part of the ARRL National Traffic System (NTS)

Station Activities

SCM — AREC — ORS — CP — SEC — OBS — TCC — OO — PAM — WAS — NTS — WAP — OES — A1 OPR — EC — DXCC — CLUBS — RM — OPS — RCC

• 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, Allen R. Breiner, W3ZRQ—We wish to welcome K3MVO to the section. Formerly K9IXK, he held ORS and OPS appointments in Illinois and now holds the same appointments in this section. HNK claims "Gremlins" poured a glass of water through the fine holes of his DX-100. ZRR is a grandpapa the second time around. An outside skywire finally was erected by NNL. K3HTZ, with his DX-40, is an ORS. ZLP had a bit of Ranger trouble, which cut into his traffic work. K3GFF is in the Amateur Radio Missionary Service handling traffic from his cohorts in the field. K3HXC was a VE1AL visitor during his vacation. K3AHT plans to attend Penn. State U. NF has changed jobs and will be with the B&W Company after Labor Day. DJW operated mobile during his trek around Nova Scotia. The Haverford Township Emergency Net Club held a transmitter hunt with EBY as bloodhound No. 1 and DQE second best. The Germantown Radio Club's call is K3MTK and the club is soliciting new members. Because of the invasion of his daughter, OY's time on EPA has been greatly curtailed. KN3MKU, in Ottsville, is a new Novice operator in the section. CMN expects to become active at M. I. T. from W1MX. RKP is operating with a DX-100-B. GYP received WBE-DUF and W-Del Awards. New gear added to K3CNN include an RT-19 and an ARC-4 2-meter transmitter. KN5ZQO is now located in Gwynedd Valley and has been accepted as a member of the North Penn ARC. New officers of the Short Skip ARC are 2ILN, pres.; K3AWD, vice-pres.; K3ANU, secy.; ZPX treas.; YLL, act. mgr. The Boy Scout Jamboree was the reason for many clubs and amateur organizations to set up traffic-handling stations. Among those reported were K3ATI by the Bucks County ARC and MKA for the West Philadelphia Radio Assn. The p.a. system was not needed at the North Penn. ARC auction with DHJ as auctioneer. Echo 7 was the expedition's name of the Mahanoy Valley Brass Pounders trip to the York Hamfest. Traffic: W3CUL 6232, VR 641, IVS 376, HNK 179, K3IPK 156, W3EML 137, WHK 93, K3DZB 85, W3KMD 82, AXA 70, K3BHU 66, IPA 65, HEX 58, DCB 51, W3NNL 43, K3JSX 34, HTZ 26, W3ZRQ 24, K3CRU 22, ANU 18, W3TEJ 17, JLQ 16, UIU 14, ITI 12, K3JLW 12, W3BUR 10, K3CAH 10, W3ZLP 10, K3ANS 9, W3BFF 8, K3GFF 8, W3PDJ 8, K3HXC 7, W3ADE 6, K3AHT 5, W3NF 4, K3CNN 3, DEM 3, W3GYP 3, K3GSU 1, KN3LZL 1, K3MVO 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—SEC: PKC. The MDD Traffic Net meets on 3650 kc. Mon. through Sat at 1915 EST, MEPN (phone) on 3820 kc. Mon., Wed. and Fri. at 1800, Sat. and Sun. at 1300 EST. New appointments: K3MLY, as OES, 4EXM/3 as OPS. AHQ maintains his high level of OO monitoring. K3ANA is busy installing an antenna at his new QTH. BUD reports the St. Mary's ARA has a new 10-meter transceiver. CDQ has returned from another European trip visiting many Italian amateurs. Section amateurs interested in participating in the Weather Amateur Reporting Net (WARN) may contact CVE. New OBS K3CRF is spending most of his time on 75 meters. Division Vice-Director ECP is starting the new club season as president of the WRC and announces that code practice classes are being resumed. UCR reports the passing away of EGI on Sept. 3. New officers of the Sweepstakes-winning PVRC for the '60-'61 season are JNE, pres.; JTC, vice-pres.; KFC, secy.; VE2BX/W4, treas. DKT received his W/Conn. Award from the Willimantic, Conn., Jr. C. of C. OES K3EJF reports in from Laurel. The Antietam, Md., Radio Assn. celebrated Amateur Radio Week by placing a wreath on the grave of Hiram Percy Maxim in Hagerstown. He is remembered as "The Old Man" of amateur radio. New OPS 4EXM/3 likes s.s.b. EKO/2 reports in by radio from Monticello, N. Y. Enjoyed a visit with the Free State ARC boys at Ft. Meade and found K3IVO, NNM, HCE, ENU, OSF, USA, 4PRV and K3USA active on RTTY. EOV was actively mobiling on his Long Island vacation. K3GBV is busy on 6 and 2 meters. K3GKF suggests an MDDS QSO Party. How about one of the section clubs sponsoring such an activity? K3GMD likes transmitting Official Bulletins on 6-meter c.w. K3GZK wants to revive interest in the slow-speed net. K3HPG has a new Ranger and a three-element beam in Hagerstown. K3ICZ is a new reporter from Wheaton. IWJ invites all section 2-meter stations to check in the PG AREC Net on Tue. at 2100. OES K3IZM reports v.h.f. activity. K3JET is becoming interested in DX. New OBS K3JIQ reports in from Riverdale. OO K3JTE received nice newspaper publicity on his satellite bouncing feat. New reporter K3KHN likes his halo antenna. OBS K3KPZ is now Sat. NCS for MEPN. OO LUL is active on 144 Mc. K3MDL reports on a Maryland teenage phone net. New OES K3MLY wants an HQ-110. OYX reports on AREC activity in Hagerstown. KØPIV/3 received a letter of commendation for helping operate NSS on Armed Forces Day. TN makes BPL again. K3WBJ keeps up traffic activity at Walter Reed Hospital. 3RN manager UE is starting the long winter grind. YTW is a welcome Baltimore outlet for MDD. OO ZAQ enjoys working TSC. ZGN is operating portable until school starts. ZNW reports work is needed on his antenna farm. The Foundation Hamfest at Gaithersburg was a big success! Traffic: W3TN 201, KØPIV/3 102, W3UE 58, AHQ 48, K3WBJ 48, KPZ 45, W3ECP 31, BKE 30, ZGN 27, ZNW 26, K3JIQ 15, W3BUD 13, EOV 5, K3GZK 5, W3IWJ 5, YTW 3, K3ANA 2, CRF 2, GMD 2, HPG 2, JET 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: W2YRW. RMs: W2BZJ, W2HDW and W2ZI. A new appointee is WA2ARJ, Millville, as ORS. N. J. Phone and Emergency Traffic Net totals for August: 31 sessions, attendance 654 and traffic 134. Members of the net held their 5th Annual Picnic at Browns Mills during August. Fifty-one attended. The Bridgeton Area Radio Klub held a transmitter hunt with WA2ARJ, WA2DID, WA2ANH, K2CJB, W2MAS and K2UQK participating. W2RG has prepared for fall-out protection with a basement shelter equipped with a transistor and receiver on 80 and 40 meters. K2SOX, Margate City Supt. of Schools, hopes to be on RTTY soon. K2MFF has replaced W2ZVW as the SCM of N.N.J. W2TLO, Glassboro, has a new transmitter. K2SNK, Trenton, has joined MARS. K2JGU, Glassboro, plans to go sideband soon. To correct an error: W7QMU replaced WA2CNS/VE8 on Baffin Island. K2BZK, Somerdale, is NCS on the 10 on 10 Net Sunday mornings. W2BLV, SJRA's *Harmonics* news and libel editor, reports on many vacation trips by the club's members. W2ZUL has a new beam on 6 meters. W2ESX, Moorestown, has skeds with W4RFR on 144 Mc. The SJRA's roster now includes the following YL-XYLs: K2SHJ, W2EBW, K2GCE, WV2NNC, WV2LCB and WA2FGS. During the recent Margate Yacht Club races WA2IQD, K2DTB, K2RXB, K4CZA and K2HBE provided communications for the event. Atlantic County RC news is published monthly by K2HBA. The Levittown (N. J.) Radio Club plans to continue its training courses this fall. K2ECY, Burlington County EC, has organized 28- and 50-Mc. AREC nets, holding weekly drills. Organizations not reporting are urged to do so each month. Reports of clubs, AREC and RACES are solicited. Traffic: K2DEI 177, W2RG 174, W2ZI 60, K2SOX 31, W2SXV 31, W2BZJ 26, K2SNK 24, K2JGU 19, K2RXB 14, W2BEI 13.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF and W2ZRC. PAM: W2PVI. NYS C. W. meets on 3615 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun., TCPN 2nd Call Area on 3970 kc. at 1900, IPN on 3980 kc. at 1600. WA2CIG made BPL during July and August. Appointments: WA2GCH and K2RTQ as OBSs, K2TDG and K2RTQ as OPSs and WA2HTW as OES. Endorsements: W2ZRC as RM and ORS, W2PVI as PAM and OPS, K2KTK as OO and K2HWI as OES. Your SCM and SEC attended the North Country Call Book Picnic at the QTH of WA2GCH. A very fine group was present and we look forward to our next visit. Plans are well under way by the Niagara Falls

(*Continued on page 92*)

No. 71 of a Series

FASTEN YOUR SEAT BELT AND CHECK YOUR AIR SPEED

Part II (Conclusion)

WHAT has happened — why has it happened and how has it happened? One must select and ponder these questions in sober judgment only to discover this is the space age — time and space; the dawn of the electronic keyer! Without the electronic keyer these terrific speeds would be highly improbable indeed. High speed operator calls are listed in *QST*, July, 1960, Page 86; 45 to 60 w.p.m. Yes, the desire to be a good radio-telegraph operator rests in the heart and the mind of most every radio amateur though some profess otherwise. Speed alone is not the criterion, however. Accuracy stands first and when the two are combined, ah, this is the opera of the air.

HOW fast is fast? Some say 30 and some say 45 w.p.m. But nothing is too fast as long as you can copy it. Try it yourself. Crank your receiver up on 7.0-mc and you will find many of those c.w. operators treading boldly hither and yon in that slip stream at 35 to 47 w.p.m. There are other slip streams in other bands, too.

NOT to the exclusion of many, many operators whose speed is beyond my capabilities or whose signals are in some other propagation path, you'll hear these wizards of this space age: W1CJC, W2MW, WA2CVV, W2TUK, W2PVR, W3FA, K4CVI, W4DKK, W4DL, W4DQS, W4IOC, W5NN, W6UF, W8CJK, W8OCT, W8RMH, W9SEM, W9TO (Jim Ricks, originator of the T. O. Keyer) and Edith Viburg, W9WZL; yep, 35, 40, 45 w.p.m. and up.

CHECKING air speed, remember 25 center holes in perforated tape are the equivalent of one 5-letter word, equal to 24 dots, our standard here . . . 30 w.p.m. would be 720 dots per minute, 12 dots per second. Who can count dots at 35 or 40 w.p.m.? Here is a simple and easier way. Count the number of dashes your electronic keyer makes in 5 seconds, for example 25. That would be the number of w.p.m. for which it is adjusted, provided it is adjusted properly.

W.P.M.	Dashes in 5 Sec.	Dots per Sec.
10	10	4
15	15	6
60	60	24

The dash time-length should be equal to the 2 dots in the letter "i" including the space.

IT IS important that the dwell time (that small increment of time when the contacts are closed while making a dot) is correct. The contact spacing for dots and dashes should be as close as possible without touching each other — spring tensions to suit your requirements.

CONNECT an ohmmeter across the electronic keyer contacts or a milliammeter, battery and potentiometer. Close the contacts and adjust for full scale meter deflection. Then open the contacts and make dots and adjust the dot control until the pointer of the meter sort of flutters about 52% to 54% of the full scale deflection. This makes for good, solid dots.

NOW for some indoor tests. Here are some uniform 5-letter test words, 5 dashes and 10 dots equal to 24 dots: CURVE, BRUCE, CABLE, CHEAP, DUCKS, LAMBS, PEACH and SMALL. FAUNA contains 1 dash in every letter and MOTTO 10 dashes. When your electronic keyer is adjusted for your capable speed, perhaps 30 or 35 w.p.m., you should be able to time your manipulation for one minute and come up with 30 or 35 of the chosen word or any group totaling 30 or 35 w.p.m.

WHEN you have checked your air speed, hie yourself off into one of those slip streams, fasten your seat belt and keep your flaps down in case of a quick, but "Happy Landing".

FRED SCHNELL, W4CF

Bill Halligan Jr. W. J. Halligan W9AC **hallicrafters**

Station Activities

Continued from page 90

ARC to hold a New York State Convention in Niagara Falls in Sept. 1961. It will be a first-class affair and 1200 hams are expected to attend. Make your plans now. The NYS C.W. Picnic was held at the QTH of K2RYH. WA2CIG donated a trophy to the fastest operator, which was won by perennial champ K2TPV. We are sorry to report that W2ZHU has joined Silent Keys. He was EC and Radio Officer for Oswego County. K2RWV moved to Florida. He did a fine job as mgr. of NYSPTEN. K2BBJ will take his place as mgr. W2QQK moved to a higher antenna farm. K2QPC now has 500-watt finals for 2 and 220 Mc. K2HWI has a Heath "Sixer" and a homebrew 5-watt 75-meter mobile. K2LMG has replaced his eleven-element Spiral ray antenna with a stacked pair of eight-element Yagis on 2 meters. WA2JWV got his General Class license and a new Heath Apache. WA2IYB runs a Valiant and an SX-100. W2LXE put the Leece-Neville System in his Falcon for KWM-1. K2LWR now has 245 countries confirmed. W2OZR has installed a BC-610 in his country place. Traffic: (Aug.) WA2CIG 805, W2EZB 385, K2SIL 267, K2QDT 231, K2SSX 217, K2RTQ 165, W2FEB 147, W2RUF 118, W2OE 109, K2IYP 104, WA2DSC 56, K2TPV 54, WA2CKH 53, K2RYH 37, K2RWV 33, K2TDG 33, K2BBJ 27, W2RQF 22, K2ATC 18, K2GKK 15, K2JBX 14, W2PVI 13, WA2HEC 12, W2PGA 12, WA2GKB 9, WV2ILF 6, K2KTK 3, K2RTE 3, W2ZDL 3, K2DXV 2, WA2IYB 2. (July) WA2CIG 1303, WA2BEX 49. (June) K2QDT 117, W2PGA 39, WA2JKL 19, WA2FQV 11.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: OMA. RMs: KUN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. The PFN meets Mon. through Fri. at 1800 on 3850 kc. It is with deep regret we record the death of UEM, of Washington, Pa. RTV attended the MARSFEST at Ft. Meade. HXF is attending Carnegie Tech. K3COT has a new 10-meter beam. K3s GHH, KAP and HWL erected a 40-meter antenna for K3HAO. WRE received her EAN certificate. The Washington County ARC meets the 2nd Thurs. of each month at the Brownson House. The Nittany ARC reports via "QST de K3HKK": SYY and K3AKR are alternate net controls for the CD Net on 6 meters; the August meeting was a combined meeting and family picnic at the HRB picnic area. The Steel City ARC reports via *Kilowatt Harmonics*: SDV completed a two-week stay at the Melody Mill in Chicago; APN and UHM are constructing W2AZL 2-meter converters. The Coke Center RC (NAV) reports: JW received his Spud Pickers Amateur Radio Klub (Sparks) certificate; the radio club is in its 33rd year. Our sympathies to KSR, who recently lost his XYL. The Horseshoe RC reports via *Hamateur News*: K3LGO now is on 6 meters; a new Novice is KN3MXR; ROA visited in Pittsburgh recently working mobile on 6 meters. Huntingdon News by K3CQU: The H-CAR did itself proud in assisting the Orbisonia Bi-Centennial with mobile units; a new Novice is KN3MRR. The Conemaugh Valley ARC has done a swell job in aiding handicapped amateurs in its area. The Etna RC reports via *Oscillator:* K3KLP received his General Class license; DMK vacationed in 4-Land; K3HJI is on 75-meter phone. The Cumberland Valley ARC reports through *Valley QRM* that interest on 2 meters is reaching a new high, with HSU, RTH, UMY, ZQU and K3EDH active. Route Manager KUN reports that the WPA Traffic Net held up very well this past summer with swell support from WRE, UGV, MFB, LXQ, MIE, YUL, K3HWL, K3GAO, K3GHH, and K3CLX. Don't forget the Fourth Annual Pennsylvania QSO Party on Dec. 10 and 11. K3CLX has moved back to Centre Hall. RTV had no success in using the Echo balloon on 144 Mc. UHN is on 6 meters. Traffic: (Aug.) W3WRE 251, K3HWL 175, W3KUN 76, UGV 29, K3GHH 17, COT 4. (July) W3HXF 3.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME. SEC: PSP. RM: USR. PAM: RYU. EC of Cook County: HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. ICF has a new 50-ft. mast to boost his 80-meter signal. LGH has joined the ranks of the DXCC boys. K9CIL's new u.h.f. rig is a Heathkit Seneca and all his reports are FB. New appointments include K9IVG and K9JTD as OOs and K9TMG as OES. The Quad County Radio Club, Inc., enjoyed being host at the very successful Breakfast Club Hamfest. The Rock Island County RACES has a new Johnson 500 and an HQ-180C at its training station. SKD is heard on 6 meters with a Heathkit Sixer. The Rockford Amateur Radio Assn. had an exhibit at the Winnebago County Fair to promote amateur radio, handle messages and to get students for its Novice class. K9DJG has a new tower and beam. DSO, chief of the 9 QSL Bureau, wishes the fellows would send him the 5" x 7½" clasp or the long business-size envelopes, as the smaller size will not hold too many QSL cards. SKR lost his antenna in a recent storm. 4LEV is new net control of the Interstate Sideband Net. IDA has resigned because of a change of working hours. PVD's new QTH is Springfield. The Calumet Area Emergency Net has resumed Sat. and Sun. operation. K9PLS is using a new TA-33 beam with his HT-37 and is bringing in the hard-to-get signals. K9KKL and K9MHF are using the Drake 2-A receiver in their shacks. The Springfield and Sangamon County C.D. RACES gang supplied communications for the Sailboat Regatta, which included craft manned by nationally-known skippers. K9QPJ's new antenna set-up includes a HAM-M rotator and a Matchbox. K9RHU is 2-meter mobile. The North Central Phone Net handled 206 messages and the ILN traffic count was 157. IAW has the RTTY bug and is busy copying and getting ready to transmit. K9PUQ is the new editor of *Hamyab* (Hamfesters of Chicago publication). The Peoria Hamfest was well attended and the new site was praised by all attending. QAZ reports that Peoria is going nearly solid s.s.b. The LARKS (Chicago) held its installation dinner in Chicago. QXO is DXing with a new Hy-Gain Thunderbird antenna. The McDonough County Mobiles "6" cooperated with Western Illinois University (Macomb) in its Annual Homecoming Parade by establishing communications along the parade route. KN9WVE is on 2 meters with a home-brew 6293 transmitter. JEC is experimenting with amateur television. K9YRX has returned to W9-Land and SIM is now K7NBG. UCW and YYF were commended for their quick action in reporting a fire in Joliet and thereby saving considerable damage. IDA, DO and K9GDQ are winners of the BPL awards for the current month. Traffic: (Aug.) W9IDA 2016, DO 834, USR 323, JSV 290, MAK 265, K9GDQ 206, BTE 126, W9SXL 80, K9RAS 71, W9GFF 65, UGY 61, K9IVG/9 54, MHW 44, QYW 30, CIL 26, OAD 26, QAE 24, LXG 16, KCX 15, W9PRN 15, K9RHV 11, W9YYG 6, K9BIV 5, IUM 3, MLI 2, QMJ 2. (July) K9CIL 30, W9JJN 6.

INDIANA—SCM, Clifford Singer, W9SWD—Asst. SCM: Arthur G. Evans, 9TQC. SEC: SNQ. PAMs: K9AOM, BKJ, RVM and UKX. RMs: DGA, FJR, TT and VAY. Net skeds: IFN 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.) 1930 daily on 3920 kc.; QIN (training) 1800 M-W-F on 3745 kc.; QIN 1900 daily and RFN 0700 Sun. on 3656 kc.; CAEN (160 meters) M-F at 1900 on 1805 kc. New appointments: FJR as RM for QIN (training), K9IHG as OPS, K9UBK as ORS, K9IBT as OBS and K9EPT as OES. The Kokomo ARC entertained the local hams and neighboring friends at the Big Bull Session with a good-sized crowd present for the ham festivities. Muncie was the location for the Duneland ARA's 3rd Annual Hamfest with well over 100 registered. The Tri-State ARS's Annual Hamfest attracted well over 300 hams from three states. K9SVD is running a new HB-180 watter. GUX has a new HQ-180 receiver. BKJ is recovering nicely from a recent illness and operation. K9KKG is touring Europe. K9UBK has received the 20-w.p.m. Code Proficiency Award and also was top "Indian" in Indiana in the 1960 Novice Roundup. K9LWD is on 6 meters with a Hi Bander and is using an HQ-110C for a hearing aid. K9ILK has a new antenna on 75 meters and a very much improved signal. K9MZV and OM MHP visited ARRL Headquarters while on vacation in the east. *Amateur radio exists as a hobby because of the service it renders.* August net reports: RVM reports IFN total at 400; K9OAM reports 243 for the ISN; QIN netted 364, reports VAY: FJR reports 57 for the QIN (training); TT reports 364 for QIN and CAEN totaled 73, reports UKX. Making BPL: DGA, TT and K9UBK. Traffic: (Aug.) W9TT 535, K9UBK 307, W9VAY 236, ZYK 190, K9AOM 166, W9DGA 160, GJS 121, FJR 118, BDG 102, GFA 68, K9BSU 65, W9RVM 58, SWD 57, NZZ 55, EJW 51, SNQ 46, QYQ 44, RTH 32, K9GBB 31, W9UQP 28, K9IYD 22, DSY 21, W9MEK 21, EHZ 20, FWH 20, K9UOF 17, W9DOK 16, IMU 16, AB 11, BDP 10, BKJ 10, K9LAQ 9, W9YYX 8, K9AHD 7, LZJ 7, W9BVR 6, KN9VIC 6, W9CC 5, K9CRS 5, W9HUF 5, KN9WET 5, K9GSV 4, MAN 2, W9TQC 2, K9VHE 2, HMC 1. (July) K9CRS 10, W9HUF 8, K9VQP 1.

WISCONSIN—SCM, George Woida, W9KQB—SEC:

(*Continued on page 98*)

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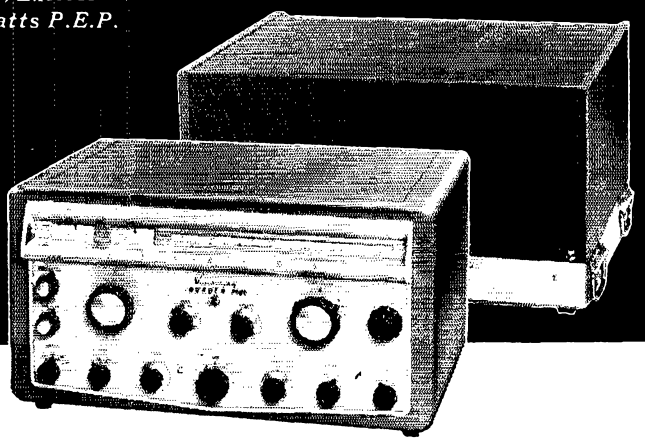

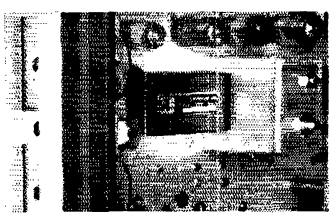

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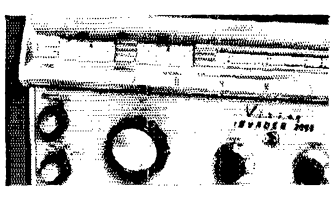

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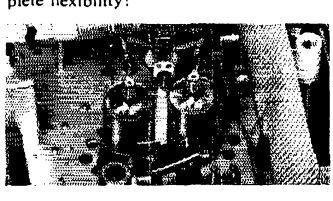

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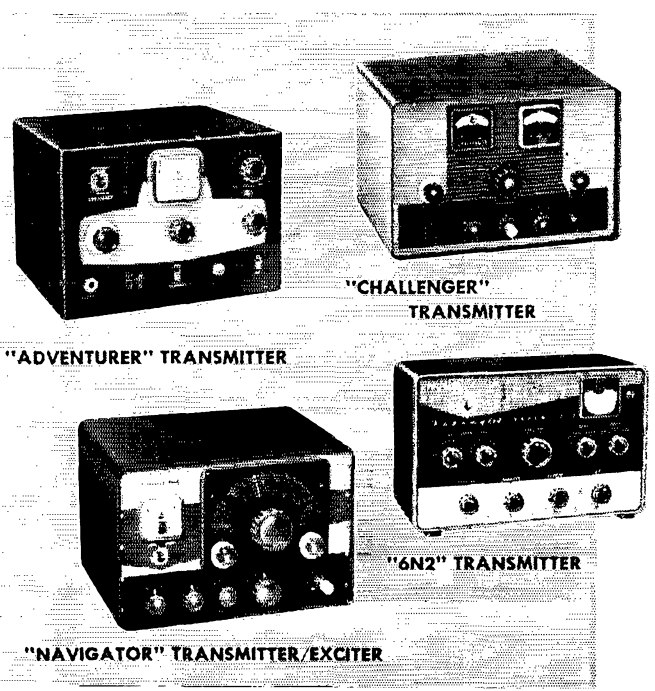
Pedestal contains complete unit. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB. With tubes. **Cat. No. 240-1000**..Wired and tested.....**Amateur Net $1595.00**

Matching accessory desk top, black and three-drawer pedestal. **Cat. No. 251-101-1**.. **FOB Corry, Pa. $132.00**

★★★★ *popular transmitters...*



"ADVENTURER" TRANSMITTER

Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . instant bandswitching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.

Cat. No. 240-181-1..Kit.....**Amateur Net $54.95**

"CHALLENGER" TRANSMITTER

70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW on 6 meters. Two 6DQ6A final amplifier tubes. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes, less crystals.

Cat. No. 240-182-1..Kit.....**Amateur Net $114.75**
Cat. No. 240-182-2..Wired.....**Amateur Net $154.75**

"NAVIGATOR" TRANSMITTER/EXCITER

40 watts CW input . . . also serves as a flexible VFO Exciter. 6146 final amplifier tube—bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes, less crystals.

Cat. No. 240-126-1..Kit.....**Amateur Net $149.50**
Cat. No. 240-126-2..Wired.....**Amateur Net $199.50**

"6N2" TRANSMITTER

Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with the Viking I, II, "Ranger", "Valiant" or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

Cat. No. 240-201-1..Kit.....**Amateur Net $129.50**
Cat. No. 240-201-2..Wired.....**Amateur Net $169.50**

★★★ *feature-packed transmitters...*

"RANGER" TRANSMITTER/EXCITER

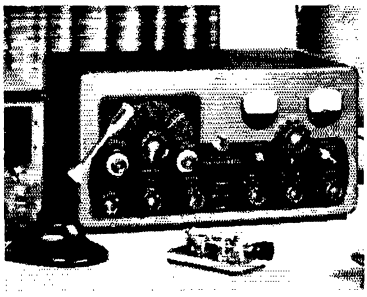
This popular 75 watt CW or 65 watt phone transmitter will also serve as an RF/audio exciter for high power equipment. Completely self-contained—instant bandswitching 160 through 10 meters! Operates by built-in VFO or crystal control. High gain audio—timed sequence keying TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No.	Amateur Net
240-161-1..Kit	$229.50
240-161-2..Wired and tested	$329.50

"VALIANT" TRANSMITTER

275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant bandswitching 160 through 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

Cat. No.	Amateur Net
240-104-1..Kit	$349.50
240-104-2..Wired and tested	$439.50

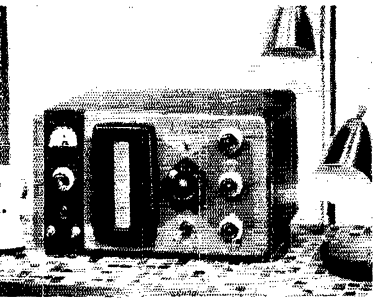


"FIVE HUNDRED" TRANSMITTER

Full 600 watts CW—500 watts phone and SSB. (P.E.P. with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-500-1..Kit	$749.50
240-500-2..Wired and tested	$949.50

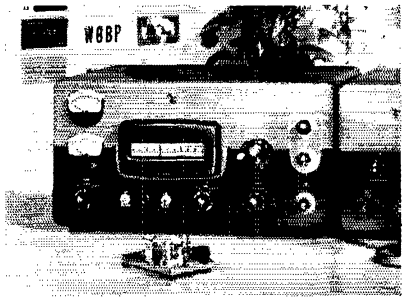
★★★ *exciting desk-top linears...*



"COURIER" AMPLIFIER

Rated a solid 500 watts P.E.P. input with auxiliary SSB exciter as a Class B linear amplifier: 500 watts CW or 200 watts AM linear. Self-contained desk-top package—continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts depending on mode and frequency desired. TVI suppressed. With tubes and built-in power supply.

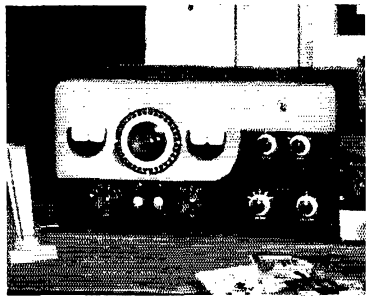
Cat. No.	Amateur Net
240-352-2..Wired and tested	$289.50



"THUNDERBOLT" AMPLIFIER

The hottest linear amplifier on the market—2000 watts P.E.P. (twice average DC) input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs.—instant bandswitching. Drive requirements; approx. 10 watts Class AB_2 linear, 20 watts Class C continuous wave. With tubes and built-in power supply.

Cat. No.	Amateur Net
240-353-1..Kit	$524.50
240-353-2..Wired and tested	$589.50



"6N2 THUNDERBOLT" AMPLIFIER

1200 watts (twice average DC) input SSB and DSB, Class AB_1; 1000 watts CW, Class C; and 700 watts input AM linear. Continuous band-switched coverage on 6 and 2 meters. TVI suppressed. Drive requirements: approx. 5 watts Class AB_1 linear, 6 watts Class C CW. With tubes and built-in power supply.

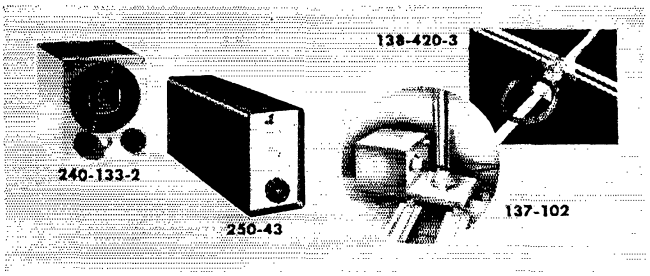
Cat. No.	Amateur Net
240-362-1..Kit	$524.50
240-362-2..Wired and tested	$589.50

FIRST CHOICE AMONG THE NATION'S AMATEURS

Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA

Boost performance... add convenience... with these popular Viking station accessories!



"6N2" VFO—Replaces 8 to 9 mc. crystals in frequency multiplying 6 and 2 meter transmitters. Output range: 7.995 to 9.010 mc. With tubes and power cable.

Cat. No. 240-133-1..Kit.....Amateur Net $34.95
Cat. No. 240-133-2..Wired and tested.....Amateur Net $54.95

"6N2" CONVERTER—Instant front panel switching from normal receiver operation to 6 or 2 meters. Available in following ranges: 26 to 30 mcs., 28 to 30 mcs., 14 to 18 mcs., or 30.5 to 24.5 mcs. With tubes.

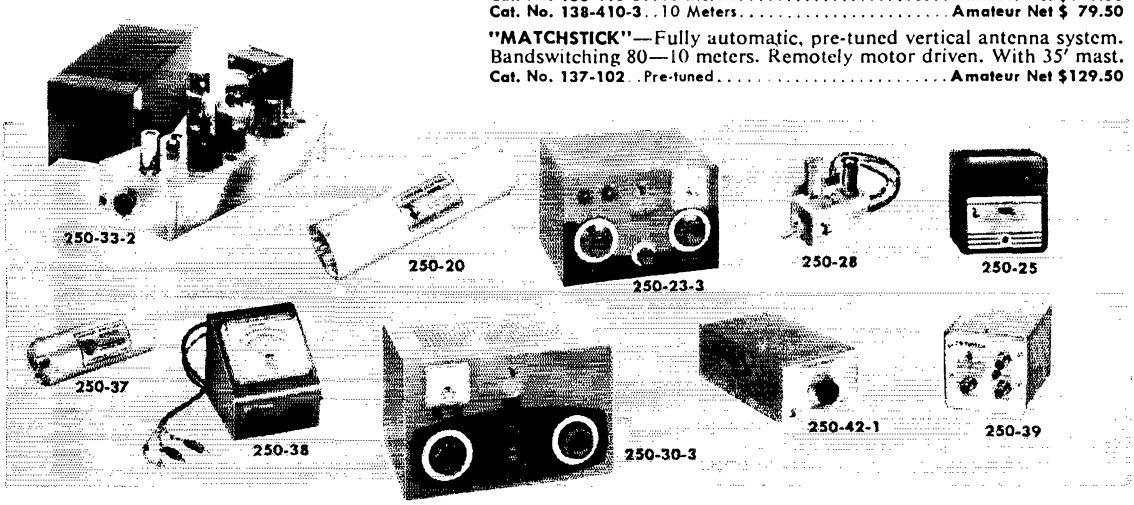
Cat. No. 250-43..Kits.....Amateur Net $59.95
Cat. No. 250-43..Wired.....Amateur Net $89.95

PRE-TUNED BEAMS—Rugged, semi-wide spaced with balun matching sections. 3 elements, boom and balun.

Cat. No. 138-420-3..20 Meters.....Amateur Net $139.50
Cat. No. 138-415-3..15 Meters.....Amateur Net $110.00
Cat. No. 138-410-3..10 Meters.....Amateur Net $ 79.50

"MATCHSTICK"—Fully automatic, pre-tuned vertical antenna system. Bandswitching 80—10 meters. Remotely motor driven. With 35' mast.

Cat. No. 137-102..Pre-tuned.....Amateur Net $129.50



VIKING AUDIO AMPLIFIER—Self-contained 10 watt speech amplifier, with power supply and tubes.

Cat. No. 250-33-1..Kit.....Amateur Net $73.50
Cat. No. 250-33-2..Wired and tested.....Amateur Net $99.50

LOW PASS FILTER—Wired and pre-tuned.

Cat. No. 250-20..52 Ohms Impedance.....Amateur Net $14.95
Cat. No. 250-35..72 Ohms Impedance.....Amateur Net $14.95

CRYSTAL CALIBRATOR—Provide accurate 100 kc check points to 55 mc. With tube and crystal.

Cat. No. 250-28..Wired and tested.....Amateur Net $17.95

"SIGNAL SENTRY"—Monitors CW or phone signals up to 50 mc. With tubes.

Cat. No. 250-25..Wired and tested.....Amateur Net $22.00

T-R SWITCH—Instantaneous break-in on SSB, DSB, CW or AM. With tube, power supply and provision for RF probe.

Cat. No. 250-39..Wired.....Amateur Net $27.75

"MATCHBOXES"—Completely integrated antenna matching and switching systems for kilowatt or 275-watt transmitters. Bandswitching 80 through 10 meters.

Cat. No.		Amateur Net
250-23-3	275 Watts, with directional coupler and indicator	$86.50
250-23	275 Watts, less directional coupler and indicator	$54.95
250-30-3	Kilowatt, with directional coupler and indicator	$149.50
250-30	Kilowatt, less directional coupler and indicator	$124.50

DIRECTIONAL COUPLER AND INDICATOR—Provides continuous reading of SWR and relative power in transmission line.

Cat. No. 250-37..Coupler.....Amateur Net $11.75
Cat. No. 250-38..Indicator.....Amateur Net $25.00

ATTENUATORS—Provide 6 db attenuation with required power dissipation to enable various units to serve as exciters for Viking "Thunderbolt".

Cat. No.		Amateur Net
250-42-1	For Viking "Ranger" or similar	$21.50
250-42-3	For use with HT-32 or similar unit	$21.50

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to Amateur Radio!

- ★ HOW TO BECOME A RADIO AMATEUR
- ★ THE RADIO AMATEUR'S LICENSE MANUAL
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- ★ OPERATING AN AMATEUR RADIO STATION

Anyone starting out in amateur radio will find these publications a necessary part of his reading and studying for the coveted amateur radio operator's ticket. Written in clear, concise language, they help point the way for the beginner. Tried and proven by thousands upon thousands of amateurs, these ARRL publications are truly the "Gateway to Amateur Radio."

$1.50

POSTPAID

The American Radio Relay League, Inc.—West Hartford, Connecticut

Station Activities

Continued from page 92

YQH. PAMs: NRP and NGT. RMs: VHP and VIK. New appointees: NGT as OPS, K9UZR as OES. SIZ became the 23rd Wisconsin member of the A-1 Operators Club. K9LWV received his WSSN certificate and K9JQA his WIN certificate. K9GYG is attending the Moody Bible Institute in Chicago. The Milwaukee Club will hold its meetings on the 1st and 3rd Thurs. of each month at the Public Library starting at 8 P.M. MTA/9 and K9GDF took part in the Annual Fly-in at Rockford, Ill., a flight of old and home-built planes. Considerable traffic was handled for the participants. K9GYQ is off to college at Dubuque, Iowa. ZB is chasing DX and is active in the NTS from his 28" x 28" shack housing a Valiant and an HRO-60. New officers of the Fond du Lac Club include HJS, pres.; K9LCL and K9UML, vice-pres.; K9UZR, secy.-treas. With the coming of the heavy traffic season, the BEN, WIN and WSSN will welcome new members, especially from the northern and western parts of the State. DX-wise, DYG has 367 different prefixes worked. KN9UJJ's broken right arm has not curtailed his hamming. HJR's plane trip to Europe resulted in his meeting many Danish operators. OTL now is in Madison. OO notices mailed: RKP 38, K9GDF 22, K9EZG 5, CCO 1. Now that the slack summer season is past, more usable news for his column will be appreciated, both from the clubs and individual operators. Please mail by the 4th of each month. Thank you and 73. Traffic: (Aug.) W9DYG 1003, CXY 478, W2MTA/9 217, K9GYQ 214, GDF 118, W9KQB 97, VHP 61, CBE 48, CCO 38, VIK 36, ZB 35, NRP 33, K9GSC 27, DTK 23, W9APB 17, K9LWV 14, W9SZR 14, K9DOL 11, W9SIZ 9, LFK 8, MWQ 8, FZC 3. (July) W9OTL 27, SIZ 2.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, W0HVA—SEC: K0KBV. PAM: K0KJR. RM: KTZ. The North Dakota C.W. Net resumed operation the second week of September. KN0YWD, of Minot, received an appointment as Official Experimental Station. The North Dakota 75-Meter Phone Net reports for July: 21 sessions reported, 401 total check-ins, 27 maximum, 8 minimum; 46 pieces of formal traffic, 53 informal and 11 relays. The August report of the 75-Meter Phone Net is 27 sessions with 400 check-ins, 24 maximum, 11 minimum; 42 pieces of formal traffic, 44 informal and 6 relays. K0CLY has an antenna up and his rig on the air at his new home in East Bismarck. Traffic: K0ITP 124, MPH 19, PVH 8, GGI 7, W0PHC 7, BHF 3, K0OMA 3, TYY 3, YST 3, W0BHT 2, K0RRW 2, RRZ 1, VTP 1.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—SEC: SCT. K0VIZ, Leola, is a Class IV OO. The South Dakota Weather Net began its sixth year of operation on Oct. 3 at 7 A.M. MST. K0UXC is attending college at Orange City, Iowa. OFS is teaching at Mankato, Minn. ACG, Canistota, is teaching at Canistota, and AYJ, Hayti, is teaching in North Dakota. TQE, formerly of Avon, now is working for KORN-TV, Mitchell. K0EYA, Rapid City, retired from the U.S. Army, is operating an HT-37 and an SX-100. HON is located at 6755 S. Logan, Littleton, Colo. Traffic: W0SCT 364, K0BMQ 270, DVB 178, K0DUR 23, ZWL 12, K0ACJ 6, W0YVF 5, K0KOY 3, W0TMN 3, K0SEJ 1.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, W0KJZ—Asst. SCM: Rollin O. Hall, 6LST. SEC: TUS. PAMs: OPX and K0EPT. RMs: RIQ and K0IZD. Net Secretary NYM attended the National Science Institute for Chemistry teachers in Minneapolis. K0VPO has a new Valiant on the air. WMA worked 4X4, Tel Aviv, Israel. LUX purchased a KWM-2. K0SNG installed a Hornet B-500 tri-bander with a rotator. OTU operated a "ham" station in Vatican City to contact his home while traveling in Southern Europe. K0RSL and K0VTG passed their General Cl. exams. K0ISV entered Nazareth Hall Seminary in St. Paul. Appointments renewed: MZR, K0KKQ and K0JYJ as ECs; KLG as ORS; K0MNY as OPS and TUS as SEC: Cancelled appointments (for inactivity or per request): BEI, DFP, K0ISV, JCF and QLM as ECs; RA and K0IDV as OOs; and K0IDV as OBS. OGP is the new EC of Rice County. KN0CVK, age 12½, registered for the AREC in Ramsey Co. The Minneapolis Radio Club's Picnic was well attended by 100 hams and their families. RM K0IZD vacationed in W6-Land. SPRC members supplied radio communications for the Open Gulf Tournament and the Annual Mississippi River Boat Parade. K0HKK moved to Anoka, and IRD to Pine City. Of the net reports received MJN, our training net, had the highest traffic total. The St. Cloud Picnic registered 185 persons with the following League Officials attending: Dir. BUO, Asst. Dir. KLG, PAMs OPX and K0EPT, SEC TUS, Asst. SEC K0EWC; also 80 per cent of the phone and c.w. NCSs, many ECs and the SCM. VOA and TJA were winners in the mobile test. K0ICG won prizes at Mankato and St. Cloud for being the oldest ham present. TUS and K0ORK made the BPL. K0EVW won a Mosely TA-33. RO TJA started a S. E. Minn. emergency net that meets at 1400 CST twice a month Sun. on 3840 kc. The 6-meter group, COS, PQS, K0s EVW, PSI, CPW, JXB, KRO and EWA, provided radio communications for the Explorer Scout Canoe Derby. Traffic: (Aug.) W0TUS 824, K0ORK 412, W0KJZ 190, K0SNC 181, UKU 156, W0KYG 80, HEN 76, OPX 61, RIQ 60, BUO 55, K0QBI 55, W0DQL 50, K0IZD 50, W0PET 48, KLG 47, K0PML 47, VPP 44, W0WMA 39, K0EPT 36, W0KFN 36, VPO 29, LST 28, K0JYJ 27, VXW 26, QYY 22, SBB 20, SNG 18, HIW 17, IKU 16, TWM 16, W0UMX 15, K0RHN 14, MGT 13, WYV 13, ISV 12, W0SZJ 9, K0OBT 8, OQT 7, MNY 6, W0THY 6, K0KYK 5, W0WVT 5, K0QLM 3, W0OET 2, K0UKL 2. (July) W0VXO 39, OET 4.

DELTA DIVISION

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—The Louisiana Section C. W. Net, LAN, is now a unit of the National Traffic System, operating on 3615 kc. Mon. through Fri. 1900-1945 CST. Net controls are CEZ, MXQ, K5UYL, K5IGW and K5LZA/5. This is your net. Call in and take traffic for your locality. OES UQR is doing some fine work on 50 Mc. The New Iberia ARC members, with two technicians from the local airbase and two others from the local radio supply house went to see what could be done about getting GMO's s.s.b. rig back on the air. K5SBF is getting his AREC Net going on 3885 kc. K5UYL has a new SX-101 with an 813 final on the way. K5KLN now has GSB-101 on his 32S-1. K5AGJ thanks everyone for the "get well" cards sent to him while he was hospitalized. 4LDM/5 is back on the air after a vacation. K5ARH finished the 4-400A final in the grounded grid and is driving it with his HT-32A. K4SXO, a new member of the FCC's New Orleans office, has joined both the New Orleans and Jefferson Radio Clubs. K5PQG, recently of Shreveport, is now portable VE2. SUM is sporting a pair of 4X250s on a linoleum-panelled final that works just out of this world. Your SCM had a very fine meeting with the Lake Charles ARC recently at the local Red Cross building. While driving through Baton Rouge your SCM noted that some fine antennas are strung about the residence of HRC. K5AHS is doing a resident M.D. stint at Charity Hospital in New Orleans. K5ARH has been appointed OPS. DPJ, with his FB s.s.b. signal, will be transmitting ARRL Official Bulletins. Recent renewal of ARRL appointments include K5ESW, OO-I; CEZ, RM and ORS; K5LKC, OPS; MXQ, SEC; K5UYL, ORS and OPS. Traffic: W5CEW 299, K5AGJ 253, UYL 111, LZA/5 93, W5MXQ 86, W4LDM/5 9, K5OKR 9.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—Senior citizen RIX has been elected a Commissioner of the City of Hattiesburg. It seems that Pat retired from the workaday world and then proceeded to get his ticket. However, the call of politics was too much. We in Mississippi are proud of Pat. We know that Hattiesburg and amateur radio will both benefit from Pat's labors. DLA and SPX have been recent visitors to the hospital. We are glad to report that both are doing better. The Magnolia Net held its annual meeting at Roosevelt Park and a fine time was had by all. It seems that VAK lost his shoes recently. Ask him about it. The Magnolia Net handled 64 formal and 103 informal messages during August. NCSs for August were K5IHQ, K5PPI, K5VAK, K5ZSU, NRU and K5SQS. Traffic: K5SQS 39.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—SEC: K4EJN. RM: FX. PAMs: UOT and PAH. WBK reports that nobody calls CQ on 50.5 Mc. in Memphis without an answer. UVP has new beams, an eight-element on 6 and a ten-over-ten for 2 meters and adds West Virginia and South Carolina to make his 2-meter standing at ten states. K4MUO is now in Marietta, Ga. DTI is in Paducah, Ky. TDZ is finishing his 432-Mc. equipment. PL says he is having growing pains with a TO keyer. K4RSU is on 6 meters with a Sixer. K4KYL and ZBQ made the news by

(*Continued on page 112*)

Just in time for Christmas . . .

HEATHGIFTS

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new through Heath research

$199.95

SAVE UP TO 50%
WITH HEATHKIT
QUALITY ELECTRONICS

NOTE: 6 METER VERSION MODEL HW-10 COMING IN JANUARY 1961

EXPECTED SHIPPING DATE
DECEMBER 4, 1960

NEW COMPLETE MOBILE OR FIXED 2-METER TRANSMITTER, RECEIVER COMBINATION . . . ALL IN ONE COMPACT UNIT

- Tracked VFO and Exciter Stages for single knob tuning
- Up to 10 watts RF output to antenna
- Built-in Low Pass Filter
- Built-in 3-way Power Supply for 117 V. AC, 6 V. DC or 12 V. DC operation
- Push-to-talk Ceramic Element Microphone

"PAWNEE" 2-METER TRANSCEIVER KIT (HW-20)

More features, quality, performance and versatility are designed into the new "Pawnee" to bring you the finest in *complete AM and CW facilities* on the 2-meter amateur band. The transmitter section features a built-in VFO with all frequency determining components mounted on a "heat sink" plate for temperature stability . . . plus, *four switch-selected crystal positions* for novice, CAP and Mars operation. VFO and all exciter stages are tracked for convenient *single knob tuning* over any 500 KC band segment (greater excursions require simple re-peaking of final). A *VFO "spot" switch* is provided for zeroing-in signals with transmitter off.

A *6360 dual tetrode final* RF amplifier provides up to *10 watts of power output* to the antenna and a *built-in low pass filter* is incorporated to suppress harmonics and other spurious radiation which might reach the antenna. The *dual purpose modulator* provides a full 10 watts of audio for *high level plate modulation* of the final RF amplifier or 15 watts of audio for *public address operation*, selectable with a push-pull switch.

The receiver is a *superheterodyne* using *double conversion* with the first oscillator *crystal controlled* for high stability. All oscillators are *voltage regulated*. The large, slide-rule type dial with *vernier tuning* provides ample bandspread for both receiver and VFO tuning. Also featured is an RF gain control, BFO, ANL, squelch, AVC on/off switch and *front panel tuning meter*. Meter is automatically switched to read received signal strength or relative power output. Meter and tuning dial are *edge illuminated* for high visibility.

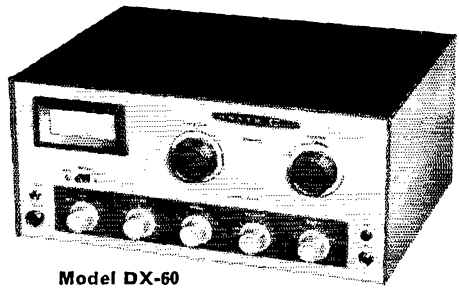
A unique *built-in 3-way power supply* allows 117 VAC fixed station operation or 6 or 12 VDC mobile operation simply by using either AC or DC power cables furnished. The power supply uses heavy-duty vibrator system with silicon type rectifiers in bridge circuit configuration. All sections of the unit are *completely shielded* for maximum stability and noise-free operation.

The "Pawnee" comes complete with *built-in speaker*, two power plugs (AC & DC), heavy duty power cables, primary fused relay for mobile installation, mounting bracket and *push-to-talk* ceramic element microphone with coil cord and mounting clip. Cabinet measures 6" H x 12" W x 10" D.

Model HW-20...34 lbs....
.....$20.00 dn., $17.00 mo. **$199.95**

more exciting
HEATHGIFTS
to choose from

NEW PHONE AND CW TRANSMITTER KIT (DX-60)



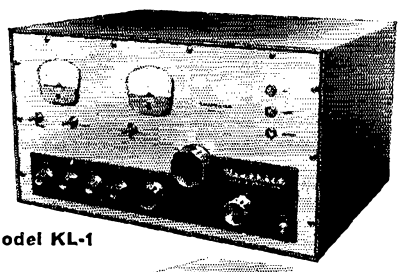
Model DX-60

This successor to the famous DX-40 offers far more than any other unit in its price and power class. Its smart modern appearance, clean, rugged construction and conservatively rated components all add up to ease of assembly and trouble-free operation. New features include a built-in low pass filter for harmonic suppression, neutralized final for high stability, grid block keying for excellent keying characteristics and easy access to crystal sockets on rear chassis apron. A front panel switch selects any of four crystal positions or external VFO. Modulator and power supply are built-in. Single knob bandswitching and the pi-network output provide operating convenience. A tune-operate switch provides protection during tune-up and a separate drive control allows adjustment of drive level without detuning driver. May be run at reduced power for novice operation. A fine kit for the beginner as well as general class amateur.

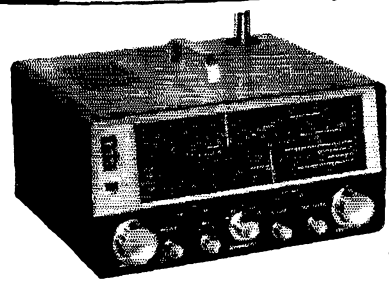
SPECIFICATIONS—Power input: 90 watts peak carrier controlled phone or CW. **Output impedance:** 50-72 ohm (coaxial). **Output coupling:** Pi-network. **Operation:** CW or AM phone—crystal or VFO control. **Band coverage:** 80 through 10 meters. **Power requirements:** 117 V 60 cycle AC, 225 watts. **Dimensions:** 13¾" W x 11½" D x 6¼" H.

Model DX-60...27 lbs....$8.30 dn., $8.00 mo..**$82.95**

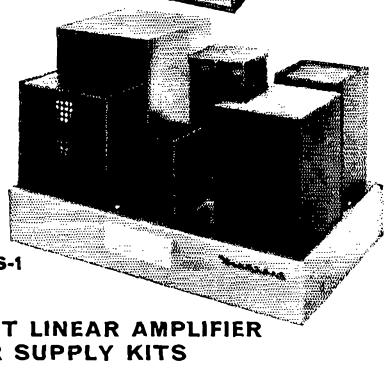
Look to HEATHKIT® *by* DAYSTROM *for the*



Model KL-1



Model GC-1A



Model KS-1

KILOWATT LINEAR AMPLIFIER & POWER SUPPLY KITS

The "Chippewa" and KS-1 power supply combination team up to bring you performance unsurpassed in amateur rig equipment at the lowest cost anywhere! Compare price, features and specifications with any other unit on the market today, and you'll see why any ham would be proud to call this pair his very own! It is the only kilowatt rig with oil-filled, hermetically sealed plate transformer and filter choke and features full kilowatt power in ALL modes of operation (1500 watt Class C capability on dummy load tests). Any of the popular AM, CW and SSB exciters can be used as a driver; provides maximum legal amateur power inputs on 80 through 10 meters, Class AB1 or Class C operation. Power input in Class AB1 attains 2,000 volts P.E.P. with much better linearity than can be obtained with lower plate voltages or other modes of operation.

Model KL-1 "CHIPPEWA" KILOWATT LINEAR AMPLIFIER..70 lbs...$40.00 dn., write for details..**$399.95**

Model KS-1 POWER SUPPLY...105 lbs.
$17.00 dn., $15.00 mo. **$169.95**

ten transistor battery powered circuit!

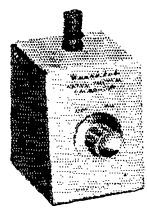
"MOHICAN" GENERAL COVERAGE RECEIVER KIT (GC-1A)

Many firsts in receiver design bring you complete portability, high sensitivity, selectivity and stability in this outstanding communications receiver. Features ten-transistor circuit, flashlight battery power supply, ceramic IF "transfilters," Zener diode voltage regulation front end, telescoping 54" whip antenna, S-meter, flywheel tuning and large slide-rule dial. Covers 550 kc, to 32 mc in five bands with calibrated bandspread scales (oscillator tuning) on amateur bands 80 through 10 meters, including 11 meter citizens band. Sensitivity is better than 2 uv for 10 db signal-to-noise ratio on amateur bands. GC-1A quickly converts from battery power to 117 VAC operation with plug-in power supply XP-2 for fixed station operation. 20 lbs.

Model GC-1A (kit)...$11.00 dn., $10.00 mo...**$109.95**

Model GCW-1A (wired) ...$19.35 dn., $17 mo.**$193.50**

Model XP-2: 117 VAC power supply for GC-1.....
2 lbs.....**$9.95**

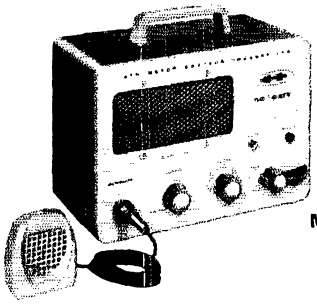


100 KC CRYSTAL CALIBRATOR KIT (HD-20)

Perfect for amateur or service shop use in dial calibration checks of communications receivers. Provides marker frequencies every 100 kc between 100 kc and 54 mc. Transistorized and battery powered for complete portability. Accuracy assured by .005% crystal furnished.

Model HD-20...1 lb.....**$14.95**

now a new improved 6 meter model joins this famous transceiver series



Model HW-29A

new through Heath research

2, 6 & 10 METER TRANSCEIVER KITS (HW-30, 29A, 19)

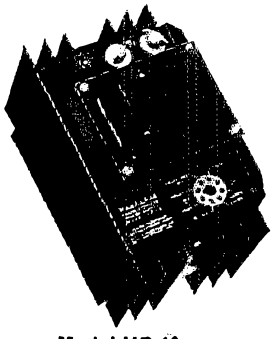
The new 6 meter HW-29A joins "Tener" and "Twoer" to bring you top transceiver performance at the lowest prices anywhere. Like the "Twoer," the new HW-29A multiplies to its output frequency from an oscillator using an 8 mc fundamental crystal for rock steady stability. All models have crystal controlled transmitters and tunable, super-regenerative receivers with RF preamplifiers. Receivers pull in signals as low as 1 uv and the 5 watt transmitter input is FB for emergency work or "local" nets. Features include transmit-receive switch, metering jack, ceramic element microphone, and two power cables. Less crystal. 10 lbs. each.

Model HW-19...(10 meter)..... **$39.95**
Model HW-29A...(New improved 6 meter version) **$44.95**
Model HW-30...(2 meter)..... **$44.95**

Attn. HW-29 owners: Convert your "Sixer" to the new improved "A" model by ordering this easy to install conversion kit. Allows use of 8 mc crystal for maximum stability.

Model HWM-29-1...1 lb..... **$4.95**

best values in Amateur Radio



Model HP-10

UTILITY AC POWER SUPPLY KIT (HP-20)

Furnishes filament and plate voltage for converting Heathkit "Comanche" and "Cheyenne" or other mobile amateur gear to fixed station operation. Delivers 6.3 VAC @ 8 amps or 12.6 VAC @ 4 amps for filaments and 120 watt ICAS DC plate power of 600 VDC @ 200 ma or 600 VDC @ 150 ma & 300 VDC @ 100 ma. Less than 1% AC ripple.

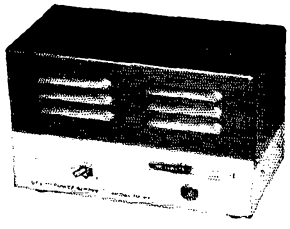
Model HP-20...15 lbs..... **$29.95**

MOBILE POWER SUPPLY (HP-10)

Heavy-duty, all semi-conductor circuit furnishes all power required to operate Heathkit mobile gear. With 12.6 v input supplies 600 VDC @ 200 ma or 600 VDC @ 150 ma & 300 VDC @ 100 ma, and —125 VDC @ 30 ma. 120 watt ICAS output rating. Extruded aluminum heat sinks provide efficient cooling of power transistors.

Model HP-10...10 lbs..... **$44.95**

new through Heath research



Model HP-20

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See how you can save up to 50% or more on over 200 different Heathkit products in Hi-Fi, Test, Amateur Radio, Marine and General consumer fields.

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HEATH COMPANY
Benton Harbor 9, Michigan

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Fill out the order blank below. Include charges for parcel post according to weights shown. Express orders shipped delivery charges collect. All prices F.O.B. Benton Harbor, Mich. A 20% deposit is required on all C.O.D. orders. Prices subject to change without notice.

Please send the following HEATHKITS:

ITEM	MODEL NO.	PRICE

Ship via ☐ Parcel Post ☐ Express ☐ COD ☐ Best Way

☐ SEND MY FREE COPY OF YOUR COMPLETE CATALOG

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Address_____

City_____ Zone____ State_____

Dealer and export prices slightly higher.

How to Acquire a Permanent Savings Habit in Minutes

Learning to save isn't the easiest thing in the world. But thousands of Americans have discovered a way that requires no learning—buying U. S. Bonds on Payroll Savings. Just ask your company's bond officer to set aside any amount you wish each payday. You'll be surprised how little it changes your spending habits—and how quickly your savings will grow. Try it and see!

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NOW every Savings Bond you own—old or new—earns ½% more than ever before.

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You Save More Than Money With U.S. Savings Bonds

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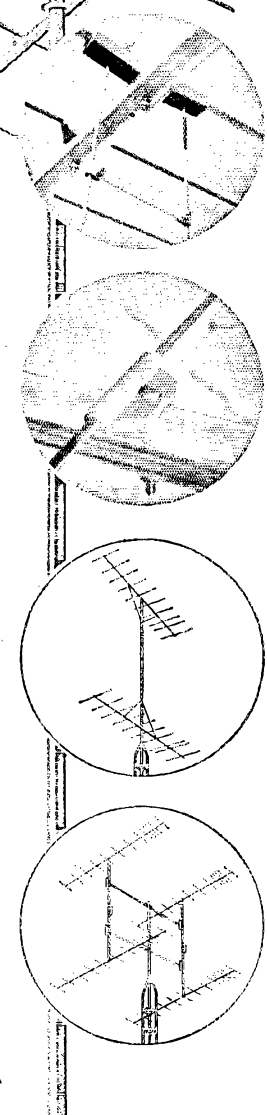
MAXIMUM PERFORMANCE AND MECHANICAL SUPERIORITY

hy-gain VHF Hi-banders

FOR 2, 1¼ AND ¾ METERS

"The World's Largest Manufacturers of Amateur Communication Antennas"



2 Meter 5 Element

Hy-Gain's 5 element 2 meter Hi-Bander is small and extremely light weight (2¾ pounds) and may be rotated by any TV antenna rotor. Although designed for years of trouble-free installation it is also very convenient for semi-permanent or portable VHF applications. The beam is completely factory pretuned and quick and easy to assemble. May be fed with either coax or parallel transmission lines. Boom length 5' 4". longest element 41¾ inches *

9db Gain
MODEL 25 **$8.95**

2 Meter 10 Element

The world's most popular 2 meter beam, the 2 meter 10 element Hi-Gain Hi-Bander is still small and light weight (4¼ pounds) enough to be rotated by any TV rotator. NO COMPROMISE DESIGN DEVELOPS THE TREMENDOUS FORWARD GAIN OF 13.4DB WITH EXCELLENT FRONT TO BACK RATIO CHARACTERISTICS. Boom 12 feet long, longest element 41¾ inches. May be fed with either coaxial or parallel transmission lines. *

13.4db Gain
MODEL 210 **$14.95**

1¼ Meter 11 Element

The same high quality construction as the 2 meter series results in an extremely strong yet light weight (3¾ pounds) 220 megacycle beam with a boom 12 feet long and the longest element of 27 inches. A pretuned advanced design folded ratio dipole is used and specifically designed for low loss 450 ohm open wire transmission lines. (Open wire low loss lines are a must for minimizing feedline losses on 220 megacycles.) This great performer has proven itself in many pioneering amateur projects in this challenging VHF. band. Optimum Spacing and high Q rod element design result in the very high gain of 14.2db. *

14.2db Gain
MODEL 111 **$13.95**

3/4 Meter 13 Element

One of the highest gain (16.1db) and efficient extended multi-element Yagi's ever commercially manufactured for amateur communications purposes, the Hy-Gain ¾ meter, 13 element Hi-Bander makes consistent long-range contacts on 430 megacycles a reality. Boom length 8 feet. Longest element 13⅜ inches. Net wt. only 2¼ lbs. *

16.1db Gain
MODEL 313 **$12.95**

hy-gain antenna products

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*Based on Fig. 4-63, page 166, The A.R.R.L. Antenna Book, Ninth Edition.

NEW BETA MATCH

Both the 5 and 10 element 2 meter arrays use the revolutionary and exclusive new Hy-Gain beta matching system. Although it is completely factory pretuned and requires no further adjustment to result in an SWR of less than 1.5:1, it is fully adjustable to compensate for variables encountered at each installation site. Instructions are furnished for feeding the 2 meter series with almost any of the commonly used coaxial or parallel transmission lines. Completely unaffected by weather, the beta match also allows tuning of the array for maximum forward gain and front to back ratio with no compromise to facilitate matching.

CONSTRUCTION AND DESIGN FEATURES

All Hy-Gain Hi-Banders are ruggedly constructed of heavy wall 1¼" diameter heat treated alloy aluminum tubing booms and 3/16" diameter solid rod elements. They are built to withstand extremely high wind velocities and heavy ice loading conditions. All Hi-Bander beams are optimum spaced, which together with the advanced design high Q solid rod elements result in tremendous forward gain and excellent front to back characteristics. Elements are insulated from and firmly attached to the boom by the exclusive Hy-Gain high impact cycolac formed bracket. Both boom and element ends are plastic capped and all hardware is hot dipped galvanized and iridite treated in accordance with military specifications for maximum weather ability.

DUAL STACKING KITS
+ 3db Gain

Two Hy-Gain VHF Hi-Bander beams may be stacked to produce an additional 3db gain (equal to doubling the power) with considerable reduction in vertical beam width concentrating maximum power at low vertical angles which are so important in VHF propagation. These stacking kits are complete and include all necessary hardware and complete assembly instructions (less mast). Order by antenna model number. Model DS Stacking Kit $4.95 ham net.

QUAD STACKING KITS AND FRAMES
+ 6db Gain

Stacking four (two by two) Hi-Gain VHF Hi-Bander beams results in the tremendous additional gain of 6db (equal to four times power) together with the all important reduction in both vertical and horizontal beam width. The quad stacking arrangement results in the maximum concentration of radio frequency energies within the mechanical limitations of most amateur installations. The quad stacking kits are complete, including all hardware and assembly instructions, (less mast and mounting frame). Order by antenna model number. Model QS stacking Kit $15.95 ham net.

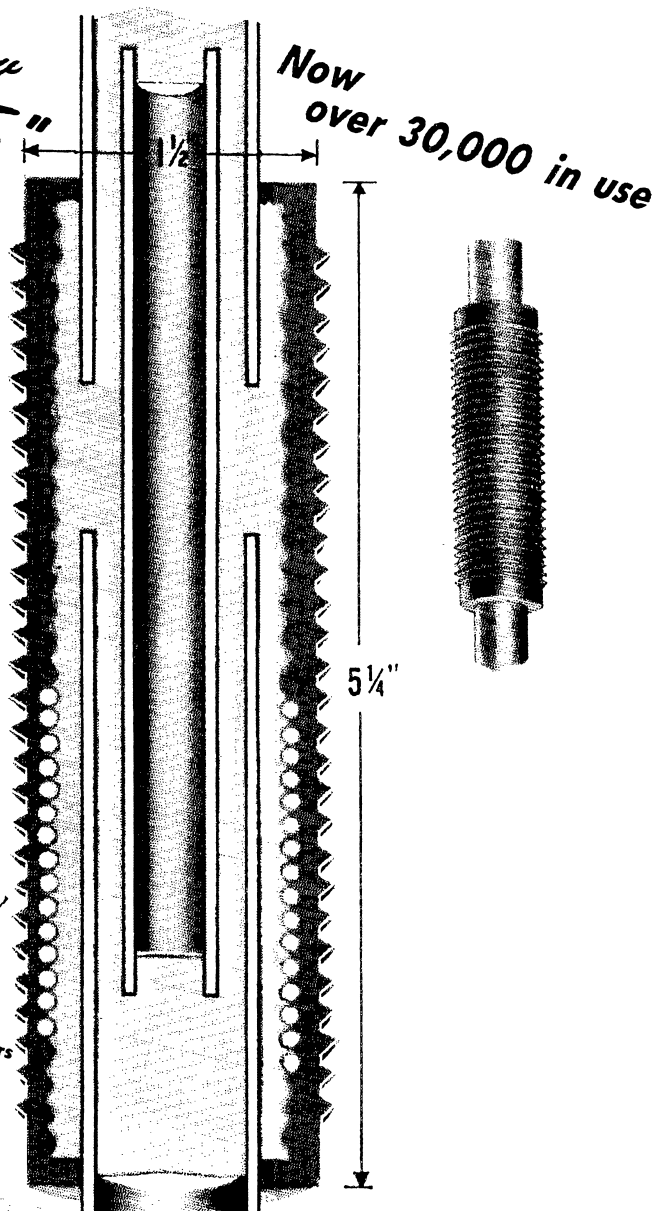
Quad stacking frames are also available. They are constructed of extra heavy duty steel and heat treated alloy aluminum tubing, especially designed positive grip tubing mating brackets and iridite treated hardware. These stacking frames will mount in the proper relationship 4 Hy-Gain VHF Hi-Bander beams and will withstand heavy ice loading and high wind velocities. Order by antenna model number. Model SF, ham net $59.95.

ALL HIBANDERS GUARANTEED FOR 1 YEAR

The Only Completely New "SOLID STATE" trap system!

Now over 30,000 in use

Take a close look at this new Hy-Gain Slim Trap! It's the world's smallest (only 1½" in diameter), lightest weight high efficiency trap assembly. A circuit is wound and capacitor imbedded in the new low loss polypropylene plastic. This revolutionary design offers a thoroughly integrated, "solid state" tuned circuit assembly which is 100% devoid of air cavities. The Slim Trap therefore requires no sealing and no breathe holes. Polypropylene, a newly discovered plastic has a high efficiency, low power factor dielectric, maintaining these excellent characteristics over wide temperature variation of from —60° to plus 250°. It is unconditionally guaranteed to be completely impervious to all weather conditions. Power rating: 1000 watts CW or AM, 2000 watts peak envelope power single side band.



Actual Size Cutaway

THE hy-gain SLIM-TRAP

is individually resonated in a highly accurate temperature compensated oscillator circuit which is checked against crystal controlled frequency standards. It is then re-injection molded, sealed forever, on an exact design frequency. No other antenna trap is manufactured to such close tolerances.

Almost indestructable, the new "solid state" Slim Line Trap is mechanically stronger than the aluminum tubing used in the antenna elements.

hy-gain antenna products
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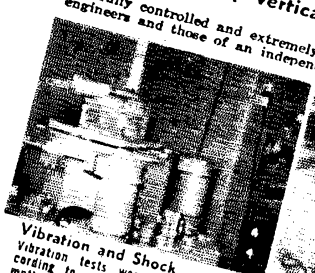
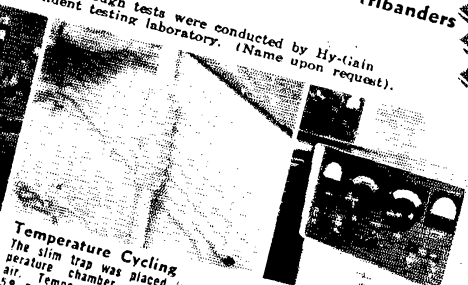
NOW AN INTEGRAL FEATURE OF THE hy-gain THUNDERBIRD tribanders and hy-gain trap verticals

Carefully controlled and extremely thorough tests were conducted by Hy-Gain engineers and those of an independent testing laboratory. (Name upon request).



Vibration and Shock

Vibration tests were conducted according to military Standard #202A, method 201A, consisting of vibration under three different mounting conditions and axis of vibration. Trap specimens were subjected to simple harmonic motion having an amplitude of 0.30" with maximum excursion of 0.06". Frequency of vibration was varied uniformly between approx. 10 and 55 cps. Vibration cycling was conducted for an extended period of time in each mounting condition.



Temperature Cycling

The slim trap was placed in a temperature chamber with circulating air. Temperature varied at rate of 5° F. from —60° F. to 250° F. The new polypropylene plastic was completely undamaged at the lower temperatures; no discontinuities at higher temperatures.

Power

All antennas using the new slim line solid state traps were subjected to maximum legal power, AM CW and SSB, as generated by commercially manufactured amateur Xmttrs., Collins S Line Series Xmttrs., including the 30S1 linear amplifier, the HT33 combination; Gonset HT32, linear amplifier, Hallicrafters Model GSB100 linear amplifier, Johnson Viking kw and Thunderbolt linear, Collins KWS1 and KW-1, and several other high powered Xmttrs.

Moisture Resistance

Moisture resistance tests were conducted according to military standard 202A, method 106A. Test consisted of 40 days and nights of humidity cycling under conditions of humidity 95% relative humidity while the temperature varied in 5° steps between —24° F. to 160° F. These tests were more severe than any possible weather conditions.

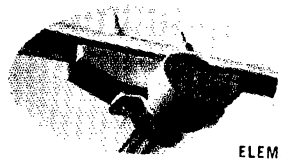
No electrical or mechanical change or damage of any kind occurred. Traps were completely intact mechanically with no deterioration whatsoever and frequency and Q remained exactly the same after completion of tests.

AN HONEST STEP FORWARD IN DESIGN WITH THE NEW

hy-gain 2 AND 3 ELEMENT THUNDERBIRD tribanders

THE 3-ELEMENT THUNDERBIRD

Here is the end result of an intense engineering program initiated to make produce the finest 3-Element trap tribander for amateur communications on 10, 15 and 20 meters. Unconditionally guaranteed to be better constructed and to outperform any other 3-Element trap tribander regardless of price. Compare the 3-Element Thunderbird in construction, weight, trap design and PRICE . . . Overall boom length 14 ft. Longest element 26 ft.

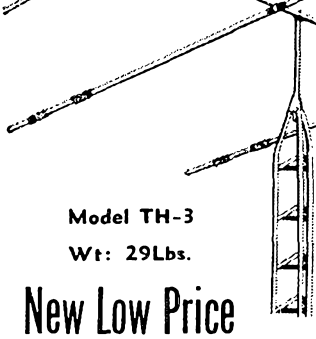


ELEMENT TO BOOM CLAMP

BOOM TO MAST CLAMP

OUTSTANDING FEATURES OF THE 2 AND 3-ELEMENT THUNDERBIRDS

All aluminum construction of 2" OD booms and 1¼" telescoping to ¾" OD elements . . . New plastic and steel gusset bracket assemblies; - all steel fixtures and hardware "iridite" treated in accordance with military specifications. 100% rust proof.



Model TH-3

Wt: 29Lbs.

New Low Price

$89.95

LOW SWR

Guaranteed less than 2 to 1 SWR on all bands with no tuning or adjusting necessary. Excellent broad band characteristics. Designed for 52 ohm coaxial line. Quick and easy assembly and installation from clearly written instruction manuals complete with drawings and photos.

NOW WITH THE NEW

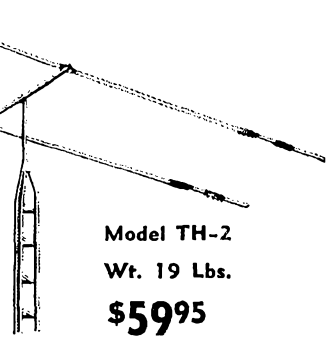
hy-gain SLIM-TRAPS

SLIM TRAPS

Completely impervious to all weather conditions. The new "solid state" slim traps are the world's smallest, lightest weight trap assemblies (1½" in dia.) The highly efficient coil and capacitor are wound on and completely imbedded in the new low loss polypropylene plastic. Withstands Maximum Legal Power.

THE 2-ELEMENT THUNDERBIRD

The 2-Element Thunderbird is extremely light weight and easy to handle; installs in a matter of minutes. It goes up almost anywhere . . . apartment roofs, crowded city lots, small suburban homes . . . wherever space is a problem. This little beam develops maximum gain possible in a 2-Element tribander. Rotates easily with a TV-Rotator — pack it up and take it with you when you move. Boom length only 6 ft. Longest element 26 ft.



Model TH-2

Wt. 19 Lbs.

$59.95

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AMATEURS

CITIZEN LICENCEES

MOBILETTE 61

MOBILETTE 61, International's *new improved* all transistor, crystal controlled converter provides a "quick and easy" way to convert your car radio for short wave reception. **MOBILETTE 61,** units cover a specific band of frequencies providing a broad tuning range. Mobilette units are miniature size and quickly interchangeable.

Check these all New features . . . New and improved circuit for increased gain . . . New internal jumper for positive and negative grounds . . . New RF amplifier, mixer/oscillator . . . New separate input for broadcast and short wave antennas . . . Mounting bracket for under dash installation.

MOBILETTE 61, is available in a wide choice of frequencies covering the Amateur bands 75 through 6 meters, Citizens band, Civil Air Patrol

CIVIL AIR PATROL AMATEURS CITIZEN LICENCEES

. . . with improved circuit

for mobile short wave reception

Write for International's complete catalog of precision radio crystals, and quality electronic equipment—yours for the asking.

INTERNATIONAL
CRYSTAL MANUFACTURING CO., INC.

18 NORTH LEE • OKLAHOMA CITY, OKLA.

low band frequencies, WWV time and frequency standards. Any frequency in the range 2 MC to 50 MC available on special order.*

Designed for 12 VDC, MOBILETTE 61 will operate on 6 VDC at reduced output. Power connector plugs into cigarette lighter socket.

See the MOBILETTE 61 at Your Dealer Today.

Mobilette 61 units cover these short wave frequencies.

Catalog No.	Frequency
630 - 110	6 meters (Amateur) 50 - 51 MC
630 - 111	10 meters (Amateur) 28.5 - 29.5 MC
630 - 112	11 meters (Citizens) 26.9 - 27.3 MC
630 - 113	15 meters (Amateur) 21 - 21.6 MC
630 - 114	20 meters (Amateur) 14 - 14.4 MC
	15 MC (WWV)
630 - 115	40 meters (Amateur) 7 - 7.4 MC
630 - 116	75 meters (Amateur) 3 - 3.6 MC
630 - 117	10 MC (WWV)
630 - 118	CAP (Low Band)
630 - 119	Special Frequencies 2 MC - 50 MC

Complete, ready to plug in and operate . . . . only $22.95

**Special frequencies 2 MC -50 MC.....only $25.95*

AN APPEAL TO INTELLIGENCE

A product that is consistently advertised in *QST* month after month, year after year, has to be good. Over 10,000 GOTHAM antennas have been purchased by *QST* readers. Even the "price-is-no-object" customers choose GOTHAM antennas on the basis of performance and value. Select your needs from this list of 50 antennas:

Airmail Order Today—We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

6–10 TWO BANDER.....	☐	$29.95
10–15 TWO BANDER.....	☐	34.95
10–20 TWO BANDER.....	☐	36.95
15–20 TWO BANDER.....	☐	38.95

TRIBANDER

Do not confuse these full-size Tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is broad banded. It does not have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

☐ 6-10-15 $39.95 ☐ 10-15-20 $49.95

2 METER BEAMS

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

☐ Deluxe 6-Element 9.95 ☐ 12-El 16.95

6 METER BEAMS

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

☐ Std. 3-El Gamma match	12.95	☐ T match	14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match	24.95
☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95

10 METER BEAMS

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match	25.95
☐ Std. 4-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95

CITIZENS BAND ANTENNAS • Any of our ten meter beams or the V40 vertical is perfect for the CB operator.

FREE GIANT 1960 CATALOG

Name.....
Address.....
City.....Zone.....State.....

New! Ruggedized 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

☐ Beam #R6 (6 Meters, 4-El)....$38.95
☐ Beam #R10 (10 Meters, 4-El).. 40.95
☐ Beam #R15 (15 Meters, 3-El).. 49.95

15 METER BEAMS

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95

20 METER BEAMS

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34.95	☐ T match	37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

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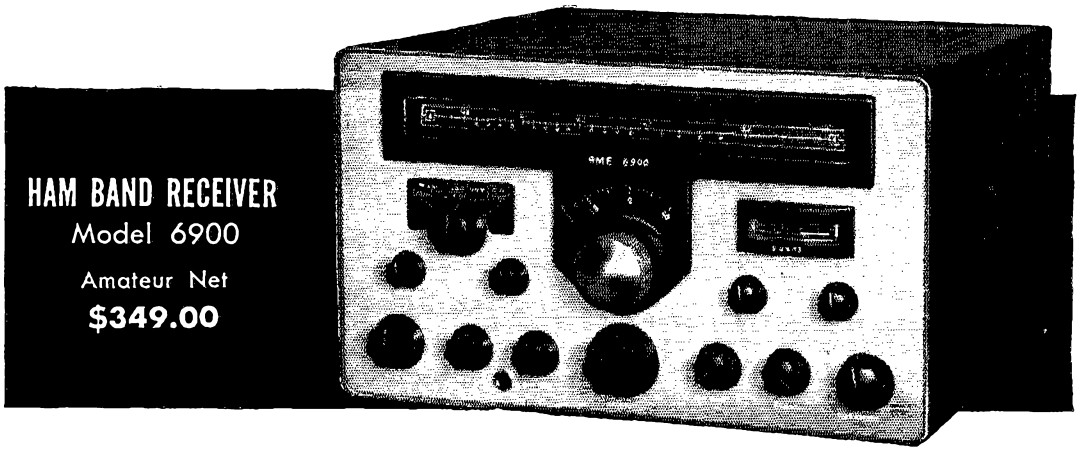
THE NEW RME 6900



HAM BAND RECEIVER
Model 6900
Amateur Net
$349.00

The design and production of communications receivers today is considerably different than in past years for two principal reasons. Costs have risen precipitously; to manufacture a receiver in the face of this and keep the price reasonable requires good tooling, long runs, and little allowance for error. Secondly, there are greater demands placed on receiver operation than ever before, versatility . . . handling ease . . . yes, amateurs have come to ask for parameters of performance almost unheard of in past years.

RME in announcing the new 6900 states without equivocation that this receiver performance is unmatched by anything near its price class. The 6900 is engineered to give optimum service for all modes of amateur communications — not merely one. Engineered under the supervision of Russ Planck, W9RGH, the 6900 has as many advanced pioneering features as its extraordinary namesake, the world famous RME69, which was the first band-switching communications receiver ever produced — over 20 years ago and still widely used today.

What makes the 6900 so Hot? First, meticulous attention to details so that every circuit is performing in an optimum manner. Second, an ingenious function selector, the Modemaster. Every circuit in the 6900 is designed to provide high selectivity; frequency stability, sensitivity and low internal noise. Finally, inclusion of *all* function controls necessary for a modern communications receiver... vernier control knob with overide clutch for fast tuning; RF gain; AF gain; antenna trimmer; band selector, stand-by/receive/calibrate/transmit; ANL; T-notch filter; calibrate adjustment; band selector.

Whether you operate CW; SSB; or AM, you will have the almost uncanny feeling the 6900 was designed solely for you — this is the test of a modern communications receiver that we believe only ours can meet on the operating desk.

- **CONTROLS: 11½" Single Slide Rule Tuning Dial; Logging Scale.**
- **COVERAGE: 80, 40, 20, 15 and 10 on 5 bands plus 10 to 11 mc for WWV or WWVH.**
- **Peak Selectivity plus tunable "T" Notch.**
- **Internal 100 kc Hermetically Sealed Crystal Calibrator.**
- **500 and 4 ohm Outputs.**
- **Noise Limiter for SSB and CW, AM.**
- **Separate Detector for Single Sideband.**
- **S Meter Calibrated in 6 db Steps Above S9 for Better Reading.**
- **Improved Fast Attack AVC Circuit.**
- **Selectable Sideband.**
- **Panel of Attractive Grey "Clad-Rex" Vinyl Bonded to Aluminum with Charcoal Trim.**
- **Front Panel Controls Re-Grouped for Ultimate Operating Ease and Convenience.**
- **SENSITIVITY: 1 mv. 30% Modulation for 100 mw output.**
- **S-N-R: 10 db at 1 mv Input.**
- **SELECTIVITY: 500 cps, 6 db down, in CW mode.**

offers optimum performance on SSB, AM or CW with no compromises

NEW...VERSATILE

Model 6900

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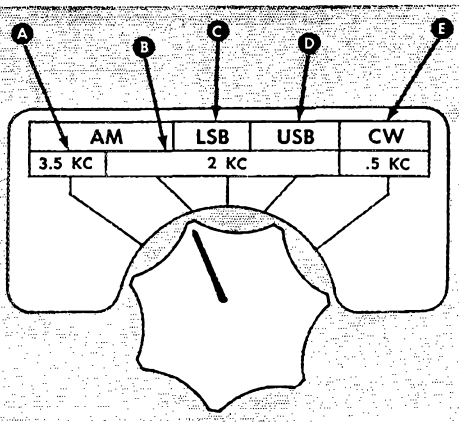

Gives One Hand Knob Control of 5 Distinct Functions

A When in the indicated AM position, a *full-wave* diode detector is used. The IF frequency response curve is 3.5 kc wide at 6 db down and, the AVC system is switched for fast attack/fast decay operation. The AM band width for this area is 3.5 kc.

B In this AM position all of the conditions described for function A above remain the same except that the IF response curve is narrowed to 2 kc to reject nearby signals on crowded bands.

C In the LSB (Lower Side Band of SSB carrier) position a series of steps occur.

(1) The AVC system is switched to a fast attack/slow decay performance.

(2) The Beat Frequency Oscillator is turned on and positioned for desired sideband reception.

(3) The second conversion oscillator frequency also shifts for reception of desired sideband while the IF response curve remains the same.

(4) An advanced Product Detector switches in to replace the Diode Detector in all SSB and CW positions.

D In the USB (Upper Side Band) the changes cited in function C above also occur but are designed to accommodate the Upper Side Band.

E When switched to the CW position:

(1) The band pass of the IF System is reduced to 500 cycles (.5kc)

(2) The BFO Injection Control and BFO Pitch Control becomes operational.

(3) The AVC system is changed for optimum when operating under CW conditions.

(4) The second conversion oscillator is positioned for reception of the upper sideband beat note.

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(*Continued from page 98*)

bouncing a 6-meter signal on Echo 1. VQE, working portable from Colorado, talked with BXP and WBY. TTJ and K4KEK have new QTHs in Oak Ridge. K4LTA is working to boost his signal with an 814 linear. FX was pleased to see 22 c.w. net members at the Gatlinburg meeting. Traffic: W4PL 1098, K4AKP 752, BWS 276, W4FX 86, PQP 62, VJ 55, K4YFC 50, W4PAH 23, EIN 20, TZG 20, K4FNR 17, OUK 15, W4UIO 14, TYV 11, K4OEK 10, AMC 8, W4UVP 8, K4LPW 5, W4UVL 4, ZBQ 3, K4KYL 2, RSU 2, W4SGI 1. (July) W4UVP 14, VTS 4, TDZ 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, 4CDA. SEC: BAZ. RM: K4CSH. PAMs: K4HCK and SZB. V.H.F. PAM: K4LOA. K4KWQ is a big help to CSH, assisting as manager of KYN. KYN's total traffic was 166. A new ORS and KYN member is RNF, of Lexington. K4IFB has moved to Indiana. K4DFO has 91 confirmed for DXCC. KN4QDF reports the Tri-State Novice Net has fair attendance but low traffic. We are sorry to lose K4BUB as Kentucky's most active OO. K4QCQ has a new Heath "Sixer." CDA has completed a new emergency transmitter for use with the c.d. generator. ADH worked A3USA air mobile. K4VUD reports great wind damage to the quad and tower. The Audubon Amateur Radio Society has big c.d. plans. K4VDN is QRT school. GSH is experimenting with signals reflected from Echo 1 on 2 meters converting APX6 for 1296 Mc. There is good 6-meter activity in Louisville. K4LOA is heading up the new 6-meter MARS net. K4ZQR is on s.s.b. and working 15-meter DX. The Louisville V.H.F. Net was active at the speed-boat races. K4AVX is QRT school. OO reports were received from K4ZRA, K4ZQR and K4DFO. K4LRX has a new beam and a 60-ft. tower and is working DX. He also transmits ARRL Officials Bulletins on 15 meters with a tape recorder. K4HTO is taking the s.s.b. rig back to M.I.T. K4ZRA has a new 20-meter ground plane for 56 toward DXCC. Traffic: W4ZDB 464, K4KWQ 90, W4SUD 50, K4CSH 46, DFO 41, SFD 41, VDO 39, OZI 32, W4CDA 27, SZB 25, K4LHQ 23, HCK 21, W4MWX 20, K4ZQR 16, KWE 15, AVX 14, VDN 13, W4ADH 10, K4KIS 8, SBZ 6, DFZ 5, W4VJV 4, WVU 4, K2LWQ/4 3, W4KJP 3, JUI 2, KN4QDF 2, W4RNF 2, HTD 1, K4IFB 1, QHZ 1, ZRA 1.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: YAN. RAMs: SCW, OCC, QQO, and FWQ. PAMs: K8CKD, K8JUG and ATB. V.H.F. PAMs: NOH and PT. EC appointment went to TOX; OO to EMD; ORS to ILP, NUL, SWG, WVL and K8BQD; OPS to JYJ, THZ and UFS; OES to EMD, FZ and PT; OBS to IWV, PT and K8NHC. Local visitors: 3WRC and 3WRE. OES reports were received from NOH, BFF, PYQ and FZ. K8IXU has worked over 400 stations, 30 states, with 2¾ watts to a 40-ft. TACO ten-element beam on 50 Mc. PYQ had to build a 3. 4/4 i.f. converter to make all 30-Mc. i.f. converters fit his 75S-1 receiver. NOH junked the "bedspring" antenna for 432 Mc. and says the 2-meter antenna does as good a job. The U. P. Hamfest, put on by the Twin Sault RC, was a success with 300 attending, including UPB, AQA, CQU, FX and YAN; all of whom represented the League. The V.H.F. Hamfest, same time, near Saugatuck, had 138 in attendance, including V.H.F. PAMs NOH and PT. CVQ (West Mich. U.) gave fine publicity. K8BGZ got back from the Colorado Springs Boy Scout shindig. K8KYS worked New York with mobile on 2 meters. EMD had to move his antenna farm to a new location because of the new super-highway. K8KCO also is moving because of antenna-lead cutting! The vandal is known, but no proof! The Mason Co. RC is raising funds to fix up mobile in a bus. UOQ is working on the SET. MGQ "enjoys" the overhaul on the HQ-120X! AAU and RX were mobile control for the Frazer Parade. Muskegon RC officers are K8KPS, pres.; FDE, vice-pres.; K8ROH, secy.; K8BRJ, treas.; K8CBL, act. mgr. ZHB is working on a generator project. SWF says 15 is "lively" for 15 minutes, when "Echo" passes over. K8KIT won the U. P. mobile contest. K8EWI cured the chirp in the Ranger. K8LOS worked in the VFW Convention and Silver Cup Races. Nice OES reports were received from PT and K8BGZ. PT worked K2CBA, 650 miles, on 220 Mc. Traffic: (Aug.) W8ELW 434, JTQ 221, OCC 177, FWQ 170, K8QIL 62, W8FX 52, K8GJD 47, W8RTN 47, K8DJQ 32, KMQ 26, W8EU 25, ZHB 24, CQU 22, TBP 22, SWF 20, K8EXE 19, W8AUD 17, HKT 17, SCW 16, K8GWZ 13, W8NOH 12, K8KIT 10, W8AHV 9, ALG 6, DSE 4, YAN 4, EGI 3, K8BGZ 2, EWI 2. (July) W8CWI 99, K8OTJ 58, W8ILP 25, AEM 15, K8CKD 15, W8UOQ 15, K8EXE 10, W8SCW 10, TIN 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE. SEC: HNP. RMs: DAE and VTP. PAM: HZJ. KN8UNO is a new ham with a DX-40 and a Mohawk receiver. K8s MAD and MAZ are on 6 meters. K8DDB has a new HQ-170. K8SNB, ex-8ABG of 1915, is back on the air after a lapse of 44 years. QHW received his W-Conn Award. K8MZS and K8MZT have a new HT-32, a Johnson Thunderbolt and a Hy-Gain 2BD for 40 and 80 meters. KN8UPN, the son of KIH, is a new ham. The Geneva ARA is a new club. AEB has a new Ranger and Courier combination. The Canton ARC's *Feedline* states that its ham directory has been printed and mailed to all Stark County amateurs, K8HUI has a new Hornet Tribander. KYE and his wife vacationed along the West Coast. LDR is mobile and K8LBZ vacationed in Canada. The first issue of the Findlay RC's bulletin tells us that the club is going to publish a ham directory. KN8TMX is a school teacher and is a new ham. K8TJM (ex-W9JWQ) moved there from Illinois. K2SVD/8 moved there from New Jersey and 87-year-old QP has been named as its "Ham of the Month." Another bulletin is in need of an editor, namely the Springfield ARCs *Q-5*, which informs us that DCJ vacationed in Minnesota using his new Ford. K4MJH, a former club member, visited with his friends and EHW vacationed in Michigan. The Seneca RC held a transmitter hunt and potluck picnic. Toledo's *Ham Shack Gossip* names K8EHN as its "Ham of the Month." K8KGL is mobile on 6 meters, TZO is mobile on 160 meters, MHW and TTM vacationed in Florida. K8JDS has a new tilt-over tower and a Gonset VFO. K8LFM is on 6 meters, AVB is trying out a cubical quad on 160 meters, the stork brought WKO a baby boy. K8VDN is a new ham and KN8TVM and KN8TVX are a husband-wife team. K8GVV and KN8UKH have new SX99s. KN8VLU has a new DX-40. DAE made BPL in August. New appointments in August were K8MTI as ORS, K8HSU as EC and K8PUT as OES. The Lancaster and Fairfield County ARC has planned a twelve-week code and theory class. K8RMY received his General Class license. The B. & W. Penn.-Ohio V.H.F. Net was formed with K8CMI pres.; K3GGZ, vice-pres.; BBF, net control; and K8RWG, secy. K8DBV has a new NC-300. K8MUG has a new SX-100. SLF has a chemical factory at his QTH. The Tire Town RC handled the communications at the Manchester Fair and held its picnic with a hidden transmitter hunt won by K8CLX. New mobiles are ATH, PYZ, OLY, K8s LDU, LUV and NYM. K8DHJ and K8DVJ enlisted in the Navy. JEI is mobile on 6 meters. IBX received a Certificate Hunters' certificate and TPA. Columbus ARA's *Carascope* tells us that TYY worked W4HHK on 420 Mc., ex-PA0GE helped build the club's Field Day antennas, the picnic brought out 65 amateurs and their families. HUE received his DXCC and the club directory is going to press. Rain all morning and up until 1400 didn't stop 1400 amateurs and their families from attending the Alliance Hamfest, where the Globe Hy-Bander was won by K8RSC, the transistor radio by K8NJM and the Heathkit v.t.v.o. by K8MYG. The Warren Hamfest was attended by 187 amateurs and their families with a Drake 2A and a Q multiplier won by K8ORF, a Mosley TA33 jr. and a CDR rotor by L. Ziegler, a Johnson directional coupler and indicator by TTQ, a JT30 crystal mike and base by SQJ and a 1961 Zenith 19" TV by George Cooper. The Canton ARC Picnic was attended by 42 amateurs and their families, with K8DHJ winning a 10-D mike. AL received his BERTA. Traffic: (Aug.) W8DAE 554, UPH 422, BZX 196, K8HKU 154, W8DQG 100, CXM 84, K8MFY 54, W8IBX 47, K8DHJ 41, W8ZYU 36, DSZ 30, K8MTI 28, W8CTZ 27, OKN 24, K8QHH 22, ONQ 21, W8WYS 18, AL 16, K8BNL 9, W8QCU 8, BEW 7, K8HDO 6, W8HQK 6, BLS 4, K8OEX 4, W8WE 4, K8MYG 3, OQC 3, W8ACN 2, CL 2, FFK 2, K8HEJ 2, HSU 2. (July) W8AEB 16, DG 10, K8MAZ 4, LDL 2, W8TXT 1. (June) K8MTI 16.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: W2PHX. PAMs: W2IJG and W2NOC. Section nets: NYS on 3615 kc. at 1900; NYSPTEN on 3925 kc. at 1800; SRPN on 3980 kc. at 1600; ESS on 3590 kc. at 1800; ENY (emerg.) on 29.490 Mc. (Thurs.) and 145.35 Mc. (Fri.) at 2100; MHT (Novice) on 3716 kc. Sat. at 1300. Congrats to K2UTV, who made BPL in Aug. and July. New appointments:

(*Continued on page 114*)

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This new RME 4304 Citizens Band Transceiver combines a portable radio transmitter and super-heterodyne receiver designed for short range communications in the 27 mc range. It is fully transistorized with 7 high gain RCA transistors for superior sensitivity, and selectivity... utilizes newly announced RCA DRIFT FIELD transistors for high gain, high reliability and stability.

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Station Activities

Continued from page 112

K2SJN as EC for New Rochelle, WA2BAH as OES. We welcome ham family W2ASI. K2DEM and K2UTP, who have moved to New Rochelle from the NYC-LI section. K2DEM is in his fourth year at Cornell. K2TJB, of G. E., was speaker at the Albany Club on basic instruments. The committee for Old-timers Nite at Albany was W2AWF, W2ONE and K2OTQ. This year's Field Day resulted in the best score in recent years, according to the Schenectady Club. E.N.Y. members of the Red Cross New York State Mutual Aid Net (3875 kc. the 1st Sun. of each month at 1200) include K2CKG, W2EFU, W2FVP, K2GCH, W2GTC, K2HNW, WA2CGD, W2KGC, K2LKI and W2RTE. Their goal: amateur radio contact with all 104 chapters in the State. The Peekskill Club reports all members are planning 6-meter operation with walkie-talkies. W2LWI reports working Ohio, Maryland, Massachusetts and Long Island on 220-Mc. aurora. Bob reports that W2YPM is active on 432 Mc. K2OZT is NCS on NYSPTEN each Thurs. night. K2BGU is using a 5894 on 220 Mc. with an eleven-element beam. With 150 watts on 50 and 144 Mc., WA2BAH now has 40 watts on 220 Mc. August picnics were held by both the NYSPTEN and NYS nets. Traffic: (Aug.) K2UTV 5021. K2YZI 403. W2PHX 107. K2MBU/2 82. K2RKY 78. K2OZT 32, K2DEM 6, W2EFU 6. WA2EKE 2. (July) K2UTV 4609.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannals, W2TUK—SEC: W2ADO. RM: W2GXC. PAM: W2UGF. V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc, nightly at 1930 EST (regular session) and 1815 EST (early session) and Sat. and Sun. at 1915 EST. NYC-LIPN, 3908 kc, Mon. through Sat. from 1730 to 1830 EST. NYC-LI AREC, 3908 kc. Sun. at 1730 EST. V.H.F. Traffic Net, 145.8 Mc. Tue.-Wed.-Thurs. at 2000 EST. You will note a new call on the masthead. W2GXC is the section's new RM. Harry replaces W2VDT, who served excellently during his two-year hitch. Thanks to Doug for his fine work. W2GXC requests that all hands pitch in as often as possible on our section nets. Remember, NLI's early session is scheduled for the school gang who have to hit the books for most of the evening. Congratulations to K2UFT, WA2GPT, W2EW and K2SFS, who earned BPL cards, the latter three on originations plus deliveries. K2SFS will be operating from W2SZ while at school. W2GKZ added an SB-10 to his Apache. K2IUT is now Wednesday NCS for the New England Weather Net. WA2KSD passed his General Class exam. W2PF enjoys DXing with his 32S-1 and folded dipole on 15 meters. K2MEM is mobiling with a Heath Sixer. The Brooklyn Poly RC, W2BXK, is experimenting with 60 KMC. W2UAL worked his first VK in 38 years. K2QJQ and his 100-watt rig worked Ohio on 220 Mc. K2TPU received his 1st-class radiotelephone ticket. A new call in Dix Hills is WV2OLQ, operating with a Novice-converted ARC-5. WA2KIM passed the General Class exam. WV2JRY is on 40 meters with a Globe Scout 680A and an S-86. K2PFH writes from the Azores where his HT-37 and HQ-180 are gathering dust waiting for the ban to lift. K2AZT is working on transistor gear for 50 Mc. for use in conjunction with his Heath GC1-A. An excellent net bulletin has been received from WA2FGP, asst. mgr. of the Eastern Area Slow Net. The EASN meets on 3748 kc. nightly at 1800 EST. This is an excellent training ground for future BPL winners. WA2IKN, WV2JUG and WV2OIF, all brothers, are on the air from Island Park. Excellent band openings permitted K2JWT to add his 13th and 14th states on 144 Mc. K2QVH is mobile on 6 meters in his V-W. Your SCM would enjoy meeting your club at your convenience. Club secretaries, write or call to arrange dates. Please send along club newspapers or newsletters so that your club or group can be recognized in our section column. All appointees are urged to check their certificates for renewal. Traffic: (Aug.) K2UFT 583, WA2GPT 334, W2EW 219, K2SFS 124, WA2CZG 118, W2GKZ 117, K2RBW 103, W2DUS 102, W2OKU 61, K2THY 42, W2OME 35, WA2CSE 34, K2DKR 33, K2IUT 31, W2JBQ 25, WV2KSD 25, K2YQK 23, K2CMJ 14, W2PF 12, K2PHF 11, K2AZT 8, K2OEI 5, K2DNY 4, K2MEM 4, K2RHG 4. (July) W2DUS 70, K2PHF 4.

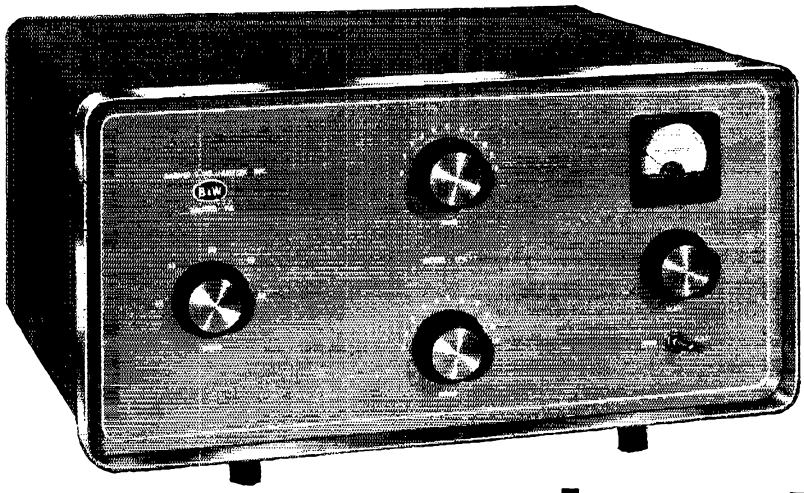
NORTHERN NEW JERSEY—SCM, Edward Hart, jr., W2ZVW—SEC: WA2APY. RM: W2RXL. PAMs: K2KVR and K2SLG. NJ6 and 2 report 15 sessions, 106 present and 36 traffic. K2THC is sorry but he wasn't very active in traffic in August. He made BPL of course, with a total of only 604! W2EWZ visited W1MHN. WA2GUI, who handles his traffic on 2 meters, has a new tower and beam. W2NIY got Certificate Hunters Club certificate No. 54. WA2CCF is a new OO. The Belleville ARC has the memorial club call W2JUU. NJN had 31 sessions, attendance 667 and handled 427 messages. K2RHN, from Sussex County, is mobile on 10 meters. WA2GQI expects his traffic style to be crimped by school. K2UWN built a 1-tube 2-meter transceiver. K2UCY had DX-100 trouble. K2CEP had a visit from K9KBW. WA2EDG is working on Heath 6-meter sets for the c.d. but finds time for traffic work on 80 meters. W2COT reports that all AREC members in his area also are RACES members. WA2FCB passed the General Class exam. W2ZI reports for NJPN: 31 session, 654 stations checked in and 134 messages handled. W2QNL is Deputy Radio Officer for Essex Co. WA2FGP was limited by vacation. WA2GZR has returned from a vacation on the farm. W2BVE/5 is now home from New Mexico. K2PVH is working 10-meter s.s.b. with a new ground plane. K2UKQ received the WAZ and Maritime Mobile Awards. K2AGJ is member No. 913 in the TOPS C.W. Club. W2CVW made 241 contacts in the N.J. QSO Party. K2CBG spent two weeks in California. K2PTI was on from Cape May with K2BMI/2 for the QSO party. W2CZE reports from Sussex County that few stations are active and lists K2AQV, W2UVS, WA2FZK, K2CBK, K2BXN, W2POB, WA2LQE and WA2HPW as possibles. W2CZE says he will make skeds for anyone needing that county. This is my last report as SCM and I thank all the hams in the section for their loyal support. Your new SCM is K2MFF. Be sure to get behind him and help. Traffic: (Aug.) K2THC 604, K2UCY 429, WA2COO 268, WA2APY 247, WA2GUI 244, WA2CCF 165, W2RXL 142, WA2GQI 135, K2VNL 127, WA2EDG 104, W2QNL 87, W2ZVW 74, WA2FGP 51, WA2GZR 46, WA2GQZ 42, W2BVE/5 39, K2ETS 39, K2PVH 37, K2VVL 30, K2EQP 27, W2EBG 22, K2MFF 22, K2UKQ 22, K2MFX 19, K2AGJ 18, W2DRV 18, K2JTU 13, W2CVW 12, W5FKL/2 12, K2CBG 6, W2CFB 6, WA2AKM 4, W2CJX 2, W2MZR 1, K2PTI 1. (July) K2VVL 17.

MIDWEST DIVISION

IOWA—SCM, Russell B. Marquis, WØBDR—Asst. SCM: Walter G. Porter, ØUJC. SEC: KØEXN. PAM: KØBSZ. RM: PZO. Nevada was host at the Iowa 75-Meter Phone Net Picnic Aug. 28. Over 200 hams were registered and with their XYLs and harmonics the attendance was over 500. NWX, Midwest Division Director, and BDR greeted the guests with short talks. KØEXN held a state-wide AREC meeting during the picnic and it was well attended. KØHEA operated portable at the Iowa State Fair and UIZ operated portable at the Avoca County Fair. The Sioux City Amateur Association will have its club house soon. DSP and KØASW operated DSP/VE4 from Northern Manitoba. YDV has a new 205—1 amplifier. New officers of the Council Bluffs Radio Club are KØUAB, pres.; KØULW, vice-pres.; KØWRV, secy. New Generals are KØWRV and KØUIC. A new Novice is KNØDCV. WA6JBA now is in Iowa. KH6IJ visited NWX. KØBSZ reports increased activity on the 75-Meter Phone Net with 28 sessions, 1241 QNS and 311 traffic. PZO also reports increased activity for TLCN with 27 sessions, 234 QNS and 767 QTC. KØTNJ and KØPOI are new TLCN members. KØHEA, KØUKN and KØEXN made BPL on originations. 3TMZ, Maryland OO, "observed" personally by visiting several hams here. Traffic: (Aug.) WØLCX 2508, LGG 1811, BDR 1502, SCA 1205, PZO 618, DUA 374, KØHEA 269, UKN 151, HBD 150, WØNTB 149, KØEXN 114, JNK 109, WVK 64, GXP 63, AUU 61, TNJ 57, POI 51, WØVWF 39, UIZ 35, LJW 34, KØBSZ 28, KAQ 23, EAA 21, WØPTL 20, KØMFX 18, WØYDV 17, KØEJN 16, KTP 16, OFK 16, WØFMZ 13, KØHC 13, BRE 11, WØVQX 11, KØGOT 10, WØMEL 10, KØTGT 10, WØNGS 8, QVA 7, KØKZC 5, OTV 4, WØQVZ 4, KØSEW 4, WØEEG 3. (July) WØLJW 8.

KANSAS—SCM., Raymond E. Baker, WØFNS—SEC: VZM. Asst. SEC: LOW. RM: QGG. PAM: UTO. V.H.F. PAM: HAJ. Section nets: KPN, UTO mgr., 3920 kc., Mon., Wed., Fri. 0645, Sun. 0800; QKS C.W. Net, 3610 kc. daily. QGG mgr. Area Net Ham Butchers, 7280 kc., daily 12 noon. KØHGI mgr. KØMXU and KØSPF are playing with RTTY, also ALD, FDJ, RCY, QPR, FNS and other stations are putting Model 15s on the air. AMJ reports the Salina Club assisted the Highway Patrol in recovering two bodies from Smoky Hill River. Three simulated emergency tests were conducted at Schilling AFB. KXB's son now has his Novice Class license. ETX has moved to Arizona and has hopes of keeping in touch with Kansas on "2." He was a most active ham in Kansas and was editor of *Ham Monitor*. President WXY and Secretary KØAOQ were assisted by ONH and SSM at

(*Continued on page 116*)



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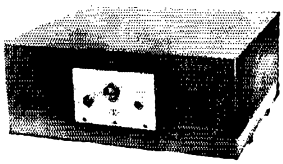

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the Kansas Nebraska RC Hamfest Aug. 21, with 152 registered, approximately 250 present and 50 emergency mobile units. Benton gave a very good talk and told of his retirement as MARS Director Army 5; also Gen. Phil Smythe was present for any comments. KØLPE is out of the hospital and back on the air. It is with regret we lose THX to Nebraska. Traffic: (Aug.) KØBCH 745, HGI 192, WØABJ 156, FNS 145, TOL 125, UTO 73, SYZ 56, ORB 54, IFR 38, KØHVG 36, UAX 31, WØQGG 30, KØSWU 24, IZM 23, WØAMJ 16, VZM 15, KØVBD 14, EFL 10, QKS 10, JID 9, TNW 5, QOB 4, WØWFD 1. (July) KØQOB 4, WUG 1.

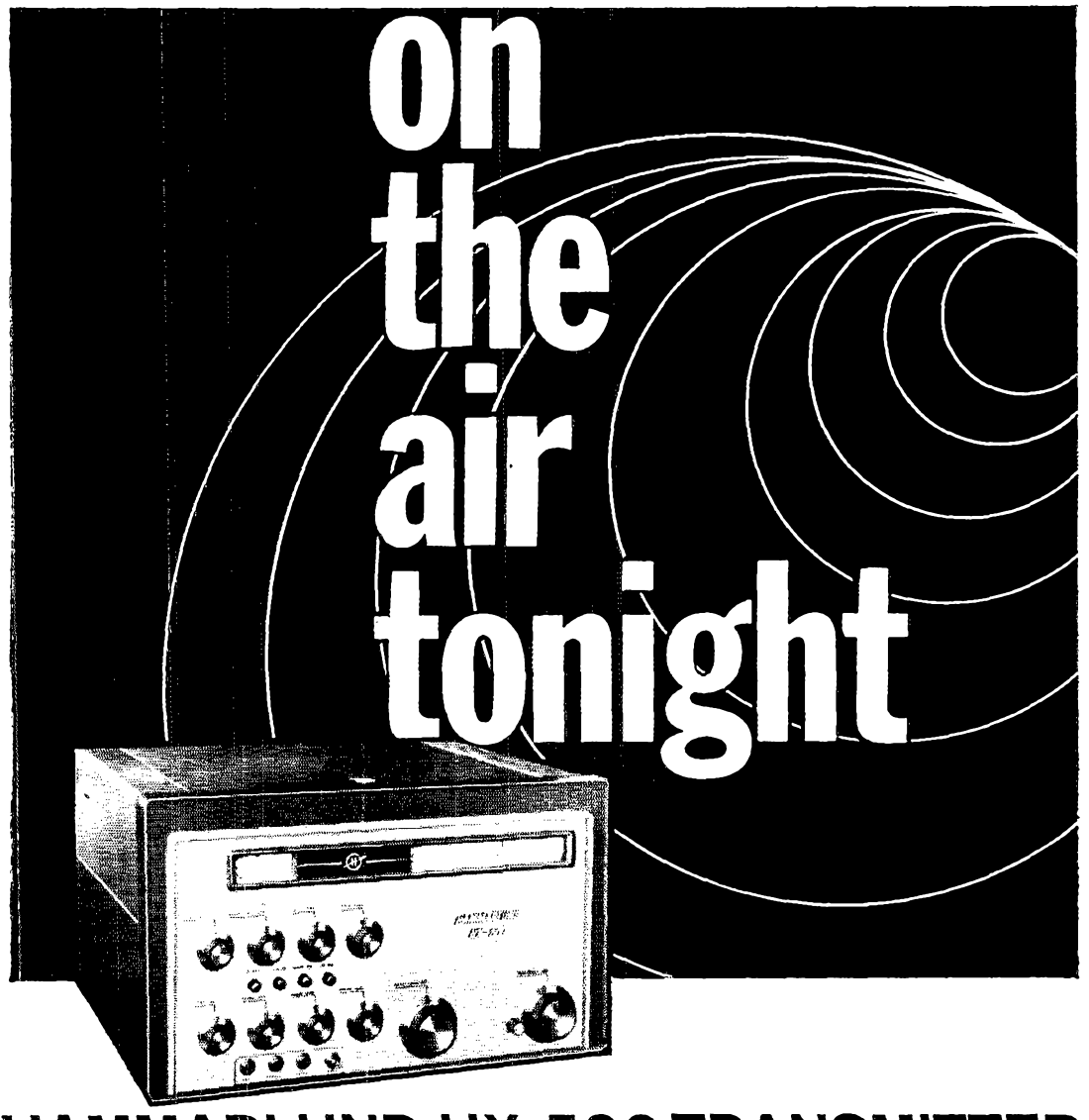
MISSOURI—SCM, C. O. Gosch, WØBUL—SEC: KØLTP. RMs: OUD, QXO and KØONK. PAMs: BVL, OMM and KØKLQ. Net reports: MEN (3885 kc. 1800 CST MWF) 13 sessions; QNI 342, QTC 119, NCSs, OVV 5, OHC 3, KØKBD 2, WØVPQ 1, OMM 1, BUL 1. MON (3580 kc. 1900 CST M-S) 27 sessions; QNI 175, QTC 255; NCSs, OUD 18, KØQCQ 7, KØONK 2. SMN (3580 kc. 1600 CST S) QNI 6; NCS OUD; 1 session. MSN (7115 kc. 1615 CST M-F) (July) 21 sessions; QNI 100; QTC 131; NCSs, KØUTX 6, ONK 8, KØVXU 5, VBU 2; (Aug.) 22 sessions; QNI 79, QTC 63; NCSs KØVXU 4, VBU 3, ONK 7, UTX 7, KNØZQF 1. For the next six months information concerning the HBN (Ham Butchers' Net) will be found in the report of the Kansas section. The combined SWMARC, Inc. Missouri Picnic at Springfield was voted a huge success by all in attendance. The SCM was privileged to conduct a "Missouri Mobilecade" and donated the "golden whip" trophy won by RSX, with KØJOI as runner-up and KØBIY placing third. Additional mobilecades are planned for the near future; monitor the nets for information. KIK received a letter of appreciation from the officer in charge of the St. Louis Station U. S. Marine Corps for delivery of several pieces of traffic from W6YDK (MCRD, San Diego). WYJ reports moving to a new QTH with construction of a new receiver keeping him from OO activity. New officers of the Three Rivers RC (Eldorado Springs-Butler) are KØRDD, pres.; JEG, vice-pres.; RPT, secy.-treas.; BRN, act. chm. KØJPL reports ZB, FP8, UA and YU as DX on 14-Mc. A1. Traffic: (Aug.) KØONK 678, QCQ 330, WØKIK 149, KØMAU 105, WØOUD 105, YKC 74, MKJ 61, OVV 52, KØLGZ 34, WØBUL 30, KØVBU 29, WØVPQ 27, GBJ 26, RTW 26, KØPFF 22, UTX 21, RPH 13, VPH 13, WØBVL 9, OMM 8, KØPCK 8, MMR 6, WØQMK 4, KØOJC 2. (July) KØQCQ 345, WØOMM 75, KØMMR 37. (June) KØMMR 73, PFF 4.

NEBRASKA—SCM: Charles E. McNeel, WØEXP—SEC: KØTSU. The Nebraska Section C.W. Net, reported by NYU, had 22 sessions, QNI 91, QTC 57. This net resumed full operation as of Sept. 1. The Western Nebraska Net, NIK as NC, reports QNI 650, QTC 117. The Nebraska 75-Meter Emergency Phone Net, ZOU reports, had QNI 441, QTC 36. The Nebraska Morning Phone Net, reported by KØDGW, had QNI 758, QTC 147. The July report for the Morning Phone Net was QNI 474, QTC 36. A new Hastings Area C.D. Net, with LJO as NC, operates each Wed. at 2030 CST on 1997 kc. KØTSU is our new Section Emergency Coordinator replacing JDJ, who has done a good job as SEC for several years. SXR has moved to California and will be looking for his old friends from there. Traffic: WØNYU 167, KØIJW 97, DGW 87, GFK 75, KJP 48, WØZJF 41, NIK 38, KØDVW 29, RRL 29, WØOKO 25, KØBRS 23, MZV 20, WØOCU 20, KØTUH 19, MSS 18, WØVSJ 18, KØKDW 16, VIA 15, WØBOQ 13, FTQ 13, VEA 11, DDT 10, KØKTZ 10, WØGGP 9, LFJ 7, KØYDS 7, WØHOP 6, HTA 6, KØRQA 5, WØYFR 5, OOX 4, URC 4, SWG 2, KØUQN 2, WØWKP 2, EGQ 1, KØSFB 1, ULQ 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Victor L. Crawford, W1TYQ—SEC: EOR. RM: KYQ. H.F. PAM: YBH. V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 1800, Sun. 1000 on 3880 kc.; CN, daily 1845 on 3640 kc.; CVN, Mon., Wed. and Fri. 2030 on 145.98 Mc.; CTN, Sun. 0900 on 3640 kc. K1PGQ, K1HZT and KP4API/1 made BPL. In addition to KP4API/1, K1PGQ also made BPL during July. FHP has a new Ranger. The CQ RC held its annual picnic Aug. 21. KYQ advises that CN handled 245 messages during 31 sessions in August. Average attendance was 6. High QNI were RFJ, K1GGG and K1HOP. BDI vacationed in Maine. K1IVR is back after 8 weeks at camp. BFS has a new SX-101A. HAX is building a new 50-watt rig for 2 meters. K1MNX is on 2 Meters. APA has moved to a new QTH. YBH reports that CPN handled 274 messages during 31 sessions with an average of 23 stations checking in. QNI honors go to K1AQE, YBH, 30; K1BSB, 27; FHP, 25. K1IIG of Jewett City, is now active on CPN. A new three-element beam is helping OBR with his TCC schedules. The Tri-City Amateur Radio Council fielded 8 fixed and 4

(Continued on page 118)



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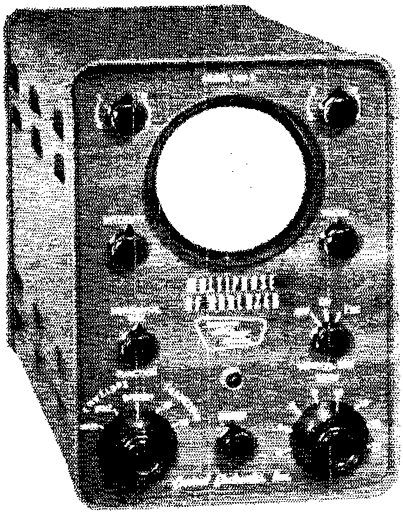
mobile stations to help with the Annual State Firemen's Convention and Parade in New London. K1HEC won a science contest sponsored by the Thames Valley Science Council. He also won a prize at the New London Hamfest for his mobile installation. K1CEC has a new rig. ILV is rebuilding. DDE is searching through the surplus around the shack with an eye toward a new all-band rig. K1EKC is off the air with transmitter trouble. New Novices in Waterbury are KN1OVF, KN1PHF, KN1POX, KN1POY, KN1PQC and KN1PPR. OOW is a member of the Plebe Class at the Naval Academy. The Waterbury ARC has started a code and theory course. A picnic at GVT's in July and another at ZZK's in August rounded out the summer season for the Southington ARA. ZPV is out of the Navy and active on all bands including 50, 144 and 420 Mc. Section Net certificates were issued to K1GGG and K1HOP. New appointees: K1CSY as EC for Southington, ZPV as OES. Appointments renewed: FHP and YBH as OPSs, YBH as OBS, MBX as OO. Reports received: OES from FVV; OO from K1GUD, K1IFJ, K1IVR, K1MBA, EQV, NWE and VW. Traffic: (Aug.) W1YBH 287, K1PGQ 195, KP4API/1 156, K1HZT 121, W1AW 107, KYQ 63, EFW 52, K1JVZ/1 43, W1RJF 41, BDI 35, K1AQE 27, W1QV 22, K1MBA 17, BSB 15, DGK 11, W1VIY 10, K1CBV 8, W1CWF 6, K1IVR 6, W1MBX 6, BNB 3. (July) W1OBR 169, K1PGQ 138, W1MDB 70, FHP 66, NJM 64, QV 18, K1BSB 15, W1VIY 14, BDI 9, K1MBA 5, W1BNB 3.

MAINE—SCM, Jeffrey I. Weinstein, W1JMN—All ARRL station appointments are currently available to qualified applicants. Further information and application blanks regarding OPS, OES, OO, ORS and OBS appointments are obtainable by writing Jeffrey I. Weinstein, W1JMN, 79 Caleb Street, Portland 4, Maine. Active participation in the League's programs results in a stronger amateur fraternity and better individual operators. Therefore, everyone who has the qualifications should be an ARRL official appointee. Secondly, and just as important, is the State of Maine AREC. Every Maine amateur is urged to register and support his local AREC organization as soon as possible. Contrary to what seems to be popular belief, registration in the AREC does not obligate anyone, whether it be financial or personal. You are simply showing me, ARRL and the FCC that you are willing to provide communications during times of domestic disaster or emergency. It is this service which we offer the public that, among other things, justifies our existence as amateur radio operators. Don't take the AREC for granted—register today! Traffic: K1KSG 107, W1GRG 23, JMN 10, FV 8, K1DYG 7, MBM 7, IAA 3, KN1OJH 1.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—SEC: AOG. New appointments: ZOP as OPS, K1GNW as OES, K1KJC and KHP are on 2 meters. K1MMQ is now living in Portsmouth, N.H. Sorry to lose your nice traffic totals, Dave. Amateur Radio Mobile Systems (ARMS) is a new net on 52.52 Mc. It monitors day and night, patrols the roads and reports any troubles to control center in Weston. NKA heard a VO2 on 6 meters. New officers of the El-Ray Club: Jim Nye, pres.; Frank Ducat, vice-pres.; K1KTK, act. mgr.; K1HTK, program mgr.; EJE, treas.; Bill Burgess, secy.; OTH, chief eng. K1LDI has a Ranger and an NC-300 receiver. K1GNW has a Viking Challenger, a Gonset 2, an NC-300 and an RME v.h.f. receiver. TWG has a Gonset 4. Our 2-meter net gang held a picnic at Wollaston Beach. K1GVR moved to New York City. K1PKX has his Tech. Class license. Luck to HWE and hope he feels better. LMZ reports he hears VE2TT on 144.3 Mc. and K1KKP, Peru, Vt., and is going back to school. The T-9 Radio Club met at ISX's QTH. K1KUY heard VO1AE on 6 meters. K1EKV has a Gonset 3 on 6 meters. The Eastern Mass. 2 Net had 31 sessions, 430 stations, 205 traffic. HOH is a Silent Key. IIP received the All-Conn. C.W. Award. NS has an HT-37 and a Gonset KW. K1JML worked Ohio, Indiana and Michigan on 6 meters. BGW has 223 confirmed now. BB made DXCC. K1AQI was in Nicaragua, got the call YN1JS and was on 29 Mc. Burlington is getting RACES going. NF reports a poor signal on 14 Mc. K1JAW was in the N.J. QSO Party. Officers of the Reading High School Club, K1HOA, are K1JXU, pres.; K1LAK, vice-pres.; K1JIU, secy.-treas. FJJ has a Tri-bander on a 60-ft. tower. IAU is a new OES. Appointments endorsed: AOG as SEC; PEX, AWA and DOF as OPSs; EAE as RM for 80-meter c.w.; AWA No. Reading, TZ RO for Sector 2D, DOF Revere, ISU Holbrook, as ECs; AWA as OBS; EAE and HWE as ORSs; K1KCG as OES. A new net, the North Eastern States Traffic Net (NESTN) is on daily at 1700 on 3915 kc. PEX is the manager, DFS the sponsor. It started on Aug. 20 and for 12 days had 196 check-ins and 190 pieces of traffic. K1BYV is now at N. U. in Boston. ZOP, mgr. of the N. E. Phone Net, says attendance was good during the summer. K1MEM has 101 countries worked and made WAS and WAC. K1MHM has a new Globe Scout going on 6 meters with his dad,

(*Continued on page 120*)



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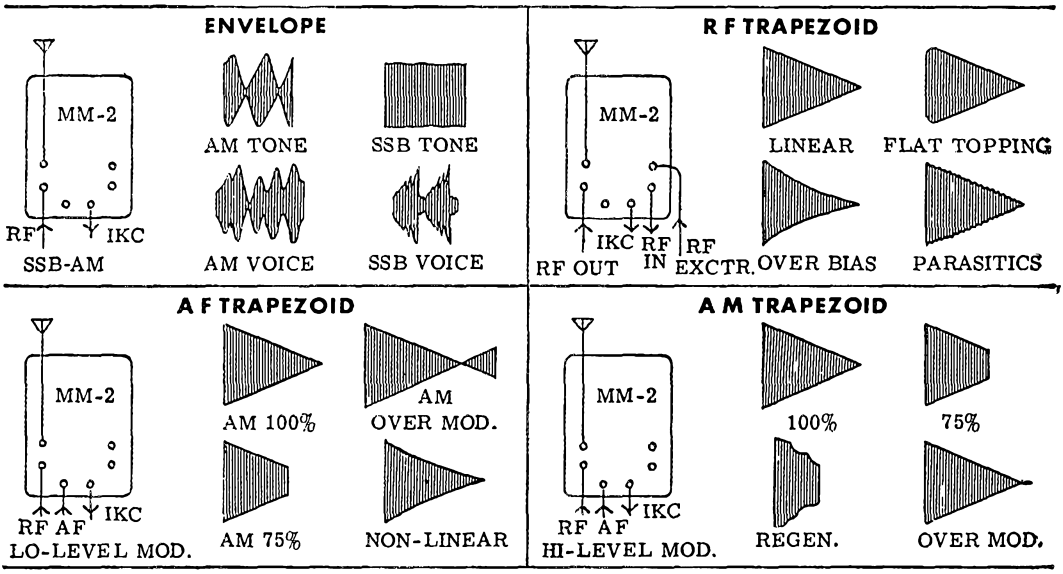

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K1OUH, K1LJK, on 20-meter phone, finally got through to relatives in Indiana. ALP is feeling much better. Thanks for your interest. JIT is moving to Rhode Island. GOU was in the hospital for an operation. Traffic: (Aug.) W1PEX 286, K1JAW 152, JIU 116, W1EMG 113, ZSS 93, EAE 91, K1LLX 74, JCC 61, BYL 60, W1OFK 59, HGN 52, FJJ 38, K1BYV 33, W1HGO 30, AOG 26, K1HMC 26, GYM 24, W1VYS 21, SIV 20, K1KZP 17, W1TWG 15, K1MEM 14, W1ZOP 14, K1MHM 10, GTX 9, LLU 6, LCQ 4, LJK 3. (July) K1KTK 18, KYN 5. (June) K1KTK 35.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: BYH. RM: DVW. PAM: DXS. Assistant to RM for Novice Net: K1IJV. WMN meets on 3560 kc. at 7 P.M. Mon. through Sat. MPN meets on 3870 kc. at 6 P.M. daily. WMNN meets on or near 3744 kc. at 6:30 P.M. Mon., Wed. and Fri. DVW has resigned as RM because of business pressure and family obligations. We are very sorry to lose him, but we'll see him on the net from time to time. K1IJV replaces DVW as RM. K1IJV, K1LBB, OSK, WEF and ZEL kept WMN on the air during August. BVR is now on the air at his new QTH. MPN reported 84 messages were handled with an average attendance of 20.26 stations between Aug. 1 and Aug. 19. K1MFS and K1MGK have graduated from WMNN to WMN. The latter probably will be active from YK this season. K1GOV continues to submit excellent OO reports. K1IQZ and K1LRB have dropped the "N" and are raring to go. AGM is in Florida until May or June. EFN has received the "Worked all Conn. Award" from the Willimantic Jaycees. Fourteen mobile units and a communications trailer were in use in Pittsfield for the c. d. "Roadwatch" operation. New officers of the Hampden County Radio Club are RRX, pres.; STR, vice-pres.; HYO, secy.; LRE, treas. TDS has a new Seneca. K1JGW is going s.s.b. New officers of the Pittsfield Radio Club are K1DAB, pres.; HPA, vice-pres.; K1LBB, secy.; K1MRP, treas. AZW is now feeling his old self again after a very serious operation. DQX is DXing on s.s.b. COI is now DXCC. New officers of the Berkshire County Amateur Radio Assn. are K1JDC, pres.; KQK, vice-pres.; FVT, secy.; K1BUM, treas. Traffic: W1WEF 90, K1IJV 72, LBB 57, W1DVW 35, OSK 26, BVR 20, K1LRB 18, W1AGM 15, MGK 11, K1IQZ 7.

NEW HAMPSHIRE—SCM, Robert H. Wright, W1RMH. SEC: K1GQK. RM: K1IIK. PAM: IIQ. The GSPN meets at 1900 Mon. through Fri. and at 0930 Sun. on 3842 kc. The NHN (c.w.) meets Mon. through Sat. at 1830 on 3685 kc. Any amateur interested in attaining the WNH Award, sponsored by the Concord Brasspounders, may secure full details by writing the club at P.O. Box 339, Concord, N.H. Present officers of the Twin-State Radio Club, K1HGS, are FN, pres.; USK, vice-pres.; and VEG, correspondent. The club meets the first Tue. of the month at the club house, Mascoma St. Ext., Lebanon, N.H. AZK, well known for his meteor scatter activity on 2 meters, is a new OES. MUJ has been endorsed as EC for Carroll County. ZUS is a new OPS. The SEC reports the formation of a new 2-meter AREC net in Sullivan County and a 6-meter AREC net in Merrimack County, also new 10-meter nets in both counties. Several other counties also are readying for active participation in AREC nets. Contact your County EC and help make these nets really go. Traffic: K1CIF 625, IIK 162, ITS 123, W1TA 71, QGU 58, CUE 42, ZUS 35, ZUR 31, K1KRP 18, W1UGV 16, AIJ 10, YHI 8, EVN 7, JNC 5, K1MID 3, W1BYS 1.

RHODE ISLAND—SCM, John E. Johnson, K1AAV —SEC: PAZ. RM: SMU. Pam: TXL. K1GRC is a new OES. K1CRN works VE2TT and K1KPP consistently on 2 meters. He is looking for skeds on 144.138 Mc. from other states. AQ expects to have its 6N2 equipment on the air soon. AQ's Round Table meets every Wed. on 29.200 Mc. at 0200 GMT. All stations are invited to break in. WAC is completing a new shack in his cellar. K1HMO and K1AMG have new Tri-banders. K1DWY and K1HMN are working on 6 meters. K1ZHN, vacationing in W2-Land, reports meeting K2HQV and working 40 and 10 meters. K1ELI assisted in the rescue of a pleasure boat off Newport. He received a distress message and informed the local Coast Guard who took the boat in tow. Your SCM had an enjoyable visit with the Roger Williams V.H.F. Society recently. The club is working with the Red Cross providing the communications. Officers are K1BWX, pres.; MDT, vice-pres.; LSP, secy.-treas. The Society provided communications during the Jazz Festival riot in Newport. G3NVA visited QCO this summer. They met on the air and have been friends for several years. K1JPK and K1DWH visited 4DEN, formerly K1DUO, in South Carolina. RISPN reports 297 QNI, 85 traffic. RIN reports 36 QNI, 43 traffic. Traffic: (Aug.) W1JXD 642, SMU 515, TXL 147, CMH 93, K1ZHN/2 8. (July) W1JXD 527, K1GRC 99.

(*Continued on page 122*)

Baltimore 29, Maryland
W3JNN

"I am really sold"

. . . writes Oscar L. Short, W3JNN, of his Electro-Voice Model 664 Dynamic Cardioid Microphone

W3JNN, among the top 10 world wide radiotelephone stations listed in QST, is highly pleased with the performance of his 664. He writes, "*In VOX operation on SSB . . . the cardioid pattern results in very smooth performance . . . background noise does not trip the VOX circuit.*" He adds, " . . . *the Model 664 has a very uniform frequency response . . . I was so pleased . . . that I have not made any modifications in my speech amplifier.*"

W3JNN concludes, "*During the first month, I added four new countries to my 287 already confirmed...I was having so much fun using my 664 that I spent more time than usual on the air . . . I am really sold on the Model 664.*" For an investment in up to 12 db more usable audio—for an elimination of most acoustical feedback problems, try the Model 664. It's available at your nearest Electro-Voice distributor. Satisfaction is guaranteed--or your money refunded.

*Patent Pending

TECHNICALLY SPEAKING: Model 664 Variable-D® dymamic design* utilizes a series of properly phased phase-shifting tubes, integral to the microphone, to cancel unwanted sound. Cancellation is effected without sacrifice of range response. Highly uniform cardioid pattern throughout range of 40 to 15,000 cps. E-V Acoustalloy® diaphragm is virtually indestructible. Impervious to mechanical shock, temperature changes, humidity variations. Pop-proof grille minimizes blasts and boominess due to close talking. High or low-Z selected at cable connector. Convenient ON-OFF switch.

Model 664 (without stand)	Net Price: $51.00
Model 664 (with Model 419 desk stand)	Net Price: $57.00

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VERMONT—SCM, Mrs. Harriet Proctor, W1EIB—SEC: K1DQB. PAM: HRG. Vermont frequencies: C.w., 3520 kc.; phone, 3855 kc.; RTTY, 3620 kc. Nets: C.W. Mon.-Fri. at 1830; VEPN Sun. at 1730; VTPN Sun. at 0900; GMN Mon.-Sat. at 1730. Community assistance is a strong feature of some of our clubs. The Bellows Falls, Burlington, Central Vt., and Middlebury Clubs report serving one or more of these situations: C.d. drills, search for lost child, boating accident, golf meet, teachers convention, Rotary Club, sports car rally, waterama, bazaar, sheriff's dept. and parades. Congratulations to them! K1KSS has purchased a home in Jericho and will have a rhombic. ETE is working on u.h.f. and v.h.f. units. KJG was visited by the former KXY, who was sporting a new Mohican receiver. Welcome to KN1OXG of Montpelier RFD. Traffic: (Aug.) VE2AZI/W1 1934, W1KJG 15, EIB 10, K1KCT 4, BKH 2. (July) VE2-AZI/W1 807, K1DQB 21, W1EIB 10, KJG 10, K1HRH 8.

NORTHWESTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillett, W7GGV—Echo Balloon spurred the 2-meter boys into activity. OHM, Boise, was heard in California; DPD, Arco, was heard by BDL, Pocatello, while the Satellite was passing over. GRU/M, at Gilmore Pass, talked via 2 meters to his home rig at Rigby, a distance of 99 miles. He also made contact with Mr. Harrison near Boise from Ryan Peak in Teton Mountains. BRF is now on 2 meters. GDA is the new prexy of the Magic Valley Club. The Idaho Radio Amateurs, Inc., held a breakfast and 2-meter transmitter hunt at Municipal Park in Boise. K7BWV spent the summer fighting forest fires, cruising timber, scaling logs, and fighting fires. Driggs has 35 hams, among them 4 new YLs, K7s MJI, MJJ, MJK and MKD. Other new hams are WV6MJJ, of Caldwell, and KN7-MDP, of Pocatello. Freemont County Police recruited 21 mobiles from the W1MU Hamfest to assist the hunt for 3 teen-age escapees. New W1MU Hamfest officers are DLW, Logan, IHE, Franklin and VNO, Idaho Falls. FARM Net traffic: 8. Traffic: W7GGV 22, K7BWV 21, W7DHL 14, VQC 9, EYR 1.

MONTANA—SCM, Ray Woods, W7SFK—PAM: YHS. RM: K7AEZ. The MPN meets Mon.-Wed.-Fri. at 1800 on 3910 kc. TSN meets Mon. through Fri. at 1200 on 7225 kc. MSN meets Tue.-Thurs.-Sat. at 1830 on 3530 kc. Your SCM hopes for the assistance of all Montana amateurs in his new job and will try to do as good a job as NPV. Amateur radio in this area was saddened by the loss of CQC, of Havre. Northwest Montana amateurs will miss VE7AIO, who is now a Silent Key. The Electric City Radio Club's picnic on Kings Hill was well attended. VPN and RZY have finished their portable units, making 1-kw. and 10-kw. generators available for emergency use. BPF is taking an XYL (she likes ham radio, too). Reports are that the Havre Hamfest was a real success. Livingston reports that the annual fish fry for the hams was well attended and lots of fish was consumed. K7BKH is keeping up with her BPL with 14 in a row. Billings went all out for the Air Show with 14 mobiles taking part in the day's events. New calls in Montana are K7NDV at Butte, K5BSR 7, W6EWD/7, KN7MEG, all of Havre. Traffic: K7BKH 305, DCI 273, W7IDK 20, DCH 19, K7BYC 10, JFR 8, IOA 3.

OREGON—SCM, Hubert R. McNally, W7JDX. There was lots of activity in August, emergency style. The Eastern Oregon gang really did a swell job during the bad forest fires in that area. Also the 2-meter gang in Portland aided a fire department during a bad brush fire and one of the mobile fellows did his best to help save a drowning fisherman. Thanks, gang, for the swell jobs. K7EPO buys parts at mysterious prices! A new ham in Grants Pass is K7IQF, who is a disk jockey at KAGI! ZB made BPL again but there seems to be no opposition to his continued good record. K7AWJ reports the traffic total during the forest fires. Guess he was the control station. K7CLL sends greetings to all from Berkeley, Calif. KN7LCM wants to be a net man. With the coming of the fall months net activity should pick up, so we should have more news to report later on. The pickins' have been pretty scarce, gang, so let's get some postcards in to the SCM. Traffic: (Aug.) W7ZB 508, K7AWJ 486, W7BDU 210, K7AXF 161, W7ZFH 43, DEM 38, K7CBA 35, EPO 27, W7MTW 23, LT 18, WKP 13, DTT 8, K7EZP 6, JWY 6. (July) K7AXF 150.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—SEC: HMQ. RM: AIB. PAMs: LFA and PGY. Washington Nets: CBN, 3960 kc. 2100 PST Mon. through Sat. ESN, 3920 kc. 1800 PST Mon. through Sat. WSN, 3535 kc. 1900 PST Mon. through Fri. NSN, 3700 kc. 2100 PST Mon. through Fri. WARTS, 3970 kc. 1800 PST Mon. through Sat. New ECs are DJA for Whatcom County, SEC for Skamania County, GSN for Okanogan County,

(Continued on page 124)

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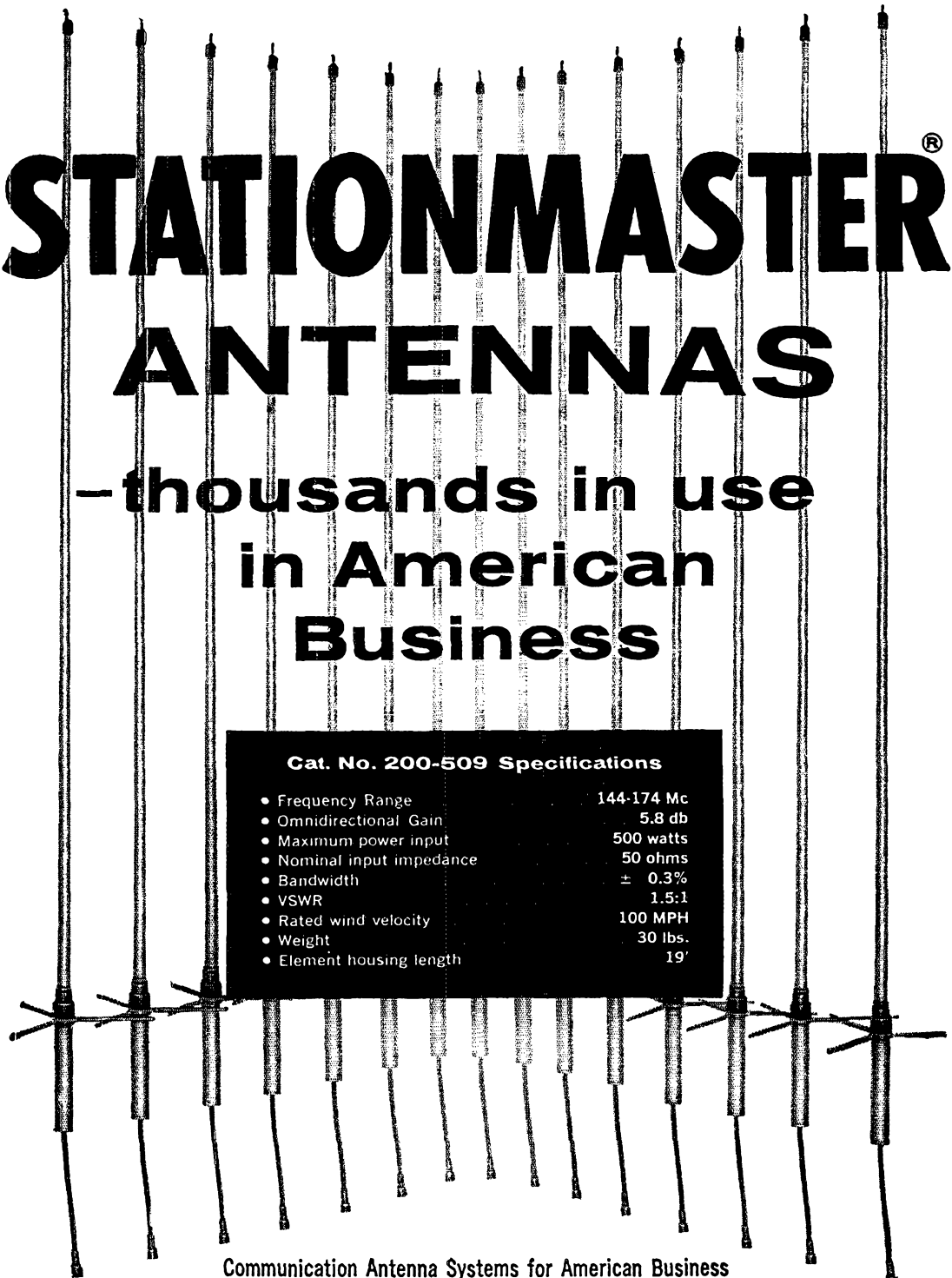

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MARLBORO • NEW JERSEY

K7EYM for Douglas County, K7KFT for Lincoln County and K7BLW for Walla Walla County. New OPSs are AXT and K7CWO. Renewals: QLH as OBS, NKO joined the ranks of Silent Keys on Aug. 21. UQY moved to Kennewick. KN7IYR is waiting for his Conditional Class license. K7JOA received his General Class license. WXW is at a new QTH near Grandview. YFO is enjoying noise-free reception since the power company fixed the lines. The Tacoma AREC Net was reactivated on 51 Mc. at 1930 Sept. 13. GD now is running a Viking KW. DIT is doing much better with a new antenna on 75 meters. K7CWO is going in the USMC. MCU showed his colored slides of the South Pacific at a recent meeting of the VARC. K7CHH has entered the U. of W. AXT is QRL remodeling his home. CWN spent his vacation in Eastern Washington. QLH received a 25-w.p.m. sticker from ARRL. AIB attended the N.W. DX meeting in Seattle and took home a new RME-DB-23 preselector. K7CCY moved to Montana. ZEI and VOL have entered the U. of W. YEM has a new 51-J. MNC works at radio station KTEL. RWF has a neat antenna farm in Dayton. K7DLW spent several weeks at CAP school in Portland. The Washington Amateur Radio Traffic System (WARTS) had 27 sessions, 1712 check-ins and handled 261 pieces of traffic during August. Eleven mobiles took part in the Western Washington mobile hunt held Sept. 4. K7DBO was first, AVC second and NJA third. This hunt is sponsored annually by the Radio Amateurs Mobile Services of Seattle. Traffic: (Aug.) W7BA 1524, DZX 782, IST 547, QLH 330, DIT 143, AMC 112, KZ 68, APS 65, GIP 53, K7ATD 38, AJT 26, W7BTB 23, K7ASY 20, W7EHH 20, GYF 18, K7CWO 17, W7AIB 10, VPW 7, K7DDQ 3, W7IEU 3. (July) W7KZ 79, AIA 69, GIP 66, EHH 22.

PACIFIC DIVISION

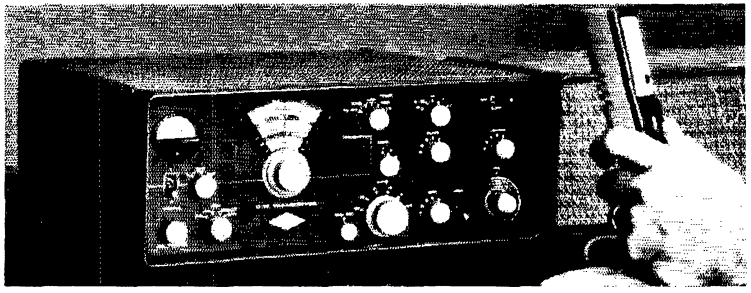
NEVADA—SCM, Charles A. Rhines, W7VIU—KN7LMM will be attending Pepperdine College in Los Angeles this winter. Your SCM has gone and done it—gotten married. If you're in Elko look us up at 701 Pine St., phone RE8-5279. Maybe you'll be allowed to help finish the new shack. Seen at the Pacific Division Convention at San Mateo: PC, CNG, MAH and his XYL, and VIU and his XYL. MAH and VIU's XYL won prizes. VIU's XYL won the Women's Bowling Tournament. If you fellows want Nevada news in *QST* get it to me by the fifth of each month. Some of you appointees are becoming lax in your reports. We can use some good traffic men for Nevada outlets for RN6.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—For the second successive year our section has been host at the Pacific Division Convention. Thanks to W6CTH, W6NVO and all the other committee members of the CCRC for putting over a fine affair at San Mateo this year. Incidentally, Larry Reed had a nice spread in the Redwood City Tribune about his newly-completed 23-ft. cabin cruiser. We hope to hear him maritime mobile on his projected trip to Alaska next summer. The SCARS's unorganized picnic went over with a bang in August with some 50 adults and kids at Bean Hallow Beach. The Monterey Bay RC enjoyed manning the amateur radio booth in shifts at the County Fair under the leadership of K6VQK and WA6BZE. K6TQN is the new Asst. EC and RO for Redwood City, replacing K6IEE, who did an excellent job for the past three years. K6MPN is the new Asst. EC for the SCARS and K6PDI is the new Asst. EC for the PAARA. WA6HRS reports on an abortive expedition to Alpine County to provide much wanted contacts for WACC. Hil has 52 of the 58 worked and 45 confirmed himself. W6YHM has completed a transistor GDO. W6DEF finally is v.f.o. on the traffic nets. WA6AVV and WA6GXI are on 6-meter s.s.b. W6WX has his beam up and is chasing DX. K6ZCR is the new 6th district chairman of the YLRL for 1961. K6RIM is on with a KWS-1 and a TA-33 up 30 feet. W6OKK reports that he is busy painting fences! A new appointee is W6RLP as OBS. Traffic: W6RSY 712, K6ZCR 427, W6AIT 192, W3MVK/6I, K6DYX 132, K6GZ 90, W6FON 72, W6DEF 69, W6YHM 42, W6JCG 37, W6UCS/6 25, W6YBV 20, WA6HRS 13, W6ZLO 8, W6HC 5, K6YKG 4, WA6JYJ 2.

EAST BAY—SCM, B. W. Southwell, W6OJW—SEC: K6DQM. ECs: K6JNW, K6VXK, K6ESZ, K6TYX, K6VXM, W6EFI and W6LDV (acting). WV6NJT is a new Novice in Berkeley and is the son of W6NBX. W6WLI moved back to the Sacramento Valley section. WA6IRK is a new General. WA6EWI is trying to get on 6 meters and has finished the new G.G. final. W6KG moved to KL7-Land. W6JOH is NCS at the key of W6OT. WA6EWI worked 6 new countries. The MDARC heard a talk on Radio Control at its Aug. 19 meeting. WV6MXC is a new Novice in Richmond. W6DWI's brother-in-law is a new Technician, WA6FUE. K6ZBG is QRL vacation.

(*Continued on page 126*)

on your
desk top...
or on wheels



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6-band 100 watt AM transceiver

Sparkling new... smooth-working combo... a powerful 100 watt AM transmitter, sensitive dual-conversion receiver... two-way operation on 80-40-20-15-10 and 6 meters. This handsome, designer-styled package is just slightly over one foot long, less than six inches high, mounts handily under the dash of your car—blends in too, belongs. Transistorized DC supply is separate, mounts in any small convenient space.

You can take this G-76 out of your car, use it—with matching AC power supply and speaker assembly—for excellent 6 band fixed station operation. Here's opportunity to add new enjoyment —and DX—with operation on another lively amateur band, 6 meters. G-76 is a full-blown, star performer on 6 as well as the other five widely used 10, 15, 20, 40 and 80 meter bands.

While G-76 is properly called a **transceiver** because of some common audio circuitry, transmitter and receiver are separately tunable. Receiver can be set to out-of-band DX, transmitter VFO anywhere within the band. Transmitter VFO is intended to be spotted on receiver dial. Frequency control may be either by VFO or quartz crystal. (Except on 6 meters which is crystal controlled only.) Transmitter and receiver oscillators are both compensated so that drift with temperature is negligible. Oscillator circuit has very low drift even with exceptionally wide excursions in both plate and filament supply voltages.

HIGHLIGHTS: Transmitter power input 100 watts AM, 120 watts CW • pi network output for 52 ohms • Dual conversion receiver • BFO for CW/SSB reception • Automatic noise limiter • Sensitivity: approx. 1 microvolt at 50 ohms for 6 db S+N/N ratio • Selectivity: 3 to 3.5 kc bandwidth at 6 db down, 14 kcs or less at 60 db down.

G-76 less power supply and speaker, #3338	**376.25**
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WA6BRD got his Extra Class ticket. WV6IMC has a completely transistorized station. W6ACN is temporary HRC representative to the CCRC. W3WAU/6 was promoted to lt. senior grade. Congrats. WA6GUM has a Regency transistor converter for his mobile. K6SCS completed wiring the speech section on her OM's kw. rig. WA6DJD is mobiling on 6 meters with a gooney bird in Texas. K6UFK walked away with all the top prizes in the construction contest of the RARC. WA6ITE is now General Class. K6QNZ has returned from KH6-Land. WV6JKB has a new HQ-180. KG6AJF will be back Stateside in about five months and can be found on 14.275-kc. s.s.b. between 2200 and 0300 looking for the gang. K6JHV has a Viking 500 and an RME-4350. The HARC is holding code classes. Traffic: (Aug.) W6NBX 254, K6GK 130, W6OT 39, WA6EWI 9. (July) WA6EWI 6.

SAN FRANCISCO—SCM, Leonard R. Geraldi, K6ANP—The Northern California Net (NCN) meets on 3635 kc. at 1900 Mon. through Sat. New officers of the Treasure Island RC are K4PAF, pres.; K4KCS, vice-pres.; W7HOY, secy.-treas.; K4DGU, custodian. The club's call is K6NCG. Guest speaker at the August meeting was W6QMO, who spoke on traffic procedure and net operation. The BAYLARC has had a busy summer. It was hostess club for the women's activities and program for the 27th Pacific Division Convention held in San Mateo. Official nets of the BAYLARC are the 50.56-Mc. Net Mon. at 2000; the 75-Meter Net on 3850 kc. Sat. at 1000. WA6ALK is NCS for the 6-meter net and W6YQL is NCS for the 75-meter net. The BAYLARC also has a brand-new award in its "Mermaid" certificate, a very attractive piece of wall paper. All you need is six contacts from BAYLARC members, individual contacts; net QSOs do not count. The Tamalpais Amateur Radio Club now boasts of about 40 members. Recent topics of discussion were a club station, affiliation with ARRL, and money-raising activities. The club held an auction in August which was most successful. The club station is a restored surplus communications hut, and TCS equipment will be used. The Far West Radio Club reports that its Field Day operation was very well handled. Novice and Conditional Class examinations were given during July. The Bandspanners Amateur RC recently voted to operate in the V.H.F. QSO Party and the SS. Guest speaker for the San Francisco RC was Dick Whiteside, whose subject was transistors. The Redwood V.H.F. Club had a picnic in Armstrong Park, with about 75 attending. W6OKR made his 50-state WAS on 50 Mc. K6EKC mobiled to Minnesota for a few weeks. W6FEA and W6WJF had a dream vacation in Hawaii. Gertie and Clare flew to the islands by jet and returned on a Matson liner by sea. W6GQA participated in both the C.W. and Phone C.D. Parties for July but couldn't work his own section in either session. Welcome to W6PYL, who has just moved back to Eureka from Oregon. W6FBK has a new son. W6ZZK caught a 9-ft. shark off the Humboldt Coast. A new appointee is W6MXJ as OBS. W6PHS won the High Handicap trophy in the bowling tournament at the Pacific Division Convention. Traffic: (Aug.) W6QMO 231. (July) W6QMO 138, W6FEA 22.

SACRAMENTO VALLEY—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William Van de Kamp, W6CKV. SEC: K6IKV. The time has come for all of you to consider who you want for your next SCM. My term expires on February 25, 1961. Will you please discuss this matter at your club meetings and talk it up among your friends. It would be fine to see each club nominate a candidate and have a real election in this section as this has not been done for a long time. I will not be able to continue the job after my term is up, so if you do not get busy and nominate some candidates there will be no SCM next year. Watch for the Election Notice in December 1960 *QST*. The Northern California Net (NCN) meets Mon. through Sat. on 3935 kc. at 1900. K6CKH is working on a high-power rig for 144 Mc. W6GDO has a new job which has been keeping him traveling much of late. He made two trips to Dayton, Ohio, and New York in one month. This Jet-Age travel sure is the thing. W6KME worked into Sacramento on 2 meters consistently while vacationing in his cabin located in a deep canyon in the Sierras about seventy miles from Sacramento.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—W6EFB has installed a G4ZU beam on a 54-ft. tower. K6ZCD has a new triband beam 70 feet in the air and a new shack. The NCN meets Mon. through Sat. at 1900 on 3635 kc. W6BAN, W6PSQ, K6LRQ, K6-OGX and W6IRV attended the Pacific Division Convention in San Mateo. W6PSQ won a Gonset triband beam at the convention. WA6DAU also attended the convention and came home with a 2-meter beam. K6JGH is building a high-power final with a 4-1000. K6OZL is building a modulator for his DX-40. W6JUK is having HT-33A problems and solves them by replacing PL172 tubes. W6JXY has a 75A-4. W6NKZ is running more

(Continued on page 128)

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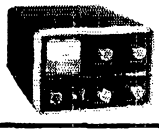

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Kit $49.95 Wired $79.95
Ideal for novice or advanced ham needing low-power, stand-by rig. 60W CW, 50W external plate modulation. 80 through 10 meters.

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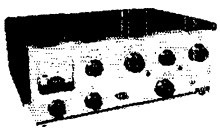

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power in his mobile rig. K6AUA is running ARC-5s on 80 and 40 meters. K6OER is heard on 75-meter mobile. W6ARC is mobiling on 75 meters again. W6LOS has a BC-1031A panadapter and is overhauling it. W6NAS, K6PPI and W6NCG are on 2-meter f.m. mobile. The Fresno Amateur Radio Club meets the 2nd Fri. of each month at the PG&E Building. Keep the news and reports coming in, as I need them. Traffic: K6OZL 23, K6ROU 22.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—PAM: DRC. V.H.F. PAM: ACY. RM: PNM. I am very pleased at the progress being made by the NCN (c.w. net). Ken has done a good job with the help of the net control stations. I am pleased to note that the net now has forty-two members with a large percentage of them meeting the net thirty out of thirty-one times. Outlets are needed in the Fayetteville, Wilmington, South Port and possibly other areas. There is now an early net, a late net and a slow net, something for every c.w. operator. K4HGK reports some excellent results with "Echo" and long skip on 6 meters. ACY reports the 6-meter gang held a picnic with a very creditable turnout, many of whom were mobile on 6 meters. The Cleveland County RACES group is to be congratulated on the activity in the county. Those boys have a mobile truck complete with 500-watt transmitter and a receiver plus 2-meter equipment and a generator on wheels. This is no elaborate unit but it does the job. It has four positions for operators. These same boys put on a swell hamfest on Sun., Sept. 4. The fellowship was excellent. Many old friends and some net boys who take traffic in earnest were present. Glad to see BCO was able to be there. HR was the oldest ham present and was presented with a bedspread to help keep him warm.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—Reports indicate that the Rock Hill RC operating AKC/4, was the States' high scorer in the Field Day activity. The Barnwell Mike & Key Club participated in the local Electric Fair with an exhibit and K4FJP succeeds PIA as editor of *Cross Talk*. VIW and TLC each have 41 states confirmed on 6 meters. FFH has completed an excellent article on gasoline-driven generators which will appear in *Scarab*. The Spartanburg ARC held its Annual Melon Cutting Aug. 14 with the local Citizen's Band Club as guests; its mobile on 75 meters acted as a relay station for the All Dixie Air Meet on Aug. 20; K4VOH received his General Class license and also a club certificate for code proficiency; K4HDX suggests using an interruption frequency coil as automatic volume control as described in the latest issue of *SPARC*. The picnic at Kershaw State Park on Aug. 28 sponsored by the DX RC was well attended, with DX as M.C.; short talks were given by GQV, K4PJE, FFH and HMG. The Low Country RC picnic at Moncks Corner attracted much interest and trading. After the freak tornado split off from Hurricane Donna and struck Charleston the emergency net was set up and efficiently handled with JLE as NCS. Traffic: K4ZHV 214, VVE 158, AVU 121, W4CHD 72, K4HDX 71, BRP 69, W4KNI 50, AKC 49, VIW 46, PED 7.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—SEC: K4MJZ. PAM: BGP. RMs: K4JKK, K4KNP, SHJ, K4QER, K4EZL and QDY. The Winchester Hamfest, sponsored by the SVARC, was a whopping success. K4IKF reports a much-modified HQ-129X is working like a charm. OOL says that they still can't get much 2-meter activity going in his area. K4FMJ is getting his new Hornet tribander in the ozone. There is much interest in new appointments by our Virginia gang with many queries being answered by ye SCM. LK, up Richmond way, is back in traffic work and we welcome this outlet. Our PAM, BGP, operated maritime mobile while fishing 15 miles off the Virginia coast and reported good coverage into the Hampton Area. PRO is working the night shift and it cuts down net activity but is fine for DX. K4IIP is operating portable 4 from Chester, Va., week nights. Our top frequency measuring station, CVO, reports he is much on the move and it is limiting OO and OPS work. K4DWP, from Danville, says brother Larry (9 years old) is a new Novice with the call KN4-BJL. K4JDJ now is a Norfolk resident. CKK has a new HQ-180. K4LPR's and PK's (OOs) reports contain nicely-worded letters of appreciation from amateurs notified of violations. KX's rig finally has given up the ghost and he says only complete replacement or rebuilding will suffice. JUJ likes to talk about "Awards and Contests" to the Richmond Club (4th time)! K4RBQ vacationed in Kentucky and is headed back to college along with a number of our other fellows. VMA is doing a nice job on Hampton Peninsula with the AREC. Traffic: (Aug.) W4SHJ 350, ZMH 266, DVT 239, K4MXF 189, W4QDY 148, K4IKF 70, SGQ 70, W4OOL 60, K4FSS 51, SNS 49, FMJ 30, W4OWV 18, AAD 17, LK 16, BGP 15, PRO 14,

(Continued on page 130)

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K4IIP 11, W4CVO 10, K4DWP 10, LPR 8, CHA 7, W4KX 6, K4LHB 5, W4VMC 5, JUJ 2. (July) K4AL 20, W4BRF 9, KX 9, GOF 8, K4CHA 4, W4LK 4, VMC 2, IF 1.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—The Black Diamond ARC Annual Bass Lake Picnic was well attended, with K8OEJ winning the DX-100B. New officers of the Blennerhassett ARC are MIT, pres.; K8DXU, vice-pres.; K8PCF, secy.; GWR, act. mgr.; K8OIZ, publicity. BARC members attending college are VVE, K8AFQ, VSV, K8AJX and IHY. K8KFA will be in the Army for three years. AMS now is teaching school in St. Leonard, Md., and has a DX-100 on the air. DYA and K8DZU have new 100-V exciters, HNC has a new HT-37 and an SX-101 receiver. K8PJC and K8PJS, father and son, are active on 3890-kc. phone. K8MQT is being transferred to Brownsville, Tex. K8HID, WVN Net Manager (c.w.) reports, the fall session is off to a good start. ESH worked A3USA mobile on 6 meters. K8CNB has a new homemade keyer. The MARA ARC had a booth at the Winfield District Fair. The Kanawha ARC plans state-wide distribution of its club paper, *Splatter*. WUB, PAM, plans to send a monthly phone net bulletin to active members. Congrats to K8IUD on his interest in emergency work. K8RQL is now 4CBM in Virginia. The East River ARC of Bluefield is quite active and publishes a club paper, *Static*. Traffic: K8JLF 94, PJC 24, HID 22.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Carl L. Smith, WØBWJ—Asst. SCM: Howard Eldridge, KØDCW. SEC: NIT. RMs: WME and MYB. PAMs: CXW and IJR. OBS: DCC. On Aug. 13 and 14 members of the Denver Area RACES and AREC combined forces to assist the Jefferson County C.D. organization in "Operation Aircrash." This exercise was viewed with a great deal of interest by civil defense heads from Washington, D. C. Net activity was on the increase during August with many of the winter regulars getting back into action. It is encouraging to note the increase in EC reports and in AREC activity. The use of 2 meters in Colorado is rapidly increasing; at last count there were 30-odd stations on 2 meters, with IC, IUF, ACA and KØAYK probably being the most active. Boulder, Fort Collins, and Denver seem to be the most active areas on 2 meters but Colorado Springs and Pueblo are catching up fast. All ARRL appointments have been renewed up to current date; those desiring endorsement of certificates please send them in. The HNN has been an active registered NTS net for the past 12 years. We welcome FEO, newly moved to Colorado. He is now Wed. and Fri. NCS for CCW. Traffic: KØEDH 369, EDK 278, WØWME 230, KØDCW 159, WØKQD 146, FEO 81, MYB 74, KØQGO 29, WØCBI 27, IA 11.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, 7OCX. RM: OCX. V.H.F. PAM: SP. QDS has received appointment as OBS. There are several appointments open for those interested. QWH still is the Acting SEC. Any volunteers? Reports from ECs have been nil. Criterion for continued appointment is your monthly report. QWH moved his station. OCX was in the hospital for a short time. KØEDH was TWN liaison for BUN during John's absence. BUN could use some NCSs and ANCSs. OCX and QWH received BRAT Awards for August on BUN. K7GOF and JJC are a father-and-son team from Provo now operating on 6 meters and expecting to be on 2 meters soon. GOF reports that contacts are few and far between. Traffic: W7OCX 256, QWH 3.

NEW MEXICO—SCM, Newell F. Greene, K5IQL—Asst. SCM: Carl W. Franz, 5ZHN. SEC: CIN. PAM: ZU, 10-meter PAM: LQM. V.H.F. PAM: FPB. RM: ZHN. We bid farewell to our SEC, Leonard has moved to Santa Barbara, Calif., from where we hope to hear him soon, QRM permitting. We shall miss his timely reports and diligent work as Emergency Coordinator. FPB is building a high-grade secondary frequency standard, second to none with three ovens in all, with multivibrators, markers, etc. Mort asks that more v.h.f. operators report to him. 2BYE/5 was located at the Philmont Scout Ranch. All nets are back on winter skeds and operating habits should be settled down. VWU has been trying to utilize Echo I, without luck so far. Your SCM, with a 6-ft. dish, is listening on 432 while completing the p.p. 4X250 rig running the limit on 144-Mc. s.s.b. Traffic: W5ZHN 557, K5IPK 49, W2BYE/5 39, W5GD 6, UBW 5, GB 2, K5LWN 2, UYF 2.

WYOMING—SCM, Liat D. Branson, W7AMU—SEC: CQL. The Pony Express Net meets Sun. at 0800 MST on 3920 kc. The Wyoming Jackalope Net meets Mon. through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc. K7KMS and K7LBW, two Novices, got their Conditional

(*Continued on page 132*)

Class licenses. CQX, Box 148, Sheridan, has been appointed as OBS. K7LIL, of Buffalo, K7HKD, of Cheyenne and 4DLX/7, of Cheyenne, are new experimentals. The Ham Picnic held Aug. 14 at Cheyenne had a large turnout of Wyoming and Colorado hams. There were two transmitter hunts and an auction. K7IAY has his beam back up on a new 60-ft. tower. Traffic: W7LKQ 6, AMU 5, K7GMB 5, HVH 5, W7CQL 2, 7BKI 1, K7IBU 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—SEC: JDA. RMs: RLG and OCV. PAMs: PHH, BTO and JJX. New appointees: K4TDJ and DJR as OPSs, EOH as OO III, IOZ and IRT as OBSs. K4HJM reports the Anniston Club is being reorganized. K4AJF is on the air with a new DX-100B. CIU is moving. GYW has a new Gonset GSB-101 linear. PTR moved to W1-Land and K4UEE to KR6-Land. Highest QNI on AENB in Aug.: K4SAV 24, RLG 24. Welcome to AENB: K4JSO Decatur, MAM Huntsville, K4DRQ/4 Hampton,Va. Congrats to K4GOW on receiving an AENB Net certificate. RN-5 welcomes K4GOW. K4IWI added an SX-100 to his trusty SX-28. New hams in Tri Cities are KN4WXW and KN4WYA. K4AUP is building a new ham shack on the Tenn. River. K4AAQ is sporting a new KWM-2 transceiver. K4KQN is chasing DX on c.w. EI, K4JJM and K4CTN have joined Silent Keys. K4RCE and K4-OZL are in the Navy. The Jefferson County Emergency Council Bulletin is being reactivated with GET as chairman. ASW has 134 countries on phone confirmed by ARRL. New officers of the Birmingham ARC are K4DSO, pres.; K4LQL, 1st vice-pres.; K4AAU, jr. vice-pres.; K4HPX, secy.; K4HAG, treas.; DFE, DEC; K4OVE, OLG, NZZ, WJX and EOH, directors. K4AYF is booming out with a new mobile rig. K4AOZ has moved to 572 Park Avenue, Bluff Park, Birmingham 9, Ala. *Six-Meter News:* K4DJR has a 6-er in his Volkswagon; he also is experimenting with reflecting or bouncing the mobile signal via power lines above the car. EFF reports AENX members are checking space balloon effects on 6-meter signals. K4HNO is mobile. CIN still holds a daily sked with Georgia and thinks a net system would work between Alabama and Georgia on 6 meters. K4-OVE, K4UMD, K4HAG, K4MQN, DFE, K4DSO and others participated in the Powderly Train Wreck emergency communications. The Jefferson County Civil Defense RACES network "C" held a simulated drill in conjunction with the radiological civil defense group of Jefferson County, with 24 stations taking part and handling 10 messages. The Civil Defense RACES Network "C" of Jefferson County is called at 7 P.M. each Wed. on 145.350 f.m. All RACES communication personnel are urged to join and call in this net. Traffic: W4RLG 226, K4PHH 47, GOW 44, JDA 44, W4KIX 42, MI 37, K4BTO 26, W4WHW 25, K4HVN 24, W4CIU 22, K4AAU 20, BFT 19, AOZ 12, TDJ 12, AAQ 10, RIL 10, UMD 10, KHC 9, W4CEF 8, PVG 7, K4HJM 6, DJR 4, W4RTQ 4, K4HFX 3, ZBX 3, ZNI 3, W4CIN 2, ZSH 2, K4JSP 1, RIX 1.

EASTERN FLORIDA—SCM, John F. Porter, W4KGJ—SEC: IYT. RM: K4SJH. PAM: SDR. V.H.F. PAM: RMU. New officers of the Hollywood ARC are IEH, pres.; DXL vice-pres.; and PM, secy.-treas. Meetings are held every 3rd Fri. at 8 P.M. at the Hollywood Savings and Loan Bldg. JOCO VII was a big success with several counties taking part. AFF, EHW, DRD, K4GBS and KTE set up their own equipment in the CG truck in Everglades City Aug. 13 and operated through the 14th. K4IWT, Red Cross in Miami, acted as NCS in Dade. Naples members were ACT, EC for Collier, K4UGE, FOM, KGL and YPA, KLT and ENN acted as relay on 6 meters in Collier. K4TFS, Dade County C.D., set up at Trail Glades Rifle Range. Operators were DTV and K4KEG. See the Sept. issue of *SKIP* for full details. K4MTP, was elected Master Oscillator of the Knights of the Kilocycle. The Knights have met over 1313 consecutive Sunday mornings and possibly is the oldest organized ham net in the nation. The Southeastern Division ARRL Convention will be held at Orlando, Fla., in '61. The following were elected officers in the Fort Myers Club: K4RQY, pres.; K4KPE, vice-pres.; SMK, secy.-treas. The Daytona Beach ARA Gabfest was well attended. Your SCM was there and had many eyeball QSOs. The hamfest committee is to be congratulated for such a swell time. We all enjoyed it very much. We hope to have a complete run down on Hurricane Donna by next month. Traffic: (Aug.) K4-SJH 688, EHY 560, LCD 263, LCF 226, KDN 207, EBT 191, ILB 106. W4AKB 100, GJI 94, TRS 86, K4BY 76 W4CNZ 75, K4GBS 65, W4LDF 63, BKC 48, K4COO 44, W4FE 43, NGR 41, JRJ 37, K4RNS 34, DBT 32, AKQ 31, W4EHW 30, HRC 30, K4DAX 25, W4SMK 25, ADU 24, GLI 21, K4MTP 19, DAD 18, YOQ 15, W4LSA 14, ASF 9, DPD 7, DQS 7. (July) W4FPC 164, FE 17, NGR 16, DPD 7.

(Continued on page 134)

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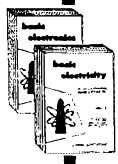

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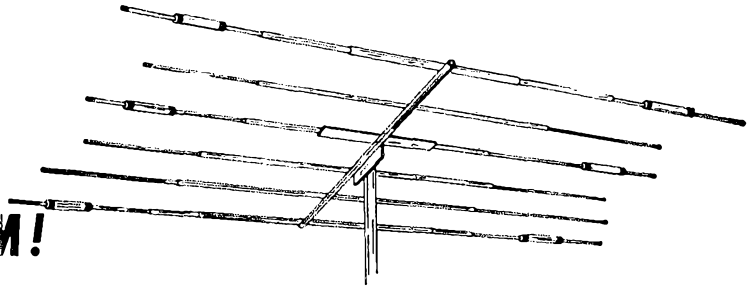
WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: HKK. PAM: K4RZF. RM: UBR. Madison: PBO, EC, holds drills every 2nd Sun. at 0815 on 3840 kc. Chipley: EQK was home from medical school for the summer and was active on 40 meters. K4SGY is General Class now. LXK works on 20 meters mostly. Quincy: KN4QDN is a new ORS. He is NCS and an active member of the Novice Hurricane Net (NHN) and has WAS 34/30. K4EYC also is active, but BGO has moved away. EKY is active on 40 meters from Havana. Crestview: OCG has renewed ORS, OES and OO Class I appointments; Fort Walton: K4UBR has resumed as net mgr. of QFN, vice ATA. Members qualifying for Section Net certificates are MLE, K4CNY and K4BSS/4. The Whipsnappers Mobile Club sponsored a picnic and transmitter hunt, won by BSS. UXW has been appointed OES. He. NVW and others around Eglin Field are experimenting with 220 Mc. and above. Gulf Breeze: K4ZMV has the 80-meter antenna down for repairs. Pensacola: MS has a new 63-ft. tower going up. His DX total is now 177. LJS has moved here from Jax. K4RMO is working 15 meters with a quad. K4SOI is on 10 meters with a new tower and beam. KN4YYE has a DX-40 and mobile rig. SRK and K4UBR are organizing a Weather Amateur Reporting Net (WARN) on 3795 kc. to cover all coastal areas in the Southeast. Traffic: (Aug.) K4UBR 244, W4NBF 110, K4RMO 7. (July) K4BSS/4 96 ZMV 4.

GEORGIA—SCM, William F. Kennedy, W4CFJ—SEC: PMJ. PAMs: LXE and ACH. RM: DDY. GCEN meets on 3995 kc. at 1830 EST on Tue. and Thurs., 0800 on Sun. GSN meets Mon. through Sun. on 3595 kc. at 1900 EST with DDY as NC. The 75-Meter Mobile Net meets each Sun. on 3995 kc. at 1330 EST with K4YID as NC. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4ZZS as NC. The Atl. Ten-meter Phone Net meets each Sun. on 29.6 Mc. at 2200 EST with BGE as NC. The Ga. S.S.B. Net meets Mon. through Fri. on 3970 kc. at 2000 EST with K4AUM as net mgr. New officers of the Ga. Peach YL Net are K4LVE, pres.; K4DNL, vice-pres.; K4LIU, secy.; K4BDZ, treas.; and K4ZZS, NC. FWH has a new 220-Mc. transmitter and receiver, also a 50-Mc. converter completed. Congratulations, Walter. The Greater Atlanta Six Meter Net meets every Fri. at 2030 EST on 50.169 Mc. NC is K4FNZ. The net has a roster of approximately 70 members. Let's try to join the gang on 6 meters. LNG worked his first WØ on 144 Mc. during August. K4TEA has a new Apache on and worked VP2MB his 148th country. K4TEA also has joined the Southeastern DX Club. K4KZP is back at the old grind in college again. FWH is reading ARRL Official Bulletins on 145.350 Mc. at 2000 EST each night. Traffic: W4DDY 174, K4TEA 126, EJI 40, OGG 30, BAI 28, BVD 24, W4JWO 12, K4MIH 1.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: AAA. AOD applied for an OPS appointment and has assembled his Heath Sixer. AOD and DJ have all the parts for six-element 6-meter beams on 24-ft. booms. AAN, JM, MO and ABN have ordered Heath Sixers with vibrator power supplies. NY, the Colegio San Jose RC now has three operators, AOD, AQD and K2GJR/KP4. WT, Dña Maria Luisa, skeds the Antilles Weather Net and the Antilles MARS Net on 40 meters and Stateside traffic on 20 meters. ALY, pres. of the PRARC, received the first 50-Mc. WPR50 Award. TQ, operating portable in Hato Rey, is using a gooney-box. Old-timers BA and HH are on 6 meters, BA with a Heath Sixer and HH with an AF-68 transceiter, an HQ-150, a Heath 6-meter converter and a Telrex six-element beam. KD plans to invade 6 meters to contact more KP4s for WPR Awards. DJ alerted the 6-meter gang when Echo 1 was overhead San Juan. AUY is on 6 meters with 450 watts from Henry Barracks, Cayey. AVQ, ex-DL4DJ, KG1DJ and W5GUP, now is located at Fort Buchanan. AOO is on a Stateside vacation. AVM, ex-W5CJY, is a Silent Key. SV operated portable for a week from Lares high in the mountains and could work the entire island on 50 Mc. with a G-50. CU built a 6-meter transmitter into an old HRO cabinet. ALY rewired and realigned the Hallicrafters S-37 u.h.f. receiver for real hot results on 50 Mc. W2ONY/KP4 is mobile on 6 meters. ES and son, AST, are on 6 meters from Ponce. AMN, vacationing in P. R. using a Heath Sixer, says he is a member of the Denver Mile High Hi-Bander Club, operates as KP4-AMN/WØ using a Globe Scout Deluxe HQ-110 and a five-element beam on 50.3 Mc. and has worked 22 states and 3 VEs. CK and SV caught the first band opening of the season on Sept. 2 and worked LU2FCD and LU4GOZ. DJ's and AVB's one-watters reach there along with the rest of the gang. RM is installing gear in the concrete shack in back of the new house. APR ordered a Heath Sixer. The Antilles Weather Net, with KP4AED as NCS, stood by on 7245 kc. during Hurricane Donna. Traffic: KP4WT 62.

(*Continued on page 136*)



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CANAL ZONE—SCM, Ralph E. Harvey, KZ5RV—August 1960 saw a number of the Canal Zone hams leaving for new stations in various parts of the world. VR's and RV's jr. operator has left the Canal Zone and is now in Uncle Sam's Navy at Great Lakes. VR has moved to a new location and is awaiting her new triband. TD has been duly elected SCM for the Canal Zone, effective Oct. 1. All traffic reports, news items, etc., should be sent to him. It seems that there are quite a few new Apache owners in the Canal Zone. Among them are HB, RM, PR and HK. A group of hams had a get-together for RM and KA on the occasion of their 24th wedding anniversary. The same group pulled a surprise housewarming on RV and VR. A farewell party was held for LL, who is leaving for California. HB is taking over the duties as NCS for the Air Force MARS Net. KQ has been hospitalized in the States, but latest reports are that Gus is on the road to recovery, and will return shortly to the Zone. Best regards to all who assisted during my term as SCM for the Canal Zone. Traffic: KZ5JW 118, ET 45.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: W6LIP. RMs: W6BHG and K6HLR. PAMs: W6BUK and W6ORS. The following stations made the BPL in August: K6MCA, W6WPF, W6GYH, K6EPT, KØCLS/6, K6LVR and WA6EEO. Congrats, fellows! KØCLS/6 added a new mill to the shack. W6BUK is heading east to New York City for a vacation. WA6HUO made RCC! WA6EEO has been in San Francisco for eye operations. We wish you a speedy recovery, Larry! K6EA is heading for Minnesota for a couple of months and will sign WØMFW back there. W6CIS was very busy in the October CD Tests. W6FB made WAS and is moving to Palm Springs! K6COP is back in traffic again with more power! WA6GHW is going 6-meter mobile. W6NKR is getting on 2 meters with a five-element beam. K6CDW spent his vacation in the High Sierra Country! W6SRE is visiting some of the traffic gang in Washington. W6AM has phased rhombics for Europe! W6QEZ made WAS with 3 watts on 10-meter phone. K6SIX is trying to copy KL7FLC on 50 Mc. W6GMC is sporting a new RME-6900 receiver! K6SLM is getting ready for some 420-Mc. space bounce. WA6DJB put up a new Spiralray antenna on 50 Mc. W6IBD had the radio room flooded! K6GLS is spending a nice vacation in VE7-Land. W6ORG reports that an XE2 from Tia Juana is on 2 meters. Support your section nets: On c.w., the Southern California Net meeting at 1900 PST on 3600 kc.; on phone, the SoCal 6 Net meeting at 1900 PST on 50.4 Mc. Traffic: (Aug.) K6MCA 1510, W6WPF 1119, W6GYH 954, K6EPT 674, KØCLS/6 667, K6LVR 609, K6OZJ 333, WA6EEO 227, W6BHG 226, K6COP 100, W6SYQ 93, K6EA 90, K6SIX 67, WA6DWP 29, K6PZM 22, K6JSD 18, W6USY 18, W6BUK 9, W6CIS 6, K6MSL 6, W6NKR 2, W6SRE 2. (July) WA6DJB 190, WA6CKR 156, W6SYQ 149, W6ORG 4.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—The Copper State Net meets at 1930 MST Mon. through Fri., the Grand Canyon Net Sun. at 0800 on 7210 kc., the Catalina Emergency Net Wed. at 2000 on 29.627 and 145.8 Mc., the Tucson AREC Net Wed. at 1900 on 3880 kc. For the first time since 1948 an ARRL convention is planned for Phoenix, Ariz. The date has been set for May 26 through May 29, 1961. The convention is made possible through the joint sponsorship of the Mummy Mountain Radio Club, the Scottsdale Radio Club (both of Scottsdale) and the Arizona Amateur Radio Club of Phoenix. The following officers for the convention have been chosen: Honorary chairmen are K7KYV and W7EH (ex-9EH); general chairman is ASK; vice-chairmen are K7AWI and FEW; secretary is 2KEB/7; treasurer is QZH. Registration will be handled by KFV/7, and KOY is all set for XYL and YL entertainment. Technical sessions will be headed jointly by EBG and SSC. K7BGL and YAL are in charge of the exhibits and prizes, while K7KCB will set up the contests. The Woulf Hong will be jointly supervised by MAE and WFY. YWF will handle breakfast activities. Although we regret the loss of CAF (PAM) and FMZ (SEC) we extend our best wishes and congratulations. Both have entered the University of Colorado. WYY has started classes on code and theory at the Phoenix YMCA. SSC, who suffered a slight heart attack, is back to work on light duty. Traffic: W7FMZ 8, K7HIJ 5.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W6VIV, OO, in Costa Mesa is active on all bands with the addition of 50- and 144-Mc. equipment in his shack. W6VTQ and W6YGE, in Santa Ana, are active on 50 Mc. WA6BDW, who works for the San Diego Post Office, sends all incorrectly addressed QSLs to the San Diego DX Club for routing; a real assist. Amateurs are reminded in applying for various ARRL appointments that

(*Continued on page 138*)

the three requirements beside League membership are experience, ability and regular reporting to the SCM. A new Novice is WV6NHT, the XYL of WA6CRW. A late BPL for July was W4DNU/6, who has applied for ORS appointment. K6LKD, in Escondido, qualified for the MTHC Award in August, and got his WAS certificate also. W6EOT, RM and ORS, missed BPL in August for the first time in years, but did receive his DXCC. W6IEY, in La Mesa, continues to be the most active OES in the section. K6RCK, in Santa Ana, is now an OES, and is active on 50, 144 and 420 Mc. Your SCM is authorized to make 10 trips a year to visit and talk to clubs in this section (San Diego, Orange and Imperial Counties). If your club is interested in a visit by your SCM, please contact him to set a date. He is ready to give your club a run-down on recent amateur happenings, League news, the AREC and RACES program, and appointments available to League members. WV6IPS, of San Diego, won one of the 32 Ford Motor Company Outstanding Achievement Awards in its Annual Industrial Arts International Competition for a Tesla Coil he built. It won a four-day trip for him and his instructor, W6LRU, to Dearborn, Michigan by jet in mid-October, plus a $100 cash award to WV6IPS. Traffic: K6BPI 1509, K6LKD 524, W6EOT 475, WA6CDD 239, WA6ATB 204, WA6AVA 5, W6ELQ 2.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR—The Santa Barbara ARC reports new and more interesting programs. There are speakers and plenty of hot coffee to go along with ragchews. K6MQX changed his QTH to San Luis Obispo. WA6DYD has a new Valiant transmitter. W6ENR has opened up an electronics store in San Luis Obispo. WA6FGV and WV6HYE have put up the Santa Barbara Boys' Club antenna so that the Boys' Club will have a rig on the air, which consists of a Ranger transmitter and an S-38E receiver. WA6CMC donated the Ranger to the club. K5AOB, from Oklahoma, received his new call, WA6PNQ. WA6HGZ received his Cond. Class ticket. WV6HYE and WV6MBQ took the Cond. Class exams. New calls around Santa Barbara are K6SZ, ex-W1SZ, W6KXK, ex-K2JCV, and K6UAD. WV6MUP, WV6MCW and WV6MBQ went to the ranger station on La Cumbre Peak to visit ex-WN6SPK and work 2-meter DX. Traffic: W6YCF 14, K6MQX 5, W6OUL 4.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—GHU reports 6-meter activity is going great in the Mineral Wells Area with five new Heathkits completed and two more almost finished. The Richardson ARC demonstrated an emergency radio set-up at the Richardson Community Fair Aug. 10-13. The Terry County ARC elected K5LSN, pres.; K5JST, vice-pres. K5LFI was named chairman for the Brownfield free swaptest to be held Nov. 13. K5AVG is the new net control for the North West Tex. Emergency Net. LR reports the theft of a Hallicrafters SX-101 MK 3 chassis serial No. 239024, lid serial No. 66A1444 and matching speaker, HT-32 chassis serial No. 209914, lid serial No. 66A451. This equipment was stolen from the DARC Club room in Dallas prior to Aug. 20. The Ft. Worth Kilocycle Club had a picnic at Burgers Lake in place of its regular meeting for August. SZD won a scope kit. MZW announced the start of another code and theory class for beginners. K5BKH is new net manager for the 7290 kc. traffic net in place of SMK, who was forced to resign because business is taking all his time. The 5th Annual Waco Hamfest was held Sept. 4 and it was a great success as usual with 340 present. For the ladies there was a demonstration of new hair styles and the proper use of cosmetics. Transmitter hunts were held on three frequencies, there were traffic-handlers' and MARS meetings, eye-ball QSOs and plenty of prizes. Traffic: K5BKH 363, RAV 130, W5AYX 81, LR 55, BOO 48, K5HTM 39, EGB 6, PXV 4.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—SEC: UYQ. RMs: K5JGZ and OOF. PAMs: K5DLP-75, EJK-40, VCJ-6 and HXK-2. M1FX is manager of the Oklahoma Phone Emergency Net. New appointments are ERY as OO, AQZ as OBS-40 c.w., K5OJD as OPS and OOF as RM. Special thanks and commendation go to the Oklahoma City clubs for such a swell State Convention. The state meeting goes to Tulsa next year. The fellows in Southeast Oklahoma also did a good job at fellows in Southeast Oklahoma also did a good job at the Beaver's Bend Park Hamfest. K5ZEP still is talking about the fish dinner. EJK thinks there are two fellows with "K" calls who should be watched, INC and KHA. If your club needs a program, K5SWA will do the fandango for you. LIR, e.d. director and LTB, EC, really have a 1st-class set-up in Canadian County for civil defense and emergency work. Glad to hear CCK back as NCS on the Sooner Traffic Net. K5ZIY is a new operator at Commerce. ODM and K5ZZA are now radi-

(Continued on page 140)

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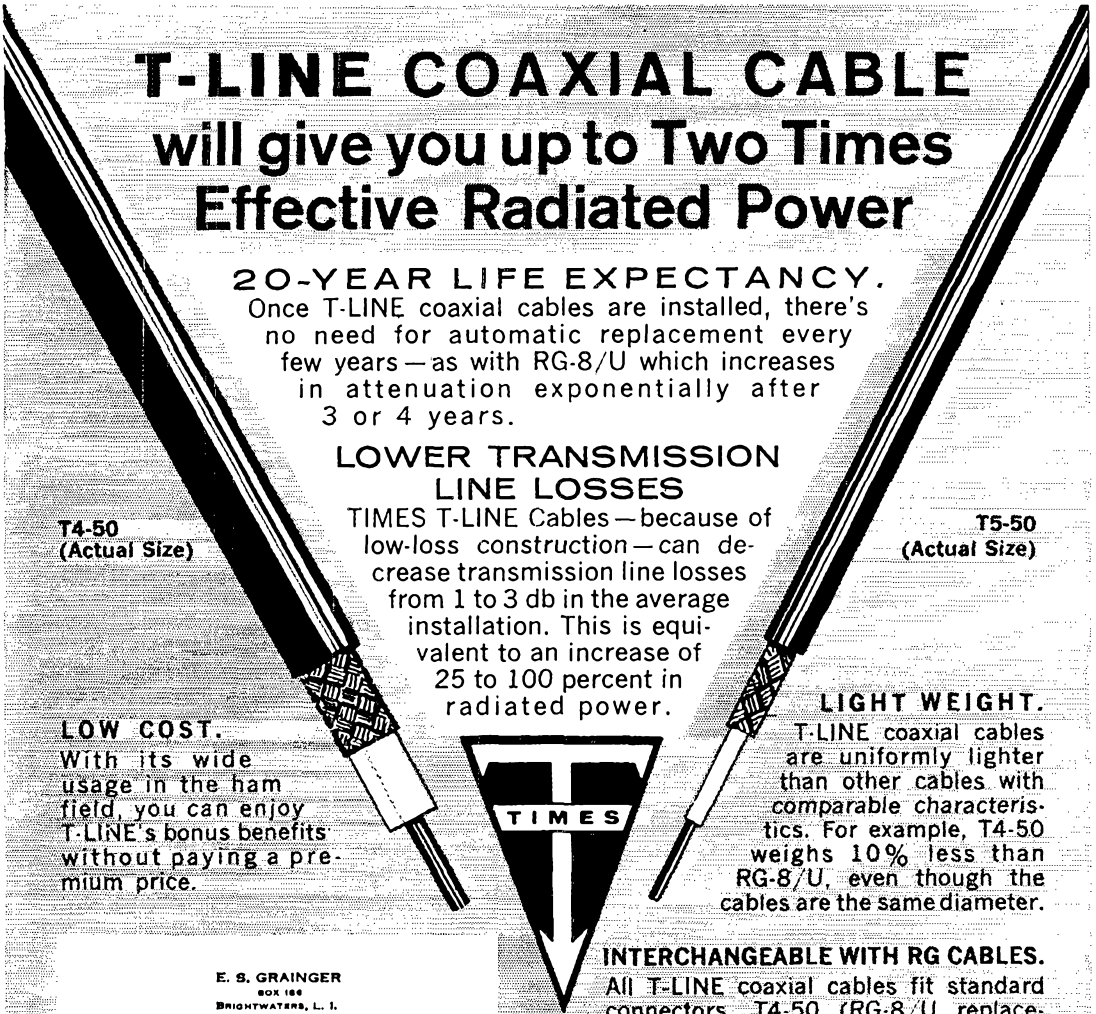

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ating signals from out Clinton way. VCJ is doing an outstanding job as 6-meter PAM. Oklahoma "77" certificates are ready. Who will be the first to claim one? UYQ still has some copies of the Oklahoma State Amateur Radio Directory. DRZ is preparing an Oklahoma Club Directory. Oklahoma clubs: Send him a short history, list your officers and give club call and place of meeting. The Oklahoma QSO Party will be held Nov. 4 and 5. Time will be from 1 A.M. Nov. 4, to 12 P.M. Nov. 5. Rules will be sent to all clubs. Others can get information from DRZ or a Muskogee station. Traffic: (Aug.) K5IBZ 150, JGZ 106, CAY 77, DUJ 56, W5DRZ 50, OOF 49, MFX 47, K5AUX 26, QEF 24, ELG 23, W5WDD 19, CCK 16, WAF 14, K5JOA 11, LZF 11, ZEP 10, EZM 8, REH 8, LUR 7, OOV 7, INC 5, W5ADB 3, K5CBA 3, W5VLW 1. (July) W5JXM 65.

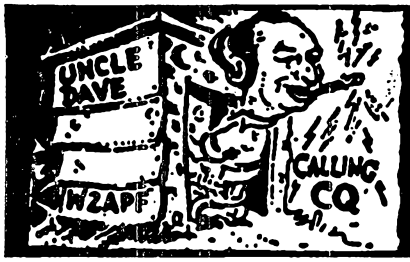
SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: QKF. PAM: ZPD. RM: K5BSZ. QKF visited the Houston Amateur Radio Club. K5BKH is the new net manager of the 7290 Net. The net had 46 sessions, 1227 check-ins and 471 messages. ZPD and ITA have been vacationing in 6-Land. Congratulations to K5WIC on making BPL. He also is a new OPS for the College Station Area. K5DQN has a new HT-37. MVL, at El Paso, is working regular 2-meter schedules with Roswell, N.M. K5PEQ is the new EC for the Bayshore Area. K5KIG is the new EC at College Station. QKF and QEM visited the Pasadena Club. The new officers of the El Aguila Radio Club at Eagle Pass are K5OFR, pres.; K5SKO, vice-pres.; RKI, secy. This club meets at 1600 the 2nd and 4th Sun. Visitors are welcome. Civil Defense also has been organized in Eagle Pass with K5-OFS as c.d. director, K5SKO Radio Officer and K5OFR net licensee and net control. They monitor 29.6 Mc. daily; anyone driving through is welcome to give them a call. The new officers of the South Texas Emergency Net are VPQ, net control; CIX, asst. net control; FNH, secy.-treas.; and QEM, net pro. FNT won the HT-37 given away by the STEN. K5JTP soon will be heard from Kessler Air Force Base. Glad to hear that K5VXN is out of the hospital. Traffic: (Aug.) K5WIC 528, ABV 230, JFP 90, W5IRJ 23, ZPD 23. (July) K5WIC 551, JFP 215, W5ZPD 144, K5ABV 137, MVI 47, MXO 30.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. D. Solomon, VE1OC, and H. C. Hillyard, VO1CZ. SEC: BL. YOs and VEIs are reminded of the recently expanded phone sub-bands as follows: 7150-7300 kc., 14,100-14,350 kc., 21,100-21,450 kc. and 28,100-29,700 kc. It is recommended that Rule One of "The Amateur's Code" be strictly adhered to in the use of these frequencies. OM invites all 6-meter operators to participate in the 50.4-Mc. Net which meets nightly at 10 P.M. VO2AW reports the following departures from Goose Bay: EB to Alberta, GB and FS to Greenwood, N. S., and K1DHE/VO2 back to the U.S.A. VO2DP has a DX-100B. New calls include VEIs AED and KX. Amateurs in all Atlantic Provinces have seen action during the recent outbreaks of destructive forest fires but no reports are in as yet. *Please* let me have more information on activities such as this, fellows. Can you imagine any 2-meter stations who refuse to believe that their signals are getting out and carry on with a local round-table while DX stations are frantically calling them? This is what happened to the Loyalist City group during a recent 2-meter opening. TrafiC: (Aug.) VE1ADH 17, OM 3.

ONTARIO—SCM, Richard W. Roberts, VE3NG —Three PAMs are now on the roster for Ontario. CFR of London, AMT of Cambleford, and of course, the old stand-by, TX, of North Bay. These gentlemen will be responsible for the operation of the Ontario Phone Net. If you have problems or inquiries write to any of them. Most of the portables are now back in their home shacks. More and more signals are returning to the fold. BSY will be running the SWAP Club on 75-meter phone again soon. Stan volunteered to do this in memory of RH. Several new calls have been heard but with old familiar voices: CMR is now BD and BJV is now LK, both in the Toronto Area. PR was in sick bay in London for five weeks. He sends thanks to the London gang. CFR has an R/C model boat. The LARC heard an s.s.b. talk recently. The Sarnia group is on the ball for the coming season. DWO has a new QTH in Toronto. DNU helped the following get their tickets: DPW, DHS, DPH, DQC and DIJ, all in the elusive Stormont County. WOC applicants make note. BUW reports that Peterborough had an FB Field Day and has a fine program for the coming year. The Niagara Club has a new format for its paper, *Feed Line*. AUR is in VE7-Land. DNU is now in W4-Land. The weiner roast was a wing-ding. The following are new hams in the Windsor Area: DEX, DWX, DWE, DXD, ETM,

(*Continued on page 142*)



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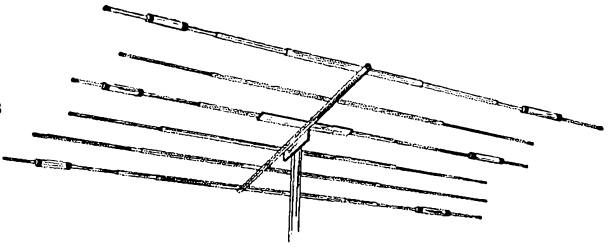

The news about the new Mosley TA-36 has all of us at Uncle Dave's Radio Shack really hopping! This dandy, six element beam for 10, 15 and 20 meter operation will really give your signal that DX punch . . . and we've got this terrific antenna in stock for immediate delivery!

I believe it is the finest antenna in its price range . . . for many reasons. It has wide spacing with 4 operating elements on 10 meters, 3 operating elements on 15 meters and 3 operating elements on 20 meters. Most important are the exclusive TrapMaster trap assemblies that are fully dirt and moisture proof for all-weather top performance. These slim-profile Mosley traps are truly proven, fail-proof, 1 KW rated traps too!

All 6061-T6 aluminum construction - completely rust and corrosion proof, guaranteed! Nuf said . . . come in and see this terrific beam for yourself.

MODEL TA-36 . . . Amateur Net, $129.50

Uncle Dave Also Sez

I'd better mention the Mosley AutoWhip TM-5 for 10, 15, 20, 40 and 80 meters while I'm on the subject of great antennas. This is really the ultimate in big signal mobile performance and it has automatic bandswitching from the transmitter!

Mobile hamming has sure improved for me - and it will for you too - if you have a Mosley TM-5! It's a neat, compact unit that can be used with all popular amateur mobile transmitters and receivers. It can also be used as a fixed or portable station with the newly available ground system accessory kit.

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EMM, DKF and Al Hodgson, whose call is not available as yet. A visit was made by some of the members to W8MYY. The Ottawa Mobile Club is up and at it. The club had a fine social, assisted in yacht racing, and attempted to "Evaluate the Mobile." Traffic: VE3CWA 189, DPO 64, NG 63, BZB 56, CFR 53, BUR 41, AIL 39, AUU 33, RN 32, BAQ 30, DZA 24, PR 24, BHL 16, LK 2, VD 2.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—It is with sincere regrets we record the passing of two old-timers, VE2JJ and VE2HM, both very well known among the VE2 fraternity. NV and YA took advantage of the Asiatic contest to work some Oriental DX. AGQ is active on 80-meter c.w. with his new DX-40. WT is the new manager of the Ontario-Que. C.W. Net on 3535 kc. at 1900 daily. Give him your cooperation. BE is off on a Western trip. ABE visited hams in the W1 Area. Le Club des Jeunes Operateurs (JC) holds meetings the 1st Sun. of each month at 7400 St. Lawrence Blvd., Montreal, at 1400. BB now has a proper 80-meter sky hook and puts out a potent signal on the traffic nets. BCK is ex-VE6CS at Drummondville. AYM lost his 35-ft. tower and now intends substituting with a 50-footer. 3EU (ex-EE) at Ottawa was married on Sept. 10. TY is dabbling with a few man-sized experiments. YU down-hoisted his beam and up-hoisted a quad. AFC seems to snare a great deal of good DX. BK enjoyed a holiday in England. IC reports that the annual RAQI (Radio Amateurs Quebec, Inc.) "summer do" was a great success even if it took him a long time to find the site at Montmagny. He was impressed with the number of fine mobiles. Apparently the Quebec boys favor center-loaded whips which perform well. Speaking of mobiles a group in Montreal, the Montreal Amateur Mobile Group, is well organized with AUU, ANV and others as spark plugs. Listen for their Sunday sked at 1100 on approximately 3760 kc. Traffic: (Aug.) VE2WT 245, W7QMU/VE8 143, VE2DR 23, BB 22. (July) VE2WT 138.

BRITISH COLUMBIA—SCM, Peter M. McIntyre, VE7JT. This report was submitted by AOT, the RM. Your SCM is enjoying his vacation in California, but was unable to make the San Mateo Convention. MG is back in the groove after a stint in Ontario, and expects to stay in the land of the setting sun for at least a year before being shipped off to some other tour. AMI now is moved to Arizona. JQ now has recovered from a nasty attack of appendicitis. AQY now is operating with a half-gallon rig in Prince Rupert. AQU set up a 40-meter position in Prince Rupert and is working on a new QRP rig for 75 meters. The BCEN now is operating daily, 7 and 10 P.M. These times may be changed if the move to incorporate GMT on the NTS nets goes through. AOT has a sequence keyer on the Viking Two and it apparently is working fine with the Knight VFO. HJ had a leg amputation. ALE is back in B. C. after two months in Europe. Thanks for the fine reports this month. Traffic: VE7AAF 86, BAZ 33, ALZ 23, AMW 15, JQ 10.

MANITOBA—SCM, M. S. Watson, VE4JY—The ARLM held a successful picnic at Falcon Lake Aug. 14 attended by 20 amateurs and families. JE, WS, HL, UR, ZK, NO, EK, QX and KØHOZ were among the mobiles heard at Winnipeg during the day. The Manitoba Hamfest held at Brandon Sept. 3 and 4 under the auspices of the BARL was a huge success with 83 amateurs and 31 XYLs in attendance. JQ was winner of the 75-meter transmitter hunt and KF won on 6 meters. LC got first for the best mobile and JK second among 16 entries. The highlight was the evening banquet with KP acting as master of ceremonies. ARRL Vice-Pres. Alex Reid, VE2BE, was the speaker and also won the prize for travelling the longest distance. EG landed a prize for having a license the longest (since 1921). IW was the first to register. Those from a distance included EDH, AXO and BJD from Dryden; 5EG from Assiniboia; BL Regina; WM Moose Jaw; WØFNZ Carbury; PHH, ORV and QFT, Cando and OB, Flin Flon. Traffic: VE4AY 11, AN 4, CB 4, JY 4, HL 2, JQ 2, KB 2, PE 1.

SASKATCHEWAN—SCM, Harold R. Horn, VE5HR—Congratulations to FC and his XYL Barbara on the arrival of a daughter, Karen Elaine; also to LZ on the presentation of a son by Ann. HR has a new Tri-band Mosley and will be after a few new ones to complete DXCC. DB has a new Apache for the coming season. XX and hs XYL, YY, have taken up residence at Saskatoon. XX has taken employment with the University of Saskatchewan. Welcome June and Keith. JG and BV were visitors to the Hub City. BV is showing off an FB mobile installation. TH has a two-element beam to go on 14 Mc. NQ is looking for members on the c.w. net. Tentative frequency is 3690 kc. The Saskatoon Club has started its fall activities and visitors are always welcome. The meeting night is the 2nd Fri. of each month at c.d. hq. We extend our sympathy to UC and his family on the sudden passing of his mother. JV has joined the s.s.b. ranks.

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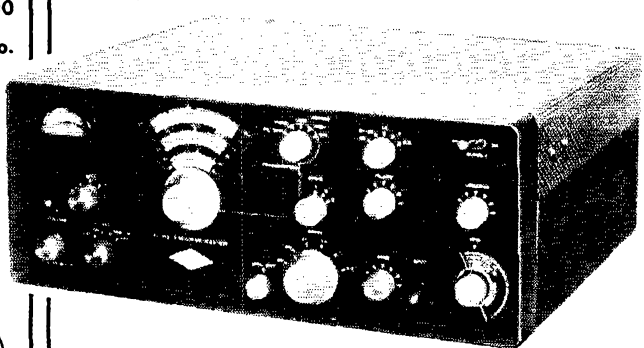

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Ground Plane

(Continued from page 17)

longer gamma section has higher inductive reactance and requires more capacitive reactance (less capacitance) to tune it out.

Leaving the part of the gamma rod which projects up past the tap intact causes no ill effects except added wind resistance. If the end is cut off, the tap will have to be moved slightly to compensate for the subtracted capacitance. QST

Transformer Design

(Continued from page 33)

outlined in the article by Coats and in this one. The reason for this perhaps lies in the fact that high-power transformers in the kilowatt range are not mass produced in the quantities of smaller units. Also, precision winding of the large number of secondary turns may be an expensive manufacturing operation. By performing this and other operations himself, the amateur transformer builder reduces the cost of his transformers considerably.

In conclusion, the author feels indebted to Mr. Coats for pointing out the idea of scramble-winding the high-voltage secondary winding in the form of series-connected pies. The prospect of winding a staggering number of secondary turns by hand has thus far prevented the author from undertaking the task. With the pie-winding technique, and perhaps its subsequent sophistication, the prospect of winding a high-voltage secondary is no longer objectionable. QST

Planning Ahead

(Continued from page 57)

up. Relax. Put on the coffee pot. That nap was just what I needed. Feel great. But, what a dream!

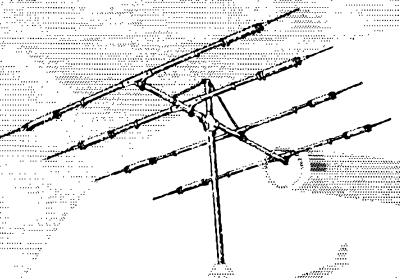
I suppose a thing like that could happen if I hadn't planned ahead a bit — sure did get the XYL squared away and the rig fixed with plenty of time to spare this year.

OK, check the charts. Frequency versus time, QSO's versus frequency. OK, 20 it is. Hmmmmmm — those bottles sure light up pretty, don't they? Don't rush now. Maybe a fast breath of fresh air, then the coffee. Easy now, you got all night, dad.

Here they come. Contest must be on. Wow, listen to that. South America. Yep, Europe — ohhh boy, Africa. Gee, this is even better than that wild, crazy dream!

Yipe! What's this? A real live bamboo-pickin' AC3! And no dream — this one is real. Never thought I'd hear one of these. Must be a good

(Continued on page 146)



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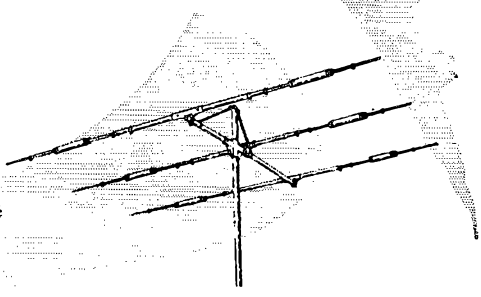

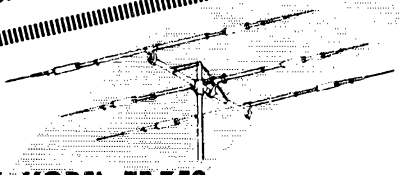

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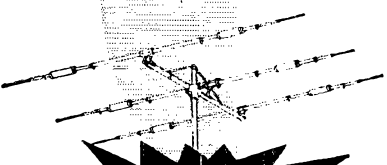

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solid S7. Get that xtal on him — don't lose him in the "crash." OK, he signed — flip the switch — relax boy, relax. This is only the beginning. You got all night. Look at those beautiful blue rectifiers — AC3, here I come —"

"Ohhhhhh John, Johnnnnnn — aren't you ready yet? I told the Smith's we'd be there an hour ago. I thought you were getting ready — now hurry —" QST

How's DX?

(Continued from page 76)

VR6AC, a certified marine navigator, is Pitcairn's postmaster and police chief (no arrests necessary there in all his ten-year tour of duty!). In addition to providing a "rare one" for the DX fraternity, Floyd's amateur station stands ready to summon assistance to the island in the event of medical or other emergencies . . . . . Pert K6QPG misses the DXcitement her old K6QPG/KW6 label used to cause but Mary managed fifty fast countries from her current Compton QTH on 60 watts. K6QPG needs but one more confirmation for her Wake DXCC. A nursing career keeps Mary quite QRL these days but she's a real ham's ham when time permits . . . . . ZL1AH has K2UYG eager for imminent CR10AD. Bill observes that VR1B rarely goes out of his way for a W/K contact these days . . . . . W8KX's letter from VK8TF describes Ted's rockbound EL32-6L6 20-watter, 4-tube superhet and a.c.-d.c. power pack. "The antenna at the moment is a lump of wire strung between two trees in the back yard about 35 feet high." VK8TF works the night shift at BC station 8DR . . . . . K4LRA hears that ZK1AR's 40 watts soon will give way to a 100-watt c.w. and phone multiband affair . . . . . VK4GT puts a plucky signal into KH6AHZ with a doughty 5-watter, screen-modulated and rockbound . . . . . KG6IVB (K2IVB) expects to begin issuing Iwo Jima QSOs next month with a Navigator and SB-10. Steve recalls working all continents with narrow-band f.m. Anybody still using that stuff? . . . . . VK5FY directs your attention to the Elizabeth (Australia) Amateur Radio Club's "Elizabeth Award", a sheepskin offered to non-Australian amateurs who confirm contacts with any six of such Elizabethan VK5s as BP BS DY EJ EV FY HA KD NO NQ PE PF QX and ZJM. QSOs dating after January 1, 1960. Check with VK5FY for full details . . . . . Further Pacific patter from WGDXC and WIA sources: Macquarie's VK0WH still is known to answer c.w. calls near his 15- and 20-meter phone frequencies. . . . VK3RJ, thirty years a QSL manager, recently visited here and on the Continent. . . . WIA (Australia) WAVKCA certifications Nos. 132 and 133 are gladly clutched by Ws 9QGR and 6TXL.

Hereabouts — VP9L and colleagues scheduled a busy visit for W3AYD, top Stateside scorer in the 1960 Bermuda Contest . . . . . W6EAY, long-time "How's" contributor, now finds his poor 20-meter beam dwarfed by a new highrise next door. Undaunted, Eric rests his 4-400As and ambushes goodies with a 2E26. "Surprising how many guys still go after HH-H1-HK-VP3-YV-etc. stations in our own back yard. These should not be difficult, but they're the hardest guys to get QSLs out of — everything is 'rare' until you get it confirmed, I guess." W6EAY will get serious and try a 16-element Sterba shortly. . . . . W2DY found VE2AFI having a St. Pierre ball as FP8BO on 20 phone . . . . . Ws 4MUA 5COZ and K9WOA team up with KL7s DHI DLQ DPO and DQE to keep Nikolski Dew Station — Det. 1, 714th AC&W Sqdn., Cold Bay, Alaska — well represented on DX bands. Squadron reporter A/1c L. Pace declares, "There is no better morale booster for men at remote sites than to be in close touch with home." . . . . . K2QXG offers endorsement incentives for holders of his "20-K" certifications. Ship Mac an inquiry with s.a.s.e. for details . . . . . The Certificate Hunters' Club of K6BX has passed the 85-member mark. W8JIN leads the membership with a wall-sagging 150 diplomas . . . . . CX9AW reminds us that RCU (Uruguay) makes available C-19-D certifications to amateurs who can confirm contacts with all Uruguayan departments (states). Another RCU award: C-33-O, for which contacts with any thirty-three CX stations will do. Consult the society for complete information . . . . . W8QHW and K2CPR signed in for OVARA tapestries Nos. 6 and 7. Interview W8JIN for the specs on this one . . . . . K6CQM succeeds K6SSJ as editor of NCDXC's sprightly *D Xer* . . . . . That was VP2VB/mm & Co. at the key and mike of HC2VB preliminary to shoving off for the Galapagos, Marquesas and what-have-you aboard *Yasme III* . . . . . PY7LJ, expecting a two-year stint, still offers Fernando de Noronha regularly around 2000-2100 GMT near 21,050 kc. . . . . W9SFR submits valid "DXCC[2]" filing No. 33 (see p. 69, July '59 *QST*).

(Continued on page 148)

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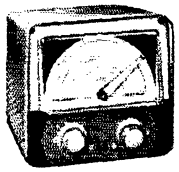

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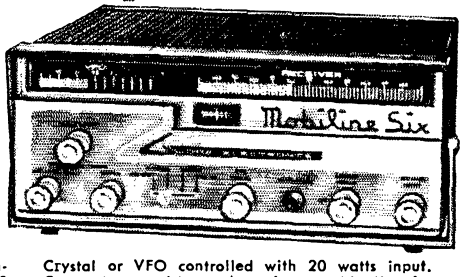

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"With four or five thousand foreign QSLs in file I thought this would be a cinch," says Steve. "It wasn't!"

Ten Years Ago in "How's DX?" — The introductory observation for November, 1950, stresses the shift to phone found necessary by c.w. men searching for such difficult DXCC credits as AR8AB, CR5UP, VR3C, etc. . . . . Eighty c.w.'s DX stock is booming because of FA8BG, OY3IGO, PJ5RE, PK4OO, PY7WS, ZB2I, ZM6AK and ZS3K . . . . Forty is favored by EA9BB, FO8AG, KR6CA, VP8AP, UAØFJ and ZE2JN . . . . Delicacies on 20 c.w.: ET9X, FKS8AL, KS4AI, LX4FS, MD2GO, MI3IM, MS4FM, PKs 1AA 1TC 1TM 3ST 4KS 5AA 6LN 6VK, VR5GC, VS4JB, YK1AM, 9S4s AR and AX . . . . Twenty phone's best are CS3AA, HZ1KE, KB6AO, KS6AA, PK4DA, TA3GVU, VK1RB and ZM6AA . . . . Ten meters attempts its fall comeback with ZDs 1SW and 4AB in the phone vanguard . . . . We note that DL4s HA and LL are negotiating to put rare Vatican City on ham bands. . . . HC8GI opens a Galapagos DX career. . . . Participation particulars are listed for the 4th All-European DX Competition . . . . Pictures of DL1YQ, EA8LP and VP2GG are on display, and our man Jeeves inherits a pair of peculiar mobile antenna masts. QST

Correspondence

(*Continued from page 80*)

WONDERING?

¶ The mention of the garbled XYL message in "25 Years Ago This Month" in August *QST* brought back vivid memories of a UX226 and a "B" eliminator in the depression days when we had more time and fun than money. It is difficult for me to realize that the waters of twenty-five summers have passed over the mill wheel since that hot August afternoon on 80 cw.

If you will consult the 1935 issue carefully, you will find that this message is still being garbled! The two participants in the QSO were W9ILH, Alton, Illinois and W9IHBK, Bloomington, Indiana, (not W8ILH and W9BHK). I wonder what has happened to ole W9EPT. — *Wally Kunz, K7KFB (ex-W9HBK), Seattle, Washington.*

. . . AND HE SENT "CL"

¶ I have read the article "A Critique on DXing" by K9DNR (August, *QST*) and I agree with it completely. However, there is one point that Mr. Tapa apparently overlooked. This is the practice of tail-ending on the part of many of the W/K/WA/VE gang. The following incident illustrates this point well:

While tuning across the 20-meter c.w. band the other night, I heard a 5A2 in contact with a W4. When the 5A2 signed with the W4 he sent CL which I believe means "I am leaving the air". However, as soon as he sent CL, a flock of W/K/WA/VE stations jumped on the frequency and began calling him. All this calling was useless and unnecessary QRM. This case proves that the receiver should be used more and the transmitter less. — *Raphael Finkelstein, W7AFF, Tucson, Arizona.*

COUNTIES MAP

¶ For those of the gang who are interested in the counties of the various states (48 of them, anyway) there is a very nice map available from the Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C., for 15¢. Don't send stamps.

Ask for the "Plant Hardiness Zone Map", Miscellaneous Publications No. 814. The counties are all clearly outlined and each state capital is shown. It is in color, measures 30" by 22" and contains other useful information. — *James E. Higgins, W2CWK, Highland Park, New Jersey.*

Crystal Exciter

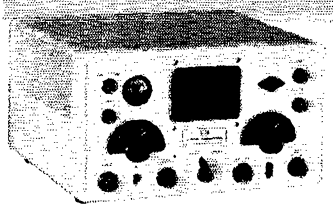
(*Continued from page 28*)

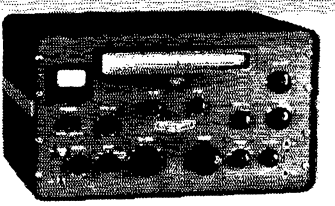
quirements, a lower tuning range may be more desirable. Some experimentation may be in order to satisfy the particular case. A reminder: L_1 is the range control and should be used accordingly; an increase in inductance increases the range.

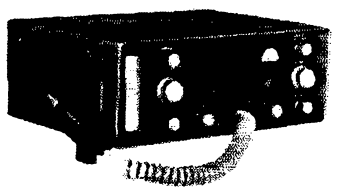
(*Continued on page 150*)

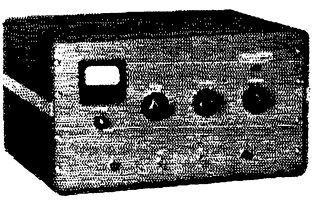
NEWARK GIVES YOU TOP TRADES ON THIS ALL NEW 1961 GONSET LINE!

Now, Newark is trading high to give you an outstanding opportunity to incorporate this new Gonset equipment into your rig—









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2 METER COMMUNICATOR IV

Model 3341. Rcvr.: front end uses new frame-grid tubes for 4-5 db noise figure! Has ANL, squelch, "S" meter. Xmttr.: 20-W input, 143.7-148.3 Mc with broadband driver. Push-to-talk mike supplied. 26 lbs.
97F690 ..... **369.50**

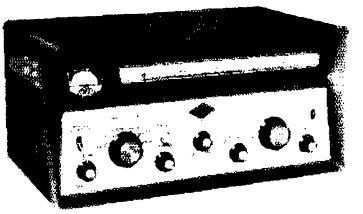
Model 3342. Same as above, but for 6 meter operation.
97F691 ..... **369.50**

GSB-100 SSB TRANSMITTER

Model 3233. 100 watts PEP input, 80-10! For USB, LSB, AM, PM, and CW. Has VOX and provides blocking bias for an external linear amp. VFO drift less than 250 cps in 2 hours. All bands covered in 600 kc segments. Pi-net output. Built-in 115 v, 60 cps power supply. 67 lbs.
97F678 ..... **499.50**

GSB-101 LINEAR AMPLIFIER

Model 3262. Capable of 1000 watts PEP. Requires 60-70 watts drive. May be used with GSB-100. Covers 80, 40, 20, 15 and 10 meter bands. Power con.: approximately 1500 watts. Built-in DC operated antenna relay. Flexible pi-network output easily matches 30-200 ohms. Built-in pwr. and bias supply. Shpg. wt. 94 lbs.
97F683 ..... **459.50**



NEW DOUBLE-CONVERSION RECEIVER

Model G-63. Covers all ham bands 80 to 6 meters in 6 bands: 3.5-4, 7-7.3, 14-14.35, 21-21.45, 28-29.7, 50-54 Mc. Diode detector for AM, prod. det. for SSB and CW. 1st IF at 2065 kc; 2nd IF at 262 kc. Peaking type "Q"-mult.; Less than 1 uv sen. for 6 db signal-noise/ratio. 24 lbs.
97F686 ..... **239.50**

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Comments and Suggestions

Many uses for this oscillator are readily apparent. The controllable range and bandspread and high stability suggest use as a tuned local oscillator for high-selectivity converters for 50, 144 and 220-Mc. Transmitter control at 50 and 220 Mc. requires only the correct crystal frequencies. Range will be less on 50 Mc., more on 220 Mc. Band switching could be incorporated in the exciter to cover different ranges. If crystal switching is used, care should be exercised to keep switching capacitance to a minimum.

This oscillator should be a natural for frequency modulation. A simple varicap reactance diode with a suitable preamplifier would do the trick. The screen or grid section of C_1 would be suitable for the varicap connection. Circuit simplification could be achieved by the use of a dual-section tube such as a 6U8A type.

As to results, the drift rate is negligible after a 5-minute warmup period. The drift is negative in direction, stabilizing in about one hour, with a total drift of about 15 kc. at 144 Mc. from a cold start, most of it in the first few minutes of operation. T9 note reports are a certainty. A 130-Mc. version is currently being used to generate the variable injection frequency for my 144-Mc. s.s.b. rig, with excellent results. In all cases of reported drift, after warmup the receiver in question has turned out to be the offender.

Acknowledgment is given to W3BWK for his helpful suggestions in developing this exciter and in supplying the many different types of crystals required to evaluate this v.h.f. application of the VXO circuit. QST

Measuring Coil Q

(Continued from page 37)

To determine the distributed capacitance, take a reading at the operating frequency, f_1, getting the resistance, R, and the resonating capacitance, C_1. Then find the capacitance, C_2, which resonates with the coil at some other frequency, f_2. (If f_2 is made half of f_1 it will simplify the figuring.) Using the capacitance values (both in either μf. or $\mu\mu$f.) and the frequencies (both in either kc. or Mc.), solve the following equation for the distributed capacitance, C_X:

$$\frac{f_1^2}{f_2^2} = \frac{C_2 + C_x}{C_1 + C_x}$$

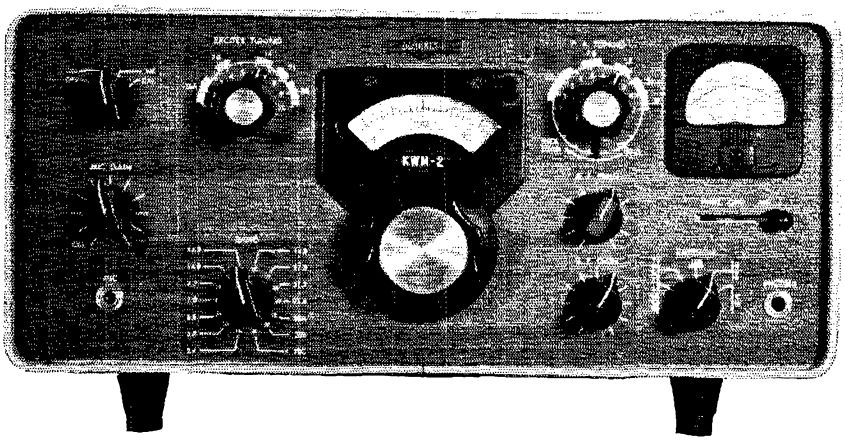
C_x will have the units of C_1 and C_2.

Of course, *any* coils which resonate with the same value of capacitance at about the same frequency can be *compared* using the method of this article. The coil with the lowest resistance is best. — *Ed.*

Strays

WA6MPR was a friend indeed, reports K1CBV. A vapor lock brought the K1's car to a halt on the Pennsylvania Turnpike last August 30, and dozens of cars passed him by without offering assistance. But the magic of a mobile whip and call letter license plates caused WA6MPR to stop and lend a hand to a fellow ham.

SEE THE COLLINS KWM-2 MOBILE TRANSCEIVER AT ACK'S



With Collins compact, lightweight KWM-2 you get excellent frequency stability on fourteen 200 kc bands from 3.4 to 29.7 mc.

Designed for swift and easy transfer between fixed station operation and mobile use, Collins KWM-2 has 175 watts PEP input on SSB and 160 watts on CW.

For more QSO's per kc—for one transceiver for use in your ham shack and in your car—try Collins KWM-2. Net price: $1150. See the KWM-2 and Collins famous S/Line at Ack's.

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Happenings of the Month

(*Continued from page 79*)

For Vice-Director:
Carl Franz, W5ZHN, was found lawfully nominated, but ineligible due to lack of the required membership continuity. Lester M. Richards, WØICR, and John H. Sampson, Jr., W7OCX, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

SOUTHWESTERN DIVISION

For Director:
Raymond E. Meyers, W6MLZ, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Director of the Southwestern Division for the 1961–1962 term without membership balloting.

For Vice-Director:
Virgil Talbott, W6GTE, was found lawfully nominated and eligible; however, the Committee was in receipt of a letter from Mr. Talbott withdrawing his name as a candidate. Lyle G. Farrell, W6KGC, and Howard F. Shepherd, jr., W6QJW, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

WEST GULF DIVISION

For Director:
Luther E. Harrison, W5LR, was found lawfully nominated but ineligible due to lack of the required membership continuity. Roemer O. Best, W5QKF, and Charles M. Sandidge, W5AZB, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division

For Vice-Director:
A petition was found for Roemer O. Best, W5QKF, but declared invalid, under the provisions of By-Law 17, because of his nomination for the office of Director. Ray K. Bryan, W5UYQ, and Robert D. Reed, W5KY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

The Chair appointed Messrs. Kahn, Meyers, and Dosland, with Messrs. Handy, Houghton and Huntoon as alternates, to serve as a Committee of Tellers to count the ballots in the current director elections, under the terms of the By-Laws.

On motion of Mr. Doyle, unanimously VOTED that the League approves IARU proposal 98, relating to the admission into membership of the Club de Radio Aficionados de El Salvador.

On motion of Mr. Kahn, unanimously VOTED to approve the holding of a New York State convention in Niagara Falls, September 15–17, 1961. On motion of Mr. Meyers, unanimously VOTED to approve the holding of a Southwestern Division convention in Phoenix, Arizona, May 26–29, 1961. On motion of Mr. Chaffee, unanimously VOTED to ratify the previous mail action of the Committee in approving the holding of a Southeastern Division convention in Orlando, Florida, April 8–9, 1961. The Committee looked with favor on an application to hold a Central Division convention in Springfield, Illinois, sometime in 1961, but deferred formal approval pending the establishment of a specific date.

Director Meyers reported on arrangements for the 1961 Board Meeting at Anaheim, California, and on his motion it was unanimously VOTED that, in accordance with By-Law 20, a mail vote is to be taken of the directors on a proposal to change the date of the meeting to May 5, 1961.

The Committee discussed, at considerable length, the subject of proper observance of the FCC rules governing the amateur service. On motion of Mr. Kahn, unanimously VOTED that the Headquarters Staff and the League's General Counsel contact the Federal Communications Commission and ascertain how, in addition to our traditional policy of self-policing, the League can further assist in suppression of illegal and unauthorized operating procedures, and report to the Executive Committee at its next meeting.

On motion of Mr. Doyle, affiliation was unanimously GRANTED to the following societies:

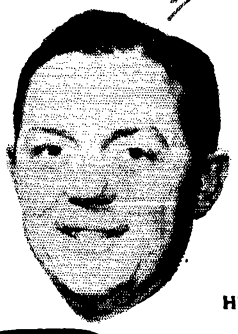
(*Continued on page 154*)

"CALL ME for Personal Service"

Bob Henry
WØARA
Butler, Mo.
ORchard 9-3127

ON

"CALL ME for Personal Service"



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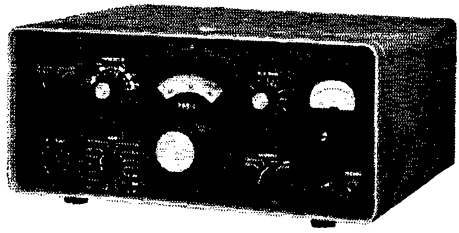

KWM-2 Transceiver	$1150.00
32S-1 Transmitter	666.00
516F-2 AC Power Supply	115.00
516E-1 12V DC Power Supply	270.00
75S-1 Receiver	520.00
312B-3 Speaker	29.00
312B-4 Speaker Console	195.00
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DX-Ploiters.....Baldwin Park, Calif.
Edmond Amateur Radio Society.....Edmond, Okla.
Iberia Radio Club.....New Iberia, La.
Larimore State High School
Radio Club.....Larimore, No. Dak.
Loudon County Amateur Radio Club..Lenoir City, Tenn.
The Oklahoma Central 6 Meter
(Club) Net.....Oklahoma City, Okla.
Oklahoma City Amateur
Radio Club.....Oklahoma City, Okla.
Putnam County Amateur Radio
Association.....Stormville, New York
Reading High School Amateur Radio Club..Reading, Mass.
Sandusky Radio Experimental League,
Inc.....Sandusky, Ohio
Signa Seekers.....Whittier, Calif.
Skywide Amateur Radio Club.....Toronto, Ont., Canada
South Shore High School Radio Club.....Chicago, Ill.
Verde Valley School Radio Club
(High School).....Sedona, Arizona
Cuyahoga Falls Radio Club.....Cuyahoga Falls, Ohio

The Committee discussed, without formal action, the subjects of reciprocal operating agreements, privileges in 1800–2000 kc., and the progress of the Housing Committee.

There being no further business, the Committee adjourned, at 12:20 P.M.

A. L. BUDLONG
Secretary

Strays

Because W8TS was from Olmstead Falls, Ohio, W8VWX of Columbus, just to make conversation, mentioned to W8TS that he had purchased an auto in 1948 from a man named Mr. Kucklick of Olmstead Falls. The immediate reply from W8TS was "How is the '36 Ford running?" Yep, W8TS was none other than the Mr. Kucklick and had just become active in ham radio after being off the air for about 30 years. W8VWX was able to report that the car was all spruced up and ready for a trip at any time.

—•••—

Perhaps we oughta take a survey sometime and see what pattern of similar hobbies radio amateurs have.

—•••—

Off and on there have been a number of letters criticizing the present-day amateur for buying instead of building his equipment. *QST* has discussed this problem, too. We quote:

"The American amateur is criticized for buying too much of his equipment ready-made. Necessity is the mother of invention — and since the necessity for an amateur building his own is nearly past, because complete sets can be purchased on the radio market, the inventive and ingenious spirit of a modern amateur is fast disappearing also, it is declared."

This was quoted from the March, 1924, issue of *QST*!

—•••—

W2OCL, a motion picture operator at Aqueduct and other race tracks, reports that Warren Mehrtens, a former Triple Crown winner with Assault, is now WA2GKZ.

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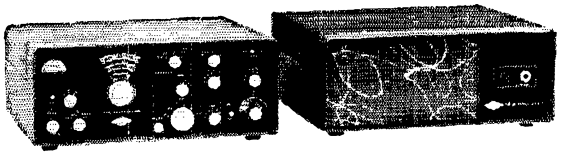


GONSET G-76

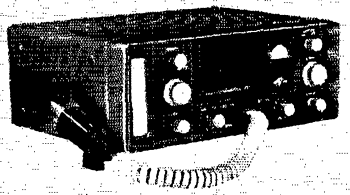
AM Transceiver

For 6-band operation . . .

Now your mobile operation will be more enjoyable with G-76 . . . a powerful 100-watt AM transmitter and a sensitive, dual-conversion receiver. First, excellent 2-way communication on any of 6 amateur bands — 80, 40, 20, 15, 10 and 6 meters! Performance has of course been the foremost design objective but flexibility and operating convenience has not been overlooked. Receiver tuning dial . . . "S" meter . . . any element that occasionally requires a quick glance while driving is fully visible. And because the entire front panel is only 5" high and 12½" wide, every control — including transmitter VFO and Band switch — is conveniently at the driver's fingertips . . . designed to be just right in size and shape for easy installation in your car.

Use G-76 both in your car and home station. Simple to do. Transistorized 12 volt DC supply remains in car. 117V AC supply with speaker is optionally available for home use.

Price..... **$376.25**



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Here's the finest Communicator package yet — a complete VHF station operating within 143.7 to 148.3 mc. which contains transmitter, receiver and universal power supply. At 20 watts input, transmitter power is greater than ever before. A full 10 watts of audio assures full "talk power" protected against overmodulation by high level speech clipping. Switch allows choice of six crystal-controlled transmitter frequencies.

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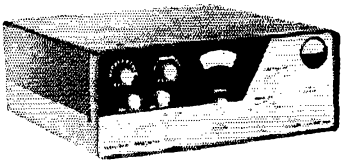

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NEW BOOKS

How To Troubleshoot TV Sync Circuits, by Ira Remer. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. 119 pages, including index, 5½ by 8½ inches, paper cover. Price, $2.90. Cat. No. 249.

This book is written primarily for the service technician and discusses the triggering of vertical and horizontal sync signals in television receivers. It is divided into five chapters and begins with a review of the basic requirements and general needs of the television sync system. This is followed by a discussion of basic sync circuits, along with typical troubles and their cures. The last two chapters cover the common forms of sync systems in current use and give information on synchronization in color TV receivers.

—•••—

Handbook of TV Troubles, by Sol Heller. Published by Holt, Rinehart and Winston, Inc., New York. 6½ by 9 inches, 302 pages.

Literally a "book full of troubles," this manual contains trouble-shooting data on all phases of television receiver malfunctioning. Arranged according to symptoms, it contains photographs to help identify the trouble along with detailed descriptions of the cures. Synchronization troubles, television interference, size, centering and sound troubles are all dealt with. Along with the photographs are many charts, tables and schematic diagrams.

—•••—

S-9 Signals!, by William I. Orr, W6SAI/3A2AF. Published by Radio Publications, Inc., Wilton, Conn. 5½ by 8½ inches, 48 pages, paper cover. Price, $1.00.

A manual of practical antenna data, this book gives detailed information on design and construction of amateur antennas. It is broken down into twelve chapters and starts with a few simple definitions of antenna jargon. The remaining chapters are devoted to actual construction projects covering amateur bands from 80 through 2 meters. A table at the end of the book lists the necessary parts needed for the different antenna projects.

—•••—

Professional TV Repair Secrets, by Art Margolis. Published by Arco Publishing Company, 480 Lexington Ave., New York 17, N. Y. 6½ by 9½ inches, 142 pages, more than 300 photographs. Price, cloth cover, $2.50.

A do-it-yourself home TV repair guide is a good way to describe this book. It contains information on most of the common TV breakdowns and gives symptoms and remedies for each. There are quite a few photographs, charts and tables to make the job easier. For those whose TV receivers are working perfectly, there is information on TV interference, lightning protection and preventive maintenance.

—•••—

Quad Antennas, by William I. Orr. Published by Radio Publications, Inc., Wilton, Conn. 5½ by 8½ inches, 96 pages, paper cover. Price, $2.85.

Here is a practical handbook devoted entirely to cubical quad antennas. It includes information on theory, design, construction and operation. Starting with a brief history, the author dives into the theory and characteristics of the antenna. Several chapters are devoted to specific types of quads while another concerns feed systems. The last two chapters give practical information on building your own quad antenna and the ever-important tuning and adjustment. The book has numerous charts, tables, drawings and photographs.

WARD J. HINKLE

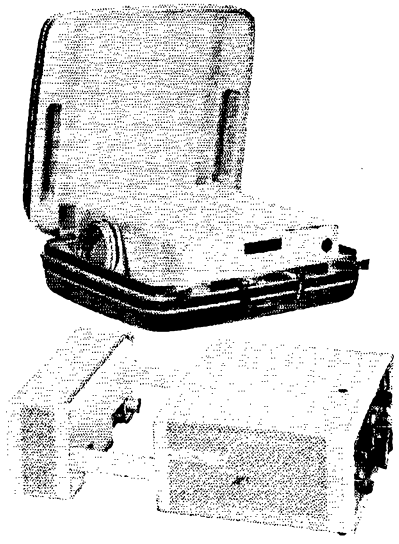
a word from Ward, W2FEU

THE MIGHTY TRIPLE-THREAT KWM-2

WE AMERICANS are the gadget-happiest race of all God's children. We buy an automatic pencil — because it writes in four different colors. Our latest outboard motors not only propel the boat — but can also bail it out. We've got chairs that look like walking sticks, and walking sticks that serve as umbrellas — and umbrellas that fold up as tidily as a paper napkin!

I guess this stems from the fact that, as a group, we Americans are just naturally *thrifty*. We like *one* tool that does the work of two or three. We go for a hammer that doubles as a screw driver and triples as a can opener because it works an irresistible tug on our sense of *value*.

Sometimes!



The cold, wet-blanket fact of the matter is that all these two-in-one *and* three-in-one gadgets don't always work. They not only don't do *three* jobs, but some of them don't even do *one* job properly.

Let me tell you how I got started on this line of thinking. Several months ago, I got wind of the fact that the Collins people were working on a new, spectacular kind of transceiver. The grapevine had it that this unit was going to be so advanced in design, power, and *miniaturization* that it could be used in either a car, boat, plane, or for fixed-base operation! As Mel Allen might say: "How about *that?*"

Well, sir, this was one case where the performance of a unit lived up to its advance billing. And that unit came to be known as the Collins KWM-2 SSB Transceiver.

Gentlemen, here's one amazing piece of equipment. The KWM-2 is light, light, *light* — only a few ounces over 18 pounds! It gives you that Collins S/Line styling. It gives you operation on all bands between 3.4 Mc. and 29.7 Mc., on either voice or CW.

In addition, you get filter type SSB generation, crystal-controlled double conversion, VOX, speaker anti-trip circuits, ALC, permeability-tuned oscillator, RF inverse feedback — and a whopping power output of 100 watts PEP into a 50 ohm load!

For the traveling ham, however, that KWM-2 is only half of the miracle. The other half is Collins' PM-2 Portable Power Supply and carrying case. Weighing only 13½ lbs., including a built-in speaker, this supply operates from either 115 VAC or 220 VAC at 50–400 cps and *provides all the voltages for the KWM-2 Transceiver!* The two go together like Pat and Mike!

The Collins people were nice enough to provide me with some terrific literature on the KWM-2 Transceiver and its companion PM-2 Portable Power Supply. I've got *your* copy in a sealed, stamped envelope, ready to be mailed out to you *today*. Only two things are missing: your name and address. Won't you send me a postcard asking for these data? Thanks.

73, WARD
W2FEU

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Rapid Radio Repair, by G. Warren Heath. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 224 pages, 5½ by 8½ inches, paper cover. Price $2.90.

Divided into four sections — receivers, techniques, servicing and troubleshooting charts — this technician's repair manual is useful in spotting, analyzing and repairing troubles found in modern radio receivers. Information is given on transistor sets, hybrid auto receivers, f.m. sets and the latest modular and printed circuit receivers. Designed to cut trouble-shooting time, the book contains a handy trouble-shooting table which gives the probable causes and cures of various difficulties. This table is broken down into symptoms by receiver sections such as power supply, converter, detector, and so on. The manual could probably be used by amateurs desiring a quick and efficient method to shoot trouble in a communications receiver.

—•••—

Motorola Power Transistor Handbook, complied by the Applications Engineering Department of Motorola's Semiconductor Products Division, Inc., 5005 E. McDowell, Phoenix, Arizona. 202 pages, including index, 6 by 8½ inches, paper cover. Price, $2.00.

Intended to serve as an accurate guide in the use of power transistors, this handbook contains more than 200 drawings and charts along with many problems and solutions. Chapter headings include Semiconductor Electronics, Transistor Characteristics, Power Amplifiers, Switching Applications, Electronic Ignition Systems, Special Transistor Circuits, Power Supplies and Power Rectification, Transistor Testing and Transistor Specifications. The radio amateur will find valuable data on transistor power supply design, with specifications and curves. A list of transistor symbols and abbreviations is also contained in this handbook.

—•••—

Fundamentals of Transistor Physics, by Irving Gottlieb. 5½ by 8½ inches, 146 pages including index. Cat. No. 267. Paper cover. Price, $3.90.

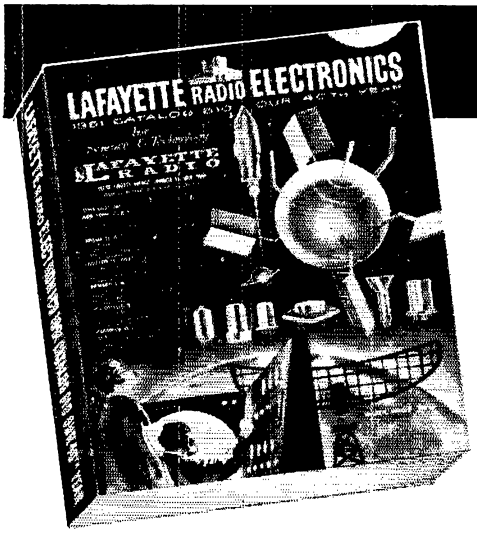
Although the subject of transistor physics is certainly an involved one, this book presents information on semiconductor physics without any complicated mathematical analogies or fancy language. It is up-to-date and includes information on such recent developments as the zener diode, semiconductor variable capacitor, and tunnel diode. Starting with the theoretical aspects of semiconductors the book works its way into transistor structure, materials and operation. Once the fundamental transistor has been explained the author discusses basic transistor circuits and other related semiconductor devices, including silicon control rectifiers, four-layer diodes, bilateral transistors and phototransistors.

—•••—

Television Explained, by W. E. Miller. Published by Iliffe & Sons Ltd., Dorset House, Stamford St., London S.E. 1, England, for Wireless & Electrical Trader. 202 pages, including 10 pages of photos, 8¾ by 5½ inches, cloth cover. Price. 12s.6d. 7th edition.

Here is an excellent beginner's manual containing information on the principles and circuits of television. Although some electronic background is necessary in order to understand fully the contents, no previous knowledge of television circuits is needed. It is written in simple non-mathematical language and contains plenty of diagrams and photographs.

Although there are some major differences in American and British television receivers, the majority of the material in this book is general enough to be of interest to any reader. It includes information on antennas, tuners, i.f., video and sound circuits, cathode ray tubes, synchronization, a.g.c. circuits and receiver installation and operation.



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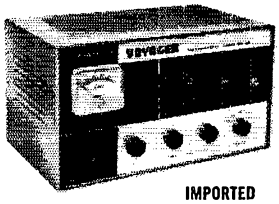

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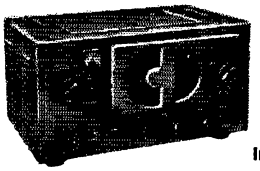

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Magnetism and Electromagnetism, edited by Alexander Schure. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N.Y. Electronic Technology Series No. 166-20. 78 pages, including index, 5½ by 8½ inches, paper cover. Price, $1.80.

Part of an electronic technology series of books, this publication deals with the fundamentals of magnetism and electromagnetism which tie in with the operation of communication and industrial electronic devices. It prepares the reader for a second volume on the subject (See *QST*, Sept. 1960, page 56) which deals with advanced magnetism and electromagnetism. Covering the theoretical side of magnetism, magnetic circuits and electromagnetism, the book keeps the mathematical descriptions simple yet extensive enough to teach the reader typical computations connected with the subject. Review problems are included at the end of each chapter to keep the reader on his toes

—•••—

FM Simplified, by Milton S. Kiver. Published by D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, New Jersey. 6¼ by 9¼ inches, 376 pages, including index, cloth cover. Third edition. Price, $7.50.

Although f.m. seems to have fallen by the wayside as far as amateur radio is concerned, there has been a tremendous interest in f.m. broadcasting in the entertainment field. This book gives the entire picture of f.m. from the basic principles to details of the major sections of a modern f.m. receiver. This third edition contains new diagrams and information on the subject and although the chapter headings are the same as those of the second edition, the contents have been brought up-to-date. The material in the book is non-mathematical yet complete in detail, with illustrations — diagrams, charts, tables and photographs — on almost every page. Several chapters should be of interest to radio amateurs, especially those dealing with antennas, propagation, r.f. tuners, i.f. amplifiers and limiters. At the end of the book is a check list for fast and efficient trouble-shooting of f.m. receivers.

—•••—

Applications of Electronics, by Bernard Grob and Milton S. Kiver. Published by McGraw-Hill Book Company, 330 West 43nd St., New York 36, N. Y. 6½ by 9¼ inches, 628 pages, including index and answers to questions. Price, cloth cover, $7.00.

This book describes the various specialized fields of electronics and the operating equipment associated with these fields. Details on industrial and military electronics are given as well as information on circuit and equipment applications in transmitters, navigational aids, test equipment and receivers. Several recent advances in electronics are covered in the book, which also includes topics on transistors, counters and computers, scatter propagation and microwave equipment. Each chapter has an introductory description of its material and a summary with review questions.

—•••—

General Electric Controlled Rectifier Manual, edited by Semiconductor Products Department, General Electric Company, Charles Bldg., Liverpool, New York. 255 pages, 6 by 8½ inches, paper cover. Price. $1.00.

This book should give the circuit designer the detailed information necessary to use controlled silicon rectifiers in almost any situation. The book contains information on voltage transients in silicon rectifier circuits, on test circuits, turn-off characteristics, firing circuits and series and parallel operation of silicon controlled rectifiers. There are chapters on protecting these devices against overloads, typical circuits operating from a.c. power, basic theory of operation and ratings and characteristics. There are many circuit diagrams, charts, nomographs and oscilloscope traces included.

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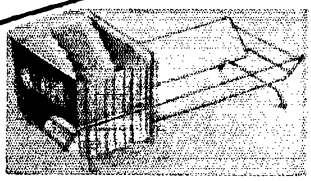

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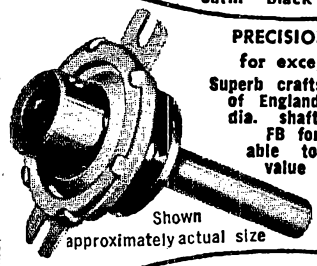

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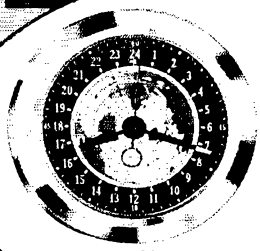

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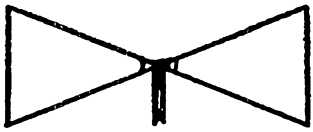

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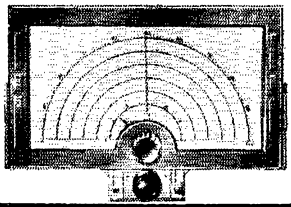

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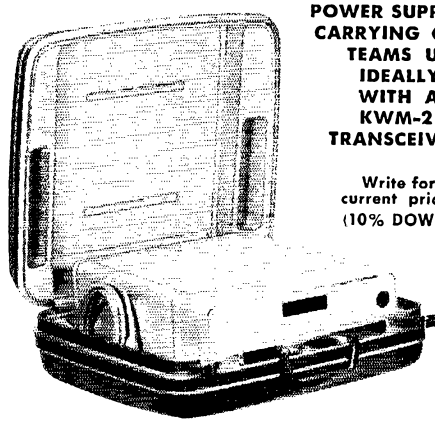

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W3EGI, Roger M. Wilson, Silver Springs, Va.
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W7ASZ, Harold G. Williams, Fort Huachuca, Ariz.
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W7NKO, William J. Henry, Walla Walla, Wash.
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W8RJC, Herbert Climie, Otsego, Mich.
K8TPW, Lester W. Johnson, Elyria, Ohio
9AVJ, William Endersby, Hillsboro, Iowa
9ZJ, Francis F. Hamilton, Miami, Fla.
VE7FY, Sherley J. Craig, New Westminster, B. C.

25 Years Ago *this month*

November 1935

. . . Ross Hull described a new receiving system for v.h.f., incorporating double-conversion and adjustable selectivity.

. . . There was much excitement over 28 Mc., and a station (ZS1H) finally made WAC on that band.

. . . Jim Millen, W1HRX, described a high-power two-band phone station.

. . . W6AM went to the top of Mt. Whitney for some 5-meter tests.

. . . Ted McElroy told how he won the code-copying contest with 69 w.p.m.

. . . There were more technical articles on resonant-line v.h.f. oscillators, a dual-tuner superhet, methods for reducing power for local QSOs, and the usual collection of items for the experimenter.

. . . The Sixth ARRL Sweepstakes Contest was announced, as well as a W/VE contest. Incidentally, the SS ran from Nov. 22 straight through until Dec. 1. Sort of an endurance contest.

. . . The Wireless Institute of Australia was celebrating its 25th anniversary. . . Clair Foster, W6HM, died. . . The annual Navy Day message was announced, as well as an Armistice Day message by the Army. The Circulation of *QST* reached 42,000. (We do a little better than that now).

Strays

W9CVU put up a new rotator for that massive beam of his, and everything worked swell for about three weeks. Then operation became intermittant, especially on the counter-clockwise direction. So, nothing to do but to climb 60 feet, dismantle the weatherproof hood, and see what was the difficulty. The difficulty was that a family of martins had built themselves a home inside the rotator housing, and when one of the birds happened to sit in just the right position, the reversing relay would not close!

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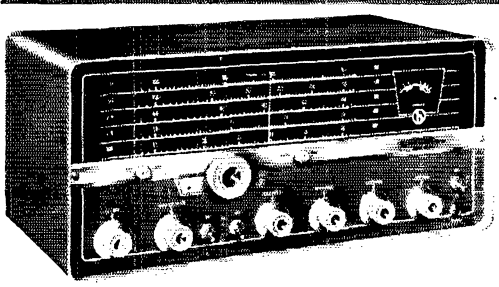

Hallicrafters SX-111 Receiver

This new dual-conversion, selectable sideband receiver covers 80, 40, 20, 15 and 10 meters in five individual bands, with a sixth band tunable to 10 mc. crystal calibrator calibration with WWV.

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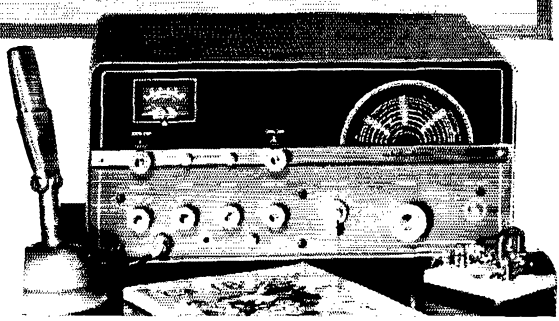
Amateur net $249.50



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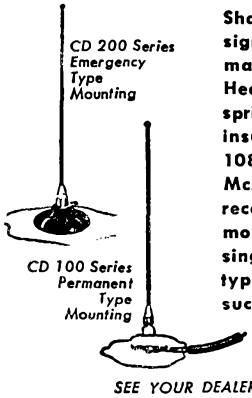

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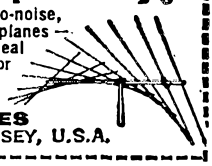

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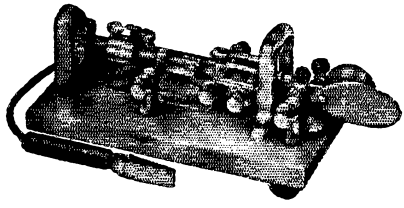

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AMECO POWER SUPPLY FOR TX-86—MODEL PS-3

Model PS-3 is an AC power supply which will provide the maximum power requirements for the TX-86. Input is 117 volts, 60 cycles AC. Output is: #1 — 12.6 volts at 3 amps. (or 6.3 volts at 3.2 amps.) #2 — 300 volts at 100 ma., #3 — 600 volts at 150 ma. Silicon rectifiers are used which give excellent voltage regulation. Since there are no tubes used, the power supply is cool and efficient. May be used for 12.6 or 6.3 volt filament tubes. The power supply has more than adequate power for the TX-86 and may be used to supply power to other accessories at the same time.

Completely wired and tested..... $44.95

The TX-86 can handle 90 watts input on CW and 90 watts peak input on phone on all bands. It is most attractively packaged in a satin finished copper panel with black lettering and a black perforated cabinet.

The transmitter consists of a 12BY7 crystal controlled oscillator, a 12BY7 buffer and a 6146 final amplifier. The pi-net output circuit on all bands will feed antennas of from 35 ohms to 600 ohms. The low distortion screen-type modulator consists of a 12AX7 and a 6AQ5. The following features included in the Ameco TX-86 are not usually found in transmitters costing much more: an audio gain control, a true potentiometer type drive control (no de-tuning of circuits), a push-to-talk microphone jack on the front panel which is also the key jack on CW.

The power requirements for the TX-86 are: 6 volts at 3.2 amps. or 12 volts at 1.6 amps. and 300 volts at 75 ma. plus 600 volts at 150 ma. for maximum output. Performance is excellent with a single 300 volt, 150 ma. supply. If desired, the 6146 can be replaced with a 2E26 without changes to permit operation on a 100 ma. 300 volt power supply.

Amateur Net Prices: Model TX-86K—Complete in kit form (specify 6 or 12 volt filament)..... **$84.95**
Model TX-86W—Completely wired and tested (specify 6 or 12 volt filament)..... **$109.95**

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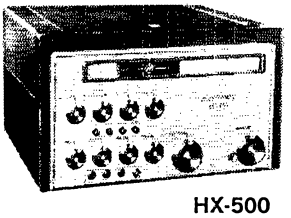

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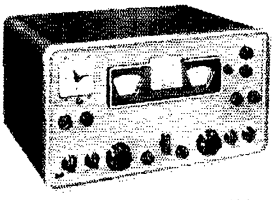

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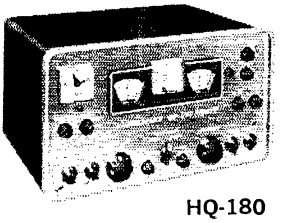

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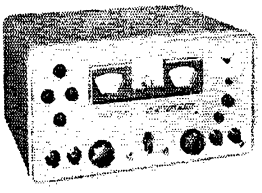

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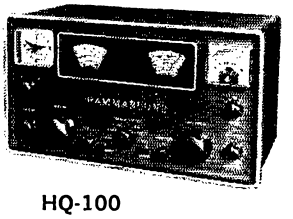

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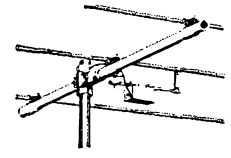

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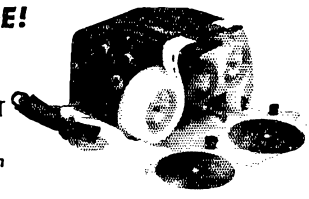

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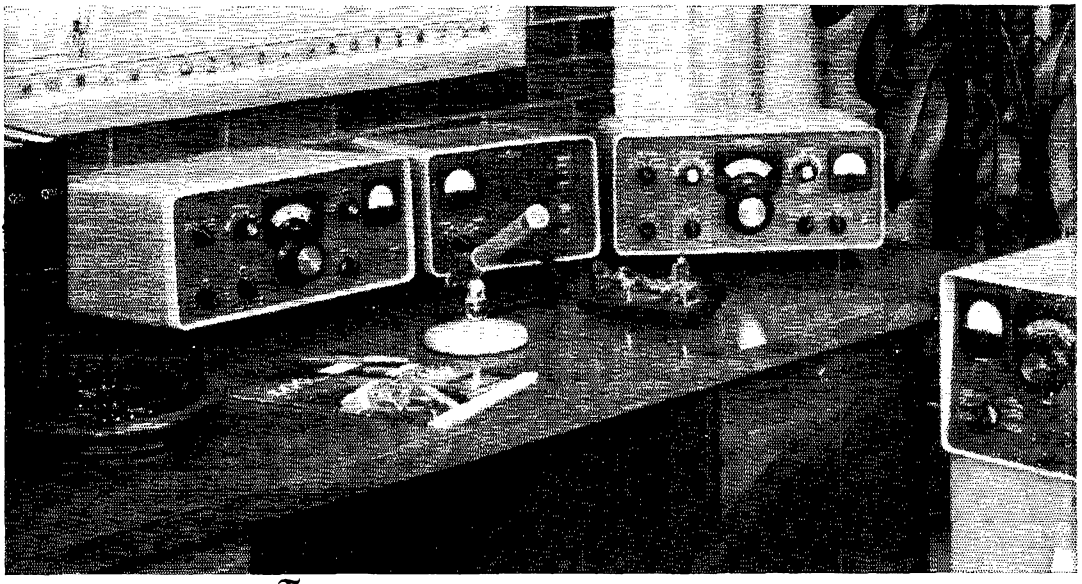

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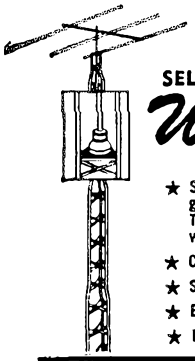

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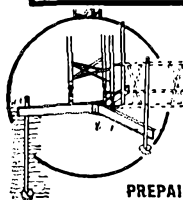

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FX-W5HO. The famous S.S.B. talking dog and Geo. W. Fahrubel, now K4DP, 1004 Drake Ave., S.E., Huntsville, Ala.

COLLINS Station: 30S-1, $1200; 75S-1 with noise blanker, $490; 32S-1, $500; 516F-2, AC supply, $90; 312B-4 console spkr, $150; Central Electronics MM-2 'scope, $100; Telrex "Monarch" Tribander TBS-626, $205; Ham-M rotor, $85; Johnson TR switch, $20; Johnson 52 ohm low-pass filter, $10; Astatic 10D with G stand, $27; all prices F.o.b. Phoenix, Ariz. K7EPD, 3850 E. Elm Tel. CR 9-2824. All above equipment in perfect condx. On the air less than 50 hours.

FOR Sale: Viking Ranger and DX-40. Both are extra gud. Want: 6M Communicator. C. Gerst, 2674 W. 25th St., Cleveland 13, Ohio.

COMPLETE File of QST for sale: 1915-1951. Landa, R2, Clayton, Ga.

KWS-1, $1200. In top condx. W2ADD.

COLLINS Receivers reconditioned: 51Js, $675; 51J2, $495; 75A-4, $545; HQ-160, $275.00; Hickok, #188, $69; HRO-60 $325.00; Ranger, $210; Teletype printers, converters, etc. SX-111, $205. Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. RIchmond 2-0048.

CASH Paid for short-wave ham receivers, and transmitters. Treger, W9IVJ, 2023A N. Harlem Ave., Chicago 35, Ill. TUxedo 9-6429.

SELL: Collins KWM-1 transceiver, a.c. power supply 12 volt d.c. power supply, mobile mounting tray with wire and connectors, and spkr.—directional wattmeter console. Will not sell items separately. All excint cndx. Best offer. Write Box 1, West Hartford 7, Conn.

DSB 100 $70; LA-1, $80; VOX-10, $15.00; WRL 755 VFO, $40; PA-1, $6.00; 400 watts sideband all for $215; S-76, $95; Novice receivers: Ecophone Commercial (80 thru 10), $25; RCA (75 meter) $15; AT-1 QST modified, $25 (shipped collect). W5FIR, 515 West Main, Houma, La.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, $1.50; General, $1.75; Extra, $2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

LOWEST Prices; Latest amateur equipment. Factory fresh sealed cartons. Self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Ridge Rd., Stamford, Conn.

TOROIDS: Unused 88 mhy like new. Dollar each. Five, $4.00. pp. DaPaul, 101 Starview, San Francisco, Calif. After Sept. 1st our address will be at 309 So. Ashton, Millbrae, Calif.

S.S.B. Xfrmrs, exact type for W2EWL Special and other sideband units; hermetically sealed, brand new set of 3 for $3.00. Brand new G-E 100 watt (audio) multi-impedance modulation xfrmr (10 lbs.) $6.25. No. c.o.d. include postage. Send stamp for list of other gear. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, N. Y.

THREE Band Quad Antennas. $49.50. Am-Tennas, P.O. Box 642, Cedar Rapids, Iowa.

75 Meter Heliwhips, 2 $7.00 ea.; Central Electronics 100 V xmttr-xctr, new, with factory guarantee, $700; KWS-1, perfect, $975; C.E. MM2 RF analyzer, $100; 6 V. mobile power supply, $20; Fisher 101R stereo tuner, $160; Fisher PR 66 stereo preamp., $18; Bell 3030 stereo preamp and amp, $100; Roberts stereo 4-track record and playback with preamps and amps, for spkrs, $375; Concertone (American Electronics), Custom 33 series, 7½ and 15 IPS, stereo recorder, preamps, 10" reels, 4 heads and room for 5th, carrying cases, $690. W3VDE, 1219 Yardley Rd., Morrisville, Penna.

40 Ft. crank-up Donner tower and Public Service Co. 1800# guys, strain insul., like new, 2 el. Hy-Gain Tribander, 3 yrs. old, worked 35 states, Johnson factory-wired Ranger and filter. Bargain. Sickness forces me to sell all. All in A-1 condx. R. S. Cole, 123 Santa Cruz Rd., Arcadia, Calif.

MOBILE: All-band complete station. Morrow transmitter MR-560A, receiver MBR-5, receiver power supply and PTT mike, Bendix dynamotor, 12 volt antenna change-over relay, 40 meter Heliwhip, cables, manuals, $350.00. Will ship. Will consider Ranger as part payment. W3YZE. 7934 Winterset, Pikesville, Md.

SELL: Viking Challenger, 1 yr. old, $115; SX-99, in exc. condx, $100; Knight VFO, perfect; $25; Knight C-11 Citizens Band transceiver, used 1 month with 6-12 volt pwr. supply, $45. K9MSN.

SELL: Hi-Fi gear, ham gear, antennas and accessories. Write for list. K1IKZ.

GOING To higher power. Sell Globe Chief 90, Globe VFO, UM-1, mod. General Class, now operating fone and c.w., $95.00. Come and try it. Dr. Reisman, 1901 E. Main St., Peekskill, N. Y.

10 METER Converter, 12V, fil. and plate, $10.00. W6RET, 8831 Sovereign Road, San Diego 11, Calif.

WANTED: Set HT-9, 15 meter coils. Howard, K7MAT, Torrington, Wyoming.

VIKING II, Viking VFO, Hallicrafters SX-99, JT-30 microphone, Semiautomatic key, 75 ft. RF8U coax. All to go for $350.00 or closest bid. G. W. Jensen, W9UZJ, Rt. 1, Fox River Grove, Ill. MErcury 9-6573.

FOR Sale: Globe King 400B, $175; matching coupler, $20. No shipping. Will finance. K5DXL, P.O. Box 60, Eupora, Miss.

FOR Sale: 600 watt c.w., 350 watt A.M. all-band transmitter with 4-250A final, $200.00: will sell separately. Also Collins 75A2 rcvr. $300 with spkr and Drake Q-multiplier. Send for list of other gear and components. Roger Goodland, W9JHB, 5306 Sunnybrook, Ft. Wayne, Ind.

WANT Tech. manual for TBS-4 or TBS-5, UHF radio equipment. Bob Jensen, K3HIU.

COLLINS 32V3 with low pass filter, $375; Elmac AF-67, $80. Both units in excellent physical and electrical condx. W2HYS, 40 Lansdowne Rd., Syracuse 14, N. Y.

WANTED: Collins or TMC Equipment such as 32V3, 75A3, 75A4, GPR90 with Slicer or am interested in S-Line or KW-1 equipment. WILL TRADE Cameras Bolex H8 Deluxe w/3 lenses on Turret, 1.5 lenses; Leica IIIf w/1.5 lens; Rolleiflex 3.5F w/Planar lens and Built-in Lightmeter; 4x5 Speed Graphic w/2 best lenses; many holders and extras; Complete professional Darkroom w/Omega DII Enlarger w/3 lenses for everything from 16mm to 4x5, trays, timers, electric dryer, etc., All Above equipment in like new condition and fully guaranteed. All inquiries answered. W9JFJ, 3013 Oak Street, Evansville 14, Indiana.

SELL: Station: HQ-110C, DX-20, Knight VFO, mod., misc. Best offer. Jon Gabel, K2SMM, Bear Ridge Road, Pleasantville, N. Y.

DX-35, VF-1, factory serviced. Write Pete Pointner, Bon Air Drive, Sidney, Ohio.

TELETYPE: Want Model 14 typing-reperforator, 19 keyboard, any condx. Have to trade, complete Model 26, 15 keyboard and cover, 12 typing unit, polar relays, brand new LM-20 frequency meter with book and crystal, FR-70-U secondary frequency standard. W4NZY, 119 North Birchwood Ave., Louisville 6, Ky.

75 milliameters, mil spec. 10304-A, 0-100 2½" for flush mounting on magnetic or non-magnetic panels, $5.00 ea. or $300 for lot. C. Larsen, 112 Winter St., Hanson, Mass.

SELL: Heath DX-20, like new, $30.00. Dick Brown, Rte. 1, Ritzville, Wash.

FOR Sale: Globe Scout 680, $65; WRL VFO 755, $40; exc. condx; 14 AV vertical, $15. Maj. E. B. Fountain, 131 W. 8th St., Fort Dix, N. J.

FOR Sale: SX-101A receiver, like new, only 3 months old. $300.000. Nathan Freund, 48 53 44th St., Woodside, L. I., N. Y. Tel. ST 6-4565.

SELL: Gonset Model 3065 six-meter linear amplifier to work with Communicator II or Communicator III. $80. F.o.b. Oak Ridge, Tenn. W4SG1, 100 Elliott Circle.

WANTED: Collins 516E-1 DC power supply and 351D-1 mount with cables. K5USR/9, 7018 Oakton Ct., Niles 48, Ill.

FOR Sale: Transmitter complete, home built, phone and c.w. Band switch single dial tuning VFO 80, 40, 10 meters, 100 watts, in six ft. rack, power supply will handle 300 watts $125. Domenic Basolo, W9TJD, 1240 West 96th St., Chicago, Ill.

FOR Sale: Collins 32 V3, in gud condx, $325.00. W9JDD, Art Fullmer, Cordova, Ill.

COST of this advertisement and $550 buys complete station: B&W 5100B, 51SB-B. Model 650 Match-Master, T-R switch, NC-300 with matching spkr, DN-HZ mike, Hy-Gain 14AV vertical, cables, etc. You pick up. Sry, no shppg. All in perf. condx. Only thing wrong is price. Sell complete only. No trade. Box 12, Lake Geneva, Wis.

FOR Sale: 32S1, 75S1, 312B-4, 516F-2 complete Collins station for $900 cash. K5OCQ.

SALE! NC-303 in vy gud condx, ur best offer. John, WA2-BJJ, 22 Ditmars St., Brooklyn, N. Y.

GONSET Super 12 mobile converter, $50.00. Hy-Gain T3 Trap Traveller and TBW telescoping mobile antenna, $20. All like new condx. K4BNZ, 1000 88th St., Miami Beach, Fla.

HEATH Mohawk receiver, completely assembled, factory aligned, $274. Bill Oringderff, 109 Main, Elk City, Okla.

DX-40 EB condx. Got WAS in 6 months with this. $55.00. S38E. $35. K3JHG, 2789 Highland, Broomall, Penna. Tel. EL 6-0822.

COLLINS 32S-1, $490; 75S-1, $390; 516F-2, $75; Mosley TA-33, $65; CDR AR-22, $25; all perf. condx. Bill Fairchild, K5UZQ, 910 S. Shepherd, Houston, Texas.

SPITERI'S Electronics, 142 West 26th St., Erie, Penna. Transmitters, etc., designed and fabricated to your specifications.

WANTED: 6 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

FOR Sale: Estate of W1GR, complete Collins station KWS-1, 30S-1, 32S-1, 75S-1, 312B-3, 312B-4, Finch xtal, duplicator, Heath 5" 'scope, multiphase MM2. Offers for all or part received via W1AXA, Swampscott, Mass.

BOEHME Automatic sender, recently reconditioned by expert, power supply, dot-dash perforator, practice tapes, blank tape, $120. W3AFM, 5800 Hillburne, Chevy Chase, Md.

SALE: Gonset mobile twins, G-66B and G-77A with 3-way power supplies, all cables, hardware and instruction books. Best reasonable offer. W2GQK, Florence Ave., Pitman, N. J.

SACRIFICE: Need money badly. Hallicrafters S-85 with S-meter, coax connectors, $59; Heath XC-2, $29; Heath AR-3 with Q multiplier, $23; SCR-522 xmttr with homebrew power supply, mike with push-to-talk, and built-in relay systems, all set to go, $25.00; everything goes for $115. Steve Gruber, WA6IDB, 707 Main St., Huntington Beach, Cal.

FOR Sale: Globe Champ, 300-A, HQ-170, mike, exc. condx, $575. Ship F.o.b. W5YEO, 2817 S.W. 62nd, Oklahoma City 19, Okla.

SELL: Like-new condx, HQ-100 w/clock, $100.00; Lettine 240 xmtr, w/lo pass filter, coils and xtals, T/R sw., $50.00; Wilcox-Gray tape recorder, 2 speeds, 3¼-7½ IPS, tapes, reels & mike, $35.00. Call Rich, K2GTG, Fairbanks 4-6071, Bronx, N. Y.

SELL: ARRL map, $1.00, Knight signal generator, $12.50; Knight CPO, $1.00; QF-1, $6.50. WPE70L, 421 5th St., Sidney, Montana.

WANTED: Coils E and F for HRO-60. Quote price. Dr. J. Vernon Pace, 203 Sycamore Dr., Paducah, Ky.

516-B-1 power supply, $175; KWM-1 mount and cable, $25, both $185. W4KGR, 2333 Elizabeth, Winston-Salem, N. C.

FOR Sale: Eimac 4-1000A, $27.50; Collins 70E-8A oscillator, $30.00. Both in excellent condx. W8DYA, Box 1275, Bluefield, West Virginia.

TWO good 4-1000A tubes at $25.00 each. K4RLO.

WANTED: HRO60 15-meter bandspread coil and scale. 6-meter coil and scale in exchange or for cash. Burton Bacher, K8JZS, 10104 Nadine Avenue, Huntington Woods, Mich.

SALE: College bound, everything goes! All in exc. condx: SX-99, spkr, multiphase Q-mult., $121.50; National 6 mtr. converter, $20; Knight 50 watter, $25.00; Eico 50 watt modulator, $35. Write Bob Lander, WA2GXU, Cornell University, Rm. 1302, Ithaca, N. Y.

RANGER, Viking, for sale, in excellent condition: $155.00. Gone SSB. J. Brock, 4 Nassau Road, Poughkeepsie, N. Y. Tel. GL 4-5238.

SELL: HT-32, used 5 hrs. Three extra 10 M xtals. $450.00; HT-17 with meter and all coils, $20.00; Carter Gen-E-Motor package 400 V, 225 mil. 6V DC, $10. Cash F.o.b. Chicago, Ill. W9GBD, Bob Gold, 1107 W. Albion Ave., Chicago 26, Ill.

FOR Sale: Heath DX-35 transmitter, Hallicrafters SX-42 rcvr, both operating. Many high quality components for 600 watt amplifier and high level modulator. Bargain prices. W1UKV, Resides, Sherwood Road, Ridgefield, Conn.

75A4 w/spkr, 500 cycle filter Ser. #4125, $525; Viking Navigator f/w $100; 813's linear w/3000 volt P/S, commercial appearance, $100. Cash only. Krim, W3STA, 122 E. 65th Ave., Phila. 20, Penna. Tel. L I 8-6779.

200 Watt amplifier for 220 Mc. Exc. condx, $39.00 including 4x250M tube. WA6LEN, Box 602, Cardiff, Calif.

FOR Sale: Hallicrafters HT-30 exciter and HT-31 linear. 3 watts P.E.P. $400.00 for both of them. Mark Grossman, K2CON, 1665 Monroe Ave., New York 57, N. Y.

SAVE $666.00, Collins gear, priced for quick cash and carry sale: 75S-1 with factory installed noiseblanker; 32S-1 and 2 Kw linear 30S-1; absolutely as new used only a few hours. Retail cost, $2866. Yours for a firm price of $2200. Radchex, Box 431, Jasper, Alabama.

FOR Sale: One DX-20. $30.00. Bill Jacobs, K5WTA, Melbourne, Arkansas.

BARGAIN Hunters: Electronic parts at giveaway prices: 6J6 tube and shield, 29¢; 115 v. A.C. relays, 59¢; 4 μfd/2000 v. condensers, $1.89; 3½" meters, $1.99. Will swap. Send stamp for list. W7HNV, 3113 Rocky Point Rd., Bremerton, Washington.

B&W 5100-B in exc. condx. Used very little. Pick up deal only. Cash. Certified check $400. Firm. W1OTJ, 141 Calderwood Drive, Warwick, R. I.

312A-1 Collins speaker wanted. Norman Feitelson, 22 Darbrook Rd., Westport, Conn.

SELL: DX-40, in perf. condx: $60.00. Pete Tryon, 7 Robin St., Ossining, N. Y.

SELL Or trade: New 4CX300S, socket and chimney, best offer. WA2AJP, 62 Astor Dr., New Hyde Park, N. Y.

1-503-A Telrex 20 meter beam and manual: $80. Alan Lee Fleming, KL7CAN, 1169 South St., Blair, Nebraska.

LONG Island tube headquarters. We stock more than 1000 types of tubes. Surplus and recent production at maximum discounts. Maritime International, 199 Front St., Hempstead, L. I., N. Y. Tel. IV 5-2040.

MODEL 26 teletype with table and Automate, $70.00 or trade for tape gear. Bob Blaney, R.R. 4, Decatur, Indiana.

LOOK! B&W 5100-B, brand new, $300; SX-101, matching speaker, perfect, $250. Ed Savage, WA2JXU, 147 Ridgecrest Rd., Ithaca, N. Y.

PACEMAKER in mint condition, only $300. Unused HQ 170C in sealed carton, $303. K2SHX, Bob Lieberman, 117-01 Park Lane S. Kew Gardens, N. Y..

CANADIANS! HRO with bandspread coils. Excellent condx. Best offer over $95. Ilott, 46 Foothills Drive, Bell's Corners, Ont., Canada.

S.S.B. Xfrmrs. Exact type for "W2EWL Special", and other sideband units, brand new set of 3 for $3.00. Brand new hermetically-sealed half-ampere bias power xfrmrs, 13 lbs., $4.00. No c.o.d., include postage. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, L. I., N. Y.

WANTED: Pi-network inductor B&W 850A; filament transformer, 5 volts 15 amps. Sell: Rotary inductor, Johnson 229-202, new, $7.00. W9WUO, Bob Ruffer, 2035 So. 24th Ave., Broadview, Ill. Phone FI 4-2319.

MEGGER: (Biddle) 1000 megohms, 500-volt hand-crank model. In perfect condition, with heavy-duty leads. For checking insulation resistance, filter condensers, antennas and leakage paths in electrical circuits. $100. E. Heubach, 132 S. Main St., Morton, Ill.

LEARN Code. Qualify for Amateur or Commercial Licenses. Free Book. Candler System, Dept. Q-11, Box 9226, Denver 20, Colo.

VIBRO-KEYER, $10.95, Kleinschmidt and Boehme automatic c.w. equipment. W8RMH, 1910 Longpoint, Pontiac, Mich.

COLLINS 32V-1, factory modified to 32V-2, $275.00; S-76, new condx, $90.00; Trap antenna, relays, etc., extra complete $406.00; A544 Elmac, $55.00; PMR6A, $55.00; ant., power supplies and accessories etc., extra. Complete $172.50. John Clouser, W0AZJ, Virgil, South Dakota.

VIKING Ranger, $175.00 f.o.b. Perfect A-1 condx. Used vy little. Latest model. Bob, K2UFP, Box 91, Merrick, N. Y. Tel.: FR 9-5138, sell: SX-71, gud condx. $95.

SELL: Viking II, VFO-122, (push to-talk); $234.50; new HQ-145 (calibrator), $237.50. Albert Johnson, K1IK, Newport, N. H.

32V-3, in exc. condx, incldg coax antenna relay. $315.00. W2AEB.

SURPLUS-Of-The-Month-Club! ! Details, sample: 4¢! Dick Hinz, W6DIE, 833 7th Ave., Sacramento 18, Calif.

SELL: N C-183D, want: 800 cycles F455BO8 filter for 75A-3, also Ham-M rotor. W2QQ.

HEATH 0-10 oscilloscope, RCA 45 RPM attachment, Motorola, FM mobile xmtr w/cables, etc. Misc. items. Send for list. E. K. Taggart, W9RBM, Nashville, Ind.

75 Meter mobile: BC-654-A transceiver, PE103A, whip, mike, and all cables. Used under 20 hours, $75.00, or best offer! W9UNW, 4210 Wanetah Trail, Madison, Wis.

FILTER Chokes: 10 hy., 150 Ma., 150 ohm. new, cased, ceramic standoffs, 5½ lbs. postpaid $2.00. D. Bates, 824 11th St., Portsmouth, Ohio.

SELL: SX-100, clean, in orig. carton. $200.00. L. W. Stuber, W8PJH, 125 Orchard Hill, Amherst, Ohio.

HT-32A, in exc. condx, used 30 hours. No time to operate. $550.00. K9CYS, 651 Saratoga, Chicago Heights, Ill.

TEST Osc. TO—$10.00; tube tester, $30; Gonset Triband converter, $12.50; BC348Q, vy cln, w/A.C. supply, $60.00. You pay shipping. K7DHL, Box 189 Grand Canyon, Ariz.

SELL Complete station. Viking I, VFO, time sequence keying. $125; NC-300, 100 kcs. standard, spkr, $240. F.o.b. Westwood, N. J. W2EQS.

GONSET Tri-band converter, $9.00; TNS, $1.00; eight new 3-4 Mc. ARC5s, $2.00 each; meters 25¢ each; QST's complete run from 1920, like new condx. Gonset Communicator II, SX104, SX105, NC-88, Lysco 600S. Moving to new QTH. Need house trailer and printing press. Send stamped addressed envelope for lists of hundreds of ham items at giveaway prices. W3HDL/2, 3 Albemarle Rd., Hamilton Square, N. J.

FOR Sale: AVR-20, RCA, Aircraft Rcvr., $30. WA2FQE, 20 Henry Ave., R. D. #1, Albany, N. Y.

SELL: Viking Ranger, push-to-talk, A-1 cond, $180; SX-101 Mark III, like new condx, $300. K2HPZ, 119 Vanderburgh, Rutherford, N. J. Tel. WE 9-3885.

HIGHLY Effective home-study review for FCC commercial phone exams. Free literature. Wallace Cook (Q11), Box 10634, Jackson 9, Miss.

WANTED: Communications equipment, late model, base station and mobiles. Also filters for 75A3 rcvr. George Tate, W4AIS, RFD #4, Taylors, S. C.

WANTED: SX-28 and BC779, K5IPK.

SALE: Microphones, two E-V 664 Cardioid. See p. 117 Sept. QST $37.50 each. One Turner model 58, $30.00. All new or new condx. E. T. Schorle, 3172 Colony Lane, Plymouth Meeting, Penna.

HQ-129X for sale, in gud condx. Make your best offer. W2CXM, Barton Hall, Ithaca, N. Y.

GO Sideband—entire station: HT-32, Heath Mohawk rcvr, PP 811s final 500 watt reflected power meter, Dow-Key relay, D-104 mike, LM freq. meter with power supply. A steal at $725.00. W5GPT, 1860 Terrell, Beaumont, Texas.

RECONDITIONED: Terms: Guarantee: Hallicrafters S-53A $65.00; S-85 $89.00; SX-99 $109.00; Hammarlund HQ-110 $180.00; National SW-54 $37.00; HRO-60T $345.00; NC-173 $114.00; NC-183D $234.50; RME-84 $59.00; Gonset Super 12 $54.95; 3-30 $34.50; Globe 6PMC-1 $17.00; Regency ATC-1 $49.50; B&W 5100 $245.00; Central Electronics 20-A $169.00; 600L Amplifier $299.00; Collins KWS-1 $999.00; 32V3 $399.00; Elenco 77 $299.00; Eldico SSB-100A $349.00; Globe CB-100 Transceivers $89.95; Scout 65A $59.00; Champ 300A $349.00; King 400C $255.00; King 500B $565.00; Gonset 500 Linear $149.00; Heath Apache $265.00; Johnson Pacemaker $295.00; Lakeshore Phasemaster II $159.00; Sonar SRT-120 $59.00; Globe 755 VFO $37.00; Leo, W0GFQ, Box 919, Council Bluff's, Iowa—World Radio Laboratories.

FOR Sale: Rack mount CE20A, $170; Lakeshore Bandhopper SSB VFO, $65.00; Dow-Key coaxial relay DKC-GE 115V AC, $6.00. All in new condition. Will ship in factory cartons with instruction book. First certified check or money order takes one or all. Charles Richman, 778th Acwron, Havre AFS, Mont.

HT32A, 75A3, Skylane quad, $850. W2MHL, 147 Fairview, Paramus, N. J.

WANT 6 Kc. filter for 75A4 rcvr. In exc. condx. State price in your first letter. Sell ASB-5, 410 Mc. recvr, brand-new, unconverted. See Oct. 1956 CQ. With tubes and spare 664s, $20.00. W3CLP, 707 Edgemoor Rd., Wilmington, Del.

FOR Sale: F.o.b. Detroit. Will ship Viking Navigator xmtr used for 10 hours, $140.00; Bud Codemaster, $8.00; KW4M coax ratiometer, $18.00. Model 152T; Hy-Gain Triband beam, $40.00. You pick up beam. W8GRN, Phil Girard, 14025 Norborne, Detroit 39, Mich.

BRAND New Hammarlund HX-500 transmitter, in factory-sealed carton with warranty, $645.00. W9DOO F.o.b. Madison, Wis.

CANADIANS! 20A VFO (covers 10 meters, matching case), $250.00; APA38 Panadapter, 110V. supply, $25.00. 6146 transmitter AM or CW Geloso VFO, power supply, $95.00. VE3NW, Carruthers, 255 Dufferin Ave., Belleville, Ont., Canada.

INTERNATIONAL Reply-paid QSLs. Standard: 25, $1.00. Personalized: 100, $6.00. Hart, 467 Park, Birmingham, Michigan.

KWS-1, all modifications by factory, spare tubes, including 2 unused 4X250Bs. Can ship in factory containers. $1195 F.o.b. Waterbury, Conn. W1RMS, 198 Euclid Avenue, Waterbury 10, Conn.

SELL: Gift certificate, $27.00. Worth $50.00 on Mosley TA-33. W4HXE.

FOR Sale: Elmac AF67, PMR7, M1470 power supply, Dow 12V. relay, mounting racks for rcvr. and xmtr., all connecting cables included. In gud shape. College, $310.00. K5JLF, Troy Morrow, Station ACC, Box 834, Abilene, Texas.

VALIANT, factory-wired, serial No. 29181, $350.00; SX-100, Mark II, $225.00, both like new, less than a year old. W4OEF/2, 59 Vine Wayn, Bordentown, N. J.

SELL: DX-40, VFI, $60.00; S-40B, QF1, $65.00. In gud condx. All manuals. K. Shirk, K2JHZ, Tel. BA 5-6020, 248-08 Depew Ave., Little Neck, L. I., N. Y.

HEATHKIT DX-100 transmitter. Sell $125.00 or swap even for good 2 meter Communicator. W1ROX, Bob Wicke, Hillwood Place, Norwalk, Conn.

SALE: AR88D receiver with "S" meter in perfect condx. $160; Dumont (24S) 'scope, $50.00; Gonset Super Six converter with 110V power supply, $30; Millen R9r with 10, 15, 20 coils, $10.00; Millen absorption freq. meter set, $10.00; SCR522 (new), $15.00; numerous VOMs, meters, tubes. Col C. E. Howland, W6WMA, 910 19th St., Pacific Grove, Calif.

SELLING KWS1, $1573, 75A4, 75S1, new Gonset 101 linear. Make cash offer. Will consider trade. W0BNF, Box 105, Kearney, Nebr.

SINGLE Sideband generator as described on page 26 August CQ, $75.00. Longhorn Electronics, Inc., Box 157, Wolfe City, Texas.

GONSET 144 Mc Communicator II, in like-new condx, in factory carton; Lysco 600S, all-band xmttr; three-speed disc recorder complete with playback unit, speaker, microphone, instructions, etc. Transmitter power supplies, chokes, transformers, capacitors. Pilot Super Wasp. Crystals, tubes, etc. Moving to new QTH. Many items 10¢ or less on the dollar. Also photographic and hobby equipment. Need 75A1 and 32V1 or similar. Send stamped addressed envelope for complete list. W3HDL/2, 3 Albemarle Rd., Hamilton Square, N. J.

FOR Sale: Hammarlund HQ-170, 2 yr., $250.00; Gonset GSB-100, 1 yr., $350.00; Hy-Gain Tribander TGS-3 2 yr., $35.00. All in gud condx and first check gets it or all in one. Donald B. Straley, K8DEO, Rte. #2, Cedarville, Ohio.

WANTED: Transmitter, Collins 32V2 or 32V3; Apache; DX-100. State condx, lowest cash price. Joe Harms, Plaistow, N. H.

SELL: DX-40, VF-1 in vy gud condx, $75; balun, $8.00; "Ocean Hopper", $11. K1MEM, 35 High Rock St., Westwood, Mass.

CRYSTALS Airmailed: SSB, MARS, Net, Novice, Commercial, etc. Custom finished FT-243, .01% and kilocycle 3500 to 8600, $1.49. (10 or more FT-243 99¢) all Novice 99¢, 1700 to 20.000, $1.95, 20.001 to 30.000 $2.25. All frequencies 60¢ additional for HC-6/u hermetic holders. Builders crystal packages: November QST "Phasing Sidebander" $9.95; June 1958 QST or SSB Handbook, "SSB Package", 5 mixer FT-243 $9.95, hermetics $13.95, seven matched filter $6.90. Crystals for QST, CQ and other magazine construction projects. All types, if you don't see it, be specific, write. Airmailing 9¢ per crystal. Crystals since 1933. C-W Crystals, Box 2065Q, El Monte, Calif.

SELL: Collins 75A1, in exc. condx. $225. Durland, 27 Edgerton, Darien, Conn.

WANTED: Apache, Gonset Communicator I 2 Meter, SB10, Super Pro. W2CE.

HALLICRAFTERS S-38C, $20 and postage. Cotton, 831 Virginia Ave., N. Bellmore, L. I., N. Y.

FOR Sale: Alpha 6 Xmtr., f/w, $64.50; C.E. 20A w/458 VFO, $225.00; 32V2, $300.00; 32V3, $350.00 310B-3, $149.50; KWM-1 (exc.), $610.00; KWS-1 $1250.00; AF-67, $127.50; Globe Chief, 52.50; Globe Scout 680, $65.00; Globe Champ 300-A, $325.00; Globe LA-1 linear, $69.50; HT-30, $325.00; HT-32, $450.00; HT-37, $380.00; DX-35, $47.50; Challenger, $109.00; Viking Mobile, $65.00; Ranger, $195.00; Valiant, $335.00; Meissner EX signal shifter, $26.50; LA-400, $145.00; Drake 1-A, $199.50; PMR-7, $119.50; G-66B w/3 way pwr., $175.00; SX-71 w/"Q" Mult., $135.00; SX-100, $207.50; SX-101 Mk.III, $275.00; HQ-110, $196.50; HQ-160, $279.50. Write Art Brown, W9IHZ, Brown Electronics Inc., 1032 Broadway, Ft. Wayne, Ind.

SALE: SX-100, Hallicrafters, $180; R46B, spkr, $10. In exc. condition electronically and physically. John R. Ottinger, 91-34 Lefferts Blvd., Richmond Hill, N. Y.

SSB Rig for sale: CE 10-A, Deluxe 458 VFO, B Slicer, 400 watt linear. Write for details. W1NFG.

SACRIFICE! Rotobeam rotator. Will turn anything. Cost $375—$150; KW linear 250THs, Bud 40 in. cabinet, $150 new, 250THs, $15; RK4D32s, $15. Send for additional parts list. Don Cordray, 6803 Amestoy Ave., Van Nuys, Calif. Dickens 4-1736.

WORLD'S Best reconditioned equipment. Shipped on approval. Trades. Terms financed by us. Central 20A $159.00; Collins 75A-1 $229.00, 75A-2 $299.00. 32V-3 $349.00. 75S-1 $399.00, 32S-1 $449.00, KWM-1 $549.00; Globe Scout $59.00; Hallicrafters S-76 $99.00, SX-99 $109.00. SX-100 $199.00, SX-101 $279, HT-32 $429.00, HT-32A $499.00, HT-33A $575.00; Hammarlund HQ-100 $129.00, HQ-129X $149.00, HQ-110 $189.00, HQ-150 $219.00, HQ-170 $289.00, HQ-160 $289.00; Heath DX-35 $49.00, DX-4 65.00; SB-10 $89.00, DX-100 $179.00, RX-1 $199.00, Apache $239.00; Johnson Adventurer $39.00, Viking II $179.00, Valiant $279.00; National NC-173 $99.00, NC-300 $209.00, HRO-60 $349.00. Many other items. List free. Henry Radio, Butler, Missouri.

SELL: Perfect HRO-7 with 4 coils, pwr, supply, and spkr, $175. Want BC-348, 312 or 342. Sell QST 1953, -54, -55, -56, -58; CQ 1954. Make offer. K2DZS, 58 Wayside Lane, Trenton 8, N. J.

FOR Sale! Complete sets Electronics, RCA Review, Control Engineering, QST (less 10 issues), IRE Proceedings since 1928. Also runs of Tele-Tech, Radio News, Radio-Electronics, Popular Electronics, many others. Stamp for list. Wanted: Used KWM-2. W4NYF, 405 N.W. 30th Terrace, Ft. Lauderdale, Fla.

MODULATION Transformer, Collins 150 watt. Primary: 5500 Ω; Secondary: 2400 Ω. Potted; herm. sealed. New, $6.95 postpaid. PAM Electronics, 3438 S. Burrell, Milwaukee 7, Wis.

SELL Transcon 6M, $79; gud condx. James 6 x 12v heavy mobile pwr. supply, $25.00. WA2AIC, Millbrook School, Millbrook, N. Y.

HT-33, $575 with extra tubes. HT-32, $500; SX-101, $290. All like new condx, not a scratch. You pick up. No shipping, sry. W8GWA.

SELL: Complete station 10 thru 80, perfect condx in two 68 in. cabinets; TVI suppressed, monitor-scope VFO phone c.w. clipper, bug. HRO-7; Q multiplier; 100 Kc marker, spares. Will not ship, sry. W2YKW, Tel. GE 8-8979, E. Rutherford, N. J.

SX-43 Receiver, Excellent. $125.00. W8VDA/5, 203 Harding St., Big Spring, Texas.

SELL: SX-101A, Mark III, AT-32, $700. Unaltered. One owner. Deliver within 50 miles N. Y. C. Bob Hertzberg, W2DJJ, 241-16 Alameda Ave., Douglaston 62, L. I., N. Y. Phone BAyside 5-5383.

WIRED And Tested Heathkits, new and unused. Apache transmitter, $295.95; DX-100B, $229.50 and others. Send orders or write to C-V Electronics, Box 4578, Sarasota, Fla.

LEECE-NEVILLE 50 amp. rectifier, $5.00; 24V 10 amp. rectifier, $5.00; 110 volt selsyns, $3.00. Trade high vacuum pump for SSB generator. B. J. Kucera, 10615 So. Highland Ave., Cleveland 25, Ohio.

KWS-1, all modifications, $1000; 75A-4, excellent, $475; 1960 model 20A, $185, unopened 100V. $595. HT-37, $355.00, unopened 32S-1, $575. W8WGA.

EIMAC 4-125As, new, sealed cartons, $15.00 each; 304TLs, never used, $10; also new 24G tubes and Gonset 100% R modulation indicator. Used, but in gud condx: PF-103 dynamotor and cables and pair Stancor C1415 chokes, 500 M.A. Best offer. W2IWS. Curtis, Box 125, RFD #1, Utica, N. Y.

KNIGHT R-100. Vy FB with spkr, S-meter, cal. Will be willing to ship in the W1-W4 area. $100. Paul DeBonis, K1NKV, 67 No. Quaker Lane, West Hartford, Conn.

COLLINS 75A3, in exc. condx, $330; SX-101A, less than year old, $269; spkr, $4.00; Johnson 6 and 2 meter converter, factory-wired, 28 Mc. I.F., $39.00; Deluxe 1 KW AM, break-in C.W. xmtr, bandswitching 80-10 meters, fully metered, Collins VFO, fully shielded and TVI suppressed, a real beauty, only $390. Have KWM-2 and little time for radio. Henry Hayes, Rts. 2, Fulton, Ill. Tel. ALbany 3718.

GONSET G-66B with 3-way power supply, $210; Gonset G-77A with 3-way power supply and Electro-Voice mike, gud, $250.00. All are in excellent condition. Reg Foumi, W7JHL, 2105 Knight, Helena, Mont.

GREAT SURPLUS VALUES! 1 BC-603 Receiver New $23.00—BC-683 New $37.00—R-26/ARC 5 Rec 3-6 mc New $15.00—R-27/ARC 5 Rec 6-9 mc New $15.00, used exc $9.95—BC 659 Transceiver with PE-120 $19.95—T-47/ART-13 Transmitters $39.00—BC-603 AC-Supply $9.95—Synchroscopes Model TS-34/AP $49.00—Sound-Powered Dynamic Phones Pr. $4.75—Rec. Microwave R-111/APR-5 $49.00—Collins Mod. Xformer 100 watt 811-PP to 813 final $3.95—RA-62-C Power Supply A-C for SCR-522 VHF 110/60 cyc. New $59.50—Kits only for above, $17.00—Ground-plane VHF antennas 30-200 MC New $9.95—T-19/ARC-5 Transmitters 3-4 mc $9.50 used—T-20/ARC-5 New 4-5.3 $10.00—BC-458 5.3-7 mc New $10.00—BC-459 7-9.1 mc, New $12.00 HiMu Electronic Sales Company 133 Hamilton Street New Haven 11, Connecticut

FOR Sale, New York City/North Jersey area: Elmac AF-67, $129; PMR-7, $119; Gonset 3-30, $20; Gonset noise-limiter, $5.00; James power supply, $25 inc. cables from Elmac units, BC-348Q w/spkr (AC) $55, Meissner signal shifter with coils, $20; Master Mobile 666 all-bander and base, $15. J. S. McKeown, W3KTF, 345 Boulevard, Hasbrouck Heights, N. J. Tel. ATlas 8.2055

SX-25 with 12 tubes w/matching speaker and QF-J., KN5AEE, Bloomfield, N. M.

WANTED: Excellent BC-348, TCS-12 with accessories, manuals if available. State condx, prices. Daniel Lee, 3167 E. Green St., Pasadena, Calif.

RANGER And Matchbox, $250.00; NC-300 with calibrator, $275. All for $500, in mint condx w/manuals. E. Jones, W2KZS, 133 Brookview Dr., West Paterson, N. J. Tel. LAmbert 3-0991.

SALE! 10B, extra coils, QT-1, VFO, $89. Want: Panadaptor. Clarke, K6TWL, 4749 Rollinghills Way, Castro Valley, Calif.

NC-300, in xlent condx, xtal calibrator, 6 meter converter, $215; B&W L-1000-A linear, like new condx, $300. Instrux books and orig. cartons for both items. F.o.b. Spring City, Penna. Walt Clevenstine, 711 Arch, W3CUO.

FOR Sale: NC-183DT and DTS spkr, exc. condx, HT18, gud. Make offer. J. T. Hoffman, W4MVN, 1503 N. Jackson St., Tullahoma, Tenn.

$1,400.00 Replacement Cost. K2RRG 75 Foot Antenna System. Consists of Tri-Ex Model HZR-354 Rotating Tower ($749.50), BMP-61 Motorized Raising Winch ($43.95), Weatherproof Electric Motor ($40.00), TB-2 Thrust Bearing ($17.50), H-8 Platform ($22.77), BPR Rotor Bracket ($43.95), Telrex R-100 Rotator and Indicator ($158.75), 30 Foot Steel Mast ($60.00), Two Telrex 6M-6C Antennas ($57.50 Each), Special Telrex Matching Harness ($17.00), and 200 Feet RG-17/U ($.58 Ft.). Tower delivered free within 50 Miles of N.Y.C. Entire System $575.00 or individual components at ½ above prices. K2MLB, 45 Rock Spring Avenue, West Orange, N. J. Phone RE-1-5064.

SELL: 75A4 Ser. # 5103, spkr 3 Kc filters $625.00; Call-Ident clock, $18; Morrow Conelrad monitor CM-3, $30; D-104 mike w/stand, $20; Gonset Triband beam, $95; Ham-M rotator, $75; 4-250A tubes, $18; KW-1 modulation transformer, new, $65; Collins low-pass filter, $20. W8RWZ, 1210 White Oak Dr., Springfield, Ohio. FA 4-1219.

REGENCY ATC-1, $55; Heath SSB SB-10, $75, Seneca VHF 6N2 transmitter, $165, RME DB-23, VHF-152A, tape recorder, mobile equipment, multiphase SSB analyzer, $65; BC-453s, transistor course, Gonset Monitor, vacuum variable, electronic flash, telescope, miscellaneous list. W4API, 1420 South Randolph, Arlington 4, Virginia.

APT-1 Front end, uses 832, 829-B & (2) 6C4. Makes ideal 2-meter final. Like new, without tubes, post paid. $5.00. Bauer Industrial Supply Co., 17170 Redford, Detroit 19, Mich.

WILL Swap: New Hallicrafters SX-104 Mark I F.M. 30 to 50 Mc police rcvr for NC-188 or NC-160 rcvr. Baker, Box 656, Gallatin, Tenn.

HQ-145, timer, calibrator, also Ranger transmitter. Both in like-new condx, $200 each. WV2LIM, Box 505, Jamaica 24, L. I., N. Y.

NOVICES Attention! Johnson Adventurer 50 watt xmtr, gud condx, $30.00. Gilbert Traverse, 1200 Locust St., Alva, Oklahoma.

KILOWATT. For sale, B&W LPA-1 and LPRS-1 (linear amplifier and power supply), little use in past seven months, in guaranteed exc. condx. Will sacrifice at $350.00. Dr. C. A. Traverse, 515 College, Alva, Oklahoma.

SELL: P & H LA400 linear amp., $85; DB23 Preselector, $30; B&W TR switch, $10; MB20 tuner, $7.50; UTC 6000/5000V 400 Ma xfrmr, $25; 5V 100A xfrmr, $10; 5V 2A, xfrmr, $7.00, swinging choke, 500 Ma., $7.00. W6SRF, 1240 N. Alamo St., Anaheim, Calif.

FACSIMILE. For sale: two TT-1C/TC-1 facsimile transceivers complete with manual, one ream Teledeltos paper, requires no darkroom processing. Also one additional transceiver minus motor, clutch and power supply. Use for spare parts. All three machines for $600. Prefer not to ship. W9WKC.

ATTENTION Hams! Receivers, transmitters and test equipment serviced and calibrated by professional personnel. Low rates. All work guaranteed! Also kits wired to order at 30% of list price for free technical and license-counseling service. Write Monarch Engineering, 3058 Lehman, Hamtramck, Michigan.

COME And get it: HT-33A, used vy little. $500. W1MJD.

WANTED: Pr 417As in gud condx. K2ARO, 112 Croton Ave., Ossining, N. Y.

FOR Sale: Globe King 500C, latest model with D-104 and stand. Spare 6156. $500. Sry, cannot ship. W9BDG, 2533 Benedict, South Bend 15, Ind.

FOR Sale: Heath Mohawk RX-1 rcvr. $250. In gud condx. K1MYA, Sheldon Brown, 250 Beaver St., Keene, N. H.

OSTS: January 1950 thru December 1959; Eico Signal Generator Model A-200, NRI Electronic Multitester. Will accept best offer. WØOWK, 4018 Lyndale Ave. So., Minneapolis 9, Minn.

CLEAN Valiant guaranteed A-1, $300. Hallicrafters SX-28, $90. Will ship. KØOHTS. Jess Smith.

CALL-Personalized items advertised Page 106, October CQ. Write for reprint. Chuck, K9TVA, 6429H Glenwood, Chicago 26, Ill.

"HORSE Trader" Ed Moory. Lowers prices again! HT-37, used 2 hours, $359. Like new, NC-300 receiver $179; HQ-170-C, new, $235; new Johnson Thunderbolt linear in sealed carton $449; Collins KWM-2 Serial 777, Demonstrator, $889; Collins 32S-1 Serial 2320, $489; Collins 30S-1 linear, two weeks old, $1149. Terms cash. No trades. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

FOR Sale: SX-101 Mark III, perf. condx. Bob Yarmus, K2RGZ, 532 Lefferts Ave., Brooklyn, N. Y.

FOR Sale: KWM-1 with A.C. supply, $550; Gonset 6-meter Communicator II, 117-12 volts, $150. K2YWO, 52 Delwood Rd., Merchantville, N. J.

FOR Spare parts FM eqpt., some 30-50 Mcs, mostly 150 Mcs. Removed working vehicles. 6V DC Federals 144-172 Mcs. PP 5812s; 1 gtd rcvr cables control box spkr, $85.00. Shipped collect or money-order. Ken D. Morgan, KØIEG, Box 611, Ft. Morgan, Colorado.

SELL: SX-100, $190; Globe Scout 680, factory-wired (push-to-talk) and D-104 mike, $90; Knight VFO, $23.00; Skylane 3 band cubical quad, $20.00; all for $310.00 or without quad, $295. K2CMF, 76 Glenview, South Orange, N. J.

FOR Sale: 2 4-400A tubes with one socket and chimney, $40.00; misc. reconditioned mobile mikes and 2-way equipment. Write for list. A. J. Tumas, 20 N. Euclid Ave., Villa Park, Ill.

FOR Sale: Two model 15 teletypes with keyboards, one exc. condx, other vy gud condx; stand, typing reperforator, 2 polar relays, make-break converter, spare parts, paper. Best offer on all or any. Cubex Mark III Deluxe 3-band quad, up only one week, in exc. condx. $50.00. KY-127/GG electric eye code machine with 15 tapes, both brand new, $35.00. 2 PP 2Y/CYN-2 pwr. supplies, choke inputs, 1500V-300 Ma., dual 1000V-300 Ma., 400V-30 Ma. Best offers. K6GPS, Richard McGuire, 205 Poplar Ave., Marysville, Calif.

HQ-129X, in exc. condx, $130.00. H. Stewart, 4187 Richmond Ave., Staten Island 12, N. Y.

2-Meter Transceiver, completely portable, tuneable, $30.00; OM-3 oscilloscope, $30; B-1 baluns, $6.00; AC-1 antenna coupler, $9.00; Ocean Hopper, $10. Jim, K1IQZ, 14 Oak St., Greenfield, Mass.

KWM-2, $820; used less than 10 hours; 12V supply, $200. Both for $1000 or will trade on Collins 618FZ, W9UWL, 1416 Walnut St., Murphysboro, Ill. PHone 252.

RESTORING Collins Autotune, TCB2 xmtr. Need Technical Manual and some parts. What have you? K9SQV, Rt. 7, Green Bay, Wis.

RECEIVERS: Excellent Gonset G66, to best offer; Hallicrafters S-77A, $50.00; converted ARB .1 to 9 Mc., $20. KØBLO, P.O. Box 437, Hiawatha, Iowa.

KWM-1 and mobile mount, AC and DC supplies so new guarantee cards are supplied. $825. Beautiful bandswitching parallel 4-400A conventional linear, vacuum variable, air system sockets, etc. First $150. Mike Ferber, W1GKX, Creamery Rd., Cheshire, Conn.

SELL: SX-99m like new, $99; VHF Aerotron 500, gud condx, w/cord, whip & mike, $125.00. T. P. Stewart, Jr., P.O. Box #17, Henderson, N. C.

FOR Sale: BC-456E with dynamotor, BC-459-A, BC-696-A, BC-455B, BC-454-B. Make offer. All inquiries answered. W3YNB, 320 Carlisle Ave., Pittsburgh 29, Penna.

FOR Sale: National NC-98 receiver with speaker. In perfect condition; $100. Glenn Krueger, W9TXU, 8420 So. Emerald Ave., Chicago 20, Ill.

WANTED: Late 75A4, Thunderbolt or HT33A amplifier. Have to trade NC-300, Bolex 16 mm movie with turret, 16 mm Ampro sound projector, Speed Graphic camera and other photo equipment. Roy Tooman, KØPGZ, Muscatine, Iowa.

DX-100, $165; Mike D-104, $10; Balun coils, $7.00; Relay switch, $7.00, cubical quad antenna complete with bamboo and C.D.R. indicator rotor AR 22. Let it go for $65. Steve Bedell, 260 Autumn Ave., Brooklyn 8, N.Y.

6 METER Communicator III, in exc. condx. $220. Ken Malkin. TR 3-5301, New York City, 15 West 81st.

KW. Completely self-contained, built-in modulator. Power supply and VFO exciter, $180, or trade for Viking I or II. T. Fitzgerald, 785 Grand Terrace, Baldwin, N.Y. Tel. BA 3-7138.

WANTED: HRO-5 coils E, F, G, H, J. W5OMJ, 4742 Denton Dr., Dallas 19, Texas.

B&W Low pass 75 ohm, $10; PE103 6 & 12 dynamotor, $9.00; 80 mtr. base-loaded whip, $8.00. Home-made trap ant., 50 ft. coax, $5.00. T-17 mike, $4.00. K8GHY.

SALE: Hallicrafters S-107 receiver, brand new and has never been worked, $75.00. Globe Scout 680 xmttr. in A-1 condition, $75. Rig, receiver, xmttr, Dow-Key relay, code oscillator, $150.00. Gerald Owens, Box 345, Fort Payne, Ala.

CALL Books wanted. Department of Commerce, Amateur prior 1926, Commercial 1930 and prior 1926. W1NP/2, 926 Woodgate Ave., Elberon, N.J.

SELL: Heath DX-20 and Heath VFO, $48; SX-71 rcvr, $130; Hy-Gain 12 Av, 10-15-20 mtr, groundplane complete with base section, $19.00; ant. relay, $4.00; or complete rig for $180. K2VIC, Hewitt, 451 Conger Ave., Collingswood, N.J.

HALLICRAFTERS SX-101A, $295; HT-32, $425; HT-33A, $545; Central Electronics MM-2, $85; Johnson Kilowatt Matchbox with coupler, $95; Ham-M rotator, $85; 2-El. Tribander Hy-Gain beam with 100 ft. coax, $35; Bud low-pass filter, $10. All perfect. Very little usage. New in appearance and operating performance. Ken Reiter, K9DBL, 240 Powell, Clarendon Hills, Ill. FA 3-0085.

FOR Sale: SX-101MK3 perfect condx, $275; swap for ham gear; 150 mm Kilfitt Tele-Kilar, 50mm Tessar. Bob Yarmus, K2RGZ, 532 Lefferts Ave., Brooklyn 25, N. Y.

SELL: 75S1, #2152 with CW filter, $425; 32S1, #1915 with AC supply, $550; Eldico 1000F, $500. W2KOY, 1740 Front St., East Meadow, L. I., N. Y.

RME-45 exc. condx, $95; VHF-152A converter, $49.50. Mon-Key, $35. All guaranteed. Gayle Wadsworth, 1555 Northeast Pkwy, Wichita, Kans.

COLLINS KWS-1, 75-A4, master control SC-101, also Telrex Tri-Band, $1,600. Claude LeFond, VE2AWA, 8010 De Gaspe St., Montreal, Que. P., Canada.

WANTED: LM freq. meter with modulation book. AC power, Panadapter, Heath SSB generator. Have new pair of Vocaline transceivers, two TO-4 Sprague Tel-Ohmike analyzers (one is new); Hickok 'scope, 300 watt portable power plant to trade. Morris Organ, KN8UMW, 13181 Poplar, Southgate, Michigan.

CLEANING Shack. Offering tubes, transformers, crystals, other components at savings to you. Send self-addressed stamped envelope for list. WØAGP, 7525 Grover St., Omaha 24, Nebr.

FOR Sale: AF-67, $135.00; PMR-6A, $65.00; James C-1050 powers supply, $30.00. K4DLI, Streible, 1805 Brentmoor Lane, Anchorage, Ky.

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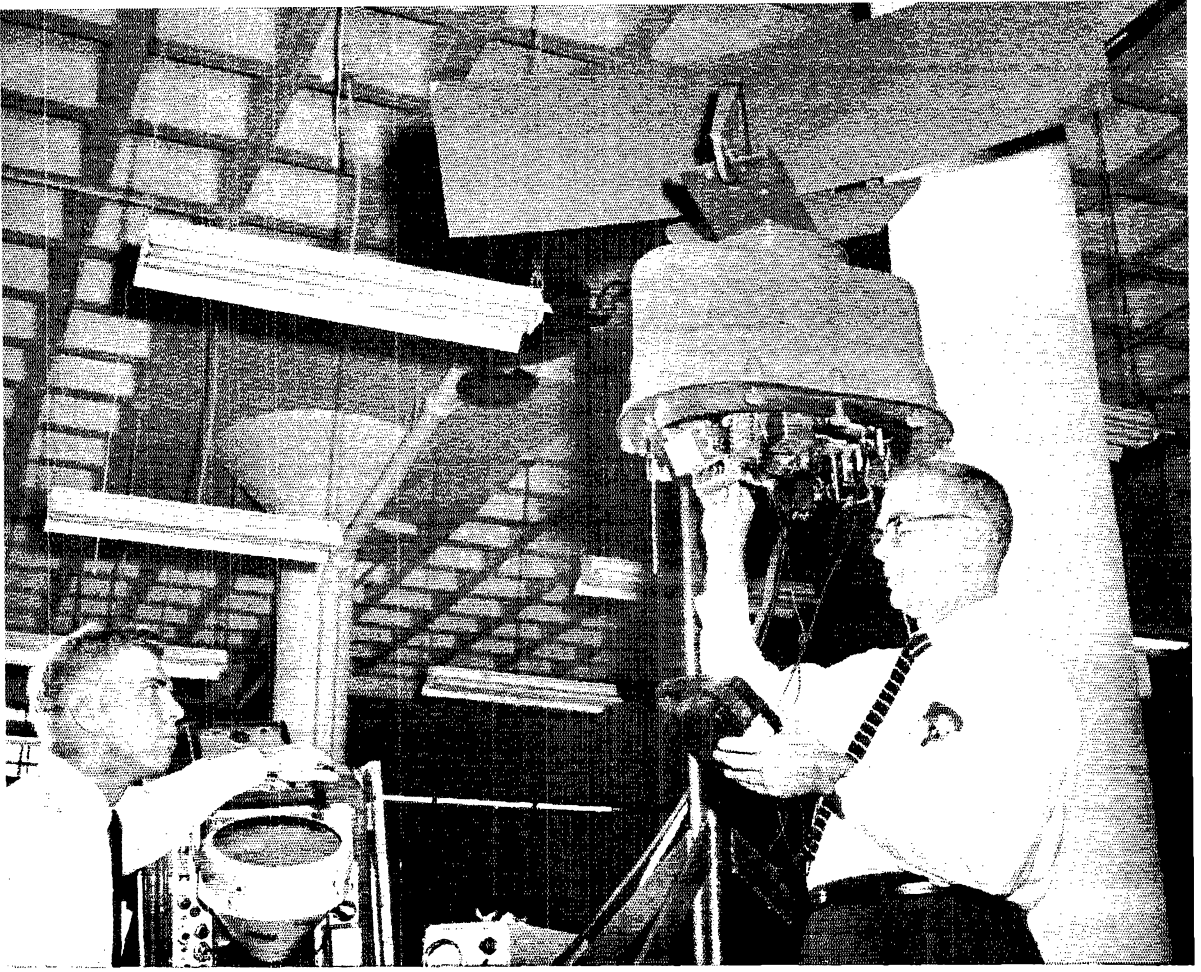

STEPHEN HERZOG (left), K5RMA, and George Mayo, K1LYE, check out marine radar equipment at a Raytheon Electronic Services Division service center in Boston, Mass.

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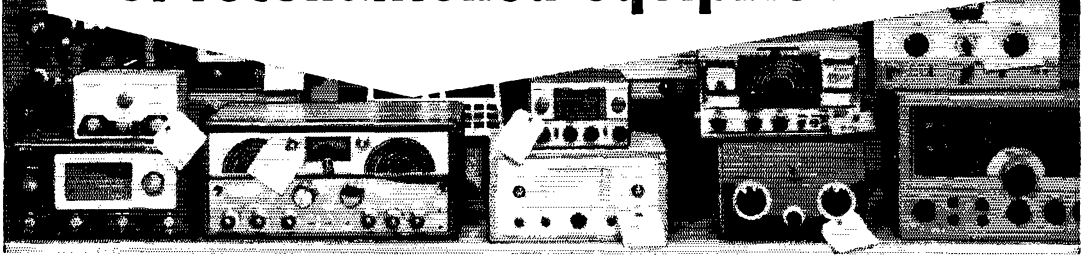

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MB-565 Transmitter	179.00
MBR-5 Receiver	139.00
MB-560 A Transmitter	125.00
Falcon Receiver W/BC Band	139.00

National

SW-54 Receiver	34.50
NC-60 Receiver	42.50
NC-66 Receiver	59.00
NC-88 Receiver	79.00
NC-173 Receiver	119.00
NC-183 D Receiver	229.00
HRO-60 Receiver	329.00
NC-303 Receiver	329.00

RME

4350 A Receiver	159.00
VHF-126 Converter	189.00
DB-22 A Preselector	29.95

Tecraft

6 Meter Converter	19.00
2 Meter Converter W/Supply	39.00
PTR-2 Power Supply	27.95
PS-1 Power Supply	15.00

EASIEST TERMS: Available on all orders over $20; only $2 down up to $50; $5 down from $51-200; only $10 down from $201 up. Up to 24 months to pay. Fast handling—no red tape.

15-DAY FREE TRIAL: Try any of this equipment under your own conditions; if in 15 days you're not completely satisfied, return it for full refund, less only transportation costs.

90-DAY WARRANTY: Allied Reconditioned equipment is covered by the same 90-day warranty against defects in material or workmanship which covers brand-new equipment.

SELECT YOUR NEW GEAR from our complete 444-page value-packed catalog. If you haven't a copy, write for it today.

IMPORTANT: Some items above are one of a kind...all items are subject to prior sale...send deposit to hold any item.

For reconditioned or new equipment, write to Jim Sommerville, W9WHB, c/o Allied, or stop in and meet Joe Huffman, W9BHD; Joe Gizzi, W9HLA, Burt Fischel, W9VOB; Jack Schneider, W8CZE.

ALLIED RADIO

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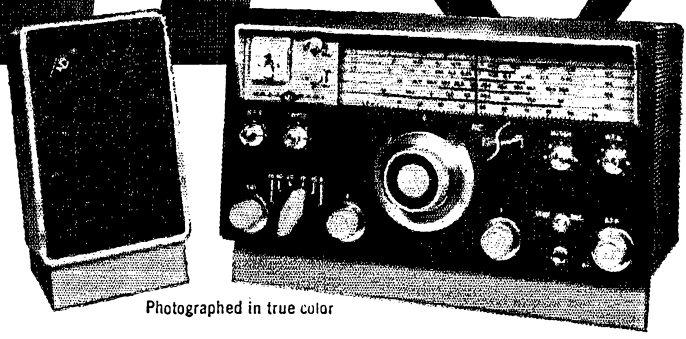
With Built-in Product Detector

NC 270

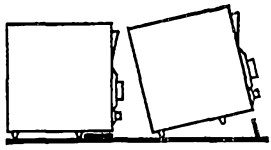


Photographed in true color

THE "COSMIC BLUE" NATIONAL'S NEW HAMBAND RECEIVER

This newest and finest precision double conversion amateur receiver with 6 meter coverage, brings you an ease of sideband tuning previously available only in the most expensive equipment. The NC-270 features an exclusive "Ferrite Filter" for instant upper-lower SSB selection and a degree of selectivity to conquer even the toughest AM and CW signal conditions. The solid 1/8" steel panel, ceramic coil forms, double-spaced tuning gang, and full ventilation cabinet combine to give mechanical and thermal stability that will surprise even the most critical operator. Even the color of the NC-270 is outstandingly different, National's new duo-tone "Cosmic Blue." Write for detailed specifications.

Only $24.99 down*



And National Radio's patented "Flip Foot" makes operating the NC-270 so easy.

Suggested cash price: $249.95. NTS-3 Matching Speaker: $19.95 (slightly higher west of the Rockies and outside the U.S.A.). *Most National distributors offer budget terms and trade-in allowances.

NATIONAL RADIO COMPANY, INC.

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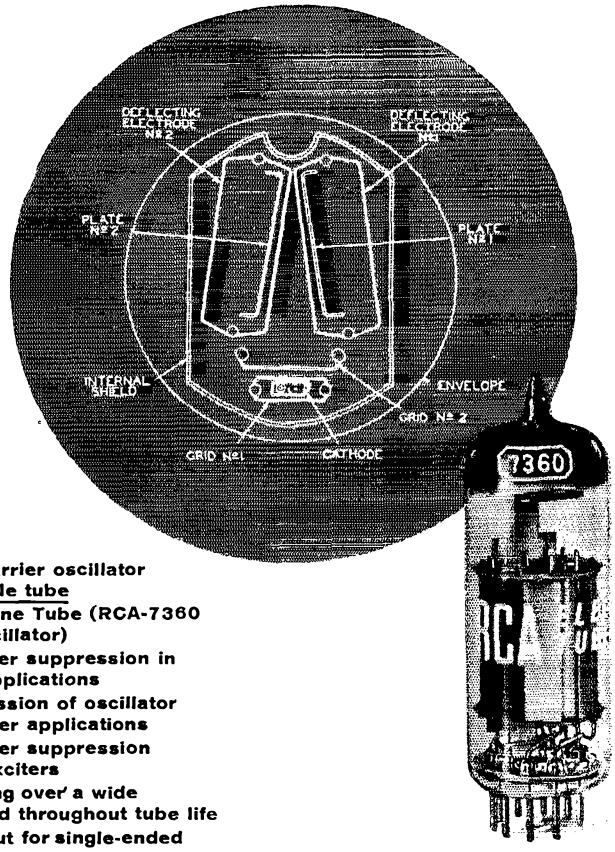
RCA-7360 Beam-Deflection Tube...

simplifies SSB!



Shown actual size

- **Balanced modulator-carrier oscillator functions within a single tube**
- **Product-Detection in One Tube (RCA-7360 needs no separate oscillator)**
- **At least 60 db of carrier suppression in balanced-modulator applications**
- **At least 40 db suppression of oscillator signal in balanced-mixer applications**
- **At least 80 db of carrier suppression in filter type of SSB exciters**
- **"Stay-put" circuit tuning over a wide temperature range, and throughout tube life**
- **Push-pull rf or af output for single-ended input—with one tube.**

Specifically developed for SSB and DSB suppressed-carrier rigs, RCA-7360 is the small-but-mighty tube that can "double-up" on a number of exciter functions at frequencies up to 100 Mc. It simplifies circuitry—makes it practicable to use inexpensive components.

Here's how it operates! The cross-section shows the main elements of the RCA-7360. The single flat cathode, control grid, and screen grid form an electron gun which generates, controls, and accelerates a beam of electrons. The total plate current to the two plates (at a given plate voltage) is determined by the voltages applied to the control grid and the screen grid. This total plate current varies with the bias or signal voltage on the control grid as in any conventional tube. The division of the total plate current between the two plates is determined by the difference in voltage between the two deflecting electrodes.

RCA-7360's are now available at your RCA Industrial Tube Distributor. For a technical bulletin on RCA-7360, see your RCA Industrial Tube Distributor. Or write RCA, Commercial Engineering, Harrison, N. J.

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