Buy power output at 3 cents a watt...

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Power Triode

GET substantial output at a bargain tube
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260 w respectively the max input per tube,
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HAVE YOU NOMINATED YOUR
CANDIDATE FOR THE
1952 EDISON AWARD?

A month ago, this page announced
the Edison Amateur Radio award for
1952, and told in detail how you can
enter your candidate. Nov.-Dec. Ham
News also will carry the facts. If your
nominating letter hasn’t been written
and mailed, it would be well to get
your candidate’s name, address and
call letters, and a description of his
meritorious public service, on record
with the Award Committee. Letters must
be postmarked not later than December
31, 1952. Presentation of the Edison
Award to the winner will be an important
event, receiving national recognition.

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

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16A-1810
THE KW-1 represents Collins' whole-hearted attempt to minimize higher order harmonics which tend to interfere with TV reception. All precautions possible were built into the transmitter by keeping the harmonic content of the various transmitter circuits at a low value, then filtering and shielding of all leads were added to minimize leakage of these harmonic voltages.

The exciter portion of the Collins KW-1 uses approximately twice the average number of tuned circuits used in ordinary transmitters, thus contributing to low harmonic output from the exciter with the added advantage of reduced subharmonic radiation from the antenna. In addition, another premium feature — a variable vacuum capacitor is used in the Class C amplifier with very short low inductance leads connecting from the plates of the amplifier tubes to the variable capacitor — thus providing a low impedance path to ground for harmonic currents. A pi-L network — developed by Collins — provides increased harmonic attenuation without adding operating difficulties or additional controls.

- The r-f section is completely shielded with closely spaced screws to insure good bonding between the portions of the shield.
- All leads carrying power and control functions into the r-f unit are adequately filtered to minimize radiation of undesirable harmonic energy.
- A low pass filter at the output provides additional attenuation of harmonics, virtually eliminating the appearance of power at television frequencies at the antenna.

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NOVEMBER 1952
VOLUME XXXVI • NUMBER 11

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

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Subscription rate in United States and possessions, $4.00 per year, postpaid.
$5.00 in all other countries. Single copies, 40 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.


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Finally! No More TV Harmonic Problems!

The New Hallicrafters HT-20 is T.V.I. proofed!*

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- Moderate cost.

* T. V. I. PROOFED—means that this transmitter has circuitry specifically designed to eliminate spurious and harmonic energies that result in television interference.

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The following people were the first 40 to work all states and obtain a General or Conditional Class Amateur License during the Hallicrafters 1951-1952 Novice Class Radio Amateur Contest. Our heartiest congratulations!

Additional winners received after publication date will be notified by mail.

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Reports Invited. All amateur, especially League members, are invited to report station activities on the last of each month (for preceding month) direct to the SCM. The administrative SCM, elected by members in each Section, Radio Club reports are also desired by SCMs for inclusion in NW. All ARRL Field Organization appointments are now available to League members, also, we have released the SCM's desire for new appointments for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, all amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (as for Form 7).

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representation of the radio amateur in legislative matters, and for
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136 Broadwater St., S. E., Orangeburg, S. C.

Southwestern Division
LEE HILL ............... W6DOL
104 North Center, San Antonio, Tex.
Vice-Director: Ernest W. Barr ....... W6GOR
911 Rosemary Ave., SW, Atlantic, Ga.

Southern Division
JOHN H. GRIGGS .......... W6W6
10412 Leon Pines Blvd., Largo, Florida, Calif.
Vice-Director: Walter R. Jones ...... W6EEM
1015 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division
A. DAVID MIDDLETON ......... W6CA
9 Kay Road, Temple, N. M.
Vice-Director: Frank E. Fisher .......... W5AHT/A2T
104 E. 11th, Pawhuska, Okla.
“It Seems to Us...”

HISTORY IN THE MAKING

Did you ever have the chance to sit in on history in the making? You probably have but didn’t realize it at the time, because it takes a mighty good man to recognize the complete worth of an idea when it is first generated. If you were a reader of QST just 20 years ago, you were in on history. Drag out the files, and we’ll show you.

The first article in the June issue was by James J. Lamb, W1AL, and was titled “What’s Wrong With Our C.W. Receivers?” It looked technical and had a few graphs and block diagrams, but if you read it through you found that it proposed the principle of eliminating the audio image by using a superheterodyne with high I.F. selectivity and an off-set beat oscillator. This probably sent you scurrying to the “Calls Heard” list, because you didn’t want anything to do with a superheterodyne — they were for a few “phone men who didn’t care too much about sensitivity. (Everyone knew a detector and one audio was “tops” in sensitivity!)

Still, the editors of QST must have thought it had some merit, because the August issue carried the first of two constructional articles that told how to build such a monster. They even prefaced this one with a box that read: “The method of reception disclosed in this article establishes a new standard in amateur receiver performance, bringing it to par with crystal-controlled transmission. The receiver described is capable of thoroughly useful selectivity that not only greatly increases the effective width of our bands but also places the deserved high premium on the good steady signal, and watt for watt, puts the unstable signal in the background where it belongs.”

But what a receiver! It used a low-frequency quartz crystal in a filter circuit, and you weren’t too familiar even with those transmitting crystals that were just coming into popularity.

However, in spite of the complexity (in comparison with the usual regenerative detector and one audio), enterprising hams built this receiver. We recall one fellow who said, seriously, that he had the receiver working for a week before he realized it was working, the thing was so sharp!

Yes, it was just 20 years ago that QST’s Technical Editor Jim Lamb introduced to the radio world the principle that is now standard in all good c.w. receivers, even though there are still a few operators who don’t take advantage of it. We say that was history in the making, because the innovation of 1932 is still standard practice in 1952.

That was a package job, handed out through QST in four months. More recently, but spread over a longer period, you have been in on history in the making, in the many QST articles dealing with TVI prevention and reduction. We are willing to go out on a limb and predict that the transmitter precautions outlined by Technical Editor George Grammer, Technical Consultant Philip S. Rand, jr., and others, especially in the past two years, will remain the standard for years to come.
Before neighbors of W9GUX got to their psychiatrist, Jim explained to them it was his ham transmitter that was intermittently recording a strange voice on their tape recorder.

WN0DZU worked W0KYF on 145-Mc, phone at 2005 CST on July 30th, 1951. Now WN0DZU, he would like to hear from ex-Novices who had earlier 145-Mc. QSOS.

W1QMJ's dad edits a firemen-hams column in the National Fireman Register, a publication devoted to followers of firefighting techniques and associated lore.

From an Associated Press dispatch:
Army Sgt. Joseph S. Martin, operating AG2AB in Trieste, was having a pleasant chat with VP6SD in Barbados.

"Say," he asked the VP6, "do you know any Martins there? I was born in Port of Spain, Trinidad, but a lot of my relatives are in Barbados."

VP6SD turned out to be the Sergeant's uncle, whom Joe hadn't seen for 22 years—W2KAD/1

Technical Cooperation Administration Radio Officer Dan Scherer, W4VXV (ex-W2NVH), and Dr. Guy Black, W6RLB, Director of Conference Aides for the International Conference on Agricultural and Cooperative Credit, teamed up to facilitate effective use of tape and reference recorders at all sessions of this recent University of California parley.

W6RLB is Assistant SCM, East Bay Section, and W4VXV is a former editor of the Voice of America Amateur Program series.

U. S. military and civilian personnel temporarily overseas are reminded that they may apply for Conditional Class licenses by mail; while such license-holding would not authorize amateur operation overseas, it would provide a start on the "experience" required for higher-grade licenses should the holder be interested in applying for such upon his return to this country. Details as to procedure are in the License Manual, but to get application blanks and examination papers those in the Atlantic region (Europe, Africa) should write FCC, Washington 25, D. C.; those in the Caribbean, to FCC, 312 Federal Bldg., Miami, Fla.; and those in the Pacific, to FCC, 502 Federal Bldg., Honolulu, T. H.

In addition, a recently-adopted FCC action permits military personnel overseas who will have held a General Class license for at least one year by Dec. 31st, 1952, to take the Advanced Class exam by mail any time between now and Dec. 31st.

TVI LECTURES
ARRL's Technical Consultant, Phil Rand, W1DBM, is continuing to give his popular talks on TVI before various groups. If you're having TVI trouble and would like to get some more information on the subject, see if you can't make one of the following dates. Bring your TV service-man along, too!

The Boston Chapter of the IRE Broadcast Group will have Rand as a speaker on October 28th, with the meeting to be held at Huntington Hall, Massachusetts Institute of Technology, Cambridge, 8:00 p.m.

Rand will speak before the Baltimore section of the IRE on November 12th, at 8:30 p.m., in Remsen Hall at Johns Hopkins University.

On November 20th, at 8:00 p.m., he will speak on TVI at the PEPCO (Potomac Electric Power Co.) Auditorium, 10th and E Streets, N.W., Washington, D. C., with this meeting sponsored by the Washington TVI Committee.

HAMFEST CALENDAR
WISCONSIN—Sunday, December 7th, at Petrifying Springs club house, Kenosha, Wisconsin. Annual Operation Festivus, sponsored by the Kenosha Radio Communications Society, includes a transmitter hunt and entertainment. Plenty of hot barbecues and coffee. Follow Highway 41 to A or Highway 31 to park. All bands will be covered for mobile operation except 2 and 8. Donations will be accepted. For further information write Mrs. C. F. Dickinson, 7034 29th Avenue, Kenosha, Wis.

Quist Quiz

Our friend A has an inspiration for a simple super-selective c.w. receiver. He plans to take the output of the regular 450-kc. i.f. amplifier in his receiver and drive a doubler stage with it. Thus signals in the i.f. at 449, 450 and 451 kc. will appear at 898, 900 and 902 kc., separated by 2 instead of the original 1 kc. Passing them into another receiver, they will then be easier to separate, he reasons. Why hasn't someone thought of this simple idea before?

(Silent Keys)

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

ex-W2MKL, L. Lawrence R. Gebert, USNR, Corpus Christi, Texas
W3NVM, Thomas T. Tafalavacce, Mahanoy City, Pa.
W3WYJ, Louis J. Kozub, Pittsburgh, Pa.
W4QGH, George T. Rassell, East Gadsden, Ala.
W4WLT, Coleman Puckett, Lisbonia, Ga.
W5LCC, Henry K. McClune, El Reno, Okla.
W6FEW-W7IEH, Leonard A. Storm, Jr., El Cajon, Calif.
W7RBO, Frank C. Parich, Henderson, Nevada
W9QCA, Donald L. McCaskell, Watertown, Wis.
W9YIP, Richard Sustashek, Kaukee, Wis.
W6AUM, Andrew H. Freimuth, St. Louis, Mo.
W9DE, Richard O. Spry, Waterloo, Iowa
VE1BD, E. S. Wright, Summerside, P.E.I.
VE1DI, A. H. Love, St. John, N. B.
EL3T, D. J. Reoebe, Dublin.
ZLIAJL-VRSGA, Pat Spary, Kamo, N. Z.
A 100-Watt Rig for 2 at Moderate Cost

BY C. VERNON CHAMBERS, W1JEQ

Thanks to its availability at almost giveaway prices on the surplus market, the 829B has for some years been standard equipment for the final stages of 2-meter transmitters in the 100-watt class. This was fine—until surplus stocks ran out. Fortunately, it wasn’t long before an inexpensive substitute appeared in the form of the 6146. Tests with the transmitter to be described here indicate that a pair of these new tetrodes operate fully as well on 144 Mc. as a single 829B, and they cost about half as much.

The transmitter shown was designed primarily to exploit the 6146s, and consequently it was built in a hind-to-end manner, starting with the final amplifier and working backward. Several experimental finals were built and discarded before the objective, a stable amplifier that would be easy to build and adjust, was attained. After the amplifier had been completed it was set aside and the exciter built.

The sectional construction makes possible an amplifier design that can be duplicated by anyone who already has an exciter that was formerly used to drive an 829B. It also allows the builder of a complete rig to substitute his own exciter design, in case his idea of a desirable 2-meter exciter differs from the one shown. Almost anything capable of delivering 5 watts or more of 144-Mc. r.f. will do the trick.

Circuit Details

The line-up for the transmitter as shown consists of a 12AV7 dual triode overtone oscillator and tripler, and a pair of 5763s operating as a push-pull doubler driving the 6146s in push-pull. The amplifier has a self-resonant grid circuit, practically a necessity because of the high input capacitance of the 6146s. Its plate circuit is a copper tuning line, tuned by $C_{16}$ which is connected part way out on the line from the tube plate caps. Neutralization of the amplifier is done by series resonating the screen circuit by means of $C_{14}$.

A 6Y6G protective tube works in conjunction with a Type 0A3 regulator to prevent excessive plate dissipation when excitation is removed from the tubes. This permits c.w. keying in a preceding stage and avoids breaking the final cathode circuit. $S_1$ is connected across the 0A3, so that the latter may be shorted out when the rig is plate modulated. Output from the amplifier is fed to the coaxial output jack, $J_9$, through a swinging loop, $L_9$, that is in turn series-tuned by $C_{17}$.

A six-position metering circuit allows all important circuit currents, with exception of the final plate input, to be registered by an externally-connected milliammeter. The amplifier plate circuit is not included in the meter-switching system because we wished to keep this current under constant observation.

The transmitter is keyed in the cathode circuit of the 5763s for c.w. operation. For chipless keying the 12AV7 should be run from a separate supply, or its plate voltage otherwise maintained constant at 300 volts during keying. This may be done by connecting a pair of VR-150s in series across the exciter power supply and drawing the oscillator plate current from that point.

Power supply requirements for the exciter section of the transmitter are 300 volts at ap-

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* "Tailor-made for 2" is just one of the claims that have been made for the popular 6146. This transmitter uses a pair of these tubes at 144 Mc. and its performance proves that somewhere there is a competent tailor who is a v.h.f. man at heart.
Fig. 1 — Circuit diagram of the 144-Mc. transmitter.

C1, C2, C3, C4, C5, C6, C7 — 0.001-mfd. disc ceramic,
C2 — 50-mfd. variable (Hammarlund HF-50),
C2 — 22-mfd. mica,
C4, C5 — 15-mfd. per section (Hammarlund HFD-15X),
C6, C7 — 3-30-mfd. trimmer.
C3, C8 — 15-mfd. mica.
C11, C12 — 30-mfd. per section (Hammarlund HFD-30X),
C13, C14 — 30-mfd. variable (Hammarlund HF-30X).
R1 — 4700 ohms, 1/2 watt.
R2 — 17,000 ohms, 1/2 watt.
R3, R5, R6, R12, R19, R14 — 100 ohms, 1/2 watt.
R4 — 220 ohms, 1/2 watt.
R5, R11 — 20,000 ohms, 1/2 watt.
R6, R10 — 10,000 ohms, 1/2 watt.
R8 — 100 ohms, 1 watt.
R9 — 15,000 ohms, 1 watt.
R15 — 10,000-ohm adjustable, 25 watts.

L1 — 10 turns No. 20, 1/2-inch diam., 3/4 inch long.
L2 — 6 turns No. 20, 1/2-inch diam., 3/4 inch long. (Note: L1 and L2 made from one length of B & W 3005.)
L3 — 6 turns No. 18, 3/8-inch diam., 3/4 inch long, tapped at center (B & W 3005).

L5, L6 — 3 t. hook-up wire, 3/8-inch diam., close-wound.
L8, L9 — See text.
J1 — Closed-circuit jack.
J2 — Coaxial-cable connector.
RFC1, RFC2 — 1-ohm, r.f. choke (National R-50).
RFC3, RFC4 — 7-ohm, r.f. choke (Ohmite Z-50).
RFC5, RFC7 — 1.8-ohm. (Ohmite Z-144).
S1 — S.p.s.t. toggle switch.
S2 — 2-pole 6-position selector switch (Centralab 1411).
T1 — 6.3 volts, 6 amp. (Merit P-2947).
Approximately 150 ma. ICAS 'phone ratings for the 6146 at 145 Mc. suggest a d.c. input of 360 volts at 278 ma., and the maximum c.w. rating is 440 volts at 205 ma. To avoid the inconvenience of changing the supply voltage when going back and forth between 'phone and c.w. operation, we have been running the final with a 400-volt power pack. An input of 100 watts for 'phone work is obtained by loading the amplifier to 250 ma., and the current is raised to 325 ma. for a c.w. input of 130 watts. Novices desiring to use this design may reduce either the loading or the final plate voltage to stay within the 75-watt limit.

**Construction**

Photographs of the transmitter show an absence of crowding anywhere within the unit. Reasonable compactness in the interest of short leads should be striven for at the r.f. end of the 7 × 17 × 3-inch aluminum chassis. The layout shown places the three low-level tubes on a line 3 inches in from the left end of the chassis. There is a 1½-inch interval between the centers of the sockets and the two variable capacitors, C4 and C12, are centered off to the left and right by a distance of 1¾ inches, as seen from the bottom view. The aluminum brackets that support C4 and C12 are high enough to place the shafts of the capacitors at the center of the chassis depth. Copper strips, approximately ¾-inch wide, are used to connect the plate pins of the sockets to the variable capacitors.

The placement of below-deck components not associated with the r.f. circuits is not at all critical and may suit the individual taste. However, it is advisable to leave the mounting and wiring of T1 until after the amplifier and the exciter chassis have been fastened together. The large ventilation holes punched through both chassis to provide ventilation for the 6146s cannot be easily marked or otherwise worked on if the transformer is mounted at this time.

**The Amplifier**

The amplifier of the transmitter uses a 5 × 7 × 3-inch aluminum chassis and an L-shaped aluminum section measuring 2½ × 5 × 3 inches. A single top plate with ¼-inch diameter ventilation holes is used to cover the two compartments. If anyone intends to construct only the amplifier part of the transmitter, it is suggested that topside combination consist of a 5 × 10 × 3-inch chassis and a 3 × 5 × 3-inch end compartment. In this case, a chassis measuring 5 × 13 × 3 inches may be used as the lower deck.

As shown by the open view of the amplifier, the tube sockets are mounted on metal pillars on the inside of the chassis. This arrangement has been used previously to good advantage, and is one of the constructional features resorted to in the attempts to stabilize the 6146 circuit. With this arrangement, it is necessary to provide short, solid ground paths for socket pins Nos. 1, 7, 4, 6 and 8. This bonding can be accomplished most easily if performed before the sockets are bolted to the chassis. The most convenient system is to mount a pair of soldering lugs on a ¼-inch metal pillar at each end of the sockets. The lugs are then twisted around, so that one pair may be soldered to Pins 4 and 6, and the other pair to Pins 1, 2 and 8. The nuts that have temporarily held the lugs in place may now be removed while the sockets are mounted over the ¼-inch clearance holes located in the end of the chassis.

The plate line for the amplifier is formed by bending a 9¾-inch length of ¼-inch diameter copper tubing around a ½-inch drill or dowel. At the open end of the line, the plate caps are securely held in place by wire lacing that has been freely covered with solder. Inasmuch as the line has little weight, it may be supported by means of the leads which run down to the stator terminals of C12. These leads connect to the line at a distance of 2 inches in from the open end.

The variable output link is made from an 8-inch length of No. 12 enameled wire that has been covered with spaghetti. The loop has a ⅝-inch spacing between sides, a 2¾-inch length that couples to the plate line, and 1½-inch vertical section that permits the ends to pass down through slots that were drilled in a length of ⅜-inch diameter polystyrene rod. Wire coils, soldered to the loop on either side of the rod, hold the loop in place. The rod is then mounted in a solid insulated shaft coupling that is in turn mounted on the shaft of a panel-bearing assembly.

At the grid end of the amplifier C14 is mounted on the outside wall of the chassis just above the tube sockets. RFC6 and RFC8 mount between the
tube sockets and the shield partition of $C_{14}$. The partition is insulated from ground and from the rest of the circuit and, as a result, it may be used as a tie-point terminal. $L_7$ is self-supporting and is mounted directly on the grid terminals of the sockets and $C_{13}$ and $R_{12}$ each have one end connected to a 2-terminal tie-point strip that is located in back of the rear tube socket.

After the aluminum doghouse has been bolted to the amplifier unit, the assembly should be positioned on the exciter chassis so that holes for mounting and ventilation may be marked and punched. The holes knocked out beneath the 6146s should be approximately 1/4 inches in diameter and the other ventilation openings, located near the right end of the chassis, may be cut with a 1/2-inch drill. The last operation to be performed prior to the bolting together of the two chassis is the drilling of clearance holes for the spade lugs that pull the doghouse down against the large chassis when the assembly is completed.

**Testing**

With 115 volts a.c. connected to the heater transformer, and with the exciter power supply turned on, the oscillator, the multiplier and the doubler are each tuned for resonance. Proper operation of these stages will be indicated by a plate current of approximately 18 ma. for each section of the 12A7, by doubler grid and plate currents of approximately 5 and 80 ma., respectively, and by maximum amplifier grid current. In the process of tuning the exciter, it will be found that the oscillator functions most smoothly when the plate tuning capacitor is set to the low-capacitance side of resonance. Adjustment of overtone oscillator circuits has been covered in detail in QST and the Handbook. Balancing capacitors $C_6$ and $C_{13}$ must also be adjusted during the alignment and correct setting for the capacitors will result in maximum output from the multiplier and the doubler circuits.

Before power is applied to the final amplifier it is advisable to experiment with the spacing between turns of the grid inductor, $L_7$. When this coil has been properly resonated and with $L_6$ and $L_4$ adjusted for optimum coupling, it should be possible to obtain an amplifier grid current of 6 ma. or better. It will be found that the tuning of the screen capacitor, $C_{14}$, has an effect on the grid current and that maximum current is obtainable with $C_{14}$ set at almost minimum capacitance.

The amplifier is prepared for testing by connecting a 60-watt lamp bulb to the output jack, $J_2$, and by switching $S_1$ to the 'phone position. When plate power is applied, the amplifier should be resonated by means of $C_{13}$ and then loaded to the desired level by adjustment of the variable link and the series capacitor, $C_{17}$. As the loading adjustments are being carried on, it is necessary to make repeated checks of the amplifier screen voltage. With a 400-volt supply in use, the tap on $R_{15}$ should be adjusted to deliver 150 volts to the screen circuit when the amplifier is fully loaded. The 144-Mc. doubler should now be retuned for maximum output inasmuch as the preliminary adjustment of this circuit is usually thrown off when power is applied to the 6146s. Grid current for the final should measure 4 ma. when the transmitter is completely aligned and fully loaded. Under these same conditions, the screen current should be approximately 22 ma.

Proper adjustment of the screen capacitor, $C_{14}$, is usually indicated by the simultaneous occurrence of maximum grid current and minimum plate current when $C_{13}$ is tuned to resonance, and by lack of oscillation when excitation is removed. To make a more comprehensive test of amplifier stability, remove the 0Y9 protective tube and operate the final with excitation removed. Under these conditions, it is advisable to lower the power supply output to approximately 200 volts and, even at this reduced input, to make the test of the shortest possible duration. Naturally, the screen capacitor should be adjusted so as to prevent self-oscillation of the amplifier.

Both the voltage and the current for the screen circuit will drop slightly when the 0A3 is activated for c.w. operation of the transmitter. When excitation is removed from the final by keying, the plate current for the stage should fall to less than 75 ma.

In conclusion, we should like to add that the 6146 really does seem to be tailor-made for 2. The amplifier leaves little to be desired from the standpoint of efficiency at 144 Mc. and it handles just as well at v.h.f. as the 807 does at lower frequencies.
Where Is Your Mobile Signal Going?

A Simple Method for Checking Antenna Patterns

BY HOWARD J. HANSON,* W7MRX, EX-KR6EK, EX-J2UUU

It didn’t take long after I installed the “Pacific Northwest’s Best Mobile” to discover that the radiation was far from uniform in all directions. For 10 meters, it uses an 8-foot-plus whip mounted on the left rear bumper of my 1948 Hudson sedan, and the whip leans back about 15 degrees from the vertical, in the hope that this will reduce absorption of the radiated energy by the car body. But received signals would suddenly rise or drop when I turned corners, and I soon became curious as to which direction or directions were my strongest, and which my weakest. Local experts informed me that an antenna mounted like mine, on the left rear bumper, threw its main and strongest lobe forward—some said over the right front fender. This did not seem logical to me, since it was my opinion that the metal back of the car would act as a plane reflector, throwing the main lobe to the rear in a rather broad pattern. Finally, with the help of Everett “Bud” Young, W7HMQ, of Puyallup, I checked the actual radiation pattern, and discovered that the local experts and I were both partly right. The pattern has two main lobes—one to the front, and another slightly larger one, to the rear.

Measuring the Pattern

Not having access to a conventional field-strength meter, Bud and I used the S-meter on his HRO-7 with the following technique: About half a mile from his house, and on the same side of the street is a large open baseball field. The street between Bud’s house and the field is perfectly straight, thus furnishing a direction reference. I selected a spot on the field about as far from the road as I knew Bud’s antenna to be, and proceeded to mark out directions on the ground. The base line ran parallel to the road, the second line at an angle of 30 degrees, the third line at an angle of 60 degrees, and on around a complete circle in 30-degree steps.

I then maneuvered the car so that the left side was parallel to the base line pointing toward Bud’s house, and the antenna itself directly over the intersection of the various lines. I gave Bud a call, told him I was ready, and he set the r.f. gain on his HRO to give me an exact S9 reading on the S-meter. This provided a signal-strength reference. I next re-parked the car on the 30-degree line, gave Bud a call, and recorded that S-meter reading. In a similar fashion I got a signal-strength report for each orientation of the car. In order to minimize effects of relay-contact resistance, momentary generator surged, etc., we actually took three readings in each position, and used the average for our chart. After all readings were taken, I held the transmitter on and turned slowly in a complete circle while Bud watched his meter carefully for any sharp variations in signal strength between the 30-degree points. There was none, so the final plot may be accepted as a fairly accurate representation of the pattern. The readings are shown in Table I.

![Diagram](image)

Fig. 1 — The antenna pattern, plotted from the data in Table I. The car is headed toward 0°.

<table>
<thead>
<tr>
<th>Azimuth</th>
<th>S Reading</th>
<th>Db.</th>
<th>Db. over Lowest</th>
<th>Power Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>9.0</td>
<td>27.0</td>
<td>6.6</td>
<td>4.6</td>
</tr>
<tr>
<td>30°</td>
<td>8.7</td>
<td>26.1</td>
<td>5.7</td>
<td>3.7</td>
</tr>
<tr>
<td>60°</td>
<td>7.8</td>
<td>23.4</td>
<td>5.0</td>
<td>3.0</td>
</tr>
<tr>
<td>90°</td>
<td>7.0</td>
<td>21.0</td>
<td>6.6</td>
<td>1.15</td>
</tr>
<tr>
<td>120°</td>
<td>8.8</td>
<td>26.4</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>150°</td>
<td>8.8</td>
<td>26.4</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>180°</td>
<td>9.3</td>
<td>27.9</td>
<td>7.5</td>
<td>5.6</td>
</tr>
<tr>
<td>210°</td>
<td>8.8</td>
<td>26.4</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>240°</td>
<td>8.4</td>
<td>25.2</td>
<td>8.0</td>
<td>3.0</td>
</tr>
<tr>
<td>270°</td>
<td>8.5</td>
<td>20.4</td>
<td>9.0</td>
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</tr>
<tr>
<td>300°</td>
<td>7.8</td>
<td>21.0</td>
<td>5.6</td>
<td>1.4</td>
</tr>
<tr>
<td>330°</td>
<td>8.2</td>
<td>24.6</td>
<td>4.2</td>
<td>2.6</td>
</tr>
<tr>
<td>360°</td>
<td>9.0</td>
<td>27.0</td>
<td>6.6</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Plotting the Results

To draw the diagram, we converted the S-meter readings to db., at the rate of 3 db. per 8 unit (third column). Next, we subtracted the lowest db. figure from all readings to get the fourth column—db. over lowest reading. Last of all, (Continued on page 104)
A Cool Kilowatt

Putting the Cabinet To Work

BY J. ERNEST SMITH,* WIPIE

HAVING collected some husky transformers from war surplus, I wanted a pair of tubes to match, and finally wound up with RK-65s in the final, with another pair as Class B modulators. (The RK-65 makes an excellent zero-bias high-µ tube by tying the grids together.)

A type of construction used in many b.c. transmitters allows maximum air flow for cooling purposes, and this rig was built in much the same way, with some chassis simplification. A blower bought for the rig has never been used — it isn’t necessary.

The accompanying photographs illustrate several features of the construction.

(Above): The basic idea of this construction is the use of the side walls of the cabinet for chassis support. This side view of the final amplifier shows how the arrangement permits short grid and plate leads in an r.f. amplifier.

(Left): The tubes and meters are clearly visible through holes in the panel that are covered with wire mesh for better shielding against VHF. U-channels on each side of the cabinet at the rear (not visible here) carry all inter-chassis wiring.

*33 Howland Road, West Newton, Mass.
(Below): This arrangement affords convenient shielding between the r.f. components and the d.c. leads on the other side of the wall. The parasitic suppressors and neutralizing condensers were not needed, but they were easier to leave in than to remove.

(Below): The screen audio chokes and the filament transformer are mounted on the other side of the dish. Short leads from filaments to transformer minimize the voltage drop. The primary voltage of 220 is selenium-rectified for protective grid bias.

(Right): Rear view of the cabinet shows all of the units mounted on the side walls. Class B modulator is mounted opposite final amplifier — power supply at bottom uses separate rectifier and filter systems to distribute weight of heavy filter components.
More Effective Utilization of the Small Power Transformer

An Economical Dual Power Supply for the Novice-Type Transmitter

BY GEORGE GRAMMER, W1DF

It is perhaps not generally appreciated that there are some factors entering into the design and use of replacement-type power transformers that can be employed to advantage, although in somewhat unconventional fashion, in powering small transmitters. The resultant saving in weight, space, and money is worth considering when laying out a power supply circuit for, for example, a Novice, portable, or just plain low-power rag-chewing transmitter consisting of an oscillator, a buffer (possibly), and an 807 or comparable tube as the final amplifier. The accompanying photographs show a supply that delivers two voltages—one, approximately 240 at a load of 30 ma. or so; the second, 600 volts at a load of 90 to 100 ma. The transformer is a replacement type made by several manufacturers, and has a high-voltage secondary rated at 360 volts each side of the center tap and a d.c. output current of 110 ma. Yet it is not overloaded when delivering the outputs mentioned above; if anything, it runs considerably cooler than it would at its “normal” ratings.

There is nothing resembling magic in it. It is simply a question of utilizing to best advantage the power capacity built into the transformer. There are three reasons why the ratings seemingly can be increased, assuming that a transformer of the receiver or replacement type is properly designed: first, it is built for continuous operation at full load; second, it is designed for working into a condenser-input filter; third, it has filament windings designed to handle a good-sized receiver or amplifier.

Continuous vs. Intermittent Duty

The amount of power that a transformer can handle safely is determined by the temperature at which it can operate without danger of damaging the insulation. The temperature in turn is determined by the rate at which heat is generated—i.e., the power loss in the transformer—and the rate at which the generated heat is radiated. The final temperature is reached when these two rates just balance each other.

There are two sources of power loss in a transformer, loss in the iron core—in a given transformer, this loss is practically constant regardless of the power being handled—and loss in the windings because of the current flowing through the resistance of the wire. The latter, generally called “I^2R” or “copper” loss, is very small (occurring only in the primary) when there is no output, but increases rapidly as more power is drawn from the secondary. Most transformers are designed with the object of making the core losses and copper losses just about equal each other when the transformer is delivering its full rated load, because the over-all efficiency of the transformer is highest under such conditions.

Now let us assume that the secondary load is a keyed c.w. transmitter, with the key down approximately half the time. Then the average power loss in the copper is only one-half what it would be where the key held down continuously. Hence we can double the key-down power loss and still not have the average loss exceed the value for which the windings were designed. Since the loss varies as the square of the current, the current taken by the transmitter can be increased in the ratio of √2, or 1.4 times the output current for which the transformer is nominally rated.

This example is somewhat oversimplified, since a transformer of the type we are discussing probably would not be entirely without load with the key up. At least some of the filament windings no doubt would be used, and there would probably be a bleeder across the high-voltage output consuming some power. These would reduce the ratio somewhat. However, the main point applies—if the transformer is designed for continuous

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operation, more power can be taken from it when a substantial part of the load is intermittent. (By intermittent is meant here that the load is on for relatively short periods — up to several minutes, possibly — and off for at least equal intervals.) But it does not apply to transformers rated for intermittent operation, such as the higher-power equipment sold under I.C.A.S. ratings.

Condenser- vs. Choke-Input Filters
The copper loss in the high-voltage secondary of a transformer working into a condenser-input filter is appreciably higher than it is when the same secondary delivers the same d.c. output current through a properly-designed choke-input filter. This is because the current waveform is highly distorted with condenser input and the current flows in pulses rather than in a continuous stream. There is no fixed ratio between the secondary losses with the two types of filters; it depends on the filter constants, the transformer characteristics, and the kind of rectifier tube or tubes used.

Measurements made with typical filters of both types, used with the transformer in the photograph, showed that for the same d.c. load current the secondary power loss was between 2 and 2.5 times as great with a condenser-input filter, using a high-vacuum rectifier. Consequently, about 50 per cent more current could be taken from the transformer with choke input than with condenser input, for the same secondary heating. Unfortunately, with choke input the

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1 Although this is a single measurement, it is probably safe to assume that the same ratio will hold in any comparable supply — that is, one using a high-vacuum rectifier and an input condenser of about 8 µfd. The ratio will increase if a mercury-vapor rectifier is used, and also to some extent if the capacitance of the input condenser is increased.
d.c. output voltage is considerably lower than with condenser input so there is no marked power advantage — it is simply a matter of swapping current for voltage. However, a check of the primary current showed that for the same d.c. power output the primary current with the choke-input filter was only about 0.7 of the value with condenser input. Hence the primary is better utilized with choke input. This is an important consideration, since all the power eventually realized has to pass through the primary.

The question is how to cash in on the advantage that results from choke input, since using it reduces the voltage to a value that would not be much good for an 807. There is an “out” in the bridge rectifier.

**Bridge vs. Center-Tap Rectifier**

The bridge rectifier is not much used in amateur circuits, although its characteristics are generally known. Principally, it requires four rectifier elements but does not require a center-tapped transformer. Thus by using the whole secondary the d.c. output voltage is twice what could be secured with a center-tap rectifier.

It does not automatically follow that the same d.c. output current can be taken in both cases. Twice the voltage at the same current means that the power output is doubled, and that in turn means that the transformer losses are at least doubled in the ordinary case. For example, in a transformer designed for transmitting plate supplies using choke-input filters, the bridge rectifier seldom offers any advantage because if the output voltage is doubled the current must be halved in order to stay within the transformer capabilities. But with a small replacement-type transformer we have seen that the secondary loss can at least be cut in half, for the same output current, by changing from condenser to choke input in the filter. In this case, then, the bridge rectifier does offer the possibility of getting twice the voltage at the same current, provided a choke-input filter is used.

Of course this means that the primary must be capable of handling the additional power, and in the type of transformer we have been discussing this is quite possible. First, as described above, there is a reduction in primary current in changing from condenser to choke input. This is worth, in this specific case, about 25 more watts of high-voltage output. Second, in powering a small transmitter we do not usually have to make full use of the filament secondaries. Transformers of the general type used here all have a 5-volt 3-amp. winding for the rectifier tube and a 6.3-volt winding with a current rating varying slightly from make to make. This particular one is rated at 4.5 amp., which will do well enough for discussion. If a rectifier tube having a 2-amp. filament is used we release 5 watts to the high-voltage end. If the transmitting tube filaments do not take more than 1.5 amp., a reasonable value, we release an additional 19 watts to the high-voltage supply, a total of 24. Added to the 25 saved by using a choke-input filter, we have close to 59 watts of primary capacity to spare for the extra load we expect to take from the secondary. It is ample.

**Rectifier Considerations**

A bridge rectifier offers some practical difficulties, if the cost is to be kept to a minimum. There would be no problem at all if there were available a double rectifier having separate, indirectly heated cathodes and a cathode-to-heater breakdown rating of 1000 volts or so. The best we could find in the tube manuals was the 6X5GT, which is a full-wave rectifier that does not have separate cathodes, and has a heater-cathode rating of only 450 volts peak. Two tubes were required, both to get the needed separate cathodes and also to get sufficient current-carrying capacity, by paralleling the elements in each tube. It was considered out of the question to light the filaments from the 6.3-volt winding on the transformer, since that winding would be connected to nega-

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Complete and ready to go, a 35-watt "package" for the 3.5- and 7-Mc bands is housed within this 9 1/4 x 17 x 11-inch cabinet. All of the operating controls are grouped about the National ACN vernier dial, which is calibrated for both bands.

"Packaging" 35 Watts for 80 and 40

A High-Performance VFO Rig for Fixed and Portable Use

BY RICHARD M. SMITH,* WIFTX

A "packaged" transmitter, meaning one that is complete in itself, is always an attractive proposition. The whole thing can be picked up and carried off on short notice to serve as emergency gear, as a Field Day rig, to fill in while a neighboring ham's rig is out of commission, or it can be installed permanently in the home shack as an auxiliary transmitter-exciter. Just such a rig is described here. It provides over 20 watts output in the 3.5- and 7-Mc amateur bands, has a stable variable-frequency oscillator, and an inexpensive built-in power supply. Provisions are included for break-in operation, and for "silent" zero-beating to eliminate "swishing" while the frequency is being changed.

The Design

Many portable or auxiliary rigs are built without much thought being given to the quality of the signal they put out. They over-simplify to such an extent that the resulting signal mimics a wandering whippoorwill. Not so in this rig. We wanted something good enough to rate inclusion as a permanent part of our station, even though it might only be used occasionally. Fortunately, this was possible without adding materially to either the cost or the complexity of the circuit.

Past experience with keyed-VFO rigs told us that chirp-free operation can be obtained only with plenty of isolation between the oscillator and the output stage, regardless of the type of oscillator used. The most effective way to achieve this is by operating the oscillator at least one band lower in frequency than any following stage. Adequate shielding of the oscillator grid circuit and voltage regulation are also required.

As shown in Fig. 1, the 6AG7 oscillator uses the "old fashioned" high-C Hartley circuit, cathode-keyed, and with regulated voltages applied to both screen-grid and plate. The grid circuit tunes from about 1.7 Mc. to just over 2 Mc. An untuned plate circuit using a 100-mH choke as the inductance is then capacity-coupled to the 6SK7 doubler which follows. This is a slight departure from earlier arrangements in which the untuned plate circuit utilized an ordinary 2.5-mH choke as the load impedance. It provides much better output in the 3.5- and 7-Mc ranges from the doubler stage.

The 6SK7 plate circuit can be tuned all the way from 3.5 Mc. to about 7.4 Mc., thus eliminating both plug-in coil and bandswitch requirements. Cathode bias and low regulated screen voltage combine to hold the operating conditions of this stage to the desired level. Actually, it operates just a bit beyond Class A conditions. Adequate excitation for c.w. operation of the 807 amplifier stage is obtained with this arrangement, and the frequency of the oscillator remains unchanged when the doubler is tuned through resonance, indicating that the isolation is excellent.

The amplifier stage operates with 45 volts of battery bias to limit plate current to a safe value when the key in the oscillator circuit is opened. We weighed the cost of a built-in bias supply against that of the battery, and found that the battery was considerably cheaper. With the meager grid current requirements of the 807, shelf life can be expected of the battery, so that it should last for at least a year under even heavy use.

A shunt-fed plate circuit is used in the 807

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Fig. 1 — Schematic diagram of the transmitter. To simplify the drawing, interconnecting power leads have been omitted. Supply leads are keyed, however, to the proper junction in the voltage-regulating network in the lower right corner of the diagram.

C1 — 660-muf. silvered mica (three 220-muf. units connected in parallel).
C2 — 140-muf. midget variable (Millen 19110).
C3 — 100-muf. midget trimmer (Millen 26100).
C4, C5, C6 — 100-muf. mica.
C7, C8 — 0.005-muf. disc ceramic.
C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25 — 0.001-muf. disc ceramic.
C26 — 225-muf. variable (National ST-225).
C27 — 300-muf. variable (National TMS-300).
R1, R2 — 47,000 ohms, 1/4 watt.
R3 — 470 ohms, 1/2 watt.
R8 — 15,000 ohms, 10 watts, wire-wound.
R9 — 10,000 ohms, 25 watts, with slider.
L1 — 10 µh., 27 turns No. 22 d.e.c., 1-inch diam., 15 inch long. Tap 9 turns up from ground end.
L2 — 100 µh, r.f. choke (National R-35; see text).
L3 — 11 µh., 32 turns, 3/4-inch diam., 1 inch long (B & W Miniductor No. 3012).
L4 — 7.3 µh., 24 turns, 1-inch diam., 1 1/2 inches long (B & W Miniductor No. 3015).
L5 — 2.5 µh., 14 turns, 3/8-inch diam., 7 3/8 inch long (B & W Miniductor No. 3011).
J1 — Closed-circuit phone jack.
J2 — Coastal output connector.
RFC1, RFC2 — 2.5-mh. r.f. choke (National R-1005).
RFC3 — 5-mb. r.f. choke (National R-1005).
RFC4 — 1-ah. r.f. choke (National R-33).
S — D.p.d.t. toggle switch with center "off" position (second pole used in power supply diagram, Fig. 2).

stage merely to simplify construction, as it permits plate tuning condenser C2 to be mounted right on the chassis. The LC circuit used here also covers the full range from 3.5 to 7.4 Mc.

A toggle switch is wired into the cathode circuit of the 807 so that the output stage can be made inoperative while frequency is being changed. The switch used is a double-pole double-throw unit with a center "off" position. One pole is wired as shown in Fig. 1 to open the cathode of the 807 circuit and short-circuit the key for zero-beating. When the "transmit" position, the switch grounds the cathode of the 807 and removes the short on the key. The other pole of the switch serves as the transmit-stand-by switch in the plate supply circuit, as shown in Fig. 2.

A voltage-regulating network, shown at the lower right in Fig. 1, is included on the transmitter chassis so that the rig may be used with an alternator power supply in the event of emergency or breakdown. Any supply capable of delivering 350 to 450 volts under a load of 150 ma. can be used. Connection between the transmitter and the power supply is through terminal strips (rather than a plug and socket combination), to make it a more universal arrangement. Each terminal in the transmitter is by-passed so that TVI-producing harmonics will not be radiated by the leads that leave the chassis, and all wiring except the r.f. leads uses shielded wire.

Construction

The panel layout is shown in the front view of the transmitter. The a.c. line switch is mounted just to the left of the main tuning knob. The transmit-tune switch is at the right of this knob where it can be reached easily by the thumb of the same hand that sets the oscillator frequency. The smaller dial in the lower left corner of the panel controls C28, the amplifier plate condenser, while the one just below the main dial controls doubler tuning condenser C19. The key jack is in the lower right-hand corner of the panel. Arrangement of the parts within the cabinet and on the transmitter chassis is shown in the top view. The 5 × 13 × 3-inch transmitter chassis is spaced 1 1/2 inch behind the panel, and rests on four small rubber feet bolted to the bottom cover. The power supply chassis, which is the same size as that of the transmitter, is bolted to the bottom of the cabinet at the rear. There is enough space on either side of the two chassis to hold the bias battery, and for passage of the necessary interconnecting cables.

1 Grammer, "By-Passing for Harmonic Reduction," QST, April, 1951.
The oscillator grid circuit is entirely enclosed in a 2 x 4 x 4-inch aluminum utility box, and is placed so that the shaft of C14, the bandspread condenser, is centered behind the main tuning dial. The entire shield box is shock-mounted, as shown in the close-up photograph. This is accomplished by slipping rubber grommets underneath the box, then passing long screws through grommet-lined \( \frac{3}{4} \)-inch holes in the chassis and then through another set of grommets. Washers large enough to hold the bottom grommets in place are slipped on next, and the assembly is fastened together loosely with lock washers and machine nuts. The lower half of this mounting can be seen in the bottom view of the box.

In addition to the oscillator tube socket, grid coil L3, bandsetting condenser C3, cathode choke RFC1, and all of the small parts of the oscillator grid and screen circuits are mounted inside the box. All of the wiring within the box is done before assembly, and the shielded d.c. leads are then cabled to come through one grommet-lined hole in the bottom of the box, while the unshielded (but insulated) r.f. lead from the plate of the tube passes through another. Corresponding holes for these leads are drilled through both the bottom cover of the box and the top of the chassis.

The remaining circuits can be seen in the bottom view of the transmitter chassis. In this view, all of the components associated with the amplifier circuit are grouped in a 5\( \frac{1}{2} \) x 5-inch shield compartment at the left. The doubler circuit and the voltage-regulating network are in the larger compartment at the right. It is necessary to insulate doubler tuning condenser C12 from the chassis. This is done by mounting it on a sheet of Millen Quartz Q supported by aluminum angle brackets. An insulated coupling passes the tuning shaft through the panel to the dial.

In the amplifier compartment, plate tuning condenser C22 is mounted right on the chassis, with L4 and L5 on \( \frac{3}{4} \)-inch ceramic stand-offs adjacent to it. Grid choke RFC3, which is needed to eliminate v.h.f. parasites, is mounted right at the tube socket. Bias choke RFC2, and plate choke RFC4, are mounted so that they are at right angles to one another to minimize feedback. The lead from the plate of the 6SK7 to the 807 grid passes through the shield partition in a small ceramic bushing. Coupling condenser C14 is on the amplifier side of the partition, with one end passing through the bushing to C12, the other supported by an insulated tie point that serves to hold the junction of the leads from RFC2 and RFC3.

The lead from the plate cap of the 807 to RFC4 is made of a length of RG-59/U coax, with the shield braid grounded right at the cathode pin of the tube socket. This serves as both a shield and a v.h.f. by-pass condenser to reduce the amplitude of high-order harmonics flowing above the chassis.

Output link L3 is made of smaller-diameter coil stock than the plate coil so that it will slide inside of L3 to provide adjustable output coupling. Fairly long leads on L3 are necessary, and the one which passes through a part of the length of L3 is insulated from it by spaghetti tubing.

**Power Supply**

The power supply circuit is shown in Fig. 2. Separate transformers for the filaments of the rectifier and the transmitter are used, and the otherwise-unused 5-volt winding on plate trans-
form the transformer $T_1$ is used to power an indicator light on the panel whenever the plate supply is turned on. The general layout of the power supply can be seen partially in the top view of the equipment in the cabinet. The plate transformer and the 5-volt filament transformer are mounted on top of the chassis, while the 6.3-volt transformer $T_2$ and filter choke $L_1$ are mounted below decks with the bleeder resistor $R_1$ and the filter condensers. A few ventilating holes are drilled through the chassis just above the bleeder resistor to allow the heat dissipated there to escape.

**Adjustment**

The first adjustment needed is to set the slider on the limiting resistor $R_5$ to the correct point. To do this, first connect a milliammeter in series with the VR tubes, turn the transmit-tune switch to transmit, and with the key open, adjust the slider on $R_5$ until the VR tubes draw between 35 and 40 milliamperes. (Remember to turn the plate voltage off before you touch $R_5$.)

Next, adjust the tuning range of the oscillator by setting $C_2$ and $C_3$ to bring 3500 kc. to the maximum capacity end of the range of the main tuning condenser. The bandspread dial will now tune from 3500 kc. to 3800 kc. in the 80-meter range, and the 40-meter band will cover about half of the dial travel. If operation in the upper half of the 3.5-Mc. band is desired, bandset condenser $C_2$ can be adjusted to bring 3800 kc. to the bottom of the dial.

If you are unable to cover all of the desired range, it may be because the capacitance tolerances of the condensers used to make $C_1$ have added up in the wrong direction. This difficulty can be corrected by substitution of different individual condensers, or by the addition or subtraction of capacitance to the circuit, depending upon whether the total works out to be too low or too high.

**Operation**

Once the preliminary adjustments have been made, the rig can be tuned up for operation. Only the plate current of the 807 stage is metered. More elaborate metering is not necessary, because all tuning can be done by observing this one circuit. Plate current in the 807 stage will be about 20 ma. when the key is open. This is a safe level, and produces cleaner keying than if cut-off bias had been used, because it adds to the over-all power supply regulation. When the doubler stage is tuned to resonance, plate current in the 807 stage will be driven up to a value as high as 125 ma., depending upon the setting of $C_8.$ If it happens to be set near resonance, (Continued on page 110)

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2 Of numerous ordinary 220-µfd. silvered-mica units tested, only one was within 5 µfd. of rated value. The highest value encountered was 245 µfd., the lowest 185 µfd. This, of course, will vary because most condensers are manufactured to a tolerance of ± 20 per cent. The only way to be certain is to pay the higher price for closer-tolerance condensers, but if a fair supply is on hand, the "right" value can usually be obtained with ordinary units.

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Bottom view of the transmitter chassis, showing the method of mounting the panel and the general interior layout. The components of the 807 circuit are in the small compartment at the left, the doubler tuning condenser $C_2$ in the center, the sockets for the VR tubes in the upper right corner, and the doubler just below them. The small by-pass condensers used to filter the supply leads are mounted right on the terminal strip in the lower right corner. Also visible between $C_6$ and the VR tube socket is one of the shock mounts for the oscillator box.
The Reception of Single-Sideband Signals

By Paul N. Wright,* W9OHM

According to many remarks heard on the amateur bands, single sideband (s.s.b.) is a mysterious bunch of gibberish that defies clear reception and causes an unwarranted amount of QRM. It is human nature to dislike anything not clearly understood. A problem not readily understood sometimes may be prepared for easy mental digestion by comparison. It is the purpose of this article to present a comparison of a s.s.b. "phone signal and an a.m. double-sideband-with-carrier "phone signal, and to describe two methods of s.s.b. reception.

Let us first consider the conventional a.m. signal, consisting of a carrier wave and two sidebands, one on either side of the carrier frequency. We will choose a carrier frequency of 1 Mc. and a convenient plate-modulated amplifier for our consideration. We connect a 1-ke. sine wave audio voltage to the input of our speech amplifier. At the output terminals of the modulated stage, there will appear three r.f. frequencies: 1000 kc., which is the carrier frequency; 999 kc., the lower sideband; and 1001 kc., the upper sideband. This is shown in Fig. 1.

In the reception of such a signal, it is necessary to provide a device that is able to detect the frequency difference between the sidebands and the carrier wave. This device is the amplitude-modulation detector. The amplitude detector transforms the frequency difference between the sidebands and the carrier wave into pulsating d.c. corresponding to the frequency difference, enabling us to recover at the receiving end the intelligence-bearing frequencies with which we started at the transmitter end (in this case, 1000 cycles). The frequency-mixing action of the modulated amplifier provides means for transforming the audio frequencies from the modulator into radio frequencies approximating the frequency of the carrier. Not only does the carrier transmitter and transmit only the two sidebands, the detector in the receiver would detect the beat between the sidebands instead of the beat between the sidebands and the carrier. The sidebands being separated from each other by twice the audio frequency will produce a beat twice the frequency of the original audio tone. This beat coming out of the detector would then appear as 2000 cycles instead of the original 1000 cycles. (See Fig. 2.)

Since the only part of an a.m. signal that does not vary in frequency is the carrier, it becomes readily apparent that the carrier could be replaced at the receiving end. Only a small fraction of a watt of carrier is required at the receiver, even on the strongest signal; whereas, to transmit the carrier sometimes requires as much as 1.5 kw. transformer primary power in an amateur transmitter. Only one sideband need be transmitted to produce the original audio frequencies at the detector output, so we can eliminate one or the other of the sidebands. The transmitted signal (or sideband) will then become simply a carrier (single tone sine wave audio input) that differs from the original carrier frequency by the frequency of the audio tone. (See Fig. 3.) A panoramic picture of a double-sideband signal with carrier and transmitting voice might appear as in Fig. 4A at some instant. An s.s.b. signal would appear as in Fig. 4B.

The pips or "grass" appearing on the base line of the panoramic pictures in Fig. 4 correspond to the individual frequencies comprising a rather complex voice wave, with components at 500, 1250 and 2500 cycles.

Bandwidths

All intentional transmission of radio frequency energy is done for the purpose of conveying thoughts from one place to another. C.w. has enjoyed the No. 1 spot down through the years as the most efficient method of transmission. This efficiency is obtainable at the receiving end because the unmodulated c.w. signal has no width; consequently, the selectivity of receivers can be increased many times beyond the bandwidth required for "phone transmissions.
The increased selectivity provides a much higher signal-to-noise ratio at the receiver. The number of e.w. signals that may appear in a given frequency spectrum without mutual interference is limited only by receiver selectivity, stability, and effects of keying. Unfortunately, this is not the case with ‘phone signals. In the case of ‘phone, the limiting factor is the width of the sidebands produced by modulation.

It is generally agreed that an audio bandwidth of 3000 cycles will allow sufficient fidelity of reproduction for transmission of the human voice. Any reduction below this figure will tend to reduce the intelligibility of the voice reproduction through removal of the overtones and sibilant sounds. It would seem, then, that the minimum bandwidth obtainable with d.s.b. transmission is 6 kc. Referring to Fig. 4B, we find that only one sideband is required to reproduce the original audio at the detector terminals in the receiver; so actually the additional sideband may be termed as excess baggage. It is not needed to reproduce the original modulation at the receiver. Further, comparing Figs. 4A and 4B, we find that by removing the unwanted sideband we cut the bandwidth in half. It appears rather obvious that this one stroke will permit twice as many stations to occupy a given spectrum. It will effectively double the width of our ‘phone band!

The Carrier

Upon further study of the chart, it would appear that we can improve the over-all efficiency of our transmitters by eliminating the carrier wave. Since the only intelligence-bearing energy transmitted is in the sidebands, the carrier does not contribute one bit at the transmitter end so far as intelligence is concerned. It has served its purpose of converting the voice modulating frequencies to radio frequencies; there its usefulness ends. From there on the carrier is excess baggage. So far as the detector in the receiver is concerned, it isn’t particular as to the source of the carrier. It can just as well be furnished from an oscillator at the receiving end. If we have succeeded in presenting the thoughts clearly to the reader up to this point, it will have become apparent that essentially, the s.s.b. signal is the same as the conventional a.m. signal, with the carrier and one sideband removed. Therefore, the only thing that needs to be done in order to restore the original intelligence is to replace the carrier on the signal before it reaches the audio detector in the receiver.

Reinserting the Carrier

In a superheterodyne receiver, the carrier may be replaced by injecting the carrier from an oscillator at the i.f. frequency into the i.f. section of the receiver, or by injecting the carrier from an oscillator at the signal frequency at the antenna terminals of the receiver.

If carrier injection from the b.f.o. in the receiver is used, the receiver should be adjusted as follows: First, with the receiver set up in the regular a.m. position, tune the bandspread dial for maximum deflection of the S-meter from the s.s.b. signal. Do not touch the bandspread dial after this. Next, reduce the r.f. gain to zero and increase the audio gain to maximum. Bring up the r.f. gain until the signal is heard at a comfortable level; then turn on the b.f.o. and carefully adjust the frequency of the b.f.o. until the voice sounds natural. If this procedure is followed closely, little difficulty should be experienced in tuning the signal, regardless of which sideband is being transmitted.

In using the b.f.o. method of carrier insertion, it should be pointed out that practical reception of s.s.b. signals depends upon the stability of the h.f. oscillator in the front end of the receiver, as well as the stability of the beat oscillator that supplies the carrier. Any frequency change in the h.f. oscillator produces the same effect as changing the frequency of the transmitter on the other end. The h.f. oscillator in most receivers is fairly stable on the lower frequencies. However, at frequencies above 5 Mc. the stability of many h.f. oscillators leaves much to be desired, when thinking in terms of the stability required from these oscillators when using i.f. carrier insertion.

In using carrier insertion at the signal frequency from an external oscillator, the procedure is as follows: With the receiver set up in regular a.m. position, first tune the bandspread dial for maximum indication of the S-meter from the signal. Then adjust the frequency of the external oscillator to the approximate frequency of the

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YLRL 13th Anniversary Party

YLs everywhere, it’s time again to keep two
week ends free and to notify the OM that he'll
be chief cook and bottle washer while you join in
the fun of the YLRL Thirteenth Anniversary
Party. Contacts should be easier to make this
year for the good reason that there are more girls
on the air now. Here are the rules — from here on
it’s up to you!

Dates; ‘Phone — Nov. 20th-30th; C.W. — Dec. 6th-7th.

Hours: Starts Nov. 20th & Dec. 6th 7 A.M. local standard
time; ends Nov. 30th & Dec. 7th 7 P.M., local standard
time.

Frequencies: All bands may be used. Net frequencies are
3610, 3900, 7040, 14,240 kc. It is suggested 14,150 kc. and
3740-3750 kc. be used, calling on the hour, for WN contacts.

Eligibility: Only YLRL members are eligible to compete.
However, all YLs are invited to participate and submit logs.

Exchange: RS or RST report and name of state, U. S.
possession, VE district, or country.

Operating: Call “CQ YLRL.” Skeds and crossband opera-
tion permitted. However, ‘phone to ‘phone or c.w. to c.w.
only.

Scoring: (1) 10 points for each YLRL member station worked,
multiplied by the number of different states (incl. and D.C., one state), U. S. possessions, VE districts, and
countries (except W and VE). Each station, state, possess-
on, etc., will count once only, regardless of frequency band
worked. (2) Count 1 point for each non-member worked
during the party period. These points to be added to total
after multiplying. Exchange report and state, etc., but these
states, etc., will not count as multipliers.

Awards: Highest ‘phone score — cup donated by
W1MCW and now held by W3IUG for two years; highest
c.w. score — cup donated by W4HWR and now held by
W1FTI for two years. These cups are awarded on a yearly
basis. A member winning the same cup three times gains
permanent possession. Second- and third-place awards for
both ‘phone and c.w. to be donated. Certificate for high
score in each U. S. district and country.

Logs: All participants are requested to submit logs
whether competing or not, to be postmarked not later than
Dec. 13, 1952, and mailed to Dorothy K. Wickenheiser,
W3SH, 1112 State Avenue, Cosopolis, Penn.

Keeping Up with the Girls

W12R, Edith, is doing fine work in training c.w.
operators for MARS nets. . . . WITKW teaches a group
of youngsters code and theory daily. Doris hopes to have a
member of the ready force for Washington, D. C. for the
festival, a 10-watt 10-meter rig has made W5TTU a happy YL.
While convalescing at Memorial Hospital, San Angelo,
Texas, Pat finds QSOs better than medicine. . . . W5OA
is a noncommissioned officer in the radio section. Donaldson
AFB, S. C. Building has been busy building a mobile rig for
10 . . . Winters are long in Alberta, but VE6YW finds
that they afford lots of time for working 50 and 40. Elin
enjoys leisure contacts with VE2YG, Nancy, and VE52O,
France. . . . Some new YLs are W2EKYE, Marie, Al-
bany, N. Y.; KN2AYL, Joyce, Schenectady, N. Y.;
WNSKLZ, Betty, Fliet, Mich.; WN8HES, Pauline, Weston,
W. Va. . . A few '8s via ham radio resulted in the mar-
riage of KN2AIC, Helen, and W2FHS. . . . W1USR,
Rita, finds it convenient to have her transmitter in
the kitchen. She thinks hamming and cooking a well-matched
pair. . . . W6WKR, Louise, would enjoy hearing from
friends while she recuperates from an illness . . . OM
W3CQY reports with pleasure that Sigrid Toppen removed
the “N” from her call and is now W3MVc, as a result of
interest, persistence, and W1AW. A junior at Cornell Uni-
versity, Sigrid is faced with a “no transmitters” rule in the
dorms, but she will be on from W2CCAX, the Cornell club
station . . . . W1NAD, Ina, and OM, WINDI, are teaching
code and theory classes for c.d. operators in Bedford, Mass.
. . . As president of the windy Net, W1TYR, Gloria, of
Weymouth, Mass., offers a certificate to anyone who works
ten net members . . . Time magazine disclosed that

There aren’t many YLs who take their amateur radio
exams on their wedding day. Lenore, W9MGT, can
claim that distinction, for on October 14, 1939, she mar-
mied Martin Zudovnik, W2BPR, and took her Class B
exam, too. Lenore now holds her Advanced Class license
and is active on all bands from her Milwaukee QTH.
And she’s a popular teacher at the Browning School in
Grandville, Wisconsin, where she organized the school’s
Radio Amateur’s Club and is president and trustee of
the school station, W9TBT. As a result of her code and
theory instruction, six YLs, six OMs (all age 9 to 13),
the fifth-grade teacher, and two interested parents are
now Novices. Many trips to the school kitchen for but-
ter for burned fingers have been necessary, but the
youngsters are really learning how to use a soldering
iron! — Photo courtesy W9MOT

(Continued on page 110)
Bandswitching the Antenna Tuner

A Five-Band Cabinet Unit for Powers Up to 500 Watts

BY J. F. WOHLFORD,* W4CA

EVER since hams got away from old-style breadboard construction, I've had a pet gripe. So often you will walk into a ham's shack and see a sleek six-foot rack-cabinet rig, resplendent in its chromium-trimmed cradle finish. You take in the operating table with its late-model communications receiver, bug stuck down at just the right angle, microphone at perfect speaking level, and the clock with its sweep hand right on the dot with WWV. Even the log book is turned to a fresh page and a pair of lately-sharpened pencils stand at rigid attention alongside. Everything oozes efficiency and beauty until you raise your eyes to the top of the transmitter cabinet. If you hadn't seen it so many times, you'd be startled at the dusty rat's nest of coils, clips, condensers and wires that leaves you with a vague impression of Raggedy Ann. Yes, I'm talking about the antenna tuner!

Sometimes an apologetic attempt is made to take the curse off the scene by hanging the antenna-coupler components from the feed-through-insulator rods behind the curtains at the window on the far side of the room, but somehow few hams seem to make provision for this all-important part of the rig. It usually ends up as an outboard afterthought.

Having recently acquired a Collins 32V-2 to go along with the 75A-2 receiver on the operating table, I decided to see what could be done about the rat's nest. I, for one, cannot see the point of spending a lot of dough for the convenience and trimness of a bandswitching rig and then hooking it up to a plug-in-coil tuner 25 feet from my operating chair. The antenna tuner is just as much a part of the operating gear as the receiver or the rig itself and should be treated as such.

The 32V-2 covers five bands -- 80 through 10. Therefore, the antenna unit should cover these bands, too. It ought to be built in an enclosure to harmonize with the other two units and be made as convenient to reach and operate. In other words, it should be a bandswitching unit in a cabinet that I could put on the operating table along with the other two.

Accordingly, I bought a cabinet that corresponded as closely as possible to the Collins job and started in. The wiring arrangement is shown in Fig. 1. Like most hams, I have room for only one antenna at a time. However, I like to try out new antennas from time to time. Therefore, the coils are fitted with clips to permit manual adjustment of the feeder taps to suit the particular antenna in use. Three pairs of switches are provided. One pair connects the transmitter output terminals to the proper antenna link, the second pair connects the antenna terminals to the appropriate coil, while the third pair switches the single tuning condenser.

Construction

The coils, condenser, and switches are assembled on a 13 × 17 × 3-inch chassis that fits into a 15½ × 21½ × 10½-inch cabinet with a hinged lid. The tuning condenser is mounted at the center on cone insulators and an insulating coupling is used on the shaft. The coils are grouped around the condenser, with the 80-meter coil at the rear and the others at the sides. The last four are mounted at an angle of about 45 degrees with respect to the sides of the chassis. While the coils themselves might be mounted on stand-off insulators, I have used a jack bar for each. Shielding between the coils was found unnecessary. The wires from the coils and condenser are run through grommet-lined holes down through the chassis to

*A cabinet-mounted bandswitching antenna tuner. The switches, from left to right, are for the coax input, tuning condenser and feeders.
Fig. 1 — Circuit of the 500-watt bandswitching antenna tuner.

C₁ — 100μfd, per section (National TNC 100D).
L₁ — 3.5-Mc. band — 40 μh. — 35 turns No. 14, 2½-inch diam., 4½ inches long, 2-turn link (B & W 20TA).
L₂ — 7-Mc. band — 15 μh. — 20 turns No. 12, 2½-inch diam., 4 inches long, 2-turn link (B & W 40TA).
L₃ — 14-Mc. band — 5.5 μh. — 12 turns No. 12, 2½-inch diam., 4 inches long, 2-turn link (B & W 20TA).
L₄ — 21-Mc. band — 2.4 μh. — 8 turns ½-inch tubing,

the switches underneath. All wires, with the exception of the input link lines, should be kept as well spaced from each other and from the chassis as possible. Some crowding around the switches is unavoidable, of course. I used shielded double-conductor cable for the link lines.

On the panel, the two r.f. meters are mounted above the chassis line, on either side of the dial for the tuning condenser. The switches are lined up along the bottom. Although the Mallory switches might seem to be rather light for the job, they have given no trouble whatever.

Along the rear edge of the chassis are the coaxial input connector and the two feed-through insulators that serve as the antenna terminals.

I have tried the tuner on a variety of antennas and have had no trouble at all in loading up on all bands. The taps on the coils are adjusted until proper loading is obtained with the circuit in use tuned to resonance. In other words, it works as beautifully as it looks and is a great improvement over any of the hit-and-run arrangements I've used before. Once the taps are set for your particular antenna, you just turn the switches to the band you want and resonate with the condenser for maximum reading on the r.f. ammeters.

Interior of the 500-watt bandswitching antenna tuner. The 80-meter coil is in the foreground, behind the tuning condenser. The 40- and 15-meter coils are to the left, those for 20 and 10 to the right.

November 1952
DIRECTOR ELECTIONS

In the current elections, three director posts are being filled without membership balloting by virtue of no competition. John R. Griggs, W6KW, continues as director of the Southwestern Division, and Franklin K. Matejka, W7DDD, remains director of the Rocky Mountain Division, while P. L. Anderson, Jr., W4MWH, becomes director of the Roanoke Division on January 1st.

Four vice-director posts have also been filled as the result of no competition; Karl W. Weinart, W7BG, continues in the Northwestern Division; Gus M. Browning, W4BPD, continues in the Roanoke Division; and Walter R. Joos, W6EKM, continues as vice-director in the Southwestern Division. Assuming the vice-director post on January 1st will be Claude Maer, W8IC, in the Rocky Mountain Division.

The remaining offices are contested, and balloting is now in progress.

M.A.R.S. NAME CHANGE

Effective September 2, 1952, the Department of Defense changed the name Military Amateur Radio System to Military Affiliate Radio System. The change has no significance as concerns the activities of MARS and comes only because of difficulties encountered in overseas areas, where the "Amateur" resulted in operational difficulties with foreign governments when it came to extending MARS operations on military block channels.

STAFF NOTES

There will soon be two new W1 calls heard on the air, as the result of the addition to the Headquarters establishment of Mr. and Mrs. Robert L. White, from San Diego. Bob, W6YYN, takes over the ACM C.W. post left vacant when John Cahn, W1RWS, transferred to the Secretarial Department; while Ellen, W6YWM, up until now the SCM for the San Diego section, becomes ACM 'Phone. L. G. McCoy, W1ICP, formerly the ACM 'Phone, becomes a Technical Assistant to replace Dick Smith, W1FTX, who resigned to join the new electronics branch of a local plant.

Charles Bender, W3ODU, of Pittsburgh, Pa., is the new operator at W1AW, replacing Charles Wood, W2VMX, who has transferred to 38 La Salle Road as contest log-checker.

PHONE EXPANSION

In accordance with action taken at the Board meeting last spring, the League has requested the Commission to allot a mobile 'phone subband at 3775-3800 kc., to increase the 20-meter phone band to include 14,300-14,350 kc., and to increase the 10-meter 'phone band to include 28,250-28,500 kc. The text of the League's filing is quoted below:

FEDERAL COMMUNICATIONS COMMISSION

In the matter of a proposed amendment to § 12.111 for the Rules and Regulations

PETITION FOR RULE MAKING

Pursuant to § 4.4(d) of the Administrative Procedure Act and § 1.702 of the Commission's Rules and Regulations, the American Radio Relay League requests that § 12.111 of the Commission's Rules and Regulations be amended to provide for the following additions to suballocations available for voice (A-3 or narrow band frequency or phase modulation) emission:

I. 2775-3800 kilocycles, under the usual operator license class limitation, to amateur mobile stations only.

II. 14,300-14,350 kilocycles, under the usual operator license class limitation.

III. 28,250-28,500 kilocycles, to all amateurs except Novice and Technician licensees.

These requests are filed pursuant to decisions of the Board of Directors of the American Radio Relay League, Inc., after lengthy deliberations at its annual meeting in May 1952. As the Commission is aware, the ARRL Board of Directors is composed of sixteen amateurs nominated and elected by approximately 35,000 licensed amateurs to represent them in the formulation of League policy.

In support it is shown:

I. The growth of mobile interest among amateurs is considerable, it is spurred by participation in emergency and civil-defense preparations, although not based on these aspects alone. During the initial stages of mobile interest some years ago, activity centered in the amateur 28-megacycle band. Until 1947 it was the lowest frequency band in which mobile operation was permitted; predominance of operation in this band continued with the existence of excellent propagation conditions. In recent years more and more interest has turned to other bands, with their opening to mobile operation, primarily the voice allocation 3800-4000 kilocycles. This arose from a deterioration of propagation conditions at 28 megacycles, and the gradual improvement in design and operation of whip antennas effective at lower frequencies.

The comparative interest in mobile communications by bands is shown in the following tabulation of results of an investigation conducted last year by the American Radio Relay League among a cross section of members of its Amateur Radio Emergency Corps. There were 1,380 mobile units in this sampling:

<table>
<thead>
<tr>
<th>3.8-Mc. band</th>
<th>28-Mc. band</th>
<th>144-Mc. band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units: 679</td>
<td>1,363</td>
<td>200</td>
</tr>
<tr>
<td>Unites on other bands</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

(The sum of individual bands is larger than the total because a number of units operate multiple bands.)

An associated tabulation indicates that while the percentage growth of interest in 28-Mc. mobile activity was 69%, for 1951 vs. 1950, comparative growth in 3.8-Mc. mobile activity was at the remarkable figure of 93%.

This recent heavy increase in amateur mobile activity in the 3.8-Mc. band poses a practical interference problem. Mobile transmitting equipment has of necessity very low power and employs antennas of reduced efficiency, yet in this band it must compete with higher-power fixed stations.

QST for
with effective antennas. The result is that amateur mobile stations operating in the 3.8-megacycle band do so under a considerable handicap because of interference. Fixed stations, such as control stations of emergency nets, often find considerable interference on the frequencies of the mobile stations they are attempting to reach.

In the League's view, relief should be provided by the establishment of a small suballocation within voice emission. A-3 or narrow-band frequency or phase modulation, might be used by amateur mobile stations. Our proposal is 3775-3800 kilocycles. This band is small enough so that it will not cause undue hardship on activity presently within its boundaries, especially with the low-power employed in mobile units. It is contiguous to the present voice suballocation and therefore facilitates work with fixed stations in the adjacent band. Without the heavy interference from high power fixed stations, amateur mobile stations will be able to conduct their operations more successfully.

The League requests that the current restrictions of Advanced Class or higher licenses should apply also to mobile operation with voice emission on any such new suballocation.

II.

Of all suballocations of the amateur bands in which voice emission is permitted, that in the 14-megacycle band, 14,250-14,300 kilocycles, is most crowded. For a number of years this band and that at 3.5 megacycles both possessed 100-kilocycle segments available for telephone operation. Since War II, as amateur telephone interest has increased, the suballocation in the 80-meter band was gradually expanded until now it contains 200 kilocycles. No expansion has been made of the 20-meter voice assignment.

If current proposals of the Commission are adopted it will result, in general, in the following percentages of total bandwidth available to voice operation by U. S. amateurs in major low-frequency bands:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500-4000 kc</td>
<td>40%</td>
</tr>
<tr>
<td>7000-7500 kc</td>
<td>33.4%</td>
</tr>
<tr>
<td>14,000-14,350 kc</td>
<td>29.6%</td>
</tr>
<tr>
<td>21,000-21,450 kc</td>
<td>44.4%</td>
</tr>
<tr>
<td>28,000-29,700 kc</td>
<td>70.6%</td>
</tr>
</tbody>
</table>

Though it is a band heavily populated with voice stations, the amateur 14-megacycle allocation contains the smallest percentage of frequencies available to voice emission. The resultant condition is one of overcrowding to an extreme unusual even in amateur experience. The League believes that relief should be provided, and can be provided by opening to voice emission the top 50 kc. of the 14-megacycle band.

III.

For a number of years the amateur band at 28 megacycles has had occupancy predominantly in the voice suballocation. One of several reasons for this heavy telephone occupancy is the fact that the band is the major high-frequency location in the spectrum where amateurs are permitted voice emission without holding a class of license higher than General or Conditional Class. Whatever the contributing factors, the band has continued its tendency toward more and more voice occupancy. A check by the League of amateur activity in December, 1952, showed the division of interest in this band to be approximately 15% c.w. telegraphy, 85% voice. A sampling of interest in several League divisions conducted early in 1952 indicated that the percentage of voice interest now runs even higher, being as much as 88% and 85% in two areas. The tendency to increase becomes more of a factor when it is realized that propagation conditions in the 28-megacycle region are for the time being extremely poor. At the same time, c.w. occupancy has dropped to perhaps $\frac{1}{4}$ of its level several years ago.

For the above reason of predominant telephone occupancy, and with the aim of obtaining even more effective use of frequencies available to the amateur service, the League requests that the additional frequencies 28,250-28,500 kilocycles be made available to voice emission, A-3 or narrow-band frequency or phase modulation.

AMERICAN RADIO RELAY LEAGUE, INC.
by PAUL M. SEGAL

A. L. BUSLING
Its General Manager
September 3, 1952

In connection with dockets and rule-making proceedings, there is a provision in the Administrative Procedure Act which permits interested parties to request the FCC for opportunity to appear personally and argue the case before the Commission. The League, believing the issue to be important, has so requested in the case of Docket 10237, as indicated below.

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of
Amendment of Part 12 of
The Commission's Rules and
Regulations to designate specific amateur
calling, answering and emergency com-
munications frequency bands

Docket 10237

Request for Oral Argument

In viewing of the complex character of the problems presented in this proceeding and the substantial innovations in the proposed regulations, The American Radio Relay League, Inc., requests oral argument.

AMERICAN RADIO RELAY LEAGUE, INC.
by PAUL M. SEGAL
Its General Counsel
September 3, 1952

NAVAL RESEARCH LABORATORY OPPORTUNITIES

There are vacancies at NRL in grades GS-5 to GS-12 with basic entrance salaries from $3110 to $7040 per year, in research positions for electronic scientists and engineers, who have one or more degrees from accredited colleges and universities with major concentration in electronics, or a combination of electronics and electrical engineering or electronics and physics. Post-graduate research experience in electronics will be given credit toward qualifying for a higher grade, depending upon the kind and amount of experience. Persons who have these qualifications and are interested in a government career in electronics research are urged to complete an application for Federal employment, Standard Form 57, and mail it to the Personnel Officer, Naval Research Laboratory, Washington 25, D. C.

A.R.R.L. STAFF OPENING

We are looking for a young man to fill an immediate vacancy in the Secretarial Department of the Headquarters staff, someone who would like to make amateur radio his career. The work is non-technical, requires the ability to express one's self well both orally and on paper, and will involve a modest amount of travel. Any applicant should preferably be one with initiative who will be able to assume administrative responsibility readily.

If you are interested, write to Box A, A.R.R.L. Hq., West Hartford, Conn. State your age, marital status, and give a resume of your educational and employment background and amateur experience.

Salary will be commensurate with ability and experience.
Turret Switching for the Receiver or VFO

A Homemade Unit for Efficient Multiband Operation

BY R. J. RODENBO,* W8YPG

A TURRET ASSEMBLY for bandswitching is usually considered to be beyond the scope of most amateur workshops, but the unit to be described has been so effective (and it was built with only a drill press and a pair of tin snips) that we would like to pass along some of the details. It was originally given a two-year workout in a VFO, and then became the basis for a receiver design. And, incidentally, this receiver is not the end result of years of receiver construction — it is the first one I ever built.

Before describing the turret, a brief description of the receiver is in order, and a block diagram is shown in Fig. 1. High-gain television receiver tubes are used in the front end — combined with the short leads possible through the use of the turret, they make an almost unbeatable combination. The first i.f. of 1700 kc. and the second i.f. of 100 kc. reduce images and increase the selectivity. The 100-kc. transformers were picked up in the surplus market, but standard 175-kc. transformers might be used, or the 85-kc. transformers from a BC-453 could be substituted. The noise-limiter circuit is the series circuit taken from the Handbook and uses one section of the 6H6. It was found to be the best of the various noise-limiter circuits that were tried, and dropping the heater voltage to the 6H6 (through a 6.9-ohm resistor) materially increased the effectiveness. Input and output leads to the noise-limiter circuit should be well shielded — if you can remove the 6H6 from the socket and have no audio whatsoever, then the limiter will really be effective! The r.f. and i.f. stages are controlled by the a.v.o. voltage for 'phone reception, but the mixer gains are held constant. The manual gain control is applied only to the r.f. and first 100-kc. i.f. stage. Although this might not give a wide enough range for some c.w. men, on 'phone it allows the manual gain to be set on the various bands to give a zero S-meter reading that depends upon gain and local QRM, since the S-meter is in the last 100-kc. i.f. stage.

Usual construction techniques were used throughout the receiver, although special attention was paid to the wiring in the oscillator portion of the 6SB7-Y to keep harmonics out of the front end. The stage, including its oscillator coil and one of the 1700-kc. transformers, was mounted on a separate subchassis, and shielded wire and good r.f. filtering were used for all d.c. leads.

The circuit of the "front end" is shown in detail in Fig. 2. Many different mixer-tube types were tried before the 6AC7 was selected for its low noise and high conductance. A high value of grid leak and of screen-dropping resistor combine to make a sensitive mixer, and the oscillator is required to furnish only a volt or two. The 1700-kc. separation between signal circuits and oscillator minimizes pulling and adds to the oscillator stability.

The tuner for this receiver is built on a separate 8 X 13 X 2-inch chassis, and the rest of the receiver on a 9 X 13 X 2-inch chassis. They were formed in the shop from 16-gauge steel, without a brake or any special tools. I used a piece of angle iron clamped to the sheet steel along the line where the bend was to be made. Then, with a cutting tool ground from a piece of high-speed tool steel to a sharp point and held in a pair of vise-grip pliers, a line was scribed along the straight edge. The scribing was re-
peated until the mark was about one-third through the metal. It was then possible to make a sharp, neat bend at the line. The corners were welded and small tapped angles riveted to the bottom of the chassis. The chassis was sanded very smooth, and all holes and cut-outs were made before the chassis was given a couple of coats of black lacquer.

**The Turret Tuner**

The turret type of bandswitch provides the convenience of bandswitching with an efficiency equal to or better than plug-in coils. Each lead from the coils is as short as possible, and all are of the same length. When it comes to pruning and tracking, the system is a great help, because to make a change it is only necessary to loosen a couple of screws and lift out the coil strip for the particular frequency band. This is much faster than unsoldering coils from a bandswitch in what may be an almost inaccessible location.

To make the turret, take a piece of $\frac{3}{16}$-inch steel and lay out a hexagon $1\frac{3}{8}$ inches on a side. In the exact center, drill and tap a $\frac{1}{8}$-20 hole, as shown in Fig. 3. This now is the template used to form the turret bulkheads. Cut four pieces of $\frac{3}{16}$-inch aluminum in a rough hexagon about $\frac{3}{8}$ inch larger all around than the template, and drill and tap a $\frac{1}{8}$-20 hole in the center of each. Using a small arbor of the sort used on the end of a motor shaft (and threaded $\frac{1}{8}$-20), screw on the template and one of the bulkhead blanks. Scribe a line around the blank $\frac{3}{16}$ inch from the template, mark the 60-degree cut-outs at the corners, and trim the blank to the lines. Clamp the whole assembly in a vise and bend the extensions of the blank over the sides of the template. Make four of these, and drill and tap a 6-32 hole in the exact center of each bent-over side of each bulkhead.

Six $1\frac{3}{4}$- by 11-inch strips of $\frac{1}{2}$-inch aluminum are required for the coil strips. The edges can be filed straight by using a piece of angle iron for a guide. Lay out the holes carefully, and drill them all at the same time, since it is essential that all holes have identical spacing. In all operations like this, it is a good idea to make steel drilling templates.

The turret bearings are made by drilling and reaming $\frac{3}{8}$-inch holes through $\frac{1}{4}$-inch long $\frac{1}{8}$-20 hexagonal-head bolts. They can be chucked in the drill press, center-drilled, and then drilled and reamed. Lacking a $\frac{1}{8}$-inch reamer, drill first with a $\frac{1}{2}$-inch and then a $\frac{1}{4}$-inch drill. Six of these will be required, and four should have the head tapped for 10-32 Allen setscrews.

The bearing supports are formed from $\frac{1}{2}$-inch steel, with the bearing holes tapped $\frac{1}{2}$-20 and two mounting holes drilled for 6-32 screw clearance. The two turret bearings without setscrews are screwed into the bearing supports and secured with locknuts. Brass turret bearings are preferable to steel at these points.
C1, C2, C3 — 35-μfd. midget variable, ganged (Bud MC-1802).

C4, C5 — 7-45 μfd. ceramic padders.

C6 — 50-μfd. air trimmer.

C7, C11, C14 — 250-μfd. mica.

R1, R2 — 0.1 megohm.

R3 — 300 ohms.

R4 — 75,000 ohms.

R5, R7 — 3500 ohms.

R6 — 5 megohms.

R8, R9 — 51,000 ohms.

R10 — 5000-ohm 25-watt adjustable.

L1 — 3.5 Mc.: 1/8 inches No. 26 enam. close-wound, bandspread tap 10 turns from top. Antenna coil, 10 turns over cold end.

7 Mc.: 50 turns No. 24 enam. close-wound, bandspread tap 16 turns from ground end. Antenna coil, 3/8 inch No. 30 enam. close-wound next to cold end.

14 Mc.: 27 turns No. 24 enam. spaced to 1 1/8 inches, bandspread tap 10 turns from cold end. Antenna coil, 5 turns No. 30 1/2 inch from cold end.

28 Mc.: 9 turns No. 24 enam. spaced to 1 1/8 inches, bandspread tap 5 turns from cold end. Antenna coil, 3 turns No. 30 enam., 1/4 inch from cold end.

L2 — 3.5 Mc.: Same as L1. Primary, 18 turns No. 26 enam. close-wound over cold end.

7 Mc.: Same as L1. Primary, 22 turns No. 30 enam. close-wound next to cold end.

14 Mc.: Same as L1. Primary, 22 turns No. 30 enam. 1 1/2 inch from cold end.

28 Mc.: Same as L1. Primary, 10 turns No. 30 enam. 1/2 inch from cold end.

L3 — 3.5 Mc.: 64 turns No. 24 enam. close-wound, bandspread tap 35 turns from bottom, cathode tap 7 turns from bottom.

7 Mc.: 42 turns No. 24 enam. spaced to 1 1/2 inches, bandspread tap 14 turns from cold end, cathode tap 5 turns from cold end.

14 Mc.: 23 turns No. 24 enam. spaced to 1 1/2 inches, bandspread tap 8 turns from cold end, cathode tap 4 turns from cold end.

28 Mc.: 8 turns No. 20 enam. spaced to 1 1/2 inches, bandspread tap 4 turns from cold end, cathode tap 2 turns from cold end.

T1 — 1700-kc. i.f. transformer (Meissner 16-8091).

The detent arm is made from two 1 1/2-inch-wide strips of 1/8-inch steel 2 1/2 inches long. The roller is a 1/2-inch diameter wheel of 3/32-inch thick cold-rolled steel, and the end spacers are made of the same material 1/4-inch thick. The roller axle is made of 1/4-inch diameter rod, and the roller should turn freely on it. The assembly is held together at the ends with 1/8-inch diameter rivets through the arms and end spacers.

After assembly, the detent arm is pivoted at one end on the front turret bearing, and a spring attached to the other end of the arm is anchored at the bearing support. Some experimentation may be necessary to find the exact pivot point and the proper spring tension, so that the turret will rotate freely in either direction without binding.

The contact springs are bent over a bending jig made from a scrap of 1/2-inch steel, as shown in Fig. 3. Before bending, the spring is a 1/4-by-3 1/2-inch strip of 0.015 brass shim stock. After
hending around the jig, the two free ends are rolled together. This loop can be used later for a soldering terminal. After the spring is formed, a $\frac{1}{8}$-inch hole is drilled for fastening the spring to the coil contact strip with a $\frac{1}{4}$-inch long 4-36 screw. To maintain the alignment of the contact springs, $\frac{1}{8}$-inch-wide slots are filed $\frac{1}{16}$-inch deep across the bakelite. Three of the coil contact strips are used for supporting the contact springs.

The turret is assembled by screwing three of the steel turret bearings into three of the bulkheads and fastening them with locknuts. The fourth bulkhead is held to the detent plate by its turret-bearing bolt, with a $\frac{1}{4}$-inch-thick washer between the two for a spacer. Assemble the four bulkheads on the $\frac{1}{8}$-inch steel shaft, using two or more of the aluminum coil strips to determine the spacing and position, and lock them on the shaft with the set screws.

The coil contacts on the coil contact strips are $\frac{3}{4}$-inch 4-36 brass round-head machine screws. Their heads are supported above the bakelite by the copper contact point spacers. The coil forms are held in place by the $\frac{1}{8}$-inch-long brass screws that also hold the coil contact strip to the aluminum coil strip, and the coil forms are spaced away from the bakelite by the plastic coil spacers.

The bearing supports should be located on the chassis after the contact springs have been mounted on their bakelite strips and these in turn have been mounted on the chassis. Use one of the aluminum coil strips for a template on the chassis. With the contact springs in place, locate the bearing supports on the chassis, being careful to see that each contact bolt hits the center of its contact spring. When the bearing supports have been bolted to the chassis, orient the detent plate.

To take full advantage of the turret, the leads from its fixed contacts should be as short as possible. In this particular receiver, the tuning condensers were mounted alongside the turret, close to the contact strips. To center the tuning dial, it was necessary to drive the tuning condensers through the brass belt and two of the drums taken from an old Atwater Kent b.c. receiver.

**Fig. 3 — Mechanical details of the turret.**

**Coils**

Adjustable ceramic padding condensers were mounted on each r.f. and mixer strip ($C_4$ and $C_5$ in Fig. 2), and these can be adjusted by removing the coil strip on the opposite side of the turret.

In winding the coils, the taps were made by twisting a small loop and later removing the insulation at this point and soldering a wire to the cleaned loop. On 10 meters, where heavier wire was used, the taps can be soldered directly to the winding. When all tracking and adjust-

(Continued on page 118)
Announcing the 19th ARRL Sweepstakes

Certificates Will Be Awarded to C.W. and 'Phone Winners in Each Section and to Top Scorers in Club Groups

<table>
<thead>
<tr>
<th>CONTEST PERIODS</th>
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<tbody>
<tr>
<td>Time</td>
</tr>
<tr>
<td>EST</td>
</tr>
<tr>
<td>CST</td>
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<tr>
<td>MST</td>
</tr>
<tr>
<td>PST</td>
</tr>
</tbody>
</table>

It's time to get your station in readiness for the 19th Annual ARRL Sweepstakes. This popular contest affords you an opportunity to pit your operating skill against the best men in your ARRL section, or to fill in some of those states that are lacking for WAS. Every licensed amateur in every League section is urged to participate; whether or not you're an ARRL member, you are cordially invited to get into the SS and submit an entry. All scores reported in accordance with the rules will be listed in a QST tabulation of final results.

As usual, the contest will run over two consecutive week ends, with a maximum allowable total operating time of 40 hours out of the possible 66 for each entry (‘phone or c.w.). The rules are practically the same as last year's, except for minor changes in Rules 4 and 5. The “power multiplier” for ‘phone entrants who maintain the input power to their transmitter output stage at 100 watts or less at all times during contest operations has been increased to 1.5. For c.w. entrants, this multiplier remains at 1.25. The operation of two or more transmitters simultaneously at single-operator stations now is specifically prohibited. You can operate both ‘phone and c.w., but separate logs must be filed for each mode.

Entries by multiple-operator stations are encouraged and will be listed, but only single-operator stations will be eligible for the certificates offered to the top ‘phone scorer and the top c.w. scorer in each section. Multiple-operator scores can be grouped with single-operator scores in club competition, however, and a handsome gavel is offered to the club with the highest aggregate score. Within a club, single-operator entries can compete for the “club-certificate” awards given to the top c.w. and ‘phone scorers.

The Sweepstakes, like Field Day, put a premium on operating skill rather than on power, since the score multiplier for stations operating with 100 watts or less insures that much of the operation will be in this power class. The 807s really go to town in the SS!

If you're new to the SS, it won't take you long to catch on. During the contest period, call “CQ SS” or answer such a call, exchange preambles in the form shown elsewhere in this announcement, and keep your log properly. ARRL will gladly send you contest forms upon request, or you can draft your entry in accordance with the sample. Although it is not mandatory under the rules, more and more operators each year are using the 24-hour time system in their SS exchanges. For those unfamiliar with this system, it is based on a 24-hour day starting at midnight. Thus midnight is 0000, 1 A.M. is 0100, 12 noon is 1200, 6:30 P.M. is 1830, and 11:59 p.m. is 2359.

Turn up your gear now, read the rules to acquaint yourself with the pattern, and then get set for an operating spree that is real fun.

Rules

1) Eligibility: The contest is open to all radio amateurs in the 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. 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) QSOS: 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 ‘phone stations. Valid points can be scored by contacts with stations not working in the contest, upon acceptance of your preamble and/or receipt of a proper preamble.

4) 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. The total number of ARRL sections (see p. 6) worked during the contest is the “sections 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 100 watts or less at all times during contest operation.

5) Reporting: Contest work must be reported as shown in the sample form. Mimeographed contest forms will be sent gratis upon receipt of radiogram or postcard request. Indicate starting and ending times for each period on the air. All Sweepstakes reports become the property of ARRL. No contest reports can be returned.

There are no objections to one's obtaining assistance from logging, "spoting" 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

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 100-watt-or-less transmitter input at all times during the contest.
EXPLANATION OF “SS” CONTEST EXCHANGES

Send Like a Standard Map, Preamble, etc., with your own call.

Exchanges: Send your own call.

Call CK Place Time Date

<table>
<thead>
<tr>
<th>Exchanges</th>
<th>Contest info, numbers, 1, 2, 3, etc., for each station worked</th>
<th>Send your own call.</th>
<th>CK (RST report of station worked)</th>
<th>Your ARRL section</th>
<th>Send time of transmitting this ARRL</th>
<th>Send date of QSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>W1AW 589 CONN 1812 NOV 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Station W... SUMMARY OF EXCHANGES, NINETEENTH A.R.R.L. ALL-SECTION SWEETSTAKES

Freq. Band (Mc.) Time On or Off Air | Sent 1 point | Received 1 point | Number of Each Different New Section as Worked |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
<td>On 1810</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Off 2135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Off 2115</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Operating Time: 5 hrs. 55 min.

Assisting person(s): name(s) or call(s), etc.: 3.5, 7 and 14 Mc. used.

Claimed score: 23 points x 10 sections = 220 x 1.25 (85 watt input) = 275

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...

Address...

Number Different Stations Worked...

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37
Fitting companion to W1PH's coffee-can VFOs, the coffee-can receiver is housed in a 14 × 7 × 7½-inch cabinet. The bandswitches and bandset condensers are on either side of the main tuning dial. The power switch, panel lamp, headphone jack and the three gain controls are lined up across the bottom.

The Coffee-Can Receiver

Bandswitching in a Simple Tuned-R.F. Job

BY EDWARD E. HAYWARD, W1PH

Unfortunately, some of us do not have the time or facilities to build the modern super-duper receiver of our dreams, or perhaps we feel that we can't afford to buy one. We have to settle for something much less expensive, or something that we can build in a short time with ordinary hand tools. This does not mean, however, that we can't come up with something pretty good if we have a little time and patience. With enough attention given to good construction, the little receiver shown in the photographs will surprise the most critical. With its small complement of tubes and other components, it will do a mighty big job at low cost. I have used this receiver for some time and have compared it with some big receivers and it doesn't have to take a seat too far back from any of them on c.w. reception. Most of the parts can probably be found in your junk box, except perhaps the wafer switches. If all new parts are required, the cost shouldn't exceed $25.00.

Referring to the circuit diagram of Fig. 1, the arrangement will be readily recognized as a regenerative detector with a tuned r.f. stage and a single audio amplifier. While this is an old type of receiver circuit, with the use of modern high-gain tubes and components of improved quality, the completed unit is bound to constitute quite an advancement over those built in the days before the advent of the superheterodyne.

A set of three coils in each stage covers an overlapping range from 3.5 through 14 Mc. The fourth pair of coils showing in the photograph are experimental for 21 Mc. Results on this band thus far have not been good enough to warrant recommending the receiver for this band. To simplify the construction, the coil-changing switches are not ganged. Good bandspread over the 80- and 40-meter bands is obtained by the parallel-condenser method. A series condenser is inserted for 14 Mc. The bandspread condensers, C3 and C4, are ganged. A gain control, $R_2$, is provided in the r.f. stage to prevent overload on strong signals. $R_7$ is the regeneration control. With a voltage-regulated power supply, frequent readjustment of this control is not necessary and frequency stability is excellent. One advantage that a receiver of this type has over a simple superhet is that there are no images to contend with. The audio stage provides all the headphone volume you can comfortably use. Audio gain can be adjusted by means of $R_{10}$.

The regenerative-detector circuit is in the can to the right, the r.f. amplifier components in the one to the left.

* 15 Woodbine Terrace, Auburndale, Mass.
Construction

There is nothing tricky about building the unit and it is extremely easy to get going, so long as you shield it well and construct it rigidly. It can be housed in a 14 X 7 X 7½-inch cabinet (Bud C-995) with a 14 X 7-inch panel. The parts are mounted on a 7 X 13-inch aluminum chassis. The components for each stage are enclosed in a one-pound vacuum-pack coffee can. These cans make inexpensive but very effective shielding enclosures. The metal is easy to work and takes solder readily. If you don’t like the advertising on the cans, you can hide it under a coat of enamel.

In the detector can, to the right in the rearview photograph, the band-set condenser, C7, is mounted at the bottom with its shaft protruding out the side that will be in front. The band switch, S2, is mounted immediately above the condenser. The tube socket is then wired up with loose leads before it is placed in the can. The assembly includes C10 and R6. Be sure to use shielded wire where indicated in Fig. 1. After connections have been made, the socket is mounted on ½-inch spacers as far toward the rear of the can as possible.

The components of the r.f. amplifier are assembled in a similar manner in the second coffee can. One of the switch circuits is not used. The small components — resistors, by-pass condensers and the r.f. choke in the detector circuit are placed underneath the chassis.

Coil dimensions are shown in the accompanying table. The dimensions (as to the inductance values given) should be followed closely for proper tracking. Within reason, a different size

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Bottom view of the coffee-can receiver showing parts and wiring underneath the chassis.

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of wire can be used, providing the coil length specified is maintained. Inductance values of the tuned coils are given so that the number of turns for a different coil form diameter may be calculated, or determined by means of the ARRL Lightning Calculator. The coil forms are spaced evenly and cemented to a 1-inch strip of thin bakelite 4¾ inches long. The strip is then fastened across the bottom of the can, between the tube and the condenser, on ¾-inch spacers.

The two cans are placed close to the edge of either end of the chassis and close to the panel so that the shafts of the band-set condensers and bandswitches extend through the panel far enough for the control knobs. The dual bandspread condenser is then mounted between the two cans at such a height that the tuning dial will not interfere with the regeneration control below it. The dial I used is a National type A.M.

The 6L5 and L13 can be mounted at the rear of the chassis. (I happened to have an old National S-101 audio coupler that I used for the purpose. The unit includes R9 and C13 as well as L13.)

Underneath, the three gain controls are lined up along the front edge of the chassis, with R2 at the right, R7 at the center and R10 at the left, as viewed from the front. The power switch, S3, to the left, is balanced by the headphone jack to the right. The jack must be insulated from the panel and chassis.

<table>
<thead>
<tr>
<th>Coil</th>
<th>Band (Mc)</th>
<th>L (µm)</th>
<th>Turns</th>
<th>Length</th>
<th>Wire</th>
<th>Tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>3.5 27</td>
<td>41</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>3.5 27</td>
<td>41</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>7 8.2</td>
<td>18</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td>7 8.2</td>
<td>18</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>14 1.7</td>
<td>9</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td>14 1.7</td>
<td>9</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td>3.5 27</td>
<td>41</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td>354</td>
<td></td>
</tr>
<tr>
<td>C8</td>
<td>3.5 27</td>
<td>41</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C9</td>
<td>7 8.2</td>
<td>18</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C10</td>
<td>7 8.2</td>
<td>18</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C11</td>
<td>14 1.7</td>
<td>9</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>C12</td>
<td>14 1.7</td>
<td>9</td>
<td>½ in.</td>
<td>26 s.c.c.</td>
<td></td>
<td></td>
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</tbody>
</table>

**Adjustment**

The diagram of a suitable power supply for the receiver is shown in Fig. 2. Voltage regulation is important if you want a stable receiver, free from the necessity for frequent readjustment of the regeneration control. After the power supply has been connected to the receiver, set R10 (Fig. 2) at maximum resistance. Then turn on the power supply and the receiver power switch. If the regenerator tube does not glow, turn off the power supply and decrease the resistance of R10 a bit and try again. Repeat the operation until the VR tube glows when the power supply and receiver switches are closed. Remember, always turn the power supply off before adjusting the slider on the regenerator.

Although a random length of wire will work, better results will be obtained with a resonant antenna system, as with any other receiver. A doubler, cut for the band in use, makes a good receiving antenna.

The detector should slide into oscillation smoothly as the control, R7, is advanced. After oscillation has been checked on all bands, attach the antenna. Set C1 at about mid-capacitance and tune C7 around until signals are heard. Then peak up the r.f. tuning with C1. Now, with the dual tuning condenser set near maximum capacitance, adjust C7 for the low-frequency end of the band and peak the tuning of the r.f. stage up again with C1. The dual tuning condenser should then cover the band without the necessity for readjustment of the band-set condensers. If strong signals tend to block the receiver, reduce the gain in the r.f. stage by means of R2 (Fig. 1). Set the regeneration control, R7, at the point of minimum voltage that permits reliable oscillation over the band without readjustment.

Mark the settings of the band-set condensers for this band, switch to the next band and follow the same tuning-up procedure until the receiver is lined up for all bands. If you want to listen in between the bands, set C7 to the approximate region of the frequency you are interested in, peak up the r.f. stage with C1, and then tune around with the dual condenser.

DX really rolls in on this little receiver, the cost is very small and, after a few evenings to become acquainted with its operation, I am sure you will be happy that you built it, as I am.
One of the current mobile modulation schemes is the circuit shown in Fig. 1. Whatever the original idea behind the use of the selenium rectifier, a check of the system shows that its effect is to provide a means of obtaining a certain amount of carrier control. As pointed out previously, carrier control increases the permissible peak input to the modulated amplifier without exceeding either the capacity of the power supply or the modulated-amplifier's rated dissipation, as averaged over a period of voice transmission, by reducing the duty cycle. The rectifier provides the modulator with a d.c. bias that varies with the average of the audio input level. As the audio level increases, the bias on the modulator likewise increases. This reduces the modulator plate current and thus the voltage drop through the modulator plate resistor, $R_2$. This allows the average or d.c. voltage of the screen of the r.f. amplifier to rise, and so the carrier level rises.

The circuit of Fig. 1 was set up using a pair of 6AQ5s and a suitable driver for the r.f. amplifier. The r.f. amplifier was adjusted and loaded to show satisfactory linearity by checking the trapezoid pattern on an 'scope. With essentially sine-wave audio input and the level set just below

1 Technical Topics, "Screen Modulation with Limited Carrier Control," QST, April, 1951, p. 64.

the point where the positive or upward peaks of modulation started to flatten noticeably, the envelope pattern of Fig. 2 was obtained. (Flattening of these peaks occurs in this instance when the negative peaks of the audio signal have sufficient amplitude to cut off modulator plate current.)

![Fig. 1 — Controlled-carrier circuit for clamp-tube modulation. A selenium rectifier is used in the grid circuit of the modulator tube. $R_1$ in this instance is 1 megohm. $R_3$ is the modulator plate load resistor. $C_1$ and $R_2$ are the usual r.f.-amplifier screen by-pass and grid leak, respectively.]

![Fig. 2 — Modulation pattern obtained with the circuit of Fig. 1 with sine-wave audio input. The result of clipping of the positive half of the audio cycle by the selenium rectifier is shown by the flat peaks of modulation in the negative direction.]

Under these conditions, and with a supply voltage of 500, the r.f. amplifier cathode current was about 45 ma. With no modulation, this current dropped to 22 ma. However, no matter what the audio level, the pattern showed the same flattening on the negative or downward modulation peaks. This might be expected, of course. With the selenium rectifier in the circuit, the audio at the grid of the modulator is limited essentially to the negative half of the audio cycle, the positive half being virtually eliminated by the rectifier.

At this juncture, it might be well to point out that a great deal of confusion seems to exist in the minds of some in interpreting a 'scope pattern of the type shown in Fig. 2. Such a pattern is described as showing "great peaks of audio rising out of the carrier" which seems to indicate that, in some mysterious way, an unusual amount of sideband power is being generated. Even though all laws of modulation are against it, this idea seems to be confirmed by the way a load lamp (or the antenna current) flashes up when modulation is applied. Perhaps this misconception arises from a hasty comparison with the pattern obtained with a constant-carrier system of the conventional type, such as a prop-
Fig. 3 — Oscillogram of a properly-adjusted clamp-tube rig with about 75-per-cent modulation. Comparison with Fig. 2 will give an idea of the distortion represented in the latter.

early-adjusted clamp-tube rig. Such a pattern is shown in Fig. 3. In the latter case, the observer first sees a pattern of the plain carrier before modulation is applied. Therefore, when modulation is applied, it is easy to compare the amplitude of the positive modulation peaks with the carrier level. With controlled carrier, the observer sees a relatively narrow band on the screen before modulation is applied. The mistake no doubt occurs when the same sort of comparison is made between modulated and unmodulated patterns. The fact that the carrier level must increase when modulation is applied in a carrier-control system is forgotten or ignored. Just as the carrier is no longer visible in the pattern of Fig. 3, just so the carrier level can no longer be seen in Fig. 2. The part of the pattern labeled A in Fig. 2 corresponds to the similarly labeled part of Fig. 3. The fact that Fig. 2 shows flattening at this point, instead of being nicely rounded in sine-wave fashion, as in Fig. 3, merely indicates serious audio distortion. And the fact that A is narrower in Fig. 3 than in Fig. 2 indicates that modulation in the negative direction actually is considerably less in Fig. 2 than in Fig. 3. Without analyzing the pattern and determining the true carrier level with modulation, it is impossible to know the percentage of modulation in the positive or upward direction.

The approximate carrier level can be determined experimentally with the aid of a scope and receiver S-meter. First, take an S-meter reading while the signal is being modulated. Then remove modulation and, without disturbing the coupling to the scope, increase the input to the r.f. amplifier until the same S-meter reading is obtained. The height of the pattern of this unmodulated carrier will then be the effective height of the carrier level on the original pattern. Input to the amplifier can be raised by increasing the supply voltage, or preferably by inserting a resistor between the modulator cathode and ground and adjusting its value until the desired S-meter reading is obtained. In either case, care should be used not to operate the amplifier under this condition longer than is necessary to make the check, since the input will be above normal rating.2

Fig. 4 shows the pattern of a conventional constant-carrier system modulated by the same audio signal which modulated the controlled-carrier signal that produced Fig. 2. The dashed line shows the level of the carrier before modulation. It will be seen that the two patterns are identical. With the same input in both cases, the same S-meter readings were obtained, showing that both carrier levels were the same. Also, readings of the audio output from the receiver were taken and these two were exactly the same, proving that the sideband powers were equal. An analysis of these two patterns (Figs. 2 and 4) shows upward modulation of about 80 per cent and downward modulation of only about 55 per cent.

2 The carrier level can also be determined graphically by drawing a line through the envelope pattern, parallel to the horizontal axis, and at such a height that the area in the light peaks above the line equals the area in the dark valleys below the line.
cent. Disregarding distortion, it is quite apparent that the circuit as shown in Fig. 1 is not a particularly effective one from the viewpoint of "talk power."

As has been pointed out previously, a high percentage of modulation with screen modulation cannot be expected unless the modulator can swing the screen voltage to zero or beyond into the negative region. This can be done only by the use of a proper transformer between the modulator plate and the r.f.-amplifier screen, or by inserting an additional resistor with audio by-pass between the modulator plate and the screen, as shown in Fig. 5. The condenser, $C_1$, tends to hold the d.c. voltage drop across the resistor, $R_1$, constant. Therefore, if the voltage drop across this resistor is made sufficient, the screen voltage may drop to zero or even fall to a potential negative in respect to its cathode when the modulator plate voltage is at its lowest point.

![Fig. 6 — Pattern obtained with the circuit of Fig. 1 by adding screen resistor and condenser as shown in Fig. 5. The increase in percentage of downward modulation will be evident by comparing this pattern with the one of Fig. 2.](image)

For instance, if the voltage drop across the screen resistor is 100 volts when the modulator plate voltage is 300, then the screen voltage will be $300 - 100 = 200$ volts. Therefore, if the voltage drop across the screen resistor remains the same and the modulator plate voltage drops to 75 volts, the resulting screen voltage will be $75 - 100 = -25$ volts.

Fig. 6 shows very clearly the improvement in downward modulation that accompanied this change in circuit. It also serves to make it more obvious that the band at the center of the pattern cannot be interpreted as representing the carrier under modulation. With 100-per-cent downward modulation, this band would be reduced to a line. The dashed line in Fig. 6 again shows the approximate carrier level. Downward modulation has been increased to about 85 per cent — just about the limit for screen modulation with good linearity. However, because of the audio wave-shape supplied to the modulator grid circuit through the selenium rectifier, this percentage of modulation in the negative direction cannot be reached without producing more than 100-per-cent modulation in the upward direction. Over-modulation in the positive direction can be tolerated so long as the r.f. amplifier operation remains linear. In Fig. 6, upward modulation is about 112 per cent.

Fig. 7 shows the pattern obtained with an increase in the audio level. The serious flattening on the positive peaks is the result of driving the modulator grid so far negative that the modulator's plate current is cut off so that the r.f. amplifier screen voltage can no longer rise. Incidentally, this is quite apt to be the adjustment that one would reach by adjusting for maximum kick-up of output under modulation. Experience in this series of tests demonstrates once more the virtual impossibility of proper adjustment of a screen-modulated amplifier without the aid of a scope.

In pursuing the subject further, the question comes up of why the selenium rectifier should be necessary. The modulator tube in this instance is not provided with fixed bias but, with the insertion of a blocking condenser, as shown in Fig. 8, it should operate as a grid-leak-biased amplifier. Operating in this manner the average bias would ride up and down with the audio level, at a rate depending on the time constant of the condenser and grid resistor. Furthermore, the
maximum bias developed should approach the peak value of the maximum amplitude of the applied audio signal. Therefore, if the time constant is made long enough, a bias sufficient for essentially Class A operation of the modulator should be held over from one maximum peak to the next.

On the other hand, it is desirable to make the time constant as short as possible while still approaching the Class A condition, because a short time constant reduces the duty cycle and a greater peak input can be used, as mentioned previously. The best time constant is one that allows the carrier to vary at approximately a syllabic rate. A time constant of about 0.25 second has been found to be about right. The values used were a 0.25-μfd. condenser and 1-megohm grid resistor.

In practice, the results do not agree completely with the theory. The reason for this is that the theory holds true only if the impedance of the audio source is low so that its output voltage does not vary appreciably with the varying load of the modulator grid circuit. A microphone transformer is not such a source and the positive peaks in this circuit will be clipped almost as badly as they were by the selenium rectifier. However, even in this case, comparative checks have shown that there is a reduction in distortion compared with that of the circuit with the rectifier.

--- D. H. M.

**YRS-1 Modifications and Experiments**

I have been modifying my YRS-1 single-sideband adapter,¹ and some may be interested in certain changes I have made in this truly wonderful gimmick.

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**Fig. 1** — Wiring diagram of the modified YRS-1 reactance modulator to allow panel control. \( C_2 \), \( R_3 \) and \( R_4 \) refer to original components that are unchanged.

First, I replaced the toggle-type power switch on the panel with a gain-control-and-rotary-switch combination. The variable resistance is connected into the cathode circuit of the reactance modulator to control the frequency of the reinserted carrier (Fig. 1). This provides panel control for oscillator readjustment and for tuning s.a.b. stations, but, more important, it allows for compensation of warm-up drifts. After initial alignment, any drift in either the receiver or the adapter requires (otherwise) that the receiver be detuned. Oscillator frequency control further permits deliberate detuning of the receiver when desired, in order to favor the outer sideband frequencies or as an aid in avoiding interference.

Secondly, I provided a panel switch in the audio circuitry to permit normal operation of the receiver without turning on the 14 tubes in the YRS-1. This switch merely connects the audio from the receiver detector directly back into the receiver audio system.

Most interesting of all, I have rewired the 6C4 audio output stage to take a 6J6, with the grids connected to the phasing networks, and the plates connected to two phone jacks (Fig. 2). This enables one to hear the sidebands separately on headphones, in addition to the operation through the receiver. With separate cords connected to each of the phones, the left ear hears the lower sideband, and the right ear hears the upper sideband.

This modification not only aids reception, but provides a certain "sense of direction." A heterodyne and the accompanying monkey-chatter associated with an interfering signal which appears on the right side of the panoramic adapter is heard in the right ear. Another interference on the left side may reach only the left ear. The brain tends to ignore the one-ear signals and

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(Continued on page 119)

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**Fig. 2** — Wiring diagram of the modified audio amplifier to allow the use of split headphones. \( J_2 \) is a 6C4 in the original unit — the connections to Pin 6 of the socket remain unchanged. With most receivers, \( J_2 \) will provide the upper sideband. The sideband from \( J_1 \) is selectable.

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QST for
CONDUCTED BY E. P. TILTON.† WIHDQ

With the summer hitting a new low for both sporadic-E skip on 50 Mc. and tropospheric DX on 144 and higher, many newcomers to the v.h.f. bands were wondering if they had been taken in by false propaganda when they made their start in the v.h.f. region. Those who had been around longer were shaking their heads and writing off 1952 as an almost complete flop as far as DX was concerned, though interest and activity were holding up well.

All during the warm months storm centers had been chasing each other rapidly across the country, and seldom had there been one of those stable highs that remain almost stationary for several days at a time — the sign that v.h.f. men have come to recognize as unfalling evidence that good times are at hand. The first one showed up toward the end of August, with results that were reported briefly last month. But it was September, as in years past, that really pored it on.

The big siege started in the Middle West on the 7th, when a large slow-moving high moved down across the Great Lakes area from Canada. For several days the weather maps showed only a slight change in shape and position of this high as it drifted slowly eastward, maintaining a stable air mass boundary along its trailing edge. The 2-meter band was open in unprecedented fashion beginning the morning of the 7th, from Minnesota to Texas, and remained so through early Monday, the 8th. During Monday the opening began to swing around to the east, making possible 144-, 220- and 420-Mc. tropospheric DX such as had never before been worked between low-altitude stations. East-west DX held through Wednesday, the 10th, though the best part of it was worked during Monday night and the following morning. From the evening of the 9th and on through the night of the 10th, emphasis was on north-south work east of a line drawn roughly through Toronto, Pittsburgh, Roanoke and Winston-Salem. In the tabulation of reports to follow no attempt was made to sort out dates and times, but they can be established readily enough by reference to the above timetable.

W0EMS, Adair, Iowa, who was heard and called by more stations beyond 1000 miles than probably any man before him, found the band open to the south Sunday morning at 9:30, and he remained at the controls almost constantly until 1:23 a.m. the following day. When he left for work Monday morning things were still hot, and DX was still audible when he returned at noon. When he called his first CQ early Monday evening, W8BFQ, Everett, Ohio, came back with an S9-plus signal. Margaret then swung around to the east to alert the W2s and 3s, and the hottest east-west opening in 2-meter history got underway. At 9:20 p.m. Frank raised W2NLY, Oak Tree, N. J., and from then until 2:40 a.m., W0EMS was in an enviable position seldom achieved by a W — that of being called with all the urgency and enthusiasm that can be mustered by hundreds of eager W1s, 2s, 3s, 4s, 8s and VE3s, all hungry for a shot at such rare DX!

Sharing the spotlight, and providing contacts for easterners who had never before heard these states, were WN0GUD, Conway, Iowa, who undoubtedly became the country’s leading Novice in 2-meter states worked, W9MJ, Odessa, W0KLF, University City, and W0NI, Pleasant Hill, Mo., W9s DDC and FAN, Sheboygan, Wis., and W4PCT, Ft. Mitchell, Ky.

By Tuesday night stations in the Southeast began to get into the fun, and the big play was given to W4CVQ, WSEP and W4JFV/4, atop Poor Mountain, near Roanoke, Va., who provided North Carolina, West Virginia and Virginia contacts by the hundred to swell the states totals of 2-meter operators of W1, 2, 3, 8 and VE3.

There have been wild DX sessions before in 2-meter circles, and immediately there arises in every mind the comparison between this one and the phenomenal western surge of W2BAV in September, 1950. Probably there was not much difference in the weather conditions that caused these two openings, but the 1950 one was almost a personal monopoly for W2BAV, operating from his superb location more than 3000 feet above sea level up in the Catskills, with close to a kilowatt and a 48-element array. In the 1952 session scores of home stations, many of them seemingly

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improved stations in Iowa, Nebraska, Kansas and Missouri enabled W4THK, W5RCI, W2-NLY, W1RFU, and many others to work DX that was beyond our fondest dreams just a few years ago.

An observer on the 2-meter scene in the fall of 1950, when W2BAK raked up his almost unbelievable record of 21 states worked in a matter of days, would have said that almost anything possible in the way of 2-meter DX had then been done. What chance was there left for the average v.h.f. man to achieve outstanding results? Yet a perusal of the mass of reports that deluged your conductor’s desk in mid-September shows that no less than 23 state-to-state “firsts” were made. There were numerous others, we know, but incomplete data make it impossible to record them at this time. For the first time the number 22 appears in the states column of our 2-meter standings, and the working of all call areas looms as a distinct possibility! Some Midwesterners lack only W6 and W7.

Note well that at least three of these “firsts” were made by Novices, operating under the combined handicap of a 75-watt power limit and restrictions that prevent their using VFO tactics, or entering into the first megacycle of the band, where a vast majority of the DX work took place. WN calls also show prominently in the tabulation of outstanding DX worked, other than the first state-to-state records.

**DX on 220 and 420**

Of interest also to the v.h.f. beginner, particularly the possessor of the Technician Class license, are developments on 220 and 420 Mc. that made history in this same period. They demonstrate that the bands open to the Technician are by no means restricted to local contacts; that when conditions are right, DX of substantial proportions is possible on 220, 420 and probably even higher frequencies.

On the morning of the 8th, when your conductor returned to his operating position after about three hours’ sleep, the band was still open to the west. W1RFU, Wilbraham, Mass., having connected with W8EMSW for the best DX ever worked on 144 Mc. from W1RFU, was requiring to leave for work after no sleep at all. The usual morning checks with W2QED and W2UK beams were turned west, and there was W8BQF rolling in nicely. This was the chance we had been waiting for—a shot at the 220-Mc. record. For nearly two years there had been a 16-element horizontal array, 200-watt rig, and a crystal-controlled converter at WHDQ awaiting just this opportunity. We knew that out at W8WJC-BFQ, Jerry and Margaret were similarly prepared and waiting.

Contact was established on 2, and we asked Margaret to go to 220 Mc. In a matter of seconds, there she was on the higher band, running 81 to 5; some rapid fading, but almost as good as on 144! So, all thumbs and left feet, we started to challenge to 220 Mc. at WHDQ. Cassy tubes in 832A driver stage— no grid drive. No usable spare, except in 2-meter rig. Two-meter 882 turns out to have oversized base; won’t fit in 220-Mc. driver. Final resort to very lame surplus 882, 81, and 2764, with fantastic results, is a Yankee fashion. With this, the 4-65As got about 5 ma. grid drive, and ran white-hot at 200 watts input, but having gone that far (and tried Margaret’s patience for a half hour!) we decided to go through with it. No ham was ever more surprised than your conductor when W8BQF came back, reporting WHDQ R5 S1 on 220 Mc. —a new record for that band. 450 miles. Contact was established at 9:05 A.M. and maintained for 8 minutes, following which we changed back to 144 Mc. to find signals almost gone on that band. Signal levels were almost the same on 220 and 144, despite less than 25 watts output on 220 at WHDQ, compared to better than 200 or better on 144.

At the Ohio end, Margaret was running 300 watts to a
pair of 4-6JA, and using a crystal-controlled converter ahead of an IRO-7. At WH1DQ the rig was the 4-6JA job described in May and August, 1948, QST. The receiver was the crystal-controlled 8QVQ converter that appeared in QST for September, 1951, and in the 1952 Handbook, ahead of an SX-73. The antenna was a 16-element horizontal array, 40 feet above ground.

On the morning of the 10th, W8BDQ came very nearly being one end of the 420-Mc. record, too. She contacted W2QED on 144 Mc. at 8:30 A.M., and then had him change to 435. His signal was received in Everett, 81 or better, and a cross modulation QSO ensued. Unfortunately, the 8058 amplifier at W8WCJ-BFQ was out of commission, and only an 832A tripler was available for the record try. This was not enough, but crossband contacts were made at 8:50, 9:30, 10:00, 10:30, 11:00 and 11:30. At noon, with 4-meter signals just audible, there was no longer a 435-Mc. signal coming through over this 380-mile path. The 420-Mc. record was bent, but not broken, on at least two other occasions. On August 28th, as reported briefly last month, 8AIH, Algiers, worked across the Mediterranean to F0BQ, Toulon, France, who was completing the circuit on 144 Mc. The rig at F0BQ uses the European version of the 902D, delivering about 10 watts output as a tripler to 435 Mc. The antenna is a 24-foot (8-meter) opening array, as soon as F0BQ completes his 420-Mc. rig these two will be trying for a 500-mile record.

On the morning of Sept. 20th, the 2-meter signals of W2QED were exceptionally good on the 144-Mc. schedule, so he went to 435 Mc. There his signal was some 10 db. stronger at WH1DQ than on 144 Mc. Surely this was a time to try for a new record again, so a call was placed for W1CLS, Walhalla, Mass., to have a try at W2QED. Dis- Unfortunately, was away on a business trip, so W2QED did some telephoning at his end. He succeeded in alerting W8BXM, Salisbury, Md., who then got on 435 Mc. and was received 85 to 9 at WH1DQ, a distance of about 280 miles. The record held, however, when your conductor could not get through to the southern end.

The period of the September V.H.F. Party, the week end of the 20th and 21st, passed without much in the way of unusual propagation. Because of the large amount of time and space we are devoting to reports of the big openings, and because the timing of the contest is such that reporting early details at this time would be slanted toward eastern coasts, we are skipping our usual preliminary summary of contest results this month. We hope to have the complete story ready next month.

As if the going-on already reported were not enough, September also provided at least one major aurora opening. There were several instances of mild auroras at others times, including some reported in the Middle West by W8WOK and others during the night of Sept. 7th and 8th, which makes one wonder if there is anything more than mere coincidence in the appearance of auroras on the order of the biggest tropospheric DX session on record. But the first real aurora binge in several months, and probably the outstanding occurrence of this phenomenon in 1952 to date, came on the night of 22nd.

Reports on this one are not complete as yet, but the following stations were among those making hay on 144 Mc.: W1s IZY PBB HDQ, W2s NLY AZL UK UTH UH RPO ORI OPG, W3s LDZ PMG, W4AO, W6s DX BJQ DOR DQR FFM, YP8A1B. The opening developed suddenly around 8 p.m. EST, with signals reaching 80 peaks, a rarity in 2-meter aurora reception, soon after. At least one check was made on 220 Mc., with your conductor listening for W9DXX, Detroit, without success. To date, the 144-Mc. band is the highest to support aurora communication. If anyone has a chance to gather evidence on higher frequencies we'd be interested to hear about it.

Please remember that detailed reports of aurora observations on all frequencies are needed for the Cornell University aurora project. Special reporting forms are available on request from ARRL. If you are not already in this work, here is your chance to make a real contribution to a worthwhile study.

V.H.F. DX Summary, Sept. 7th-10th

Realizing that the 2-meter DX worked during the big September opening would be of more than ordinary interest, ARRL, through and on behalf of his DX members, and in response to 0ES appointees and affiliated clubs, asked for detailed reports of stations heard and worked. The response was more than gratifying. The tabulation of reports below is the result. Thanks, gang! Now, will you please help us to straighten out that states-worked table?

| W1PRL, Monroe, Conn. — Worked W8s PPH RUE, W8DX, W8EMS, V8s BQNN DIR A1B, Heard W8s DQG FAN EGOOD, W8MSMH. |
| W8ABF, Wiliham, Mass. — Worked W8s RUE PPH, W8CNT, W8EP nitrogen, W8EMS, W8QMS. Heard W8s DQG VBG EGH, W8s SPQ FENG, V8s AGBD DIR. |
| W8HDX, Canton, Conn. — Worked W8s RUE PCF, W8s JFR CYQ, W8s EGH FYU, W8SBFQ on 220 Mc. Heard W8EMS, W8SBG. |
| W8HNL, Oak Tree, N. J. — Worked W8s PCT CYQ, W8s EP LDP SDJ GJF, W8SBEQK, W8FAN, W8s ECHS KTF, W8NMQG. Heard W8MN8, W8s EEQ FVG DQG EGOOD A14. |
| W8SBD, Seaforth, N. J. — Worked W8s SRW BFQ SFG, W8s DQD EQG GLW EGH LF, W8s TMLY JMS. Worked W8SBFQ crossband, 435 to 144 Mc. |
| W8RE, Lockport, N. Y. — Worked W8SFBP, W8EMS, W8SEP, W8s CVQ PCT, and many others. |

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**WUTH, Rochester, N. Y. —** Worked W6s DDG FAN E6H PK, W6s BFG OQ EEP, W6EMS. Heard W4AO, W8EP.

**WDLN, Greenville, Pa. —** Heard 15 states; numerous W6s.

**WSFPH, Leesburg, Pa. —** Worked W6s HAQ KYF, W6s WV JF VVJ, W6s WQ DQ RFU PRB. W4AO, Folis Church, Va. — Worked W6s V8B WRN NN5F GN, W6RINQ, W6s YAN ETT EQV FJQ, W6s EMS NNW LPW PIP, W8KQ GQG, W6S A8Q AGQ AQG.

**W4HKK, Collierite, Tenn. —** Worked W6HQK, W6s BPQ EYC JBS KPS LEE AT LJV MBJ PK TQ YYY 32L, W6s Q8P REM RXX, W6s H8P DVM EMS HVF AQG LON LMY TMYX YXQ, W6GUD.

**W4VQ, Memphis, Tenn. —** Worked W6s UEJ UDA BFQ LV, W6s KFQ IHD.

**W4CQ, Raleigh, N. C. —** Worked nearly 100 W4s and W8s, and many W6s and W7s.

**W5RBK, Marine City, Mich. —** Worked W6s UEJ LEE JBS ZHH BPQ ROV KPS LEE MBQ EJC PK TQ, W8RPM, W8GUD, W6s EMD IHD. Heard W8FQK.

**W5BQK, Everett, Ohio —** Worked W5DQK on 220 Mc. Heard W5QED on 430 Mc. Heard W5DQ on Milwaukee, on 2-meter teletype, Record.

**W8VEN, Columbus, Ohio —** Heard or worked (not separated in report) — Many W5s, W6s and W8s, W6s PHD HQG, W8s LVJ AZL UK, W6s UEJ EIR HQP DVO, W8s UQD GYH VYA NVK FAN MHI EJC UJM JIA DCA D4G WOK GDM P00 YYY BPQ LV JFQ ORJ LJV, W6s SDH RNE RXX, W6s KFQ HAQ INI EMS MNQ LVF, W8GUD.

**W5PK, Dovers Grove, Ill. —** Worked W5HJK, W5RCL.

**W5FAN, Shobogun, W6s. —** Worked W6s NLY ONI TSY, W5FPH, W6s AO PCT ZKF, W6s TMJ IHD, W6QAC.

**W5RJL, Toledo, III. —** Heard or worked (not separated in report) — W5s RFU HDQ, W5s TBD TSY NLY QED, W5s AQG FFE RN LNA QFM QRI RUE, W6s AO HI XK FCT VLA VVQ, W5s RCI SKY, W6s AIW H8P LNT TN, and 56 W5s, 38 and 56 W5s.

**W6LEE, Westboro, W5s. —** Worked W5RCL, W5s HHE AO, W6T1, W6AESH. Heard W2NYL, W5VBM.

**W5SW, Waukegan, W5s. —** Worked W5HIH, W5RCL, W6s EMS DEP HPP L7T KYF, W8GUD, W5s TBN VH8, and many W5s. Heard W4VQV.

**W5OIK, Bensenville, Ill. —** Worked W5U2K, W5QKI, W4AO, W5s EP BPQ. Heard W5s RFU PRB.

**W5Z2, Columbus, Ill. —** Worked W5HJK, W5HIH.

**W5RCJ, W6s Q8B V8Q OQP LDP AFU BAX EP, W2T7S, W6s Q8V DVM EMS, W6s A8B AQG.

**W7BT1, Pleasant Hill, Mo. —** Worked W3LWN, W3ZWN, plus, Mo., Kan., Iowa. W5s, Ind., Ill., Mich., Pa., and Ohio stations.

**W6EMS, Adair, Iowa —** Worked W1RFU (best DX of 1952, 1150 miles), W1PBP, W6s NLY QZ3 UK QED ORI UTH AZL CCR TBR, W3s RUE QKI W6M LNA KWL KXI A8Q V8F, W6s Q8Q AO, W6GUD, W5s HI8 D8Q, and many near. Heard W3OOW, W1HJ.

**W9OAC, St. Paul, Minn. —** Worked W4HIH, W5QKI. Heard W5s WMF FPW, W2UK.

**W5RFP, Lambeth, Ont. —** Worked W4UBY, W8EP, W3AIH, W2MEQ, W6EMS. Heard W6s BPQ LV, and many others.

**W6AESB, Toronto, Ont. —** Worked about 40 new stations including W5PBP, W6s UK QED PAW, W6s CHX FQR FYW, W6s CVJ AO, W8SNF, W6s HTI UMF DDG LEE, W8s TMJ LFQ EMS, W6GUD.

**9903 Improved**

The 420-Mc. experimenter who wants to run something approaching the legal limit of 50 watts antenna power doesn't have much choice of tubes. Most conventional transmitting types just wouldn't work in this region, leaving the 9903 and 4X150A as about the only possibilities. The 9903 was favored because it can be used with fair success with conventional circuitry.

It is generally a weak spot, however, "weak" in this case being used literally, the construction that made the tube capable of operation in the u.h.f. range also left it extremely vulnerable to breakage around the plate pins, as many a 420-Mc. experimenter will tell you. The 4X150A tube is simply the same, 4X150A.

The physical weakness has now been corrected by the use of fused glass for both base and top, increasing the safe pressure on the plate pins more than fourfold. The new construction also shortens the tube plate leads, raising the efficiency that can be obtained from 420-Mc. tripler or amplifier stages. Installation of the new tube, known as the 9903/5804A, raised the output of the Handbook 420-Mc. rig noticeably.

**Some Probable "Firsts"**

There has probably never been an entire year in 2-meter history when so many "firsts" have been made as during August 1942, one of the three days following September 7th. Documentation of such records is difficult, but on the basis of the mass of data we have at hand, the following appear as probable first 144-Mc. contacts between the states and areas concerned.


**OES Notes**

WUTH, Rochester, N. Y. — 2-meter band open for up to 250 miles during most of period Aug. 25th to 30th. The big section of Sept. 8th-10th seemed to skip the Rochester area to a large extent. Canadian operators were working the DX much more successfully. Six-meter rig and beam under construction.

W4BIH, Rochester, N. Y. — Concurs in observations of W21TH. Inquiry of local Weather Bureau brought information that atmosphere turbulence has been more prevalent than usual during summer. Widespread and stable inversions not formed prior to late August.

W8NNY, Okeona, Pa. — 40-element array for 420 Mc. should be in action by now.

W7DG, Billings, Mont. — Now running 370 watts to 375CQs on 144-288 kc. Beans toward W7THI, Gillette, W7VO, Miles City at 7 MST; steady carrier, keyed at 25-minute intervals.

W7IFA, Carrollton, Ill. — Improved 2-meter activity in St. Louis and Peoria directions. Summer DX season on 50 Mc. below normal.

W7MBI, Coleta, Ill. — Still working nightly on 420 with W7HIM and W8HAQ. Has heard 3rd harmonic of WOLF's 2-meter rig on 432 Mc.

W6CPI, Thirza, Wis. — 2-meter survey by Racine Megacycle Club in September, to determine feasibility of county-wide c.d. work on that band instead of 28 Mc.

W5FAN, Shobogun, W5s. — Big 2-meter openings causing big increases in activity. Bigger and better antennas going up all around. Circular polarization to be checked for aurora work.

W6LEE, Westboro, W6s. — Much improved activity and interest. Sked with W8BDN, Grand Marais, Minn., now entering second year; 840 and 2100 CST. Would like to hear from Canadian 2-meter operators interested in similar skeds.

W7PLJ, Jackson, Mo. — Several new 2-meter stations worked regularly. W5RCL, Marks, Miss., 250 miles, heard frequently.

W9RSC, Hudson, Ohio — Extensive checks with 432-Mc. mixers. 630 and triode-connected 6AK5 best so far, though exports new 432-Mc. mixers learned to be better. Lighthouse cellulator made from "gold-plated special" now working on 2400 Mc., and checks to be made with similar design on 1215.

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DOCKET 10237

829 Griggs Street
Grand Rapids, Mich.

Editor, QST:
... The amateur service has proven itself time and again entirely capable of handling any emergency with which it has been confronted and doing it effectively with the provisions it now has. I do not believe the proposed "calling and answering" frequencies will aid the amateur service in any manner — and the effective loss of these frequencies will definitely cause harm. This opinion is shared by all local amateurs with whom I have conversed on this subject.

— R. O. Brulock, WY7DJ

94 North Grand Avenue
Baldwin, L. L., New York

Editor, QST:
I am personally opposed to portions of FCC Docket No. 10237, and to any unnecessary regulation of amateur procedures. I see no objection to provision for clearing certain bands (whether predetermined or not) in time of emergency, but object to any rules which would in effect deny the amateur of regular communications use of ten-kilocycle segments of our most crowded bands. The proposed calling frequencies and the specified manner of use fill no need in our usual communications, and place an unwarranted restriction on our operations. A considerable burden might be placed upon the Federal Communications Commission monitors, enforcing amateur adherence to these proposed rules. ...

— Charles P. Baker

120 Main Street
Catskill, N. Y.

Editor, QST:
The members of the Rip Van Winkle Amateur Radio Society hold no objection to the proposed changes in FCC rules.

— Dolores A. Rickelson, W2EWW

730 Wyndale Road
Jenkintown, Penna.

Editor, QST:
... The Commission, in the last few years, has taken upon itself a work load in excess of its capacity. We can easily see this from the fact that it now takes from six to twelve weeks for the issuance of a new or renewed license. The enforcement of the amendments proposed in Docket 10237 would be next to impossible. Therefore, we might sum up our views on Docket 10237 with one word: Ridiculous!


1834 University Blvd.
Auburn, Texas

Editor, QST:
... It would appear that the public servant has now become the master through a typical growth of power within a bureaucratic administration.

— William A. Green, W5BKH

Rt. 2, Box 1162
Vista, Calif.

Editor, QST:
... It seems as tho the FCC is trying to kill off ham radio just to have a lot of QRN on one side of the band. I can understand that for emergency work the proposal would be an asset. But, in the past, there has never been trouble putting through emergency traffic. ... I think that the new proposal is a needless, unnecessary, foolish action that no ham in his right mind would stand for.

— Merit R. Arnold, WGNLO

1036 Parkview Avenue
New Kensington, Penna.

Editor, QST:
... In all sincerity, please (FCC) just let the amateurs in the United States of America retain their rights to a "hobby"; don't try to commercialize and regulate them right out of business. I feel certain that they are competent to solve their own problems of calling and answering and, if they find reason to need corrective measures, they themselves will seek such adjustment through their national representative organization, The American Radio Relay League.

— O. Ross Acklin, W3OD

22 Madison Road
Waltham, Mass.

Editor, QST:
The principle of calling and working frequencies is so contrary to amateur tradition and to practical application that the proposed calling frequencies will not be used for the purpose intended. ...

— Francis M. Dubat, W1BOD

226 Raymond Road
West Hartford, Conn.

Editor, QST:
... One word most eloquently expresses my feelings — Why? ...

— William B. Marks, W1DEF

1243 Westridge Rd., S.W.
Atlanta, Ga.

Editor, QST:
... It is unnecessary from an emergency standpoint because the Federal Communications Commission has authority to declare any part of, or all of, any amateur band reserved for disaster communications. There also exist National Calling and Emergency Frequencies which have been set up by the American Radio Relay League, and which have proven satisfactory in past years.

— J. C. Fleming, W4KL

302 West Market Street
Louisville, Ky.

Editor, QST:
... As a substitute measure, we might suggest that the calling and listening frequencies be adjacent to and immediately outside the present ham bands. This would serve [the purpose without further congesting our already over-congested bands as the original proposal would do].

— Joseph S. Brawntom, W4JXF, Pres., Amateur Radio Transmitting Society

5372 E. Bald Eagle Blvd.
White Bear Lake 10, Minn.

Editor, QST:
I hear the FCC has hashed up another idea, a "new concept of amateur radio," no less! Twenty kcs. on each band exclusively for calling and answering! What a lovely idea, anyway? Where does the FCC get the right to tell us what our communication practices shall be? How does this fit in with their duties? The "new concept" is in my opinion impractical, unnecessary, and would confiscate valuable frequencies in our already crowded bands. There is considerable alarm among the amateurs in this locality that I talk with over the growing tendency of the FCC Amateur Division to propose new practices and regulations not strictly concerned with the FCC's duties to licenses and police the amateurs. Some read in these proposals a deep-laid plot by the FCC to take over our frequencies (Continued on page 180)

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The Ham Who Was President

BY ROD H. NEWKIRK, W1VMW

His inauguration went off in accordance with custom; rain seized an opportunity to soak everything in sight. Though it was unnoticed by the multitude, J. Willoughby Winklespoof could not find his misplaced speech. But the President-elect put his long hamming career to good stead and produced an oral snow-job that would have put his most glib round-table buddy to shame.

Then, in a flurry of tails, gold braid and limousines, it was all over. W9!! had become W9!!3 — the first ham chief executive in U. S. history!

** * *

JWW got the intricate hang of it in no time at all. Appointments, conferences, releases, yachtig excursions — all such details kept him so occupied he had absolutely no time to contemplate the trend of conditions on the amateur bands. Months went by. His proudful pals back in Ridiculous Heights, Nebraska, began to figure he had gone high-hat. There was a definite void on the air with old W9!! QRT.

Finally, a propitious moment arrived. Mrs. Winklespoof was away as guest of the Daughters of the Industrial Revolution, the kids were away at Space Cadet school and somebody, somehow, had neglected to fill in this date with the usual duties of state. “Aha!” chuckled Will.

Shortly thereafter, he appeared in the White House sub-basement surveying four or five crates of ham gear. Clearing out some curious menial help, JWW went to work. He hauled up his old receiver, staggered upstairs with three power supplies, the r.f. section and modulator. He selected an alcove off the Green Room for his shack and soon strange squelching noises could be heard emanating therefrom.

Willoughby whipped out a log sheet and made ready to blast forth a sharp CQ only to realize he had no antenna. Back down into the depths and out he came again with a few rolls of No. 14, some insulators and a pair of cutters. Darkness was at hand; there was need to work fast.

Looking over the White House grounds, JWW elected to rig up an east-west Vee beam. It was

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*DX Editor, QST.

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- "JWW" came up the hard way. He started out with a blooper and a '45 TNT, ran the gamut of '46s, '10s, and a variety of nondescript skywires. But it wasn't until he put his Advanced Class ticket to work on the 'phone bands that he really found his element. From that time on he was a natural...

while he was perched on the iron fence, fastening one leg at the far end, that he ran into his first bit of grief.

A shot rang out through the twilight and J. Willoughby did a dive to the lawn with a clean hole through his striped tail-coat. The fragments of the Pyrex insulator he had been holding rained about him. He had to admit that the guard detachment was really on the ball!

This situation was quickly straightened out and the guard chief apologized profusely. W9!!3 was ready to hit the air!

This our hero did with his customary vigor. The Vee worked fine and his first CQ raised a W7 in Walla Walla on twenty 'phone. "You're S9-plus," said the Seven. Winklespoof gloated. "Trouble is," the voice continued, "everybody else is S9-double-plus tonight." Will then increased his modulation from 150 to 200 per cent and began to get results.

But this fun was too good to last. The landline rang raucously, forcing him to abandon the QSO, and when he picked up the 'phone extension he was almost pinned to the wall by the blast. It turned out to be a Republican over on F Street. "You no-good -- -, I'd like to mangle you! I'd know that hacky campaign squawk of yours anywhere. It's not bad enough you're taxing me goofy, but now you even have to blat out Uncle Willie on my TV set. Drop dead!"

J. Willoughby succeeded in placating the gentleman to the extent of selling him some Savings Bonds. But the phone resumed ringing as soon as he hung up. Exasperated, he tore the connection from the wall and decided to switch temporarily to c.w.

Thus did time pass as President J. Willoughby
Winklepoo huddled away in his snug Pennsyl-

avania Avenue diggings. He hadn’t had such fun

in months! However, strange things began to

happen on the outside.

FCC monitors were picking up bizarre signals

from a weird-sounding transmitter which they

triangulated as being very close to the Execu-

tive Mansion. The jargon used was indecipherable,

although they picked out the combination

“RSQ” very often repeated.

Less than an hour later, armored cars, a pla-

toon of infantry, and a company of artillery con-

verged on the White House gates. Signals were

still being heard from somewhere within the

Mansion.

Will had barricaded the door after his TVI

phone call, determined to have one decent QSO

before he pulled the switch. His concentration

was so intense that he heard nothing strange until

a tear gas bomb shattered the above window and

went puff beneath his chair. Cursing the ciger he

was smoking, a gift from the Sultan of Lend-

isuand, whose country he had had the State

Department recognize for DXCC purposes, he

burst out of the shack and sprawled flat on his

face beneath the crossfire of three machine guns.

This unfortunate affair was, with considerable

effort, kept out of the papers and things gradu-

ally got back to normal. Congress rushed through a

bill giving the President an easier call to send —

W3E — and the Army assuaged his injured feel-

ings by presenting him with a gold-plated cor-

rectly-spaced electronic key.

A special detachment of FCC engineers in-

stalled in the Chief’s rig a series of 32-section

low-pass filters especially designed for W3E by

the Bureau of Standards. (These filters served

only to aggravate Winklepoo’s TVI troubles but

the Bureau laid the blame on technical papers of

the CCIR, because their components were mea-

sured correctly to within one part in forty quin-

tillion. A Congressional investigatory committee

later settled the matter with a stiff confessing of

both factions.)

The final solution to the President’s TVI pro-

blem was found by compulsorily increasing inputs

of all local TV stations (from 200 to 200,000 kw.),

which power increase extended their fringe areas

to points beyond reach of W3E’s keying tran-

sients, harmonics, and parasitics.

At any rate, despite these minor difficulties, J.

Willoughby Winklepoo made out okay. He

successfully parried affairs of state while accom-

plishing WAC, DXCC, and RCC. Yet he was

horrified one evening while checking through his

logs and QSLs — he still needed Vermont for

WAS!

Years had passed and his term was drawing to

a close. Was he fated to go down in history as the

only Presidential ham not to make WAS?

Perish the thought!

Thereafter, JWW cut short many a conference to

swim 40 and 80 meters in search of Vermont

WIs, but for some reason they just couldn’t be

raised. He even went to such length as having the

Interior Department install three one-kw.

transmitters close beside the Vermont state line

which he operated by remote control from his

White House shack. No soap. No comebacks

from Vermonters.

Will had another inspiration. The young son of

one of his few Capitol Hill senatorial boosters had

just gotten his ticket and had a suitcase portable

layout ready for action. At the behest of the

President, the lad undertook to enter Vermont by

automobile, set up his gear and work W3E. But

alas — local phenomena beyond the boy’s control

brought the scheme to disaster.

The naked truth finally dawned upon JWW.

There was no doubt about it. Unless something

drastic was done, the Chief was not going to make

WAS.

And so it came to pass that his next Thursday

press conference made history. He looked the

hawks of the press in their stolid faces and

calmly announced:

“Boys, I’ve been doing a lot of thinking lately.

It wasn’t an easy decision to make, but I find it

a necessary one. I’ve decided that, as of now, I’ve

become a Republican.”

After the least robust of the reporters had been

carried from the room, the news hit the headlines

with tremendous impact. Even word of Lisabeth

Saylor’s seventh marriage and a boy for Eddie

Candor were crowded off the front page. The

bedlam on Capitol Hill was unprecedented. But

the announcement had the desired effect.

Slipping back to his shack, JWW worked five

Vermont hams in quick succession and received

their QSLs airmail-special delivery in the next

post. Special courier brought the cards to ARRL

Hq., and J. Willoughby Winklepoo became our

first president to accomplish WAS.

* * *

The boos, cheers, and catcalls died away in the

distance as ex-President Winklepoo headed for

the club car of the outbound Capital Express,

clutching his WAS certificate in one hand and a

cheroot in the other. There was no band to greet

him at the end of his trip, but the Ridiculous

Heights Amateur Radio Club met him with open

arms and congratulations.

“It was great to be President,” said JWW,

with an accent on the tense. “But the job cer-

tainly interferes with a fellow’s ham radio.”

Whereupon he went home and fired up the rig

on 75.

November 1952
Simplifying the 10-Meter Crystal-Controlled Converter

A High-Performance Unit for Mobile- or Fixed-Station Use

BY W. W. DEANE,* W6RET

This converter offers nothing new in the line of converters, but it again brings to light a time-honored and very useful unit for emergency defense mobile work or fixed-station application for the old-timer or Novice. The circuit has been presented before, but it has been some time since this writer has seen it published in any of the leading radio magazines. It was first constructed for emergency defense work to be installed in my own car, where I wanted a very simple, cheap and easily-constructed unit that would satisfy my needs for emergency defense work in the Ventura County area. As it turned out, not only was it a very satisfactory converter for emergency defense work, but it exceeded my expectations in dragging in DX. The first two stations I heard when I applied the juice were a ZL and a KZ5. (This was one of those especially rare days seldom to be found lately on the ten-meter band.)

Circuit

The circuit diagram is shown in Fig. 1. A 6AK5 operates as an r.f. amplifier, and a 6J6 serves as an oscillator and mixer. There are no tuning controls used, and after initial adjustment the converter can be mounted out of the way up behind the dash. A 7025-ke. crystal quadrupling to 28.1 Mc. is used in this particular installation. Other crystals can be utilized to give variations in band coverage. The 6AK5 grid and plate coils are slug-tuned to approximately 20 Mc. These could be stagger-tuned if desired, for more coverage and somewhat less gain. L2 could be tuned to 28.7 Mc. and L4 to 29.4 Mc., but I did not find this was necessary. There are no tricky circuits involved, and a minimum of components is used. The oscillator circuit is slightly modified from the conventional in that a tap for the B+ is usually found on L4. I noted in my original construction that sluggish crystals would not take off readily without adjustment of the tap and, to eliminate this tap adjustment, plate voltage is applied to the oscillator section of the 6J6 through RFC1.

Construction

The converter is constructed on a 2×1 1/2×5 1/2-inch chassis box. This particular box is homemade, but I recommend one of the many 2 1/4×2 1/4×5-inch chassis-type boxes in grey hammer-tone, black crackle or natural aluminum finished. The antenna input receptacle is placed at one end of the chassis, the power and output cables extend out the other. No precautions other than utilizing short leads were observed during wiring. RFC1 and RFC2 are single pi sections from a 2 5-mh. choke, mounted one above the other on a 1/4-inch rod. If you can find sufficient room, the full 2.5-mh. choke is OK. No special oscillator injection was required, as proximity of L2 and L4 provided sufficient coupling. If a grid-dip meter is available, I highly recommend its use in the adjustment of L2, L3 and L4, with tubes in sockets and antenna connected. I took very special care to adjust the coils so that they peaked in

* 650 South G Street, Oxnard, Calif.

This compact crystal-controlled 10-meter converter is small enough to "sandwich in" anywhere in the mobile or fixed station.

The simplicity of the converter is evident in this bottom view, but the performance is all that one could ask for.
Fig. 1 — Wiring diagram of the 10-meter converter.

C₁, C₂, C₃ — 470-µfd. mica.
C₄, C₅ — 100-µfd. ceramic.
R₁ — 270 ohms.
R₂ — 22,000 ohms.
R₃ — 0.1 megohm.
R₄ — 4700 ohms.
All resistors ½-watt carbon.
L₁ — 3 turns No. 22 enam., wound at ground end of L₂.
L₂ — 16 turns No. 22 enam., wound ½-inch long on ½-inch diam. iron slug-tuned form.
L₃ — 25 turns No. 35 enam., wound 3/16 inch long on ½-inch diam. brass slug-tuned form, or 11 turns No. 22 enam. wound ½ inch long on ½-inch diam. iron slug-tuned form.
L₄ — 35 turns No. 30 enam., wound ½ inch long on 5/16-inch diam. iron slug-tuned form, or 16 turns No. 22 enam., wound 5/8-inch long on ½-inch diam. iron slug-tuned form.
RFC₁, RFC₂ — One pie from 2.5-mh. r.f. choke.

the ten-meter band and not just close to it. This makes the difference between a so-so converter and a really hot one.

**Adjustment**

Alignment is quite simple. The oscillator can be checked in any communications receiver covering ten meters. Plug in the crystal and tune the receiver to the fourth harmonic (in the ten-meter band) and adjust C₄ for maximum indication on the S-meter. L₂ and L₃ can be adjusted for maximum noise.

A "B" supply potential of 150 to 175 volts d.c. is sufficient for operating the converter. This converter works exceptionally well into the war-surplus ARC-5 broadcast-range receiver. Different combinations of coverage can be obtained by using various frequency crystals. Assuming a typical car radio covering the range from 550 to 1550 kc., four examples are listed in the table below:

<table>
<thead>
<tr>
<th>Crystal</th>
<th>Oscillator</th>
<th>Ten-Meter</th>
<th>Eleven-Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Output</td>
<td>Band Coverage</td>
<td>Band Coverage</td>
</tr>
<tr>
<td>7000 kc.</td>
<td>28.0 Mc.</td>
<td>28.65 to 29.55 Mc.</td>
<td></td>
</tr>
<tr>
<td>7025</td>
<td>28.1</td>
<td>28.65 to 29.65</td>
<td></td>
</tr>
<tr>
<td>7050</td>
<td>28.2</td>
<td>28.75 to 29.75</td>
<td></td>
</tr>
<tr>
<td>6025</td>
<td>26.3</td>
<td>26.0 to 27.3 Mc.</td>
<td></td>
</tr>
</tbody>
</table>

*Car receiver tunes from 600–1000 kc. for this coverage.

Don't confine this converter to mobile use. With a three-element beam on the converter operating into my ARC-5 in the house, it really drags the DX signals in (but not in the last couple of months, as you ten-meter ops will know).

I haven't attempted to offer anything new here. It's just to jog your memory regarding a simple, economical and satisfying way to get on 10.

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Strays

W90MN couldn't clear up his mobile receiver's automotive noise pick-up until he installed a new engine. What price DX!

Amateurs so situated as to have blueprint facilities available may find it a convenience to have enlarged copies of small QST circuit diagrams run off for workbench use. Tacking tracing paper over the enlargements will then permit checking off wires and connections easily as construction progresses.

— John J. Towne

W2E Customize closed down ten 'phone one night after QSOing W4MZS. He was greeted on the band next morning by W2MZS.

Ham to BCId BCL who has just stabbed him with a hypodermic: "Thanks for the dope, OM." — WØRA

Articles published in QST invariably bring the authors considerable mail from readers desiring clarification or amplification on certain points. While such interest is always welcomed, authors are often hard put to handle such correspondence in volume. To expedite replies, readers should:
1) enclose stamped self-addressed envelopes;
2) when using club stationery include the secretary's address;
3) sign their correspondence with full names and mailing addresses in addition to call signs;
4) stress legibility when handwriting.

November 1952 53
Announcing 10-Meter WAS Contest

Contest Periods

<table>
<thead>
<tr>
<th>Time</th>
<th>Start Dec. 5th and 12th</th>
<th>End Dec. 7th and 14th</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST</td>
<td>6:00 P.M.</td>
<td>6:00 P.M.</td>
</tr>
<tr>
<td>CST</td>
<td>5:00 P.M.</td>
<td>5:00 P.M.</td>
</tr>
<tr>
<td>MST</td>
<td>4:00 P.M.</td>
<td>4:00 P.M.</td>
</tr>
<tr>
<td>PST</td>
<td>3:00 P.M.</td>
<td>3:00 P.M.</td>
</tr>
</tbody>
</table>

All amateurs located in the League's field-organization territory (see page 6, any QST) are invited to participate in the Fourth 10-Meter WAS Contest.

High scorers for the past three contests have been W7PUM, W7PUM (again), and W1ATE. Competition for the 48 states will be especially strong this year. No one as yet has reached this goal, but K16JH in January of 1950 missed by just one for a total of 47; he is top man to date. Call area leaders in the 1951 contest were: W1AQO, W2TVR, W3PQW, W4PJJ, W6SPW, W6STE, W7PUM, W8RXY, W9QRM, W9HOM, W7YR, K16JH, K4FP.

Contest reporting forms are available upon request, although it is not essential to use them if the sample form shown is followed. Total available operating time is 96 hours. C.w. to c.w./c.w. to 'phone, or 'phone to 'phone may be used.

If you’re lacking states for the WAS award, or want to enjoy two weekends of operating fun, just avoid black cats, hope for the right skip, and good luck with your "CQ WAS Contest!"

10-METER WAS CONTEST REPORT

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Station</th>
<th>Report Sent</th>
<th>Report Received</th>
<th>Location</th>
<th>Number of Each New State as Worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 5 6:00 P.M.</td>
<td>W9MRR</td>
<td>57</td>
<td>58</td>
<td>Ill.</td>
<td>1</td>
</tr>
<tr>
<td>6:03</td>
<td>W3DEW</td>
<td>55</td>
<td>57</td>
<td>Texas</td>
<td>2</td>
</tr>
<tr>
<td>6:05</td>
<td>W5QGT</td>
<td>45</td>
<td>46</td>
<td>Okla.</td>
<td>3</td>
</tr>
<tr>
<td>6:10</td>
<td>W9BIR</td>
<td>58</td>
<td>59</td>
<td>Mo.</td>
<td>4</td>
</tr>
<tr>
<td>6:13</td>
<td>V9AAB</td>
<td>57</td>
<td>57</td>
<td>Miss.</td>
<td>-</td>
</tr>
<tr>
<td>6:18</td>
<td>W9BEL</td>
<td>57</td>
<td>57</td>
<td>Wis.</td>
<td>5</td>
</tr>
<tr>
<td>6:21</td>
<td>W9YTF</td>
<td>58</td>
<td>59</td>
<td>Ill.</td>
<td>-</td>
</tr>
<tr>
<td>Dec. 6 3:00 P.M.</td>
<td>W4NYY</td>
<td>57</td>
<td>57</td>
<td>Fla.</td>
<td>6</td>
</tr>
<tr>
<td>3:00</td>
<td>W6T</td>
<td>59</td>
<td>59</td>
<td>Cal.</td>
<td>7</td>
</tr>
<tr>
<td>3:10</td>
<td>W9QET</td>
<td>59</td>
<td>59</td>
<td>Wis.</td>
<td>8</td>
</tr>
<tr>
<td>3:13</td>
<td>W9AM</td>
<td>59</td>
<td>59</td>
<td>Cal.</td>
<td>-</td>
</tr>
<tr>
<td>3:17</td>
<td>K4MDA</td>
<td>59</td>
<td>59</td>
<td>P. R.</td>
<td>-</td>
</tr>
</tbody>
</table>

Number different states worked 12
Number different states worked 7
Claimed score: 12 states X 7 states = 84

I have observed all WAS Contest 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
Address

Rules

1) Eligibility: The contest is open to all radio amateurs in the sections listed on page 6 of this issue of QST.

2) Times: All contacts must be made during the contest periods listed elsewhere in this announcement.

3) QSOs: Contacts must include report received and sent, location of station worked.

4) Scoring: One point is allowed for each contact and one multiplier point for each new state worked. The same station may be worked but once during the contest for credit. The final score equals the total contact points multiplied by the total number of different states worked.

5) Reporting: Contest work must be reported as shown in the sample form. Closing date of entries is January 12, 1953.

6) Awards: A certificate will be given the highest scorer in each section.

November 1927

On the eve of the International Radiotelegraph Conference, it becomes increasingly apparent that ARRL must bear the brunt of anticipated anti-amateur pressure.


Technical Editor Robert S. Kruze - "In 'My Phone Isn't Much, If Any, Broader Than C.W.'" - strikes at the "wabulation" so noticeable on many signals in our bands.

"Full-Wave Rectification and Crystal Control," by Fred H. Schaad, 9U7-ZARRL, describes in detail up-to-date gear used at his prominent Wisconsin station.

The handling of weather data by radio is the topic of Thornton P. Dewhurst's article on picture transmitting and receiving techniques.

Porter T. Bennett describes a winder for celluloid-supported coils and J. M. Thompson recommends circuits for the minimizing of howls and motorboating.

G. H. Browning analyzes several approaches to the problem of coupling receivers to antennas in his "Receiving Antenna Tuning Systems."

A new line of fixed transmitting condensers, to be known as the "Navy" type, are being manufactured and made available to amateurs by the Sangamo Electric Co.

Also newly available are machined bakelite mounts for 250-watters as announced by Radio Engineering Laboratories of Long Island City, N. Y.

The Teleplex Company of New York City produces a new automatic sender which should greatly ease the pain and strain of learning the radiotelegraph code.

"The Long Way 'Round," by G. C. Knight, takes up the problem of calculating distances traveled by radio waves which deviate from the normally shortest paths.

The Old Man returns to our pages for a blast at "Rotten Broadcasting" wherein the Laughing Lizards Symphonic Ensemble feels the sting of his verbal wrath.

November's 5-Meter Test is announced in detail, a worldwide effort to aid in the evaluation of radio propagation at this relatively unexplored wavelength.

The Communications Department announces a raising of Brass Pounders League standards - henceforth BPL listing will call for 200 traffic points or 60 deliveries.

ARRL SCMSCs 4E4C, 8AN0, 6NX, 9E6N, 1BVL, 4JR, 9BTA, 5GW, 6DNG and 9CYQ are included in a page of descriptive and photographic portraits.
CONDUCTED BY ROD NEWKIRK, W1VMW

How's DX?

How:

We hear from some of our younger DXers who have had to trim sail on DXCC aspirations in favor of that bane of youth, the Three Rs. By this time of year the load of homework being inflicted can barely be dented by an ax. Many are the longing glimpses being cast at dusty ham gear as exam crams grind ever onward.

Which strikes us with the thought that this DX game itself isn’t exactly a haven for the noddy noggins. It conceivably represents a substantial chunk of curriculum in the alma mater of many, the College of Hard Knox.

You’re bound to tuck away a smattering of weird geography—who but a bunch of doughty DX men would know that Venice, Italy, is farther north than Vladivostok, Siberia, or that it’s easier to get to Africa in the mornings by going west? As for algebra, one quickly picks up equations of great portent: 11 + AG2 + MP2 = 1 and VP3 = 6, in terms of countries. So far as spelling and history are concerned, try rattling off O1SOQ’s address or the date Newfoundland signed up with Canada. Foreign language, huh!—deciphering a few central European SWL cards will give you the equivalent of a stiff semester in a hurry. And you’ll never take a real economics course, either, until you’ve spent a few days trying to squeeze a flexible kilowatt out of an inflexible piggy bank. No need to go on.

So, for some liberal education, scrape together your notebooks, slogs, plenty of sharp pencils and join the class now in continuous session daily on 160 through 10 meters. You may play hooky at will, but watch out for that final exam early next year—ARRL’s annual DX Test!

What:

On twenty, many students have been making good marks. WA4UL turns in EA9AP (14,008). FQ8AP (045 t5), TG6OCR (060), VP5BD (012 ts), V56CG (058), YI2AM (035 88), YU1AG (059) and ZB1BR (050 t9). John heard ZB1BR is WI2SW and that C3AR is closing down. SEC work keeps W1MJJ’s DXing time limited but Carl caught several F5Ps, a Y12, CP1BK, EA6AM (052), H9eLAA (068), LAB (032), TA3A (018), V56BA (078), JA2AH (110), 4IXBF (102). He’s having a dose of time raising DUs—do they all have R.L. already? At W9UJS we encounter G3JUB (108), HZ1MY (080), E1KIFM (012), KB3AJ (090), KJ6AR (096), K4ZLF (104), YV4JAC (096) and 4BH (071). Wall now has 121 confirmed.... FQ8AG (089), HCS 1JW (015), 2ME (070 QHR), HHIJ (030), H1RL (125), OX3BQ (065), PZJCC (020), YV5JZ (070), ZB2I (025) and some CN8s came back to W8HEV’s 200 watts and FW. Some kids found C48K and VQ4KRL while tuning the band.... FB8H (015), VQ3BM (096) and 5AZIS will get fast Q5Is from W3MFW

* DX Editor, QST.

November 1952
The outstanding signal of Z56BW is familiar on all DX phone bands. You’ll find this caller listed regularly in DXCC Telephone Honor Rolls.

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West Gulf’s DX Bulletin points up the activities of AP2N (026), CR8Z 7CE (145), 7LU (035), 9AH (100), CS3AC (008), CT2DQ (075), F8BS BA (080-110), BB (130), BH (140), Z5 (050), FK8SB (030), FM7WF (050-125), FN9ON (102), F0SAG (080), F8QAR (020-054), FR7ZA (060), FT7YB (082), F9QV/EC (050), J1TAJ (013), KC6QY (077), ZM6AX (100), ZK4IC (010), MF2A (010), MP4KAI (000), OX3BF (035), ST2HK (020), TF3SV (045), VK1GN (015), V06 (010), 4IP (015), 5CL (011-045), 9FD (082), VRZ2 (027-063), CG (010), CK (075), CN (025), V8S (080), 9AW (100), V8JX (021), XA3AC (050) “Tsaking,” YT4IB/MM (040), ZB1JZ (028), ZC4XP (110), 4X4RE (001), 6L6MY (120) of Qatar and 9S4AX (005).

D1AQH has been going over twenty phone with a fine-turbled comb: AP2N 2X (14-120), ZL (140), SHQ (124), CR6BW (150), ELOA (305), FOSAJ (234), JI1OG (140), PJ2CB (120), SU4J 1Y (120), 155 (155), US8 (155), V8S 2DC (184), SAU (136), 5DQ (128), 8AL (131), V8S DQ (130), EU (171), V82Bz B5 (185), CR (145), CX (161), DL (171), VS6BY (145), VS7A BR (132), FG (197), BR (152), SP (135), WA (172), V8S9W of Oman (155), YA3BV (151), Y1s 2AM (150), 8Z9L and YK1AC (172) all answered Don.

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The DX Bulletin has those active on voice: AP2N (507), CR7AG (218), CS3AC (210), CT3AN, DU1AP, E6A9I (320), EA6AC (140-210), ET3R (220-270), F8BS BA (106-210), BB (200-230), BC (100), BR (100), F8S AF (180), AP (180), FM7WF (310), FK8SB (105-200), WY (102), F8SAB (180), F8PAQ (180), F0BS AD (220), AK (105), FR7ZA (140-300), FT7YB (022), HB1JJ/RE (150), HB1JZ (180), HHS9S (178), HSGTC (200), HZ1A0 (187), IS1BFZ (120), KB5AO (280), KJ6AW (250), K65AS (218), MF2AA (218).
This layout at KG4AF knocked off an average of over 32 QSOs per hour and racked up second high non-W/VE/VO c.w. score in ARRL's 1952 DX Test.

O18SHP, (QSL via W7MYO)
O18TH, (QSL via KB2GIZ)
SV1SMX/MM, Spirou Mounirous, MM4WO, % RCA, Buenos Aires, Argentina
W1FAS, Stan Cook, British Honduras
W1PAJ, Box 103, Antigua, R.W.
ex-VQ2MR, (QSL to V6NSL)
VQ4MY, (QSL to HZ1MY)
VQ4PF, (QSL via FQ8AF)
W5MUPF/K6C, Ray S. Caldwell, Pago Pago, American Samoa
Y56VE, (QSL via HZ1MY)
Y5IAH, Fadel Chabali, Manara Street, Damascus, Syria
Z5KIC, (QSL via W6MRU)
Z5AJA, Pierre Albert, 3 Impasse des Carrifnes, Monaco
Z6GMY, (QSL via HZ1MY)

These through the courtesy of W1RWS, W1NIWJ, W2a AOS, KG6 DBX BUY, W3XX, W4KE, W5N DBXSLJL, W6QG, GFT KA, W6a AII RZT, PJ2AA and GWDXC's DX Bulletin:

Tidbits:

Juku - From W9PFW, W8RZB and sources direct we get pick on the JA/KA situation. Call areas for Japanese nationals are JA1, Kanto and Shinzetsu district; JA2, Nagoya and Hokuriku; JA3, Kansei; JA4, Shikoku; JA5, Chugoku; JA6, Kyushu; JA7, Sendai; and JA8, Hokkaido. Licensees have been issued to over 300 applicants in most of these call areas. JA1A AA AC AD and AE are prevew J2s 1B MI PU and KM, respectively. JA6AA reports that J5CC, prominent prevew Kyushu DXer, perished at sea during hostilities. W8RZB is ex-W4MNG and holder of the call K2HBE. QSL cards for Japanese nationals may be sent via JARL, P. O. Box 377, Tokyo, and those for KAs via FEARL. Recently ticketed KR6JZ finds harno radio booming on Okinawa. The KI0s have a live wire club going and the local QRM is fierce. More notes on VSSEL's Brunei safari: Clyde managed 450 QSOs with all continents and U. S. call areas and had a peak run of 45 contacts in one hour. All this in five days of operation near the Brunei shore, two miles from inaccessible Sarawak. But the jaunt wasn't all peaches and cream - W9BEA got back on the air in Minneapolis some 15 pounds lighter. More re Ac4YN: DL4LQ was told by G8RT that "Mr. DX" is safe in India. O6DAA, now active with a 6C5-6F6-K76 25-watt, is working on an 807 final to be modulated by Class AB; 6Lis. He regrets official red tape has held up the lifting of the W ban on 0D5 QSOs for so long. Y13BZL, closing down and heading back, writes he did his utmost to plant the radio bug in Iraq so that the country will continue well-represented on our bands. Activity of Y12AM will attest to this and is the result of Y13BZL's goar being converted for club-station use. Y12AM commenced operations with a stock of 3000 QSLs fresh from the printers. Johnny sends his thanks and best wishes to all W/VE/VOe with special bows to Ws 1MCW 3R18 and 3TRV. He left Y12FD active on 40 meters with Yia 2AM and YH1 inhabiting 20. - W1NIWJ, now a happy ex-W8L reports YK1AH a believer in 100-per-cent QSLing. Fadel has a c.e. 60-watt, a dipole and a home-grown 7-tube supercooking on 20 meters.

Africa - 28SYC-SS7B reports difficulties encountered in his ZDP planning - he'll have to take into consideration the generating of his own power. Other details have been accounted for, we are told, so grit your teeth for some pot tent EKE/CN8, and we still get a spark out of the Mediterranean. Spain and Algeria were his latest stops but Steve managed no FA and PA hamming. W5HBM is home from the VQ1RF wars and, with W9GNU, wants it known he'll be glad to make good on Zanzibar cards gone astray. Send details of your VQ1RF QSOs to W5HBM at Dripping Springs, Texas. Dark Continental gleanings from GWDXC's DX Bulletin: When F3DAB returns to Poland from France he expects to sign F3A.B.

... The call F5SA6 has been pirated on 20 phone. ... F5AS8 is the son of F5Q8AG, F5Q8AT has a pair of 807s on c.w. and F5QSHC is making a comeback with 100 watts. ... F5IO rebuilds for phone. ... W3QFD is active again from shipboard. ... CR8s AB and AM, father and son, operate an electronics laboratory in Nova Lisboa.

Oceania - Some Pacific data from QIOCL. Call-sign blocks have been authorized as follows: KG8A-KG6BZ; Saipan: KG8A-KG6DZ; Tinian: KG6A-KG6ZZ; Caroline: KG6NA-KG6XX; Marshalls. The latter assignment does not include Eniwetok and Kwajalein areas. The Trust Territory of the Pacific Islands High Commissioner's office also made call assignments for official amateur stations at each District Center. Some of these may be active shortly from such spots as Majuro, Ponape, Yap and Koror. Bob is getting over cooler to DXCC at QIOCL. He notes that KG8A will join the Truk-on-the-air gang soon. KG6DX is QRT, bound for home, and KG6JS is said to be preparing for 29-Me, 'phone work ... KG6ABA, of the Guam QSL bureau, is accumulating stacks of Juley DX cards for KG6s whose operators have left the Island. He would appreciate hearing from such ex-KG6 personnel so that these postcards may be claimed and the backlog cleared away. ... KI6BVW tells us of the strong possibility of a KG6 amateur becoming active on a two-year residency. He won't ever be lonesome if he has a receiver and a few watts available! ... W6AM was W5MUP/- K9S's first U.S.A. contact.

Europe - EDR (Denmark) sponsors 1952's Sixth All-European DX Contest in conjunction with the Danish society's 25th Anniversary Jubilee. The c.w. section runs from 0001 GCT, Dec. 6th, till 2400 GCT, Dec. 7th. Next (Continued on page 126)

November 1952
M. A. R. S.  U. S. N. R.

Announce Name Change for MARS

The name of the Military Amateur Radio System has been changed to the Military Affiliate Radio System, according to an announcement by the Department of Defense. The program will continue to be known by the short title MARS.

MARS is a joint Army-Air Force program. The two services have organized the efforts of skilled technicians in order to direct them toward one-over-all communications plan founded on a national, rather than a local, need.

The name was changed because the term "military affiliate" more clearly defines the relationship between the Armed Forces and individual members of the system. The word "amateur" was employed originally in order to emphasize the technical qualification for membership — possession of a valid amateur radio operator license issued by the Federal Communications Commission.

The Chief Signal Officer, U. S. Army, and the Director of Communications, U. S. Air Force, direct the operations of MARS within the two services. An advisory committee, composed of both military and civilian members, advises the Chief Signal Officer and the Director of Communications on MARS policy. Governmental agencies and civilian organizations represented on this committee include the Federal Communications Commission, the Federal Civil Defense Administration and the American Radio Relay League.

Major Long Appointed New MARS (Army) Chief

Major James A. Long, AB6ACB-KH6ACB/3, has been named Army chief of MARS by Maj. Gen. George I. Back, chief signal officer, U. S. Army. He replaces Capt. Lester A. Peterson, A4YC/W4YC, who has completed his tour of service.

(Continued on page 183)

Carolinus Hurricane

During the August hurricane in the Carolinas, cooperation between the Naval Reserve and amateurs was an important factor in providing emergency communications. At the height of the storm, the landline between Sixth Naval District Headquarters at Charleston, S. C., and the Naval Ammunition Depot at Charlotte, N. C., failed. A Naval Reserve radio circuit to the Naval Reserve Training Center at Charlotte was used to reestablish communications. However, contact was lost after a frequency shift. Amateur station K4USN joined the South Carolina Amateur Net 3999-kc. phone and relayed a message to Charlotte with the assistance of W4AHW, W4FZK, W4OTW, and W4USN. Delivery was made within ten minutes and normal operation on the Navy circuit was restored.

Emergency radio communication was established with other Naval Reserve radio stations during the storm and valuable assistance was provided by the following amateur stations: W4VXK VDX47 E2TC EN27 E2TX KL8X M1C NC. Operators who assisted in maintaining a watch on the Naval Reserve Training Center at Savannah, Ga., were George M. McCoy (W4MIA) and Paul M. Carter, commercial operator, first class.

Code Practice Transmissions

District Naval Reserve Master Control Stations of the Fourth and Eighth Naval Districts conduct code practice schedules, as shown below, for the training of Naval Reserve communication personnel. These transmissions are available to amateurs desiring code practice.

<table>
<thead>
<tr>
<th>Station</th>
<th>Frequency (kc)</th>
<th>Operating Periods</th>
<th>Q5 Speed (m.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NQD Philadelphia</td>
<td>4010</td>
<td>7:45-8:15 p.m. EST</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2792</td>
<td>8:15-9:30 p.m. EST</td>
<td>8</td>
</tr>
<tr>
<td>NDF New Orleans</td>
<td>8000</td>
<td>9:30-10:00 p.m. EST</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>2864</td>
<td>9:30-10:00 p.m. CST</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>4105</td>
<td>9:00-8:00 p.m. CST</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5155</td>
<td>Mon. thru Thurs.</td>
<td>15</td>
</tr>
</tbody>
</table>

Here & There

H. A. Heller (W7LGO), RMN3, USNR, has been appointed ARLR emergency coordinator for the Boulder City, Nevada, area. Chief Radio Electrician F. A. Wilson (W7IFJ), USNR, received a similar appointment for the state of Nevada. Both are members of Volunteer Electronics Platoon 11-55 of Boulder City.

K6NCB, operated by the Naval Reserve Electronics Program office of the Eleventh Naval District, is looking for contacts on 40 meters. Operators are K6XV, Cdr. J. C. Pitkan, jr., USNR; W4TJD, Cdr. B. A. Wambarges; and W6HYA, Bill Munoz, ET2, USNR.

W. E. Humphries (W4SRL), RM1, USNR, and Carl Levans (W6KLY), RM1, USNR, were recently selected for transfer to the regular Navy.

K4NAA, Naval Reserve Training Center, Covington, Kentucky, is operated by W30UF, Lt. Cdr. E. M. Remoreno, USNR, and W8UFA, G. M. Bucke, ET1, USNR.

W6SBU, Lloyd I. Burns, of Volunteer Electronics Company 12-1 of Fresno, Calif., was recently commissioned as ensign, USNR.

Major James A. Long (right), new Chief of MARS, and Captain Lester A. Peterson, whom he replaces.

58 QST for
INEXPENSIVE DYNAMOTOR RELAY

Starting relays for dynamotors are relatively expensive and difficult to obtain. An entirely satisfactory substitute can be made easily from a Ford automobile starter relay which costs only about $2.

The Ford relay could be used without modification, but it draws 6 amperes. To reduce this unnecessary drain, the coil should be rewound with No. 26 or No. 28 enameled wire.

To get at the coil, pry off the top of the unit with a bottle opener, and then remove the contacts with a wrench. The coil will then drop out. Remove 176 turns of the wire with which the coil was originally wound, and rewind the form fully (the original form is not filled) with No. 26 wire. This produces a coil that will draw only 0.35 ampere. If No. 28 wire is used the coil will draw about 0.20 ampere. Any larger-size wire will work, but will take proportionally increasing coil current.

The winding operation can be done by hand, or by placing a bolt through the axis of the coil form and then slipping the bolt into the chuck of a drill. Large washers will keep the nut and the head of the bolt from slipping through. The spool of wire can be slipped over a spindle such as the blade of a screwdriver clamped in a vise. — William Herzog, W9LSK

TIPS ON USING SHIELDED WIRE

Shown in Fig. 1 is a method of preparing the leads of shielded wires which produces a neat and simple termination. It is in general use in commercial practice, but apparently has been overlooked by hams.

The sketches tell the story. First, bend the wire, as at A. Next, slide the shield over the bend (B) using either a blunt instrument or your fingernail to separate the strands. Pull the short end out of the shield, as in C, and then pull the shield taut as in D. The end of the shield may then be cut to desired length and tinned for soldering. The result is neat and strong, with no frayed ends to short-circuit the high voltage.

This method can also be used to tie into the middle of a shielded run, as is necessary when wiring the heaters of several tubes in parallel. The method for this type of connection is shown in sketch E. — Paul A. Quinn, W1QXU

PROTECTING POLYSTYRENE FORMS DURING SOLDERING

Anyone who has deformed a polystyrene coil form during the soldering process will appreciate any suggestion that solves this problem. One sure method of protecting the form and the pin alignment is to immerse the form in a shallow pan that has been filled with cold water and ice cubes. If the water extends up approximately 1/2-inch above the base of the form, it will dissipate excessive heat as the soldering operation is performed. — Carlton P. Ross, W9ABA

REFRIGERATOR-TYPE TRANSMITTER CABINET

If your transmitter needs a little dressing up, and if there is an old refrigerator within sight, think twice before dashed off to the radio store for a new cabinet. Here’s how I housed my 813 rig in an old Kelvinator unit that outlived its intended purpose. The r.f. units were mounted in the food compartment after the door, the ice-cube trays, and a few other items had been re-

(Continued on page 188)
Wanted! Volunteer Stations To Send 28-Mc. Code Practice. ARRL suggests that club officers arrange for certain members' amateur stations to put on local practice programs with special attention to transmissions on 10 meters. ARRL solicits information on such schedules and also from individuals who would like to undertake sending a good grade of code-practice transmissions to assist amateurs in their areas in attaining code proficiency. Do you work this band? If so, what schedules can you keep? In return for your proposed schedule that will be effective six to ten weeks ahead (it takes a good part of that time to get data in print and distributed to readers) we will list your schedule in QST and send data on giving practice, if you so request.

We'll include listing of schedules on other bands in QST too, but our list generally has more stations on ten since this avoids too many practice transmissions in the lower frequency bands where congestion and interference are greater. In sending any sked to ARRL, please advise frequency, days of transmission, starting time and duration of such transmissions as well as the speed ranges covered.

Pointers for Effective Operating By Novices and Others. Timing your reply to follow quickly the conclusion of any CQ (general inquiry) call will produce most replies. Keep reply calls brief. Breaking them into one or two "four times two" calls interspersed with short breaks for any reply will often get your man. Over-long calls lose attention so that replies go to others.

Conciseness or time-saving is the mark of the real two-way communicator on c.w. HW7? is much shorter and better than a painfully spelled out "turning it over to you now," showing little operating experience. Our booklet Operating an Amateur Radio Station (sent free to members on receipt of radiogram request giving your address) lists the commoner "Q" signals. Of these you will find the following especially useful: QRK, QRS, QRQ, QTC, QRU, QSZ, QSL, QSB, QSV, QRM, QSY and QRL. The best way to learn their meaning is to use them frequently on the air. Consult your booklet; keep it in the operation position.

On Accepting Traffic. Amateur message service does not compete with other services, since there are no charges and can be no guarantee. As long as no compensation is involved and FCC and international regulations are complied with, messages may be accepted from anyone for sending by amateur radio. It is a cardinal principle for each of us to observe in this matter that as an individual we do not accept traffic to be started unless our specialized knowledge indicates that it can be handled in a creditable manner, either through individual schedules or to points contacted through specific nets or via the National Traffic System.

Operators must not make changes in messages without proper authority. It is important that at the point of origination proper suggestions be given: (1) to keep messages concise, (2) to insure completeness of address as essential to delivery, (3) to screen the filing of traffic and prevent originations for a local area that are covered by the local telephone system or remote points where delivery through amateur channels is not feasible. While the importance of a message can only be evaluated truly by the originator or the addressee, it is a disservice to originators as well as amateurs who specialize in devoting their time to this phase of public service to encourage or permit indiscriminate filing of casual greeting messages or those that of themselves indicate a transitory street-corner booth filing. The "rubber stamp" message of this type will usually only overload the system and in view of the higher mortality in transit tends to create a low impression of the potentialities of our service as well as the originating station.

Systems for DX Bookkeeping and General Operating. The availability of the new ARRL Countries List (sent on receipt of radiogram request) simplifies bookkeeping to a minimum for those who merely want to write in the calls from stations representing countries in the list as they are worked. Bookkeeping for attendance on the phone or c.w. section nets may utilize a card-file system or ruled paper with columns at left and columns for each period of operations. For general record purposes, if desired, 3 × 5-inch file cards can show call, date worked, frequency band, name, whether A-1, A-3, etc., was used, whether a QSL was sent and what date, etc. We have known several amateurs with an elaborate card-file system. Where neat records are in themselves a hobby, a card file admirably can be the "ultimate."

For the fellow just getting his General Class license which makes all the amateur bands available for c.w., DX, traffic and a number of bands for phone too, it may be practical to suggest starting a small notebook or bound record book. For the fellow who decides to get all there is out of each kind of amateur radio we suggest devoting the first four or five pages of the book to calls,
days, frequencies and names of those amateurs contacted consistently on the local net of which you should want to be an active member. The list can be just calls and nicknames (or "sines") if that is all you are interested in. If working for WAS or DXCC, the next section of your notebook can be devoted to states and countries, two or three to a page with columns for data on stations as they are worked. The particulars can be as simplified or as elaborate as you may individually desire. We suggest you use just those items of the following list that you wish, simmering down the list to lowest terms but leaving in the items that mean most to you. You might show (1) the call, (2) the city, (3) the band, (4) mode, (5) month-year, (6) nickname, (7) date QSL sent. Keep your FCC log more than the required year and you can go back at any time for more elaborate data. You can save space in listing DX in such a record by listing all the colonies of the French, Dutch, Portuguese and groups of British colonies and protectorates together. Some amateurs make out their QSLs while standing by in the course of net operations. If so, QSLs themselves can be used before mailing for making up this supplementary record which will show your progress, enable you to send regular follow-ups on DX QSLs that are not acknowledged, etc.

19th Sweepstakes!!! Novices and Old-timers alike should get into this once-a-year ARRL contest for all it offers. Naturally we'll compare the Novice results printed only with reports from other similar operators, for with frequency bands circumscribed and with the operating limits of being new at the game, it would be unfair to compare otherwise. There were more than 150 WNs in the running last year... so to all WNs we say, get our free log sheet or at any rate keep a tabulation and send it in for official credit. Have some good fun and get the build-up in operating knowledge that comes with this, the annual "SS."

The 1932 Sweepstakes rules are printed elsewhere in this issue. The ARRL Sweepstakes, for those who are historically inclined, was introduced by the Communications Department in late '29, the first one meeting instant success when held in the continuous period January 18 to 31, 1930. The first two annuals were in the nature of National Relay Contests. A message exchange (10 words each, non-rubber-stamp traffic) was then required with each contact as basis for points. The helpful educational feature of following an order of parts in a message preamble (but streamlining to avoid bulky text and permit more stations to be worked) is included to this day. A neatly packaged signal report takes the place of the "check." The name "Sweepstakes" was derived from the unique bournemouth trophies put forward by ARRL to popularize the first one. The bournemouth in a clean sweep was probably first used by the Dutch when skippers tied brooms to their mastheads to signalize victory or success on returning to port... and it is noted with interest that the broom as a token is still in public discussion in our national elections with the

original meaning! Today the Sweepstakes has evolved into week-end fun instead of 14-day contesting. Also since the 3rd Annual ARRL Sweepstakes, the "SS" has always been in November, to give contest hounds time to rest up and prepare for the February-March ARRL DX Competition, the outgrowth of the International Relay Contest, which developed as a "second section" of those Operating Activities detailed at such length in January '30 QST.

The "SS" is one of the big annual operating activities — usually only the Field Day has a bigger domestic following. It's the prime chance for most of us to give the current station set-up a real test of what it can do; it's the chance to get QSLs for shack wall-paper and add to all this station accomplishment (may include WAS too!) the operating fun even aside from the competitive angle, for which there is no substitute! See you all in the "SS!" — F. E. H.

MEET THE SCM

Arizona's recently-elected SCM, Albert H. Steinbrecher, W7LVR, became interested in ham radio in 1947 and shortly after acquired his amateur license.

He presently holds appointment as Official Observer, Official Experimental Station, Official Phone Station, Official Relay Station, and Official Bulletin Station, and holds membership in the AREG, the Old Pueblo Radio Club, and the 25 Club, being past-president and past-vice-president, respectively, of the latter two associations.

W7LVR is situated in All's den, where seven Addarack units are lined up along the entire wall to accommodate power supplies and controls, transmitters and receivers, together with high-fidelity sound and recording equipment. Transmitters are a Collins 32V-1 and a Millen 90810 modulated by an 815. A kw. rig using 250THA in the final and modulator is under construction. Receiving equipment consists of a Collins 75A, 11F-10-30 and VHJ-122 converters, DB-22A preselector and a Panadapter. Antenna: Johnson Rotomatic with 10-20 beams, Magner Rotator with four elements on 6 and sixteen elements on 2 meters, 6-meter ground plane, and a "V" beam with 285-foot logs. Emergency equipment consists of a Subarco MT-15 transmitter, our receiver, and Gnoset converter. The Millen is portable and is powered by a Kohler 720-watt MG set.

All's favorite sport is baseball. Since he is a retired business man he has time for hobbies other than amateur radio, such as photography and music and growing roses and asparagus.
Cooperation of all amateurs in a community toward the ultimate in emergency operation and civil defense preparedness is a wonderful thing to behold. Given the proper spirit, a strong sense of organization and support of civic officials and local manufacturers, there is almost no limit to the things that can be accomplished on behalf of emergency preparedness. Where there is organization and teamwork, almost anything is possible. In Detroit, for example, it was decided that hand-carried units would be required in addition to the many mobile units which amateurs already had available or were making available. In the event of a bombing, the likelihood was that there would be many places where mobile units could not go, although communication with persons on foot beyond the limits of automobile movement was a definite requirement. A large number of hand-carried units were required: two to each mobile unit, to be exact.

Rather than try to "hold up" local civil defense officials for the funds to purchase these, the local AREC group got together with a prominent local manufacturer and set up plans for production of 100 such units on a voluntary basis. They got together with civil defense officials, local merchants, the telephone company, interested a few other parties, and first thing they knew they had provided themselves with sources of emergency power necessary to start work. One of the technical wizards of the group designed the unit, 100 of which are now in production by a group of some 40 amateurs who do the work at night in their spare time.

This is a story that we might have in more detail in QST later on. We mention it here merely as an example of what can be accomplished if the desire and urge to do so is strong enough among the entire group, if they all work together toward a mutually-agreed-upon objective rather than, as has often happened, divide up into opposing groups whose differences are usually personal, political or superficial after all. The Detroit story can be the story in your community too, if enough of you in that community want it that way.

"Hurricane Able" approached the Carolina coast on August 30th. The local chapter of the American Red Cross alerted EC W4BAT who got in touch with SCM W4ANK. Together, they set up their lines of communication, and when the storm hit were completely in charge of the situation. SEC W4DX put out a general message alerting the 75-meter "phone net. This net responded well and many members guarded the frequency continuously until many hours later. In the late evening of August 30th power began to go out and by midnight 90 per cent of Charleston was in darkness. Telegraph and telephone lines along the coast began to fail about 2230 and those that did not fail became unreliable and erratic. Winds up to 110 m.p.h. were experienced in some places. Interference was heavy, making power "phone contacts impossible, but by using c.w. it was possible to get messages through. The lack of a c.w. net was keenly felt.

On the morning of August 31st the Red Cross informed EC W4BAT that communication was needed with Walterboro, Beaufort and Edisto, S. C. W4BIZ loaded W4CKE, W4KOD and a 40-meter c.w. rig into his car, which was mobile-equipped, with the idea of dropping the portable transmitter and one or more of the operators at one point, then proceeding to establish communication at other points. Operation began on 75-meter "phone, but proved so impracticable that the frequency was changed to 7295 c.w. In Walterboro the Chief of Police was contacted and sent a message to the Charleston Red Cross giving estimated damage, personnel welfare and other vital information. Messages were handled for the police, who were not in contact with their base station, and similarly for the Civil Air Patrol. Messages were handled direct from State Highway Patrol Headquarters in Columbia, W4HMG assisting at that end. Direct contact was also made with Atlantic, Washington and Spartanburg, S. C., all stations reporting the roads loud and clear at all times. They all reported Beaufort and Edisto, returning to Charleston about 1500 after driving approximately 250 miles. Continuous 100 per cent contact was maintained at all times en route.

The local 10-meter net in Charleston was active on a stand-by basis, but telephone communication was not interrupted by the storm.

Local officials, especially the officer in charge at the Naval Station and the District Charleston色调er of the American Red Cross, expressed their gratitude to the local amateurs. Charleston papers carried very favorable publicity on the activity.

Several lessons were learned: (1) We need a c.w. net. (2) Members of the phone net need to take emergency operations a little more seriously. (3) Amateurs should be cautioned not to give the papers or divulge contents of messages not addressed to them. (4) More emergency drills are needed.

The following amateurs were known to have assisted, although there were undoubtedly others: W4 AAY AJC ANK AZT BRF BIZ BUF BZX CAD CEL CFJ CXO DPT DMS DNK DX EDQ EXQ EZU FFI FKH GEO HMG HVO HWZ KGP KHC KLD MDR MNP NQ BS NTD NTO NWB OKD OWW PDD PFE PLX RXO STH SUB TIZ TZW TWW UPR. Kks USN WAR; W4OOSO/5; and W8GAB. W4ANK (SCM) and W4BAT (EC)

The Indiana SEC, W9LZI, has made a practice of preparing maps of the state divided into counties, showing the appointed Emergency Coordinator in each county, and attaching a complete list of ECs. These maps are circulated to ECs and also to Red Cross and Civil Defense officials, indicating to what extent the state is covered by amateur radio, and who is the responsible AREC official in each county. The existence of blue cities is often instrumental in stirring up some activity in an otherwise dormant area.

On July 29th at about 2115 the 10-meter Birmingham Emergency Mobile Net was alerted, at the request of the Girl Scouts and the Red Cross, for the purpose of establishing communications between Birmingham and Camp Certrude Coleman, Girl Scout camp, located approximately sixteen miles from Birmingham, Alabama. A forest fire threatened the camp. Within about 15 minutes after the call for aid, two fixed stations and eleven mobile units were on the air. Atmospheric conditions were so bad that it was necessary to establish relay points. Mobile units and handy-talkies went directly to the camp. The other mobiles served as relays to the fixed stations in Birmingham. The Trussville, Alabama, fire department, police department and utility department; the Alabama Highway Patrol and the Military Police were alerted and stood by keeping contact with the camp through the 10-meter net.

W4VBZ deserves special mention as he hiked several miles into the fire-threatened area with a handy-talkie to report

<table>
<thead>
<tr>
<th>NATIONAL CALLING AND EMERGENCY FREQUENCIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. W.</td>
</tr>
<tr>
<td>7100 kc. (day)</td>
</tr>
<tr>
<td>3570 kc. (night)</td>
</tr>
<tr>
<td>14,050 kc.</td>
</tr>
<tr>
<td>28,100 kc.</td>
</tr>
<tr>
<td>PHONE</td>
</tr>
</tbody>
</table>

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency procedures have 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, 7080, 14,060; phone — 3615, 14,100 kc., 28,250 kc.

<table>
<thead>
<tr>
<th>PHONE</th>
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<tr>
<td>3875 kc.</td>
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<td>14,225 kc.</td>
</tr>
<tr>
<td>29,640 kc.</td>
</tr>
<tr>
<td>28,100 kc.</td>
</tr>
</tbody>
</table>

C. W. for

QST
conditions. The local president of the Girl Scouts, officials of the Camp and Red Cross were present and originated messages to their officials in Birmingham which were promptly relayed and delivered. At 2230 the Camp was declared in no danger and the net was dismissed. Those participating were mobile W4s CJZ ERW KPF NQK NZZ OLG RKS RFI RPT 8DX and V8B. Fixed stations were W43JD and WAGJW. W4TCL assisted in handling traffic at the camp.

--- W4TCL ---

On April 14th, WAROM was bringing a 27-foot cabin cruiser from Eglinton AFB, Fla. to Fort Walton, Fla. for repairs, but did not arrive when expected. His XYL 'phonied' a plane call for the Fort Walton area and asked for aid in locating the missing OM. The Hair Net of the Eglinton Amateur Radio Society was alerted within ten minutes to aid in the search. Mobile units reached Chocatouchtree Bay at 2115 and proceeded to look for signs of the missing craft, all the while maintaining contact with WAROM, who was in contact with the Eglinton AFB rescue boat section by land line. The search continued until 0000, the net then put on a stand-by status until dawn. At 0400, WAROM was informed that WAROM had been found, and the net was closed down.

--- W4VAPL, BC Fort Walton ---

At the request of Philadelphia Civil Defense officials, radio amateurs in the Philadelphia area on April 26th lent a hand in a civil defense demonstration in conjunction with the VPW parade. The parade started at 1430 and proceeded through downtown Philadelphia. The city's mobile c.d. communications truck led the column of 11 amateur-equipped cars. Contact was maintained on 28,493 kc. The whole demonstration was essentially to show the public that amateurs were ready and able to render service in the event of an emergency. Twelve local amateurs took part.

--- W3DYL, BC Philadelphia ---

Early in May, the Bristol Amateur Radio Club set up six stations on the shore of South Holston Lake, a TVA-created lake on the river bearing that name. The occasion was the official opening of the new lake. Each station provided one or two life-saving crews for nearby cities. The control station, W4TYU/4, was located on board a boat house. The local AREC gang manned communication circuits day and night at the lake from May 31 through June 2. Thousands of people attended each day, but there were no serious accidents. Traffic was handled involving a lost child and a stolen motorboat, with the amateurs providing life-saving crews with communications to Bristol on several occasions. 160 meters was used and proved ideal for around-the-clock operation, although standby circuits were available on 75 and 10 meters.

--- W4TY, BC for Bristol, Tenn.-Va. ---

The members of the Wisconsin Valley Emergency Corps were called on to provide communication for the State Championship Motorcycle Endurance run on May 30th. Nine mobile units and two fixed stations were in operation from 0700 to 2000, stretching over the 250-mile course. Two gas-driven generators were used to power the net control station on Squirt Hill. At the start-finish point a fixed station was in operation. All units operated on 29,620 kc.

Each mobile unit carried an extra operator and a member of the motorcycle club, and was provided with aerial survey maps of the route of the endurance run. The main job of the mobile units was to call into net control the exact time of each motorcycle rider as he came through a check point. A master chart was maintained at each station. The net units waited to accumulate about a dozen taffles before calling in, thus keeping the frequency clear for emergency calls most of the time. A listening period was maintained on the hour and on the half hour.

All participants heartily agreed that the operation could not be equal to any one by any other group or test. Experience gained was invaluable because the whole set-up was run under emergency conditions. Participants: W8a CVU and DQO; W4a CFT EWM 15E JEF PNS PVR QJB QCZ RQM SBQ SIZ and VHA; W4a PRA and PBB.

--- WPYIA, BC Waukesha, Wisconsin ---

A record-breaking 21 EC's submitted reports in July, including most of the faithful and one newcomer, Vermont. These reports indicated activity on the part of 3499 ARRL registrants. Considering that these reports represented the slack midsummer season, we are not too disappointed in the increase which it represents and which it undoubtedly heralds for the coming active season of the year. Still, EC's for 44 sections have not reported this year up to August.

TEHACHAPI EARTHQUAKE

In the early morning hours of July 21st, while most people were soundly asleep, a wide area in southern California received a severe shaking. The effect was varied: some people slept right through it, others awoke in terror to find their houses collapsing about them, and a few unfortunates never knew what hit them.

At Fresno, W6GRO, net control of the American Legion Amateur Radio Club, after being awakened by the shock at 0455, put his station on the air and started calling the network together — said network consisting mostly of other stations in the area who had similarly been awakened by the tremor.

The first order of business was to determine the most affected areas and get information on communications situation there. They soon deduced, by comparing reports from Bakersfield, where the shock was very severe, with San Francisco, where it was also quite severe, and many other first-hand reports from stations on the net, that the center and severest damage lay in the Tehachapi range of mountains at the south end of the San Joaquin Valley. Even while this process of deduction was going on, messages were starting to flow in and out of Bakersfield, W6GRA, a member of the net, informed that he was driving to Tehachapi with his son, W6DBY, picking up a Red Cross official on the way, loading his car not only with radio equipment but also with maps, picks, shovels and as much other emergency gear as could be carried. Along the way, he reported having to clear debris from the roads, and at one place having to detour because of a large clogage in the highway.

W6BIE of Bakersfield was early on the air with emergency power, since commercial power was off. As other stations reported in, many of them not affiliated with the net, W6BIE and W6GRO helped handle many Red Cross and other emergency messages. Also during this period, W6EJ checked in from his mobile unit to say he was also on his way to Tehachapi with other emergency gear.

W6GRA and W6EJ were soon set up in Tehachapi, both with their mobile rigs and other emergency equipment they took with them, WS6 set up some equipment at Red Cross Headquarters at Bakersfield, K5FAJ, of Edwards Air Force Base, also had emergency gear on the scene. Later on, several mobile rigs arrived in the area to assist in traffic handling, and K6NBZ, a Navy station of Fresno, took in a high-powered emergency rig.

Several hundred messages were handled between 1415 and

The Sheriff of Androscoggin County, Maine, quickly saw the possibilities of amateur mobile equipment, and now the County has eight "mobile sheriffs," plus one who is working on a rig for his plane. They figure this ought to cover the county. Shown in the picture, left to right: W4a CV, MFP (who owns the plane), UFW, SJ (EC), SWZ (Ass't. EC), LPS, LPA and BYX (SEC).
and 1310 by more than 80 stations in the American Legion Net. There follows a list of stations submitted by W06RO as having participated during this time, a list which he admits is incomplete since it does not include many who checked in when an alternate net control had charge: W7s BAA BLY BUG BUT BZF CP CFR/C M CUX CWW K6 CXC XU DUF/M ECX EFF EEE EIZ EUM EBP EQO/M EWR EBU FBF PMG/M FZM GCG GCS GRA/MA GRO GS GIZQ GQI CYE GHI/MA IHM IMA IMAI IMAO IHY IMA KIV IYK IGS IDY JUX KIK KMK KYO QKL KU KUR KZR KHZ LKW NCM NIAH NIT NF/P PBX PDQ PRO QAL QPA QPG QRK QRF QSB QSD QUG QUI UJ/MA USA WOC WPV WWD WWT WYQ ZQR ZZR ZRV ZUU. K0 A JN NZB and W0XX.

The Mission Trail Net was also active, controlling W1YJE of Bakerfield, who informed that the Red Cross requested a mobile unit to be dispatched to the area. W1WZC was sent, W6WMU accompanying him. W6JSI was also dispatched. W6WZC performed services in Tehachapi until late that evening. The Southern Division of MIZ was alerted to stand by that day and the channel was monitored by W6HIL, W6QR and W6DUP. Inquiry traffic was held until conditions cleared up so as not to confuse and interfere with officials at the scene. W6HIL says that all amateurs, net members or not, did a splendid job.

The Golden State Emergency Net was activated at 0503, checking with all areas for possible emergency conditions. There were several areas without power as a result of the earthquake, and Golden State Emergency Network members helped in those areas with emergency communication services from their mobile units. W6FDW was not contacted.

The alert EC for the Antelope Valley-Muroc area of the SSV Section, W6YRF, quickly contacted Assistant KC's W6WZL and W6WZM. These two picked up portable equipment and proceeded to the disaster area as W6YRF/M and W6WZL/M. En route to the scene, coordination was established with Los Angeles, W6ESR. Arriving in Tehachapi, they found W6WZL/M already in action and in contact with W6G5S in Bakerfield. However, Edwards AFP personnel, especially medics who had accompanied W6YRF/M, were in business at 1035 with a message to KSFAJ at Edwards requesting air police and supplies. W6WZL/M and W6WZM/M continued mobile operations, and W6WZL established continuing liaison with the Red Cross and screened all traffic, while W6YRF operated the station, W6YDQ assisted in operating after arriving with v.d.l. military gear. The team of W6s OLB, VRF and YDQ kept the station on the air until 1735 on July 22nd by which time four outside telephone circuits had been restored. Two hundred and four messages were originated, 99 received. Seventy-nine messages were operational in time. Among those assisting were W6s KS HK IBQ and VB. Nineteen mobile stations offered assistance, leaving no dearth of this kind of equipment.

At Santa Barbara College of the University of California, W6RFU monitored three channels on 75 meters throughout the day. Operators were W6s CS6 LDJ and WN6QO.

Other amateurs mentioned in connection with this emergency situation include: W6S CTP JUW JMW 1WG LDN MNX QNL and VRG.

In San Francisco, Red Cross Disaster Service traffic was handled by W6CXXO direct with the disaster area. Operating the station day and night during the critical period were W6NL (SEC), W6QYV (EC), W6JWP and W6LYV. W6GB also assisted from his home station.

CODE-PREFERENCES AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to encourage DX for the award. The next one from W1AIA will be held on November 13th at 2130 EST. Transmissions will be made simultaneously on 1887, 3555, 7120, 14,100, 28,000, 52,000 and 146,000 kc. The next qualifying run from W1WIP only will be transmitted on November 9th at 2100 PST on 3590 and 7245 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL, stating your call of the station you copied. If you qualify at one of the five speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AIA each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy. To get sending practice, hook up your own key and bypass and attempt to send in step with W1AIA.

Date Subject of Practice Text from Sept. QST
Nov. 4th: A Two-Band Miniature Mobile Transmitter, p. 11
Nov. 7th: A Bandswitching Encoder . . . , p. 20
Nov. 10th: The Half-Wave Dipole W1AIA, p. 18
Nov. 17th: The 80-Meter Tribander W1AIA, p. 25
Nov. 12th: R.F. Voltmeters, p. 29
Nov. 18th: The Measuring-Cup Band Spotter, p. 16
Nov. 20th: Are You Off the Air? p. 32
Nov. 24th: The "Ultimate" 75-Watt CW Receiver, p. 38
Nov. 28th: What Price Precision? p. 42

ARRL ACTIVITIES CALENDAR

Nov. 9th: CP Qualifying Run — W6WDP
Nov. 13th: CP Qualifying Run — W1AIA
Nov. 15th-16th, 22nd-23rd: Sweepstakes
Dec. 6th: CP Qualifying Run — W6WDP
Dec. 6th-7th, 12th-14th: 10-Meter WAS Party
Dec. 19th: CP Qualifying Run — W1AIA
Jan. 3rd: CP Qualifying Run — W6WDP
Jan. 10th-11th: V.H.F. Sweepstakes
Jan. 10th-25th: Novice Round-up
Jan. 19th-20th: CD QSO Party (e.w.)
Jan. 19th: CP Qualifying Run — W1AIA
Jan. 20th-25th: CD QSO Party (phone)
Feb. 6th-8th: DX Competition (phone)
Feb. 16th: CP Qualifying Run — W6WDP
Feb. 19th: Frequency Monitoring Test
Feb. 17th: CP Qualifying Run — W1AIA
Feb. 20th-22nd: DX Competition (phone)
Mar. 6th-8th: DX Competition (e.w.)
Mar. 13th: CP Qualifying Run — W6WDP
Mar. 18th: CP Qualifying Run — W1AIA
Mar. 20th-22nd: DX Competition (e.w.)

TRAFFIC TOPICS

A lot of the fellows are telling us that their net has established a policy of "refusing" certain kinds of traffic. In some cases it's "fair" traffic, in others "military traffic," old traffic, traffic with incomplete preamble, traffic with long texts, traffic with incomplete address, traffic originating in certain foreign countries, traffic of a "commercial" nature, traffic which does not (the handler thinks) say anything important enough to use up his valuable time, etc. ad infinitum.

Well now, just to keep the record straight, let's first admit that every net has the right to refuse what traffic, if any, he shall or shall not handle. We are still amateurs, and we do as we please, in the main. It is only when an individual (or a net) recommends (or implies) that what he does everybody should do that the matter is opened to discussion and/or criticism. Since that implies limit, it becomes more or less obvious in that those who are refusing traffic for one or more of the above reasons, or others, feel that they are benefiting amateur radio and the traffic game in so doing, we want to discuss it a little. Not criticize anybody, just discuss it.

To begin with, you can run the thing into the ground. A fellow with a message to peddle (that he probably did not originate), will have to remember which net will condescend to handle which traffic — either that or try handling it and be relung by it, with consequent ill feeling. It boils down to a question of whether it is more important to make a better traffic or better traffic men. Secoundly, since whatever is wrong with the message that makes you want to refuse it is probably not the fault of the station or the operator giving it to you, why slap his face if you must refuse the message? I think the most diplomatic, not to mention the proper, thing to do is to service the originating station to the effect that you are cancelling the message (and state the cause) or that you are holding it pending correction of whatever is wrong with it.

Thirdly, we think that the most effective place to correct these difficulties is at the source — the originating station. An educational program is perhaps in order, but not a punitive crusade.

Fourthly, let's not lose sight of the fact that amateur
traffic is as much a training activity as a service activity. In the 
eyes of some important non-amateurs, more so. For 
training purposes, the message form is important but the content 
not. Events on commercial circuits the operators do not 
set themselves up as judges as to what is or is not 
worth sending. They send what they are given to send — or 
else. The only difference between that and amateur traffic 
clarity is that there is no “or else.”

Fifthly, the appearance of traffic inexpertly originated 
in increasing numbers is an indication of some newcomers in 
the traffic game — a good omen, not a bad one. We old 
timers ought to encourage them to do it right, not tell them 
not to do it wrong. SN traffic out of our net.

Sixthly — but why go on? We see more reasons why 
neats should not refuse traffic than why they should, 
and our recommendation is the adoption of as much tolerance 
as possible as both individual and net policy; this despite 
the fact that the writer hits the ceiling just as you do when 
someone gives him a message in one of the “stinker” 
categories mentioned in the first paragraph above.

WISS reports the August total for the W1 call area of 
TCPN was 1008. Twenty-three stations participated.

National Traffic System. The usual upsurge of interest and 
activity in traffic work was noted in late September and 
early October. Additional applications in the Transcontinental 
Network also helped to reactivate this vital part of 
NTS. There is still plenty of room for TCC volunteers, and 
we hope that those interested will not hesitate to make 
their interests known. Requirements for full-scale operation with 
out working anybody call for a total of 50 stations: 20 
in the Eastern Area, 10 in the Central Area and 20 in the 
Pacific Area. Since the start of TCC, we have done with less 
than that, and by splitting some of the station functions we 
can use more if they are available.

Among the area nets, both EAN and CAN had a successful 
summer, but the Pacific Area Net just barely kept going. 
With the revival of TCC, we hope that this situation 
will improve; but those hopes will be in vain if PAN 
Manager W7JS is unsuccessful in recruiting net control stations 
and daily participation of representatives of the Sixth and 
Seventh Regional Nets.

August reports:

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<tr>
<th>Net</th>
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<th>Traffic High Low Average</th>
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<td>1RN</td>
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<td>2RN</td>
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<td>3RN</td>
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<td>QN</td>
<td>25</td>
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</tbody>
</table>

*Out of 21 sessions held.

The reporting record for August is even better than the almost-perfect July record. Of all existing regional and area 
ets, only the Pacific Area Net failed to report traffic figures. 
With a record like this in midsummer, we look forward to 
a consistent 100 per cent reporting record during the coming 
active season.

Note that this month we are starting to total the column.

The August NTS reported traffic total of 4256 is tops for the 
three summer months of June, July and August, showing an 
early-season increase which no doubt will continue. Totals 
so far in 1952: January — 6108; February — 7650; March 
— 7554; April — 8967; May — 8450; June — 4185; July — 
3590; total — 50,400. With four big months to go, NTS 
may break 100,000 reported in 1952. Be this as it may, we 
know that this is but a small fraction of the total traffic 
handled in NTS. In order to report all of this, we have to 
monthly traffic reports similar to the above from every 
section net, both "phone and c.w., which sends a representative 
to its NTS regional net; for section nets are a part of NTS, 
eto. You send in the dope, we'll include it in the tabulation 
it until space forces us to edit it down. How about it?

Fifth Regional Net: W4KLF, Acting Assistant Manager, 
sends in the August report, but a letter from WSMR indicates 
activity toward full reactivation of RN5.

Sixth Regional Net: W6ELQ has submitted his resignation, 
effective October 1st. Negotiations are under way toward 
selection of a new RNO Manager.

Seventh Regional Net: W7GDDV and W7CZKX have been 
awarded certificates. W7CZKX reported in every month in 
August, and W7FRU missed only two.

Eight Regional Net: A fine 8LN bulletin, written by 
W8DSX and W8ELW, heralds the opening of the fall season 
for increased activity on 8RN.

Ninth Regional Net: W7WBA TLF/9RN bulletin lists a 
reset of 379 RN members.

Tenth Regional Net: W8VEE has earned a TEN 
certificate.

Thirteenth Regional Net: VE3BVR and VE3ATR badly need 
help in keeping TRN going, September should show an 
 improvement.

Eastern Area Net: W8SCW's full bulletin congratulates 
the EAN gang (and this includes regional net managers 
and representatives) for an excellent job in keeping EAN active 
during the summer months.

Central Area Net: CAN has been improving every month 
under the energetic leadership of W7CFL VE3WV, W4AGC 
and W9YWE have received CAN certificates.

Pacific Area Net: After a summer in the doldrums, it is 
expected that activity on PAN will pick up. We need 
volunteers for NCS duties most of all.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for August traffic:

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<th>Call</th>
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<th>Recd.</th>
<th>Rel.</th>
<th>Pol.</th>
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<td>243</td>
<td>7</td>
<td>243</td>
</tr>
</tbody>
</table>

Late Reports
VE1AAK (Juky) 32 316 136 188 704
VE1MK (Juky) 357 123 4 89 533

The following made the BPL for 100 or more originations-
pluses-directories:

W9NYZ 200 W8BA 125 W3V5/2 114
W8MNN 135 K6RAC 124 W8ED/DM 101
W8BE 114

A message total of 600 or more 100 or more originations-
pluses-directories will put you in line for a place in the BPL. 
The Brassa Pounders League is open to all operators who 
qualify for this monthly listing.

November 1952
<table>
<thead>
<tr>
<th>Name of Net</th>
<th>Freq.</th>
<th>Time</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ala. C.W. Net</td>
<td>3690</td>
<td>1900</td>
<td>CST Daily</td>
</tr>
<tr>
<td>Ala. Emerg. 'Phone Net</td>
<td>3985</td>
<td>1830</td>
<td>CST Daily</td>
</tr>
<tr>
<td>Alberta 'Phone Net</td>
<td>3765</td>
<td>1930</td>
<td>Mon., Wed., Fri.</td>
</tr>
<tr>
<td>American Legion Net</td>
<td>3975</td>
<td>1900</td>
<td>PST Mon.-Sat.</td>
</tr>
<tr>
<td>Amateur Radio Club of</td>
<td>25,600</td>
<td>1000</td>
<td>EST Sun.</td>
</tr>
<tr>
<td>Belleview, N. J. Net</td>
<td>29,626</td>
<td>1900</td>
<td>EST Wed.</td>
</tr>
<tr>
<td>Amesbury (Mass.) C.W. Net</td>
<td>29,626</td>
<td>1900</td>
<td>EST Wed.</td>
</tr>
<tr>
<td>Ark. Emerg. 'Phone Net</td>
<td>3885</td>
<td>0900</td>
<td>CST Mon.</td>
</tr>
<tr>
<td>Badger Emerg. Net (Wis.)</td>
<td>3600</td>
<td>1800</td>
<td>CST Daily</td>
</tr>
<tr>
<td>Barnyard Net</td>
<td>3924</td>
<td>0800</td>
<td>EST Mon.-Sat.</td>
</tr>
<tr>
<td>Bay Area EC Net (Calif.)</td>
<td>145,350</td>
<td>2000</td>
<td>PST Mon.</td>
</tr>
<tr>
<td>Bay Area Net (BAN) (Cal)</td>
<td>3635</td>
<td>1915</td>
<td>PST Mon.-Fri.</td>
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<tr>
<td>Bergen Co. (N. J.) C.W. Net</td>
<td>29,610</td>
<td>1950</td>
<td>EST Wed.</td>
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<tr>
<td>Blue Ridge Net (Texas)</td>
<td>1880</td>
<td>0830</td>
<td>CST Sun.</td>
</tr>
<tr>
<td>Bras Pounders Net (4BPN</td>
<td>3750</td>
<td>1930</td>
<td>EST Sat.</td>
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<tr>
<td>Broward Emerg. Net (Fla.)</td>
<td>39,400</td>
<td>1315</td>
<td>EST Sun.</td>
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<tr>
<td>Buckeye Net (BN) (Ohio)</td>
<td>3580</td>
<td>1900</td>
<td>EST Mon.-Sat.</td>
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<tr>
<td>Cabernet Area Emerg. Net</td>
<td>1906</td>
<td>1900</td>
<td>Thu.</td>
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<td>Central Area Net (C.N.)</td>
<td>3670</td>
<td>2030</td>
<td>CST Mon.-Fri.</td>
</tr>
<tr>
<td>Central Gulf Coast</td>
<td>3935</td>
<td>1815</td>
<td>Daily</td>
</tr>
<tr>
<td>Hurricane Net</td>
<td>3185</td>
<td>0900</td>
<td>EST Thu.</td>
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<tr>
<td>Central Illinois Net</td>
<td>1815</td>
<td>0830</td>
<td>CST Sun.</td>
</tr>
<tr>
<td>Confederate Signal Corps</td>
<td>29,200</td>
<td>0900</td>
<td>EST Fri.</td>
</tr>
<tr>
<td>Connecticut 'Phone Net</td>
<td>3880</td>
<td>1800</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>Coronation Area Emerg. Net (Alberta)</td>
<td>3780</td>
<td>1900</td>
<td>EST Mon.-Sat.</td>
</tr>
<tr>
<td>Davidson Co. (Tenn.) 10-Meter Emerg. Net</td>
<td>29,600</td>
<td>1900</td>
<td>CST Sun., Wed.</td>
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<tr>
<td>Deep Sea Dragnet</td>
<td>3970</td>
<td>1145</td>
<td>EST Mon.-Sat.</td>
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<tr>
<td>Delta 75 Net</td>
<td>3905</td>
<td>0730</td>
<td>CST Sun.</td>
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<tr>
<td>Early Bird Transocean-</td>
<td>3845</td>
<td>0445</td>
<td>CST Mon., Wed., Fri.</td>
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<tr>
<td>Net</td>
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<tr>
<td>Eastern Areas Net</td>
<td>3670</td>
<td>2030</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>(EMN)</td>
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<td></td>
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<tr>
<td>Eastern Penna. Net (EPA)</td>
<td>2610</td>
<td>1830</td>
<td>EST Mon.-Fri.</td>
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<tr>
<td>Egyptian-St. Louis Net</td>
<td>29,640</td>
<td>0830</td>
<td>CST Daily</td>
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<tr>
<td>Eighth Regional Net</td>
<td>3530</td>
<td>1445</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>(8RN)</td>
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<tr>
<td>Fil Capital Net (ECN)</td>
<td>3855</td>
<td>1330</td>
<td>PST Mon.-Fri.</td>
</tr>
<tr>
<td>First Regional Net (1RN)</td>
<td>3605</td>
<td>1945</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>Fla. Emerg. 'Phone Net</td>
<td>3910</td>
<td>1815</td>
<td>EST Tue.</td>
</tr>
<tr>
<td>Fla. Phone Traffic Net</td>
<td>3045</td>
<td>1700</td>
<td>PST Mon.-Sat.</td>
</tr>
<tr>
<td>Hit &amp; Bounce Net</td>
<td>7040</td>
<td>0500</td>
<td>CST Daily</td>
</tr>
<tr>
<td>Hurricane &amp; Incident</td>
<td>29,560</td>
<td>2000</td>
<td>CST Mon.-Fri.</td>
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<td>Radio Net</td>
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<tr>
<td>Illinois (C.W.) Net (II)</td>
<td>3515</td>
<td>1900</td>
<td>CST Mon.-Fri.</td>
</tr>
<tr>
<td>III. Emerg. Net (IEN)</td>
<td>3340</td>
<td>1900</td>
<td>CST Sun., Wed.</td>
</tr>
<tr>
<td>Indiana C.W. Net (QIN)</td>
<td>3550</td>
<td>1900</td>
<td>CST Mon.-Sat.</td>
</tr>
<tr>
<td>Indiana 'Phone Net (IFN)</td>
<td>3910</td>
<td>1830</td>
<td>CST Mon.-Fri.</td>
</tr>
<tr>
<td>Iowa 75-Meter 'Phone Net</td>
<td>3970</td>
<td>1230</td>
<td>CST Mon.-Sat.</td>
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<td>Kentucky Net (KYN)</td>
<td>3900</td>
<td>1800</td>
<td>CST Mon.-Sat.</td>
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<tr>
<td>Lebanon Valley Net (Pa.)</td>
<td>145,800</td>
<td>2000</td>
<td>EST Tue.</td>
</tr>
<tr>
<td>Long Beach AREC 2-Meter Net (Calif.)</td>
<td>147,300</td>
<td>2155</td>
<td>EST Mon.</td>
</tr>
<tr>
<td>Long Beach AREC 10-Meter Net (Calif.)</td>
<td>29,560</td>
<td>2015</td>
<td>EST Mon.</td>
</tr>
<tr>
<td>Los Angeles Section Net (LSN)</td>
<td>3600</td>
<td>2030</td>
<td>PST Mon.-Fri.</td>
</tr>
<tr>
<td>MTN</td>
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<tr>
<td>Md.-Del.-D.C. Section Net (MDD)</td>
<td>3650</td>
<td>1930</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>Memphis Two-Meter Net</td>
<td>145,350</td>
<td>2150</td>
<td>EST Fri.</td>
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<tr>
<td>Michigan C.W. Net</td>
<td>3633</td>
<td>1800</td>
<td>EST Mon.-Fri.</td>
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<tr>
<td>Missouri Emerg. Net</td>
<td>3930</td>
<td>1900</td>
<td>EST Mon.-Fri.</td>
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<tr>
<td>Middlesex Co. (N.J.)</td>
<td>147,200</td>
<td>0700</td>
<td>EST Fri.</td>
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<tr>
<td>2-Meter AREC Net (NJ)</td>
<td>3995</td>
<td>1000</td>
<td>EST Sun.</td>
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<tr>
<td>Minnesota Junior Net</td>
<td>3710</td>
<td>1800</td>
<td>EST Sat., Sun.</td>
</tr>
<tr>
<td>Mission Trail Net (MTN)</td>
<td>3580</td>
<td>1000</td>
<td>EST Daily</td>
</tr>
<tr>
<td>Missouri Traffic Net</td>
<td>3854</td>
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<tr>
<td>Montana 'Phone Net</td>
<td>3910</td>
<td>1900</td>
<td>EST Mon., Wed., Fri.</td>
</tr>
<tr>
<td>Nebraska C.W. Net (NEB)</td>
<td>3520</td>
<td>1900</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>New Jersey Net (NJN)</td>
<td>3590</td>
<td>1900</td>
<td>EST Mon.-Sat.</td>
</tr>
<tr>
<td>N. Y. C.-L. L. 75-Meter 'Phone Net</td>
<td>3910</td>
<td>1000</td>
<td>EST Sun.</td>
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<tr>
<td>N. Y. State C. D. Net (TCD)</td>
<td>3509,5</td>
<td>2100</td>
<td>EST Tue.</td>
</tr>
<tr>
<td>NLI (N. Y.) Traffic Net (NLI)</td>
<td>3930</td>
<td>1930</td>
<td>EST Mon.-Fri.</td>
</tr>
<tr>
<td>North Carolina Net</td>
<td>3605</td>
<td>1900</td>
<td>EST Mon.-Fri.</td>
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<td>(NCN)</td>
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<tr>
<td>N. J. Mobile Radio Club Net</td>
<td>29,532</td>
<td>1700</td>
<td>EST Mon.-Fri.</td>
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<td>N. Tex./Okla Traffic Net</td>
<td>3960</td>
<td>1730</td>
<td>CST Daily</td>
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<tr>
<td>Novice River Forest Net (QRFN)</td>
<td>3727</td>
<td>2200</td>
<td>CST Mon.</td>
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<td>Novice Net</td>
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<tr>
<td>Nutmeg Net (CN)</td>
<td>3640</td>
<td>1900</td>
<td>EST Mon.-Fri.</td>
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<tr>
<td>Novice Net (OA)</td>
<td>50,700</td>
<td>1800</td>
<td>CST Tue., Fri.</td>
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<tr>
<td>Emerg. Net</td>
<td>3850</td>
<td>2000</td>
<td>EST Daily</td>
</tr>
<tr>
<td>Oak Ridge (Tenn.)</td>
<td>50,700</td>
<td>1800</td>
<td>CST Tue., Fri.</td>
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<tr>
<td>Old Colonial Net (Mass.)</td>
<td>144,100</td>
<td>1930</td>
<td>EST Mon.</td>
</tr>
<tr>
<td>Ontario Section Net (OSN)</td>
<td>3535</td>
<td>1000</td>
<td>EST Daily</td>
</tr>
<tr>
<td>Ottawa 50-Mc. Em. Net</td>
<td>50,400</td>
<td>2100</td>
<td>EST Tue.</td>
</tr>
<tr>
<td>Station</td>
<td>Frequency</td>
<td>Time</td>
<td>City</td>
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<tr>
<td>--------------------------------</td>
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<tr>
<td>Ottawa Valley Net</td>
<td>3735</td>
<td>1830 EST</td>
<td>Thu.</td>
</tr>
<tr>
<td>Ozark Net (OK) (Ark.)</td>
<td>3655</td>
<td>1900 EST</td>
<td>Mon.-Fri.</td>
</tr>
<tr>
<td>Pacific Trunk Traffic System (PT)</td>
<td>3815</td>
<td>0900 PST</td>
<td>Daily</td>
</tr>
<tr>
<td>Pelican Net (La.)</td>
<td>3870</td>
<td>1930 CST</td>
<td>Thu.</td>
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<tr>
<td>Pine Tree Net (ITN)</td>
<td>3565</td>
<td>1900 EST</td>
<td>Mon.-Fri.</td>
</tr>
<tr>
<td>Post Road Emerg. Net (Mo.)</td>
<td>28,600</td>
<td>1900 EST</td>
<td>Mon.</td>
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<tr>
<td>Potosi-Rappahannock Valley Net (PRVN)</td>
<td>3835</td>
<td>0900 EST</td>
<td>Sun.</td>
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<tr>
<td>Province of Quebec Net (PQN)</td>
<td>3750</td>
<td>1900 EST</td>
<td>Mon.</td>
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<tr>
<td>Queen City Emerg. Net (Ohio)</td>
<td>2775</td>
<td>1100 EST</td>
<td>Sun.</td>
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<td>Quincy Mass. Sector 5 C.D. Net</td>
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<td>1930 EST</td>
<td>Tue.</td>
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<td>R. I. Traffic Net</td>
<td>3540</td>
<td>1900 EST</td>
<td>Mon.-Fri.</td>
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<tr>
<td>River Forecast Net (RFN)</td>
<td>3655</td>
<td>0700 CST</td>
<td>Sun.</td>
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<tr>
<td>San Diego Section Net (SN)</td>
<td>3560</td>
<td>2030 PST</td>
<td>Daily</td>
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<td>Saskatchewan 'Phone Net (SDN)</td>
<td>3780</td>
<td>2030 CST</td>
<td>Daily</td>
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<tr>
<td>Saturday Night Net (SN)</td>
<td>3615</td>
<td>1945 EST</td>
<td>Sat.</td>
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<tr>
<td>Second Regional Net (2RN)</td>
<td>3690</td>
<td>1830 EST</td>
<td>Mon.-Fri.</td>
</tr>
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<td>S. Dak. C.W. Net (SD)</td>
<td>3015</td>
<td>1900 CST</td>
<td>Mon., Wed., Fri.</td>
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<tr>
<td>S. Dak. 'Phone Net</td>
<td>3870</td>
<td>1930 CST</td>
<td>Mon.-Fri.</td>
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<tr>
<td>Springfield (Mo.) Area Net (SAN)</td>
<td>3720</td>
<td>0800 CST</td>
<td>Odd Sun.</td>
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<tr>
<td>Tall Corn Net (TCLN) (Ia.)</td>
<td>3500</td>
<td>1845 CST</td>
<td>Mon.-Fri.</td>
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<tr>
<td>Tall Pine Net (TPN)</td>
<td>29,224</td>
<td>2000 PST</td>
<td>Wed.</td>
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<tr>
<td>Tar Heel Net (N. C.)</td>
<td>3855</td>
<td>1930 EST</td>
<td>Mon.-Fri.</td>
</tr>
<tr>
<td>Tenn. 'Phone Net</td>
<td>3080</td>
<td>0800 AST</td>
<td>Sun.</td>
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<tr>
<td>Tenn. Section Net (TN)</td>
<td>3835</td>
<td>1900 CST</td>
<td>Mon.-Sat.</td>
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<tr>
<td>Tenth Regional Net (TEN)</td>
<td>3545</td>
<td>1945 EST</td>
<td>Mon.-Fri.</td>
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<tr>
<td>Third Regional Net (3RN)</td>
<td>3590</td>
<td>1945 EST</td>
<td>Mon.-Fri.</td>
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<tr>
<td>Thirteen Regional Net (TRN)</td>
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<td>1945 EST</td>
<td>Mon.-Fri.</td>
</tr>
<tr>
<td>Transcontinental Relay Net (TVRN)</td>
<td>3970</td>
<td>1800 EST</td>
<td>Daily</td>
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</table>
| Trunk Line Atlantic-Pacific (TLAP) (Eastern Division) (Southern Division) (Western Division) Trunk Line J (TLJ) Twin City Emerg. Net (VTNS) Twin Slow Speed Net (VT0S) Vermont Net (VTN) Virginia Pines Net (VWN) Waltham (Mass., C.D. 145,500) Wash. Wash. Amateur Radio Traffic System (WARTS) Wash. Section Net (WSN) W. Virginia 'Phone Net (WVMN) W. Mass. Slow-Speed Net (WMMS) W. Pa. & E. Ohio Net 144,138 1830 EST Mon.-Fri. W. Penna. Emerg. Net 24,425 2130 EST Wed. W. Penna. ORS Net 3555 1900 EST Mon.-Fri. Whittaker (Calif.) Emerg. Net 3885 1930 EST Thu. (MA) 145,250 1000 PST Thu. Wisconsin C.W. Net 3925 1900 EST Daily Win. Slow-Speed C.W. 3625 1830 CST Mon.-Fri. W. Worchester (Mass.) Local 28,720 1830 EST Mon. Civil Defense 'Phone 28,660 Net Yonkers (N. Y.) AREC 28,730 2100 EST Tues. Net 2000 EST Odd Thu. CODE-PRACTICE PROGRAM The following stations are transmitting code practice in the ARRL Code Practice Program: W1MNG, Arthur Zavarella, 1702 Main Street, Agawam, Mass. 29,400 kc., Tues., Thurs, 1900 to 1930 EST, beginners' speeds. W1BVG, Carl Norris, 128 Meadow Street, Westfield, Mass. 29,400 kc., Tues., Thurs, 1930 to 2000 EST, Sun. 1100 EST, advanced speeds. W1UZ, Ray Cornell, 900 Curtis Street, Albany 6, Cal. 3500 kc., Mon., Wed., Fri. at 1845 EST. Speeds are 5, 7, 9, and 10 w.p.m. on Monday and Tuesday and 15, 20 and 25 w.p.m. on Wednesday. W9YBY, Charles J. Ellis, 404 Milwaukee Street, Charles City, Iowa. 3000 kc., Mon., Wed. and Fri. at 1830 CST. W7PFL, Kentworth F. Buxton, 4113 N. Jefferson, Spokane, Washington, 23,740 kc., Monday through Saturday 1900 to 1945 PST. DX CENTURY CLUB AWARDS HONOR ROLL WI1NH...249 WXYO...249 W6GHD...236 W8HG...236 QZPL...239 W8CPV...239 W8YFR...244 W8ENV...239 W8TUC...245 W8BBS...213 W8AM...237 RADIOTELEPHONE W1FH...221 W6HG...202 W2APU...194 PY2CK...215 W1NWD...201 W2XGA...192 VQ4BRR...215 W6RBI...200 W6SBB...192 X61AC...213 W1JX...197 From August 15 to September 15, 1952, DXCC certificates and endorsements based on postal contacts with 109-or-more countries have been issued to the amateurs listed below. NEW MEMBERS H6GJ...110 VSTNG...101 W6ALL...100 W1AML...107 G6DVL...101 W1UJ...100 EASY...106 W8CC...100 W8ELW...103 G8VG...106 W8RA...100 RADIOTELEPHONE (1KP,...103 VSTW...100 ENDOREEMENTS W7AMX...236 W8BJ...277 KG4AP...141 ZLH...220 W8HUB...171 W8FAX...140 W8TS...220 W8AAA...170 W8T...132 W8J...210 W4NAC...161 W8QY...130 W8BO...210 W8M...161 W1Q...123 W8TD...191 W8ENW...160 W8B...120 W8AL...180 G8BF...160 W8Q...120 W8KHH...185 W8BA...151 W8K...111 W1G...180 W8FNN...155 W1DX...111 W8RD...180 W8NG...148 RADIOTELEPHONE ZLH...180 K16OR...124 1BBW...112 G8FNN...142 G8ORS...121 W8NYN...110 CT1PK...141 W8BO...122
**ATLANTIC DIVISION**

**EASTERN PENNSYLVANIA — SCM, John H. Dubois, W3BHB — SEC: IBE, RMs: AXA, BIP, E, PA. Net: 3610 kc.** The Pottsdown ARA held a very successful doggie hoedown at Sunnyside Park. Family members were invited and won notable prizes in attendance included INFM, 22YW, 3LVF, and QV, AD, EU, PZD, and NFW are rebuilding the latter on a new farm near New Bremen, Ont. Neighbors from Lancaster includes: AKC now on 75-meter ‘phone, GGT and PTD are at new QTHs, and RKN is receiving his Advanced Class license. CUL, QRZ, RMs. **MARYLAND-DELAWARE-DISTRICT OF COLUM-**BIA — SCM, James W. John, W6OMN — FCC Docket 10237 caused considerable interest among the amateurs of the area. Reasons for the pros and cons of the proposed legislation appears to be a consensus of the amateur interests. The contest is a very active one. Many of the members are getting ready for the Fall contesting season which is on the NCS of 10-meter band. The Montgomery County, WVW is building a Sunbeam. UTH toured Alidonz- down and Catskill Mts. and visited IAW and 1EDQ. DLQW is very active this year. The Fall contest will be on 80 and 40-meter. DVE has dropped the "V" and is on 40- and 80-meter. DVE has an S-3 and RCA mobile rig. MSF is going to Clarkston for 12-meter Traffic. DVE 273, DVE 253, RAL 55, 69, 81, 7D4V 47, WV2Q 24, GBH 11, 7JW 5, K2QD 5, 282KEL 5, ZHU 3.

**SOUTHERN NEW JERSEY — SCM, Lloyd L. Gansley, W2UCV — FFA has been very busy forming a teen-age net on 40-meter c.w. So far more than twenty members have signed up. WJE reports new QTH is Fona Trailer Camp, Iona, N.J., and present activity is 160 meters. ASG is in the middle of rebuilding his three-meter 20-meter beam, just when the JA stations are rolling in strong. PQG finally gave in to the theory that an antenna is needed on 3-meters and purchased a 20-meter beam. PQG are helping out for sub-miniature construction for their new mobile rigs. The 75-meter amateur 'phone net is suffering from a very noticeable shortage of members stations in the extreme southern portion of the State. The net meets every Sunday morning at 9:30 on 3990 kc. CQS is Net Control and will welcome any station calling in on completion of roll call. PWS has shifted his QTH to Huntington, Ind. The DVRA provided communication coverage for the Trenton Soap Box Derby on 10-meter of 10-meter, and various headers on 20 and 15 meters. UPS. The annual SJRA picnic was held on Sept. 7th and proved to be very successful despite threatening weather. The session was a great success, which make this occasion the largest annual gathering in the section. Plan to attend next year, fellows, and we may turn this into a social event! DVE 270, DVE 249, ZJO 214, SDO 1.

**NEW YORK — SCM, Edward G. Urey, W2SYV SEC: ITH, RM: RUE, COU, PASS, GES: NYS, 3615 kc., 7 and 10 P.M.; 3380 kc., 6:30 P.M. Mon. through Sat., 9:30 A.M. Sun. NYS 3385 kc., 8 P.M. NYS CD 3309.5 kc., 3370 kc., 9 A.M. Sun. QMNP, operator at FAY, has been transferred to Alaska by the AF. The NYS 'phone Net sponsored a basket picnic at the NYS c.w. and TCPN were invited. After dinner a tour through the Corning Glass Works was arranged by QL. After which a dance was held in the Air Force Club. Net Mgr., GSS, presented net certificates to the following W.Y. members: UTH, OZB, ROL, ECM, VEP, AEC, TCPN, ZLY, QXM, CTX, QYK, KYC, THX, SSK, FIX, RUL, MB, FQW, and RKK. Picnic Committee consisted of AEC, VEP, and QLY, assisted by YT5, WW, and WW5. GSS and NYS took part. The Castaraugus County Radio Society has become an ARRL Affiliated Club. RARA v.h.d. group conduct a WAR Net on Saturday Night. Worked All Radio. Contact OWF for details and times to earn a WAR certificate. New officers of RARA are VHI, pres.; VIX, vice-pres.; CZT, secret.; ARU, treasurer; PY, FFI, ALL, YVI, and SN, executive committee. NYS c.w. now has two sessions, one at 7 P.M. and another at 10 P.M. Sat at 7 P.M. only. UNI toured the New England States and worked 150 stations. UNI and UH visited in Sweden and in the SSW area, and in the U.S. HEU is charging the shack in the rear of the garage. TRE moved to Cleveland. W4GJ is the NCS of 10-meter in the Orleans County. YGW is building a Sunbeam. UTH toured Alidonz- down and Catskill Mts. and visited IAW and 1EDQ. DLQW is very active this year. The Fall contest will be on 80 and 40-meter. DVE has dropped the "V" and is on 40- and 80-meter. DVE has an S-3 and RCA mobile rig. MSF is going to Clarkston for 12-meter Traffic. DVE 273, DVE 253, RAL 55, 69, 81, 7D4V 47, WV2Q 24, GBH 11, 7JW 5, K2QD 5, 282KEL 5, ZHU 3.**

**ILLINOIS — SCM, H. F. Lund, W9KGL — Section Net: I LIN (c.w.) 3515 kc.; IEN (‘phone) 3840 kc. SEC: QLZ. ASS: SEC: HFG, RM: BUK, PAM: UG. The Starved Rock Club, located between Bloomington and Utica, has many mobiles and control station at LaSalle Centennial Parade; several minor casualties were kept minor by prompt dispatching of medical assistance. License Q2Q, 587 TH, is active on 144-Mc. f.m. nets. EVJ has changed QTH and soon expects to be active from Fiddler’s Hill. More stations are needed on the Lower Illinois River State. Your QNI will be appreciated at 7 P.M. on 3515 kc. GTB (Continued on page 12).**
Inquiries have been received from time to time, asking what to do about local broadcast stations showing up on frequencies other than the frequency they are supposed to be using. The most frequent complaint appears to be their presence on a range of about 2 to 4 megacycles.

This problem exists because the method used to improve reception of broadcast stations, at least as far as reception in centers of population is concerned, is applied at the wrong end of the system. Apparently, it is cheaper for the broadcast station to buy a 50 KW final stage than for each set-owner to buy twenty feet of wire. So, we have super-power broadcast stations building up field-strength levels to produce satisfactory reception on receivers using midget loop antennas. But then, if you look at it from the point of view of automobile receiver reception, maybe the job is done at the right end as there is a limit to the size of whip that can be waved around on a car. (Or is there?)

Reception of strong local broadcast stations on the wrong frequency is usually due to one of two things. The first possibility, which is fairly uncommon, can be the fact that the station is radiating appreciable energy on a harmonic of its proper frequency. This is easily checked as such radiation takes place on a multiple of the proper frequency of the station. There is nothing that can be done at the receiver to eliminate this signal if its frequency happens to coincide with that of a desired signal. It must be eliminated at the source. Only this Fall, a new broadcast station near Boston was putting sweet music into the 75 meter phone bands. After several complaints by 75 meter hams had been received, it was found that the antenna tuning was incorrect. Retuning eliminated the trouble completely.

The second possibility, which is the usual one, is caused by sufficient signal voltage from the broadcast station getting into the R.F. amplifier and first mixer tubes of the receiver in spite of the selectivity of the R.F. tuned circuits to swing the grids of these tubes beyond the linear portion of their characteristic curves and causing them to rectify or mix. When this happens, the program material or modulation is taken off of all signals being received and put back again, en masse, onto all carriers. The result can be quite dismaying. The more sensitive the receiver, and the larger the antenna, the worse the effect will be. Some relief can be had by using the shortest antenna that is suitable, possibly adding a toggle switch in series with the antenna a few feet from the receiver, similar to the Local-Distant switch used back in the early broadcast receiver days. If the effect is strong, then a "wave-trap," i.e., a tuned circuit, can be placed in series with the antenna, close to the antenna post. This trap is then tuned to the frequency of the unwanted broadcast station so that the unwanted signal does not get into the receiver. A reasonably high C (500 mfd), and high Q coils should be used.

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has a new 144-meter beam, with 25000 and a VFO. This should keep TVI to a minimum. NOQ wants information on how to get more watts out of a TBS-50 on 144 M6. We received a new crystal-controlled converter, working on a tuneable l.f. companion unit. BA, DJ, and AIU were in charge of operating and supplying the disaster drill for the fire departments in Madison and St. Clair Counties. KTH and MDB are vacationing and returning to New York in a few days, delivering a new message from Korea. PTZ/MM was heard and reported on his return from the Chicago-Mississippi Race. ACZ met the first edition of his new QSL card off to a sad 10-meter termination north and south on 144 Mc. SCIF and CQAC are his best DX to date. 4M/XU9 is a new QSO at Scott AFB. MBI were back in St. Louis, and SIO is working Nebraska as a new state. Watch the expiration dates on your League appointments. This column can be made notable by sending the change of date to the date, and it's the 7th of each month. Traffic: (Aug) W0Y3I 261. (SW) LQ70, 14GR, KMO 61, KXL 15, WMX3/1X 19, WHR11 11, YW9 12, W8 VK7S, KG7, S40, KST3 3.

INDIANA: SCM, Clifford C. McGeoy, W0DGA - TTS son is W9UQP. VFX is now NEC for Randolph County. YWE and OXM are increasing their power on 75-meter phone. KDV has new mobile rig. NIZ still is going strong. Some 14-meter QSOs are showing. DJ8K reports IFN traffic is 84, ZIR and MIM are working on TVI reduction. TT, TJS, and ZIE make B9. LVJX August. ZG7B reports IFN, in addition to his brother, has attended Holyoke College. JT8D mobilized to Colorado. SWW is a new trunk. Traffic: ALC 1441, JNJ 1524, QRM 108. PMT 124, L14 84, JQZ 68, FZ6 56, TG 23, HSC 42. DJ4 11, DRR 35, QW1 24, DOK 32, NTA 30, WBA 29, BRT 26, QJZ 25, KLR 10, BPR 8, FS 2, W0RUTTY 2, W0TVS 2, OWI 1, W9KDY 1, JSR 10.

W9JJS/9, SCM: Beno W. Geistlich, W9QRM - SEC: OVO, PAM: ESF, RMs: IQW, SFL, C.W. Nat. (WIN) 7 p.m. daily, 3925 kc. Phone Net (BEH) 6 p.m. daily, 3950 kc. State Mobile emergency and v.f. frequency 220 kc. Net certificate (BEH) have been issued to HXW. GWK, LSH, QTB, IAF, KPG, WKL, and ZJW. New appointments: SFL, NEC Vacant. NEC Mr.: CDE. 25000 seconds. ARSM, Appointment renewals: IQW as RM, IVE, and QJZ as SC. IQW again will be the helm at WIN Net Mgr., with the assistance of new VEC, DJD, and AIU. Zone Mobile in his car. New at Cochrane is W9NSQM and SQM (Technician), who has a TBS-50 and an SX-42. We regret the loss of members of the Don C. J. Diggs, and the developing 6-meter operators in the section, and one of the few that have made WMS on 50 M2. Under the direction of DJD, this plan is in its fourth year. TTS will conduct the achievement program and award. Milwaukee mobiles again turned in an excellent job of handling the Sports Car Races at Milwaukee, Sept. 6th, 7th, 8th. MD17 reports the Novice ranks and can be heard minus the "N." On 144 Mc, the boys had "open house" the past month: L252 and S0L5D are two. DJN reports DXIF and the Mississipi, Tennessee, and Virginia trunks being states worked up to 15, plus a VES, D8C managed to work 24 on new street on the October 144 net. W9NNP reports 40 turned out of 85 that week end, he did manage to catch the Sept. 7 opening to add Michigan, Tennessee, Iowa, Minnesota, Kansas, and Alabama. Total of 500. W9NFR, Lake will be on with a 522 soon. FAN caught the Aug. 24-25 opening to Iowa, Kansas, and Nebraska. DDG is making a thirty-five year run this month. R. F. L. HU, just returned from Korea, is now at Racine. All EOs are requested to send their reports to OVO on the 1st of each month. EEOC, with a new move, is directed to me also, on the 1st. Traffic: W9EJS 18, CXY 60, SFL 38, JFS 48, IQW 21, FCN 18, CFD 12, OWE 8, F8A 8, RQM 4, OVO 3.

Dakota Division

North Dakota - SCM, Everett F. Hill, W8KVP - Now is the time for you to tune into W9YIA on 1150 kHz for QSL information. Your QSL is being held and will be sent to interested in your QSL. We need many more appointees as EC, OBS, and OBS. Your SCM now is available for your club meetings and any QSL requests. OSC is now taking care of DBN at Boy Scout Camp on 75 meters. He was the only one on the other end of the call. OSC is now in charge of the Nebraska State Police on the new tube. The Forks Club is busy building a kw. GZD is swapping parts like mad. Traffic reports should be sent. We had a talk of radio by the 7th of the month. Traffic for summer months: W9CWM 10, DBN 33, EFJ 8, SWB 92, SBW 70, DBN 220, JVF 59, EFJ 18, SEC 7, DBN 6, U8T 40.

South Dakota - SCM, J. W. Sikorski, W9RN - SEC: GCP, RM: OLB, EQP. Mitchell is adding Auzen- tane 1200 for August as 14. OXJ is now mobile in his first month of operation. Former Novice OQZ, OHA, and OWZ now hold General Licenses. V3J, of Atlantic, is making Silent Key a third time. Don in Minnesota. GUX is back on 75-meter phone. LQE is very active as OBS. DEH reports that 45 stations are now active on the net. OXJ in Brown Point Area and the others have held the same call and QTH for 30 years. W9NO7F is now in Hebron. RCP has moved to California. KDV is also operating a charter business as well as goldfield appointment as EC for Deseret and Shelby Counties. KDR has worked 7 states on 2 meters, his best ZIR was 15 and his best DXIF and MOW in vacationed in Colorado. KDV sent lots of time this summer working about his house and yard. YWE received 9 RN Net certificates. Newnet TRE, working 25, P2W, SFW, and SMO, VGD has worked 11 states on 2 meters. Anyone interested in 420 Mc, should contact VGD. DUL states this has been his favorite contact yet for DX. He worked earlier this year when normally he works better than 35, IRC had a boat trip on Lake Michigan through the courtesy of CYQ. W9DST is now operating from a mobile home on a lake at home. IRC reports 416 contacts made on Field Day. JULI and TEO are moving into their new home. TTQ sends greetings for new QIN Net members. PEX is the new secretary of the Elkhardt Amateur Radio Club, with FSA the activities manager. VNY took time out to paint his house. K2X is using a doorbell which he built for 2 meters. KB2X reports IFN traffic as 84, ZIR and MWM are working on TVI reduction. TT, TJS, and ZIE make B9. LVJX August. ZG7B reports IFN, in addition to his brother, has attended Holyoke College. JT8D mobilized to Colorado. SWW is a new trunk. Traffic: ALC 1441, JNJ 1524, QRM 108. PMT 124, L14 84, JQZ 68, FZ6 56, TG 23, HSC 42. DJ4 11, DRR 35, QW1 24, DOK 32, NTA 30, WBA 29, BRT 26, QJZ 25, KLR 10, BPR 8, FS 2, W9NFR, W0TVS 2, OWI 1, W9KDY 1, JSR 10. A

MINNESOTA - SCM, Charles M. Boye, W9XCM, ASST, SCM, Jean absolute, SEC, H1C, RM: EYK. The Minnesota Novices now have a net on 3705 kc. known as the Minnesota Junior Net. Everyone is invited to check into this new net for DX in the coming months. The net will be on Tuesdays at 3:00 p.m. HFY and HUV are Net Controls. ITQ is doing a big job with the Tenaha Regional Net. AUI is handling traffic, and SMI is handling open house. W9KDP now is using a Viking I and has Balken coils for a line balancer. KZJ and KMP are new hams from St. Paul. Check in on all sections of the State of Traffic: W9ES 38, PPR 6.

D ELTA DIVISION

Arkansas - SCM, Fred Ward, WMULX - The O2K A. Net opened its new season Sept. 8th. The frequency is 3900 kc. net w.e. and on 3900 kc. net w.e. A little help this year. MU, BXN, and TOE are working mobile. IRX is in a new ham at Salem. LAA has new Advanced licensees. W0Y2F is one of the outstanding operators on 10 meters and would like to get a 10-meter net started in Arkansas. RDT is new to CRE for Green County and he is looking for a station to be used in emergencies in the area. WEE has a new John son rig. RWJ licked the Indians and is busy putting more DX on the air. The new WRT is a call at Harrisburg. OXR has a new rig but the college professors seem to keep him busy most of the time. NWYCW turned out to be the 1st DXIF and Novice in the big traffic season. If you are not in one of the nets, they will be glad to have you. OXH needs all the traffic he can get. Official SCM was appointment. Class I or IV, please contact the SCM. Thanks for the reports, guys, and keep them coming. Traffic: W9PAK, EY 17, LOR 10, W9CWM, EY 17, SCM: Robert E. Barr, W9CWH.

(Continued on page 74)
BETTER LC RATIOS at high frequencies

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Hats off to UXE, 13 years of age, of New Orleans. Pete was a rapid graduate from the Novice ranks to a full-fledged Groveller in a little more than five months. Pete and his 7-M.c, this winter as well as 3.5-Mc, Louisiana has welcomed his news that LAX/LDH, Phil Spiskup, is steadily improving his distance with polonization to a 100 km on June 25th, and expects to leave the hospital in the early fall. RHQ is an ZB report of activity as O, and invites hams to call during his several accurate contacts. VRA now is a regular on the low end of the 3.5-4-Mc. phone band, but has been operating for its 4th year of continuous operation. All new operators look to have 80- and 40-meter contacts during that winter should write the RML for directions. K6GER is continuing to be the Louisiana 76-meter telephone frequency, and is a good spot to find your traffic in line, as there usually is some station working. W5MD, also active on 100 kHz, was located late during a memorable evening, with a regular net schedule Thursday at 7:30 P.M.

MISSISSIPPI - SCM: Norman B. Freeman, W5JHS - We refer to report that K5Z/JKS, a new VHFer, was accidentally electrocuted at his rig recently. Election results of the Keesler Club: TDO, pres.; FZK, vice-pres.; W5NHE, sec.; and TDO, reg. net officer. New officers of the Hattiesburg Club are TIW, pres.; UTK, vicr-prex.; FGE, secy. MUG's new QTH is Biloxi. TAK's new QTH is Jackson. UTK has graduated from Novice to General Class. JJA is on 76 meters with 500 watts. BEV works 75 and 20 meters. Your SCM is now Advanced Class and is on with 500 watts. YCV has a new VHF and works 40- and 20-meter c.w. and 10-meter phone. W5NWWQ is a new Novice at Columbus. 90/S05 now is mobile on 75 meters. RM is doing a very fine job with his new license. The Hilo QRM on 3035 kc, at 6:15 P.M. and will take your traffic. Traffic: (Aug.) K5FEB 240, W5FNM 121, KTC 54, W5FOS 5/1, W5JHS 529.

TENNESSEE - SCM: Mark M. Bowlee, W4CYX - SAE, AAE, RMG; AAC, PAM, PFF, FLW, leading our OFS, both on the c.w. and phone. WMV's QTH is on 40 QN phone and 100 kc: Sun, 1430 kc: Tues, and on 80 kc: Sun. FKE/JSR is back again. JJA and the other officers of the Hattiesburg Club are TIW, pres.; UTK, vice pres.; FGE, secy. MUG's new QTH is Biloxi. TAK's new QTH is Jackson. UTK has graduated from Novice to General Class. JJA is on 76 meters with 500 watts. BEV works 75 and 20 meters. Your SCM is now Advanced Class and is on with 500 watts. YCV has a new VHF and works 40- and 20-meter c.w. and 10-meter phone. W5NWWQ is a new Novice at Columbus. 90/S05 now is mobile on 75 meters. RM is doing a very fine job with his new license. The Hilo QRM on 3035 kc, at 6:15 P.M. and will take your traffic. Traffic: (Aug.) K5FEB 240, W5FNM 121, KTC 54, W5FOS 5/1, W5JHS 529.

KENTUCKY - SCM: I. W. Ilyce, Jr., W4KKO - TAY says there is not much activity but her traffic totals don't bear out that statement. TZ7 graduated from the Novice ranks. WBG has a new kw. job on 10 and 20 meters. KCD is active on 30 meters. KHQ is another new band. This station is not a new shack but something to see. BAZ has resigned as EC for Louisville and Jefferson County because of the press of business. WBG has been appointed to the office. Please send a QSL to BAZ and sign up for AREC. CDA is getting his outfit ready for the season. SOL got his Advanced license and has new equipment on the air. DUW, down at Evansville, is on the air. Don't miss W5R's QSL to W5TQ, their first contact. CDA is looking forward to an E.E degree this year hence, KBD is working hard back East for his new license and looks forward to see your CQs to mobile on 10 kc. His QSL is available from KCD after the 1st of July. KHQ is mobile on 10 kc. KGX, our W5, calls on all those who have a spare minute to report in to the KYN, 3000 kc, at 7:00 P.M. EST, Monday through Sat. High speed or low speed you are welcome. When you read this, you'll realize that there are only two more months to get your nomination filed for SCM. Get busy now and get it in to Headquarters. MG1 got a new TV set and we haven't heard from him since then. HU CNE and FR handle Louisville traffic for KYN, MDB is back from Portugal with some beautiful color shots. KRG spent some time in Bermuda and met a flock of American hams. Their rigs also were gathering dust because of the extremely hot summer. Traffic: KKBG 288, WFTAY 271, W5H 146, JAF 12, MJG 30, FR 8, NDC 1.

HUNSDIVISION

EASTERN NEW YORK - SCM: Stephen J. Neuman, 302 W211L - RMC: YC, KBT, PAM; JRG, K3CA; YCV has returned to New York City after a short vacation at Camp WABA. This is the youngest licensed amateur in the RWWARS. R2AVN is c.d. station at the Court House in Catskill. Our congratulations! ESL got his license and is off to the job. ESL is active on 14 Mc. FVP, EYG, and KCHQ are active on 14 Mc. KCHQ is using a Letterino 240. Despite the rain RWWARS members and R5QV managed to get on the air. We have enjoyed a short vacation in Port Jervis and New York City and has returned to Unison College for his senior year. VDX is in Korea. DWO and TQJ visited HH while on vacation. AARA now is incorporated and the new year book supplied by JQ5 is on the press. Thanks, Darry, for an outstanding job. RMM, APF, and HH are making fishing trip in Canada. RMM claims that the fish were so big that he had to sew them in half in order to get them in the boat. HH has installed a new receiver and is waiting for a new 2B-48-38. EFU is the new Zone 4 Director. W2NZD is a joy to work and he frequently passes through in Scotia, N.E. 2/3 represented the IBM Radio Club in the V.H.P. Contest. NYS on 3915 kc. at 7 P.M.; NYSS on 3355 kc. at 8 P.M. daily; NYS/SS 3915 kc. on 8 kc. at 3:30 P.M. daily and Sunday; NYSS on 3915 kc. at 3:30 P.M. daily and Sunday; NYSS at 8 kc. at 3:30 P.M. You of the ARRC is very important. If you have not registered, contact your EC or the SCM. Many of our Observers are urgently needed. A note to the SCM: SCW will bring full details. Appointments: AAP as MO, MIB as OS; Traffic: (Aug.) W5WV 72, KJ2V 38, W2QV 37, K2QD 36, W2E 17, K2J 10, H8E 5, July) K2CA 114, W2PH 37, KBT 18. (June) W2KB 12T.

NEW YORK CITY AND LONG ISLAND - SCM: George V. Cooke, jr., W2OBU - Asst. SCM: Harry Daniel, 2TUK; SEC: KTF; RM: PUK; PAM: VAT; YBT. The summer season is finally here after what manager of the Army Corps of Engineers, phone and c.w. nets appear to be in a healthy state and it promises to be a very active fall and winter.

(Continued on page 78)
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60 Megohms,
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- 100% Amplitude Modulation
- VFO Input Provision
- Dual Power Supplies
- Self Contained — No Plug-in Coils
- Pi-Network Coupling Output Amplifier
- 135 Watts Phone Input
- 180 Watts CW Input
- Instant Bandswitching

240-102 Viking II Transmitter Kit, Complete
With Tubes, Less Crystals, Key and Mike
AMATEUR NET $279.50

The transmitter kit you've waited for! The JOHNSON Viking II, successor to the Viking I, and the most complete transmitter kit on the market. The Viking II is an expertly designed transmitter, furnished unassembled but complete to the last detail. Includes all necessary parts, hardware, tubes, wiring harness, and cabinet. Assembly manual contains detailed photos, drawings, and step-by-step instructions. All amateur bands from 10 to 160 meters, 100 watts phone output, 130 watts CW.

RF section: 6AU6 oscillator, 6AQ5 buffer/doubler, parallel 6146 final amplifier. Modulator: 6AU6 voltage amplifier, 6AU6 driver, pp 807's class A/B, 6AL5 bias rectifier. Full excitation delivered to the final amplifier on all frequencies. Continuous tuning pi-network amplifier matches a wide range of antenna impedances. All stages metered, dual power supplies designed for economy and operating convenience.

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The Viking II is enclosed in a heavily copper plated, steel cabinet; perforated top and bottom. Lid bonded with silver plated, phosphor bronze contact fingers. Special shields for meter, dial window, and VFO power socket. Filters at keying jack, microphone connector, VFO power receptacle, power cord, and antenna relay connector.

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Biju recently got married. QOB now is located in New Brunswick. GY7, OQ, reports ten violation notices sent out. W2IZQ does a fine job as RM. A state-wide meeting of all civil defense radio coordinators was held Sept. 12th at the Newark Armory. Instance of RACES station authorizations was discussed. QTA: W2CQR 146, C15 146, EAS 35, GY7 8, CJX 6, FMG 4, JCM 4, K2BCK 3, W2NY 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W6PP — The Corn Belt Ham Club held its annual picnic and contest at Lost Level State Park at Ruthven attended by 43 licensed hams and their wives and families. An election of officers was held with the following results: GSL, pres.; EKB, vice-pres.; DDUB (TYL) secy-treas. The Club meets on the air each Sunday on 160 meters. It is with regret that I must report in absentia: the name of Richard G. Scobey, KPE, who was one of our younger hams. His death was caused by an auto accident. BVE reports that he got on phone but could take it for only a couple of days. SCMA's eleven days of vacation almost cost him his BPL but he squeezed in 509 to make it. BBDZ went back to the University and will be going to the college radio station WSCP this year. FTP left radio station WSCP to join the sales department at Lew Bonn in Minneapolis. QRA reports there is not much news this month. BBDZ has a factory overhaul on his 240-D. A new member of TLCN is DIT, of Cherokee. New hams in Waterloo are LAV and KVQ. EHN is back home after a tour of Navy duty in Alaska. QZK reports he's putting out the Official Bulletins as received and off a new antenna. With vacation time coming to a close, reporting to your SCM should become a habit again so let's have the news, fellows. Traffic: W6BSA 509, BVE 400, BDR 351, BZB 55, QVA 40, NYX 14, PZO 12, DJB 8, OPK 5.

KANSAS — SCM, Earl N. Johnston, W6ICV — SEC: PAH, RM; FDI, PAM; HEC. Congratulations to the Hi Pictures Amateur Radio Club, which recently became an ARRL Affiliated Club. We met a number of the club members at the Kansas-Nebraska Radio Club picnic Sept. 7th, which incidentally was a highly successful amateurgathering. More than 133 were registered and the parking lots were full of mobiles. An abundance of food, swell prices, bingo games, an auction, mobile contests, mobile contests and the get-together of various groups were the highlights of the affair. DQW, of Delphos, who just got his mobile rig, worked the biggest DX on route the picnic. CHJ, of Junction City, has revamped his station, now using a Viking, HQ-120X, home-built ECO, and well-designed antennas for all bands. FOG, a newcomer on 75 meters, is using a Command transmitter housed on top of a 15-wave vertical supported by Abilene's water tower. IFR is active again with Viking on 75-meter phone. HAI, one of the ART, of Wichita, has a new M-15 rig. Now W6HL, running 110 watts to BC-457 on 40 meters. EZT now has WBE, OFR is organizing a radio club in Nemaha and Brown Counties. A new Missouri Valley Emergency net still is reporting 100 per cent turns in traffic reports. KEM has a new Elmaz in his new Chrysler Royal. KVOH has mobile transmitter housing and picnic Sept. 7th. ELW and ZMC moved to Wichita. Traffic: W6NLY 110, BGE 51, FDIJ 65, WMQ 28, VBQ 18, ICV 9, BNU 8, OHR 3, BEO 6, LIX 2, B2V 1.

MISSOURI — SCM, Clarence L. Arrindale, W6BGBJ — SEC: VRJ; VRJ: VRJ: VRJ held its annual picnic and contest on Aug. 24th, 1968. The Midwest Division Director, gave an interesting discussion on current problems. VRJ, one of SEC, expressed the need that new ideas were awarded and the XYLs find their own prize drawer. KVH is a new ham at Sartollie and does his operating from a wheel chair. The following new DXCCs have been worked for KVH: 5ZT, EIK, FKM, GLZ, HET, JFJ, PKE, and SOM. VJR has organized a radio club at Senior High School in Springfield, which has been issued the call KGQ, and is operating mobile on 16- and 75-meters. CQG and CIA are on 75-meter phone. QMF has installed 75-meter mobile unit. PMQ has a Viking on order. LM has a new in operation. UXQ now is located in Kirkwood. PJL worked SRI, a distance of 250 miles, on 2 meters. ETM has worked 42 stations in the first six months of operation. TXM, taking a vacation trip to Canada, QXO earned another BPL certificate. CPI is waiting for replacement transformer for the Collins exciter. New Novice operators are W6BQX and W6CQX. GAR complains of erratic conditions on 40 meters. New ARGC club members are W6BQX and W6CSX. Ex-VMO is back on the air with his old call, VMO, in 75-new conditions: ECO, RAM, OM; QO, CUXE: MON needs more active reporting stations and additional stations in areas not now reporting into the net on 3990 kc. All traffic handling traffic are urged to send traffic reports. This is the first of each month to the SCM. Traffic: (Aug.) W6BQX 731, CPI 294, KGWRD 37, W6CQX 30, RIU 21, EBP 14, TGG 14, HUL 13, OUI 14, CRK 12, GAB 11, GBX 11, QMF 10, ETW 6, WIS 6, EDG 1. (July) W6BQX 731.
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Nebraska on the traffic map this coming season, which I could not do this past season. However, I want to take this opportunity to thank all the gang for the fine cooperation received during my short term as your SCM. The club at Grand Island recently put on a free picnic which the SCM appreciated. Everyone had a swell time, and all are looking forward to the next one which will be held at Wayne. I have not received any reports this month, so there aren't any activities to be reported here. I want to thank all of you a great deal for the help you gave me. Red your very best. The more we support him the better job he will be able to do. So once again, thanks to all of you and you.

NEW ENGLAND DIVISION

CONNEaCTICUt — SCM, Roger C. Amundsen, WH5YP._SEC: G. W. Johnson, W2EJK; PA M: FO6. RM: KYQ. ON-3840. OPN: 5800 kc. QEB-69.00 kc. Members of the Connecticut Amateur Radio Association turned to OVER Labor Day weekend and helped out the State Police with a safety patrol. The leaders: KYQ 21, QJIM/1 and RRE 12. LV 21, FO6 and KYQ have their respective nets well in hand and the fall meeting is set for Sept. 29th at NEH. CWA had an enjoyable picnic on Sept. 6th. AJO renewed ECM appointment and BH4 again is ORS. The Stamford Amateur Radio Emergency Corp and Trumbull Emergency Communication Assn. are now ARRL affiliated. RMT and BGT renewed ECM appointments. KYQ is trying a monthly bulletin on UN news, NPO, QL, and itx and Assistant Ecs for TIX. ORP has 600 watts on 80 meters but Ec has not been heard in UN yet. LV visited Milwaukee. FO6 sent cards to North. QL visited AO5 along with BGT of CRH. UH8 has a new pole. EMF had QSO with TIA over 100 miles mobile on 10 meters. ODW, with a new twin five, will be on 2 meters shortly. SFO makes FPU again. W1LV, at Waterford, is a mobile on 2 meters. JYF is ex-4GYK in Ridgefield. TFR has been rodding for the summer. Traffic: (Aug 11) W4RJO 964, AW 10N, KY6 343, AY5 33 43. HYF 43, QJIM/1 33, EMF 19, ODW 18, NBP/WBO 16, FO6 13, LGH 13, RRE 13, NEH 12, CUIT 6. (July) WIKY 6.

MABINE — SCM, Creses R. Brachett, W1PTT. — SEC: BYX. PAM: OLOE. EM: LIG. Pine Tree Net on 2806 at 1600 W through Fri. Sea Gulf Net on 3900 kc. at 1730 Mon. through Fri. We are sorry to report the passing of BZJ, of Brookfield, Ct, at 39 years old. BZG worked KUSA on 40-meter c.w. with a 3-4-8 report and with no plate voltage on the final. In spite of a downpour of rain about 20 minutes before 39 laid out his log to report the State, as well as two from Canada. Our SEC, Don Dean, even came with a broken ankle, also TO's XYL, who had a broken arm, attended. About 35 mobiles were there and took part in the 75-meter hunt with JSE coming in first and FQZ second. In the 10-meter hunt SSK came in first and received an award of 25 dollars, given by AUR, who is a very ardent 10-meter man with a great many countries to his credit. The usual fine chicken-diner meal was served and Steve says, "I am going to have another one next year." Many thanks to all the gang up there in Anroostock, and others along the way who made Ruby's and my vacation so much. It really was swell. Now that vacation time is over I hope that we receive some very good traffic reports from all members of the T2N and the SSK.

I might add that in the near future I am going to start canceling the appointments of those who do not show some interest in the way of reports. Trailer: W10HT 81, LKF 40, EXR 25, PPT 8, EFR 7, SUE 8.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker jr., W1LDY — OPM is new Ec. OPM and TQ5 are new OOs, Class IV. Appointments endorsed: AVV as EC for New Bedford; AVV and HWE as ORS. The Hingham Amateur Radio Club, VPI, and the Old Colony Amateur Radio Assn. now are affiliated with ARRL. UBV, of Quincy, has his Extra Class license. He received his first license in 1910 and was a charter member of the NAWA, UXX, at Fort Devens, has a 50-watt rig on the air and is 3.5- and 7-Mc, c.w. DBX has moved to Rhode Island and has a new QTH with a 400-ft. elevation. DXF now is writing in New York City. TOY has his Class A license. TOY OLN, HP, DOX, RYJ, QUI and XYL, LRT, and EHO went to the Portsmouth Hamfest, ICU, Amateur Radio Club, and Assistant Ecs, QUI and RYJ, conducted a "simulated alert." HPI has new TBS-60. UEH has rig on 20 Mc. in his car. PXD has a home transmitter on 20 Mc. and his operator has the call WGN. AVV and group have been handling traffic with KIFAR/2 at Camp Drum, N. Y., with JY at the station. The Southern New England Assn. has resumed meetings at the New Bedford YMCA with AVV, prev. LAD, soy-areas. Visitors are welcome. ESO, Mithen, EC, sends in a very nice report. PFA and OHZ are his assistants. The Merrimack Valley Amateur Radio Club, NBN, is control station for Region 4 Net and W1NYX, of Lowell, is on 5.3 Mc. with 75, 14, 20 and 40 Mc. and is 1C-125 and a Gates CT-2. The Post Road Emergency Net, formerly the Walpole Propagation Society, now is on 28 Mc. and anyone is invited to check in, says OLP. The South Shore Club's "Mystery Trip" was held at Canobie Lake, N. H. WR gave a talk on TVI at a summer meeting of the South Shore Club. UIR worked VEIGY on 144 kc. NME is (Continued on page 88)
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**Belden Radio WIRE**

The Aptitude-Tested LINE
active in the Deep Sea Drag Net and TCPN. QON has a new Viking on all bands. QFE is mobile on 144 Mc. W1VHF, of Lynn, has a new jr. operator. QIF is on 28 Mc. TBT and his XYL tuple the U.S.A. on vacation. A new net on 28 Mc., known as the Windy Net, has been formed with TYR, pres.; SMC, vice-pres.; GOU, prime minister; TUF, secy.-treas. Work on the following numbers can be reached as follows: QSL to Box 125, Quincy, Mass.; TAA, THL; QIK, FWS, TQG, CSZ, EUX, TSE, UKR, BBB; CDQ; EUN, QXO, UDD, TQG; ZK; UYF, IS, UHR, OMX, SSA, UDC, PON, PIG, DXO. PKZ, GPO, MMB, GN, VOU, RKM, PZH, UBE, TSB, UQW, SCW, ADU, UQV, ALF, UQV, YVS, etc. QZO, PEC and USA took a trip to VE-Land and had a 25-watt rig on 3.9 Mc. SQV is moving to Danvers. SHV has rig in the car on 28 Mc. KAUN spent two weeks in Beverly, taking JFS mobile to Portland. LN spent two weeks in China, Me. VQA, Fort Devens, has a 500-watt transmitter, also a 1250-lb. generator. PZA is on 144 Mc. RFP is needed. WJF is a new ham in Boston. QMD has moved to Philadelphia. LJT now is on 144, 28, and 7 Mc. ORK is on 3.9 Mc. LQX, Medford, is on 3.9 Mc. NBS has moved to New Hampshire, TVZ is on 28 and 7 Mc. FVD went to Ohio on vacation. VVS is new for Boston. Traffic: W1EMG 102, WME 114, KOC 19, TY 15, CTR 11, SY 8, WJF, WHE 5, QON 5, LM 3, LJT 2.

WESTERN MASSACHUSETTS - SCM, Victor W. Punzoff, Westfield, SEC; KUE, RM; BEY, PM; RDR, WMN on 3500 kc, at 7 p.m. Mon, through Fri. WAINNS (slow-speed net) is at 8 p.m. Mon., Wed., and Fri., 850 kc, KUE; Thomas Barrett of 769 White Street, Springfield, is the new SEC as of Sept. 1st. New QES is SWJ and new ORS is TVJ. TZA passed exams for Advanced Class license. Please note time and frequency of the slow-speed net. Detailed instructions on net operation can be obtained by writing BVR at 37 Broad St., Westfield, RKF is setting up a 2-meter repeater. SKY is more active. MTB is on 144 Mc. mobile rig. Effective Nov. 10th our new SCM will be Roger Corey, JTH, of 67 West Allen Ridge Road, Springfield. Let's all get behind Roger and build our section up to the heights it once held. I want to thank all of you who have been active in our organized activities in Western Massachusetts. I appreciate you very much your expenditure in making the past two years as SCM a pleasant experience for me. See you all in the near future. Traffic: W1ER 40, TZA 21, HWE 10, TAY 11, SDO 10, TVJ 8, SDF 3.

NEW HAMPSHIRE - SCM, Carroll A. Currier, WMGH - The Merrimack County Emergency Net operates on 28,600 kc. Tuesdays at 1830 and would like to tie in with adjoining counties. PUJ is back on with a new rig. QXQ has pace on for 10-meter beam. EKN has moved to Worcester, Mass. REFT is on 75-meter phone. Many from Concord, Nashua, and Manchester attended the outing of the NHABC and Salem and the grand prize was won by the XYL of RYD. RWM has a new 32-V and says it is FB. WNTTVQ now is WITYQ. Several members of the Nashua Mike and Kate Club enjoyed a day with OMZ and the cabin cruiser at Lake Winnipesaukee. LGV is back from Japan and working 10 meters with an Elmac transmitter. The Portsmouth Radio Club at Portsmouth is doing a good job of running classes with code and theory classes and has two transmitters in the making. The Manchester Radio Club has acquired a plot of land on the summit of Mt. Uncaskee as the site for new club house. GDE, Hillsboro County EC, is looking for recruits for the Emergency Net. UNV has new 10-meter beam. Traffic: W1YR 29, NMC 34, QJX 24, PK 12, GMH 11, UNV 2.

RHODE ISLAND - SCM, Roy B. Fuller, W1GJH - SEC; MJL, RM; BTW, PM; BBE. The RI Net meets Mon. through Fri. at 1900 on 3540 kc. SIF is confined to the VA hospital in Providence for the next couple of weeks, so I think Bob would appreciate a visit from some of the gang around here on occasions. KCS has been appointed by Radio Chief Gordon to the post of Maintenance Chief of Radio Communications for the Rhode Island Civil defense sets. NAARO now holds meetings each Friday, Vigitors can show up any Friday and find the Club open. TXA has been transferred to Corpus Christi and will be on the air and looking for all the gang in this section. BBN is recovered and is back on at his old station handling Rhode Island traffic. Traffic: W1YK 25, QX 20.

VERMONT - SCM, Raymond N. Flood, W1FFS - SEC; W1CJY, WMN, RM; W1AXN, RM; W1OAK, Assn. EKN, HAT, Hal Brown, our SEC, sent in his first report, which shows Chittenden County away ahead in AREC membership. Under the leadership of EC QON this group is growing in place. Excellent work, OMI! TXY is struggling to get the 2-meter rig working properly. Ralph says he managed to get that extra drain out of his 30-meter rig with an installation of a TVI kit in his Viking 1. ETX and his XYL took a vacation trip to Canada. LBJ is working on Marine Mobile unit. TQD now is operating VE2. AXN should be back in the QTH when you read this. Our new season is under way!

(Continued on page 84)
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 Tiny insulated composition units. Three sizes: 1/5, 1, and 2 watts—in all RTMA resistances. Tolerances ±5% and ±10%. Available only from Ohmite distributors.

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RHEOSTATS • RESISTORS • TAP SWITCHES
ALASKA -- SCM, Glen Jefferson, KL7NT - PDQ is back in Anchorage after touring detail in Nome area and has been appointed OBS. PF is back in harness as SEC. There has been much activity on 75-meter mobile of late. K720 has just about completed details for a tie-in of Nome to the highway system with the Territorial Highway Patrol control station at Anchorage, establishing procedures for reporting emergency conditions encountered by vehicles traveling on the highway, particularly in the Anchor village, IS and his YL, Jeannie, enjoyed several weeks touring the territory by land and air visiting friends and former QTHs; AN has been the same old AN, doing the same by land only. Bill and Rose really banded out some tall tales about fishing down Homer and Kenai way. AN did some fine mobile work on 80 meters, too.

IDAHO -- SCM, Alan K. Ross, W7IUW - Hayden Lake; FIS still is using Booth T.A. on 10, 11-11 mtr. The following are Emergency Coordinators in Idaho: KOC Grangeville, 1SH Coeur d'Alene, 1BDL, Pocatello, 1FT Idaho Falls. We can assure good coverage for Idaho if at least one amateur in each city and town checks into one of the above nets — for nothing more than to say ‘Hello.' Black Sky often turns in more DX for August with his log showing X2E, KL7, KZ5, CM2, VE2, and VE3. Boise: 'The hamfest in September netted a good crowd and 40-10-11 net. We have the QLQ, v.h.f. antenna design, and mobile hunts. NPL, of Nampa, walked off with the door prize, a Weller soldering gun. Traffic: W7MRS 56, FIS 7, LKW 30.

MONTANA -- SCM, Edward G. Brown, W7KGJ - Mobile activity is up on the lighter end of the bands as well as with 10, 9-9-11, 20, 50, 144, 432, 2350 MHz and a couple of others. As far as we know, all local nets have done a good job of contacting each other and getting QTHs, even though we are not hearing as much as we might like.

OREGON -- SCM, J. W. Roden, W7MQI - HDN has been making trips all over the State, visiting various clubs and putting the ARRC on the air as well as RACES going. He is the SEC for Oregon and doing a bang-up job. BDN is getting started once again in his radio shop after some breakdowns; picnic at country club; K720 got a new Vigilant 1 for 20 meters running about 380 watts to a twelve-element beam. Ken also is active on 6 meters and has made some very nice contacts from his new QTH, 8CN7/7, new 40-foot tower at Treasure Island, Calif., where his son is studying electronics. The Electronic Research and Development Company has invited the Billings Club to hold meetings and set up a club rig in their new two-story building which recently was completed. OBY has p.p. HU, 80, 40, and 20 meters and the new rig sounds swell. FT7 soon will move into his newly-constructed home. Your traffic and activities reports are needed.

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Illustrated below are the more popular units in the complete VARIAC line. Other models are available. VARIACS can be used singly, or in gangs for higher power and for polyphase operation.

**Variac**

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<th>Input Voltage</th>
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* I Unmounted model.
II Protective Case around windings.
III Protective Case, terminal cover, line switch, convenience outlet and line fuses.
IV Protective Case, terminal cover and fuses.
V Two gang assembly — requires type 50-P1 choke — $12.00.

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ILLUSTRATED BELOW — 3 ARRAYS FOR TOP 2-METER PERFORMANCE

**"QUAD-X"**
- 8-element Conical Quad
- Offset yagi
- Provides low vertical angle, narrow horizontal beam
- Bandwidth: 9.6 db Gain; 23.0 db Front to back ratio; 23° Beamwidth.

**"2-METER "FISHBONE"**
- Twin-driven broadside, hi-gain
- Can be stacked up to 40 elements: 11.6 db Gain; 27.0 db Front to back ratio; 18° Beamwidth.

**"TWIN-FIVE"**
- Stacked side-by-side for added gain and narrow beamwidths: 10.6 db Gain; 21.0 db Front to back ratio; 16° Beamwidth; V or H polarization.

WRITE for specifications, data and other information

with guests being CZY, IU, PRW, PRV, MRS, and PPR. NZM and OAB joined the VARC. PHP is home on furlough from the AEC. JJK changed his call to KBB. JDS made BRAT award for July and August. The Seattle civil defense has seven complete stations set up with two transmitters and receivers at each station. LAX, KYO, and JPH have both 10-meter work out fine with new Workshop 20-meter beam. LBF is home and operating 10-meter mobile while DXVING his home via LAX, TXY, OEB, and JPH. ARA and JRF brought RA 100-20 beam to the top of the 90-foot tower. KZP, HXK, LBF, and AW installed fish antennas, complete with automatic pumps. Listeners from AKQ, JRF, HXK,噪声Hi, plus 20 dB. JWE is using an 814 with clapper tube on 75 and 20 meters. Traffic: W7IQI 1045, BA 334, ETQ 293, CZX 1040, EIU 167, JWE 98, EVH 98, EFG 98, AF1 20, QRD 74, APS 61, FPD 46, MSI 45, OEB 45, OPO 40, AGQ 35, EKT 19, ZU 18, ETO 14, AIB 12, CWN 9, NTU 4, NRB 1.

PACIFIC DIVISION

HAWEI — BCM. John R. Sanders, KH6RU — BARK had another interesting talk on Propagation Forecasting by AED. The Honolulu Mobile Club's "hidden picnic hunt" resulted in a wild dash election to see who could work the CBO ahead of the June AME contest and first second prizes for mobiles. The Honolulu YL Club held a picnic-meeting at Aiea Heights. OB is active on 144 with equipment tuned in from all over the state. The busy building a new home at Kailua, ABI is rebuilding to higher power, J3 visited Honolulu for several weeks. The Hawaii Club has started with a new station on the 2-meter band.

KV6AOM is much 14-Mc. DX. K6n.d at a modest antenna at Wailuku, EKZ is rebuilding his three-band mobile rig, RQ is assembling a KF6FA-like antenna. Per Petrie's sad notice: KG6ACH comes through for BPL on origination this month. KG6FAA, BPL again, works 28 Mc. frequently in spite of its operation. Traffic: KG6AC 2005, KG6AD 2002, KG6AC 156.

NEVADA — CM. Ray T. Warner, W7UJ — SEC; HJ, ECS: JLM, KOA, MBQ, OXX, TXJ, YQ, LGS, and ZT, RM: PST, OPB: JUO, OO, LG8, Nevada State frequencies are 3000, 7225, and 32000 kHz. We regret to report the passing of Frank L. Mich of Henderson, many of us knew. Last days were eased by his interest in ham radio and his recently-acquired shell. RSO, Reference City hands, and Bob D. 100 per cent AREC. BVZ is looking for openings to try his new 6-meter transmitter, ECZ, 7T, OXX, MBQ, and JU participated in the 10-14 Mc. exercise called by the Reeds Army. A new Nevada o.w. net is being formed by MARS members. Applying are invited. Write to Signal Office, Presidio of S. F. The Pacific Section has the appearance of Radio Officers before getting up a full head of steam. Camp Desert Rock MARS station should now be on the air.

SANTA CLARA VALLEY — SCM. Roy I. Cadin, W6LZL — The San Mateo County Fiestas was held this month with a very fine exhibit put on by the County EC, QI.E. with the very capable assistance of the clubs in the area. The Santa Clara County Fair is next on the list for SCCARRA and plans are well under way. AEB, our SEC, reports activity still low throughout the area at this time of year, but fall reorganization is about to begin with a possibility of new appointments to further the efforts and distribute the work load. The PAAA tried something new at its Aug 1st meeting, a transmitter hunt on 146 Mc., and it went with great success. The NPEG had its Aug 1st meeting Mr. R. Mark Houghton, Bell Telephone, who spoke on Microwave Technique. At the Aug 15th meeting WB gave an interesting talk on mobile antennas. MMG is back from two weeks in W-1-Land and was amazed at the DX possible on low power from the East Coast. ALL and spouses spent a few days in the Yosemite Area and lost their 144-Mc. whip on low branches. GCG made a very good score in the VHF Contest: he operated from Mt. Loma Prieta. On Aug 9th, the SCCARRA held one of its most successful BAR-B-QUEs to date. More than 400 hams, XE, and non-ham operators had one swell time with good eats and lots of prizes, followed by a dance to round off the full day of activity. IUV reports a lot of time spent on 144 Mc. He will be back on e.w. this fall. HCC reports that signals will be forthcoming from their QTH via a Viking 1. Traffic: (Aug) W6VQG 81, MMG 5, (July) WY6HB 128.

SAST BAY — SCM. Ray H. Cornell, W6JZ — Asst. SCM. Guy H. Cocchiara, 6RLB, and Julio Aprias, 6WGM. RVC, RMC, RNS: IPW and JOH, JUD is rebuilding to cure TVL. HHX is concentrating on traffic and becoming mainstay on BAN. IPW and JUD have worked hard on BAN, and now KBQ is — a first-class traffic net. Incidentally, their traffic totals are increasing regularly. YDL finds time to handle a little traffic each month. NRC visited W&Y on his last trip to the state, and did LRT. RVC says the month of August was the lowest in AREC activity because of summer weather. HB8 is a new AREC member. The Oakland Radio Club has started a communications truck from the Red Cross. This will see doubled duty in e.d. and Field Day work. OT is putting on code practice for beginners as well as others. The AKB Club proxy, HFK, is very active in OT. He hopes to have KTT6Y going on 40 meters one of these days. Fred says (Continued on page 89)
THE PROBLEM:
The problem was to develop a crystal unit for AM broadcast (550-1600 kc) which would maintain frequency tolerance per FCC requirement (±20 cycles) without temperature control.

THE SOLUTION:
When designing the crystal oscillator, the transmitter manufacturer gave primary consideration to voltage stability and low r.f. current. The resultant design provided an ideal environment for realization of the inherent stability of the crystal unit employed.

Billey designed a plated crystal utilizing precision orientation to achieve the low drift characteristic needed. Contrary to ordinary practice in this frequency range, the crystal was soldered between rigid supports to prevent frequency deviation due to physical displacement. The assembly was then hermetically sealed in a dry nitrogen atmosphere to prevent contamination and minimize aging.

The resultant production units, type B8, are calibrated at 50°C with maximum deviation not exceeding ±10 cycles thru the temperature range from +10°C to +50°C.
when you continually blow fuses in the HV circuit, look over the ceramic feed-thrus. Sometimes they make like a 1200 ohm lamp, they short to ground, and you have to find out if the case of TVI was not only fundamental overloading of the neighbor's TV. KZP moved to North County swimming in the PAM Sat CMG. He reported up to KAK. ERF, ZQ, VJN, WGM, and YDI report into MTN A3 Net regularly. SARO is going to QBY the 10-meter net to 2 meters. A grant is ready to construct 2-meter antennas is currently in the works. NQJ not only maintains Solano County's radio system but is very active in e.d., ARES, and in the NBARA. JZ went for a new short pole; looks like 50-meter DX going to catch it again. CTL says there was just a very light activity by the DX boys during August. KFJEL makes BPL again.

BEZ has been running his 474A with 8 watts input on 75-meter phone with excellent results. LTL vacated a channel. KLW is trying out 3 meters with an EBC 50. He likes it. The Mt. Diablo Club furnished communications for the Walnut Festival in Walnut Creek, RVG, LIL, TCU, LW, and KBBQ covered the parade. The races were covered by T and YJZ. The club also furnished communications to the Contra Costa Horsemen's Assoc. members on their annual trip up Mt. Diablo. Traffic on W6JJO, W220, IPW 158, JZ 154, HTX 67, NGC 15, YDI 10.

SAN FRANCISCO — SCM, R. F. Ochelkowits, W6ATO — is now at home. Phone: PL 6-8847. Eureka: PL 6-8637. Ex-7TPC has been issued the call WR6EF. Newcomers to Eureka are Paul Flatt, RLY, and Paul Jr. A recent meeting: Blain Meek commented on his new EGC III. On June 1, a local VHF group, ATO, San Francisco SCM, spoke on TVI and its elimination, and on civil defense. The HARC plans a trip through the newly formed Eureka VHF telephone exchange. The Humboldt Amateur Radio Club meets the second and fourth Fri. in the YMCA rooms, rear of Municipal Auditorium, entrance on E St. Street, Eureka. Santa Rosa Area: EC; RE, Ellyx, TN6F, and Davis has the c.d. net in good shape, and has completed installation of county-owned gear in Petaluma, Santa Rosa, and Healdsburg. Congratulations to JD1W for his Advanced Class license. Fred is currently engaged in organizing the 2-meter net. MT2 and his XL1, H12D, have left for a new assignment on the East Coast. The chairman of the newly-formed TVI committee is DSI, and TVI trouble is being efficiently handled. New members of the SCA are W6GOQ, W6YUA, and VNX. JTR reported a 29.5-Mc. c.d. drill in Los Angeles. The Sonoma County Radio Amateurs meet on the first Wednesday. In the Board of Supervisors room, County Court House, Santa Rosa. Marin County Area: EC; KNZ. Tamalpais Amateur Club EGC, Inc. The Mill Valley, inactive during the three summer months, started meetings in September. Meetings are held the second Friday in the American Legion Hall, Larkspur. The Tamalpais Radio Club meets in the home of the secretary, OZC, 7 Loma Ave., Tiburon, on the third Fri. Visitors are invited to both clubs. Sante Fe Springs, Area: EC; BYG. Station of his ZL77. Active in the Tehachapi and Bakersfield Earthquake emergencies were N1, BYS, JW, NAC, and GB. Three operators individually handled traffic and also let news of the National Red Cross station, open as needed. Stations around Bakersfield known to be active are KRA, J1N, and KF9Z. After the Red Cross had the distinction of having its news relayed by news of the Tehachapi Earthquake to the local newspapers, in appreciation they had them appear on the Aug. 7th Margie's Show on KGO-TV, plus the weekly news and c.d. drills are held weekly by N1 and BYS. Everyone interested should contact them. Their telephone numbers are listed above. The TVI Committee continues to function smoothly, keeping up with the complaints as received by the FCC and channeled by them to the Committee. More than nine per cent of all complaints are cured by a high-pass filter on the TV set. The San Francisco Radio Club meets the third Fri. at 7 Lakeshore Plaza. The Highfrequency Amateur Mobile Society meets the second Fri., at the local Red Cross Blvd, 1625 Van Ness Ave. Traffic: W6ATO 7.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKY — JDN obtained 2nd-class radiotelephone and now is after license. L12T, Sat. at 10 meters. H7P is active on MARS, E6, is building for 6 and 2 meters. HQI is exhibit station at California State Fair. EKP has moved to Yuba City. QUB is shown 2 meters signs of activity again. In fact, 40-meter WN6PA has confirmed 16 states. 3 Alaskan, 4 Hawaiian Island, and 1 Carolina Island for the first Novice worked from W6JJO: WP175, JDN 19.

ROANOKE DIVISION

NORTH CAROLINA — SCM, J. C. Geaklin, W4DLX — At Anderson, the GM for North Carolina, has been working the C.W. Net is back in full swing and would like to have more stations report in. How about some of you who have a good log slinger, and are becoming traffic men. BOD, NCS on the Tar Heel Net, opens his garage doors with his 75-meter mobile rig. New Novices reported on the air are W1M, Charlotte; WMZ, (Continued on page 86)
PLAN AHEAD

Oscillator (Present Transmitter)

* For An Eimac 4-65A Tetrode

**Typical Operation**

Radio frequency power amplifier and oscillator Class-C telegraphy or FM telephony.

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<td>Driving Power (approx.)</td>
<td>2.1 watts</td>
</tr>
<tr>
<td>Plate Power Input</td>
<td>300 watts</td>
</tr>
<tr>
<td>Plate Dissipation</td>
<td>65 watts</td>
</tr>
<tr>
<td>Plate Power Output</td>
<td>235 watts</td>
</tr>
</tbody>
</table>

Hold a power amplifier in reserve, then you'll be all set to go on the air with a wallop when those novice days are over. Your rig will be in style and the change over is easy, efficient and economical with an Eimac 4-65A radial-beam power tetrode. With only two watts needed to drive the 4-65A up to 345 watts input in Class-C telegraphy or FM tone, your present novice transmitter will do the job with power to spare. Circuit design is elementary, neutralization is unnecessary, in most cases, and TVI worry minimized with an Eimac 4-65A.

For mobile use this small, compact, rugged tetrode with a plate dissipation rating of 65 watts is a natural. Its instant heating filament eliminates battery drain during stand-by periods. And through application of filament and plate power simultaneously, no warm-up periods are required.

Write our Amateurs' Service Bureau for further information. Also available at no cost is the handy 28 page booklet, "Care and Feeding of Power Tetrodes".

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Spring Lake; WEU and WNB, Sanford; R&B, Morgantown, have a new pair of 811s running 500 watts. PXG has been doing the busy little bee: he harvested a crop of tobacco, took Advanced Class exam, built electronic keyer, and now has to go as a ship operator. The Sjc Net wishes to thank the Tar Heel gang that stood by on “Hurricane Able” watch. The SCM would like to remind all amateurs, especially official amateurs, of the opportunity and responsibility of reporting monthly to the SCM. Also, please check all appointments for renewal date and send in your certificates. Deadline: (Aug. 1953). RRH 19, D8x 25, (July) WARC 19, RRH 189, PIC 21, ANU 12, D8x 12.

NORTH CAROLINA — SCM, T. Hunter Wood, WAANK — A hurricane struck the South Carolina coast on the night of Aug. 30th, and the lack of a South Carolina c.w. net was keenly felt. Much good work was done by the 75-meter net and c.w. stations who participated reports to the ‘phone net. The following amateurs in handling emergency communications: AST, FFH, VRQ, WNX, VXW, KOD, FM, EQD, HQG, DZ, BIZ, CEL, NTD, BZK, HWZ, STH, NQP, CVXO, BUH, PLX, SUE, CXXE, NTO, PULX, DMX, KMO, KLD, TWW, NWB, BIZ, LQ, RXO, ANK, OWW, BAT, and KUSN. The following operated from the house with emergency power: BLS, AN, OHW, KLD, RXO, KL, BIZ, CXXE, and KOD went to Wake Forest to provide emergency communications. FM sends in an activity report every month and has emergency calls on file. Any station interested in organizing a state c.w. net, please contact the SCM. All stations with emergency or mobile equipment are requested to register same with the SEC. DLX: Trailing: W4PPF 105, ANK 57, FM 7.

VIRGINIA — SCM, H. Edgar Lindauer, W4PPF — Some 200 or more mobile stations were on the air throughout the state signs by means of the new auto license plates issued by the Commissioner of Motor Vehicles, Commonwealth of Virginia. Only a heart-broken couple of days will make Virginia a plenty of enthusiasm and patriotism of civil and legislative officials made this a successful project. Personal sacrifice of time and money against these deterrents to achieve a goal, when there is a common project, is most interesting. Thanks again to all who made it possible. Join up with RACES and put that equipment to maximum use. MG's ended the formal courtship and his XYL adds a new love. She is studying for that Novice ticket. Congrats, Mrs. MLG, we'll be seeing you in the air. George also returns to the nets. PYRC held its Novice round-up and welcomed 75 at a special gathering in Washington. TV is QRT and may be dependent on for effective liaison between c.w. and phone nets. JAG had VFN running full blast during the summer session. MLG has Extra Class license with new QTH in Harrisonburg. OWV's XYL is boning for a WN. OWV is announcer at WSVA. NQV returned to Princeton. VZQ now is General Class. MLG renewed his QRT, and as a result has become a Virginian with QTH in Vienna. Welcome back, George. IJK holds down as NCB appointment on VN. RVO was transferred to Maryland. PWX garnered 1st-class commercial 'phone. CD officials of the Norfolk and Tidewater Areas held public display of mobile units with new call tags in conjunction with Emergency Coordinator, MKL Emergency Corps, and Red Cross units. Traffic totals do not reflect full activities because of the lack of reports. Traffic: W4HH 36, OQG 41, FY 38, QR 29, JAQ 17, EP 12.

WEST VIRGINIA — SCM, John T. Steels, W8MCR — Your SCM has moved to a new QTH. Please address all future mail to Hedgesville, W. Va. New nets in Princeton area, W8N8KW and W8N8KYO. IYG has completed a nice-looking outfit. HNC is active on mobile. YPR also is very active on 75-meter mobile and is quite active on C.D. organizing and supervising trial runs. SDEG, an old dyed-in-the-wool c.w. man, finally has been bitten by the 'phone bug. A little bird tells me he is on 10-meter 'phone. GEP has finished his camp session and now is back at the home QTH with his Viking. FYR and c.w. nets are back in operation for the winter. The 75-meter nets have a evening at 7 P.M. on 3890 kc.; the c.w. net meets Mon. through Thurs. on 3770 kc. at 7 P.M. EST. A net has been established in Huntington. LBT. DPF is working KXZ on mobile. The Huntington Club station is raising power to a full gallon. A new column called "Mike and Key" is appearing every Tuesday in one of the Huntington papers. LBT is teaching code to YLS and XYLs.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, W4IZQ — SEC: CHG, Aat: SEC; PGX, RM; CHQ, PAM: CHQ. This is my last news write-up as SCM and I want to take this opportunity to thank Oral, KHQ, and GHQ for their help. The effort he has put in to help get Colorado on the map in organizing the Colorado Emergency Net, Colorado still doesn't have an effective emergency net and it is due in a large part to the fault of Oral. He needs more support from each licensee... from you, please. Out of approximately 1000 amateurs, 500 of which are in the Denver Area, a relatively few give their reports each month, which makes for scanty...
BEST BUYS from your 1953 ALLIED CATALOG

FOR THE NOVICE!

New Philmore Transmitter Kit
Low-cost, 2-band 25-watt CW transmitter. Covers 80 and 11 meters. Uses 6V6 cesc. 6L6 power amp, 5Y5 rect. Transmitter and power supply on separate chasis for easy construction and flexibility. Finetwork matches any single-wire antenna. No meters required; uses plate current indicator bulb for tuning. With all tubes and parts, punched chassie forms, coil winding data, hand key, instructions. Less hook-up, wire, holder and crystal. Size: Transmitter 7½ x 6 x 6½"; power supply, 4 x 5½ x 6½". For 110-120 volts, 60 cycles. AC. Shpg. wt. 4 lbs. 88-556. NET: $29.40

NEW Meissner 2-CW Transmitter Kit
20-watt novice transmitter kit for 20, 40 and 80 meters. Quickly and easily built. Crystal-controlled 6L6; rectifier is 5U4G. Designed to operate with folded dipole antenna; instructions also for use with random-length antennas. Has terminal strip at rear to permit metering plate current. Overall size: 6×11½ x 7¼". With 80 meter coil; punched chassie, all parts and instructions; less crystal and tubes. For 110-120 volts, 60 cycle AC. Shpg. wt. 7½ lbs. 83-524. NET: $24.45
83-522. 20 meter coil. NET $2.94
83-523. 40 meter coil. NET EACH $2.94
Tubes: 5U4G, 68.46, 6L6, $1.79

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Type H-43. Popular Amateur type for 3.5 to 4.0 mc., for transmitters above X-ray oriented, optically lapped and carefully stabilized. Rectangular crystal holder with ¼" spacing. Low drift 1 cycle/mc°C. Size: 15½ x 15½ x 15½". Specify frequency. 99-370. Only. . . . $2.80

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98-320. 40 Meter (60 ft. length). Only $7.64
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97-497. 20 Meter (T-match, 52-300 ohm). Only $64.95

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Fig. A. 24-Hour Amateur Station Wall Clock. Marked in 24-hour time (0000-2400). 10" dial with sweep-second hand; 6" inner dial shows time directly in all world time zones. Self-setting. For 110-120 volts, 60 cycle AC. Shpg. wt. 3 lbs. 78-325. NET, including excise tax. . . . $15.00
Fig. B. 24-Hour Numerical Desk Clock. With seconds scale calibrated in 2-second intervals. Ivory plastic case, 4½x3½x2½". Self-starting. For 110-120 volts, 60 cycle AC. Shpg. wt. 3 lbs. 78-341. NET, including excise tax . . . $8.77
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news. When asked why I didn’t put in some news of a particular activity I have had to say it was that no one had bothered to write in, (D) I wish to commend LZY, ZJO, IC, PGX, DD, TV, OW, and several others who so ably assisted in various activities. You who are active in various activities will know who you are, and an orchid to you. It is very disappointing to any SCM not to have the SCM not to have the SCM in cooperation especially from the very people who elected him. It is expected that Karl Brueggeman, W4GDZ, 1445 Kearney St., Denver, Col., will be your new SCM and we wish him the best of success. Give him your best support! Also there’s no reason why anyone should be too busy and can’t spend two minutes a month filing out a card for the SCM to get news. Traffic: W6KCH 192.

WYOMING — SCM, A. D. Giddie, W7SHN — PKX, RM, is starting the VO Net rolling again after a summer lay-off. Your support is needed on 3022.5 kc. JDB has a new 183-D receiver and is helping with the 60 station. GOH is keeping the SCM in good time. GOH has a 6-transistor receiver. HNI heard JRC (Billings, Mont.) on 2 meters three nights in a row. NHG is trumping the experts with transmitter troubles. M4WS is moving. Lots of fellows are wanting Wyoming contacts, so get on the air, gang, and report your activities on the first of each month.

SOUTHEASTERN DIVISION

LABAMA — SCM, Dr. Arthur W. Woods, W4GJW — A RACES activity is reported as being at a high level in Huntsville, Birmingham, Montgomery, and Mobile. Louis like other clubs could try to keep pace. Huntsville’s traffic has come ahead faster than any other since the war in the matter of membership, activation, projects, monthly bulletin, and, of course, ARES participation. Hats off to Huntsville, and other localities please copy! DXB notes that the lightning arrester protected his house but not his transmitter. (Switch to Safeties!) R5M claims a DXB super band operation is time for traffic. We think it’s more nearly 1900 UTC. UHA, in his first report (thanks, ON) for helping the column), reports he answers into AE Net and MARS nets. KX5 continues to skipper ABIN, which now shows signs of enlarging. Traffic: W4KX 51, G3J 37, R5M 24, UHA 17, DX3 5.

EASTERN FLORIDA — SCM, John H. Hollister, Jr., W4PWS — Ole August Hurricane Able scared us a bit but our weather net was right on the job, so congrats to all. The U. S. Weather Bureau Miami bulletin of Aug. 26th really startled us in our gang some got news to publish. Let’s give our nets on 3675 and 3910 kc. even greater support. Daytona Beach: KWM reports new 9-dc. station with Harvey-Wells 65X-71 and NC-125. Deland: RVU reports CQX/KIB wants Florida contacts. Phil has the DX bug (BBB, please note) but took time for the CD Party. Fort Lauderdale: The ARES application for RACES license is one of the best prepared I have seen so far. LIM says RACES have great possibilities. The Club deserves congrats. Ft. Myers: LNE is off to Japan. RMK took Advanced Class exam. Ken reports that FH, in Homestead, uses a Collins transmitter, SVX, of Winter Garden, will be at Ft. Lauderdale; Z76T of West Palm Beach, called to give new K6T at Fort Jackson. The JARS really threw a picnic at WPDG and the MVC toured the JARS club house. DX in person. Miami: WNT4TY’s 60-watt rig is per May QST. Orlando: Mobilizers include TDA, QAX, QAX, and R5C. Encinitas a.s.s. AKF and QAX and SVA and W8ZD. DX in person. Sarasota: TIX is off to Iowa State U. with all new gear. LMT is getting 6-dc. radio under control. West Palm Beach: KOB will enter Ft. U. Bev. in West Virginia, visited SPQO, who is ex-PX1AR. MVJ reports that KH6AAH and W4PBM are now at West Palm Beach. IU3 and MVJ are proud pups. Traffic: W4IVC 173, DRR 160, PDT 158, LMT 87, W5R 50, 662, W4BVX 15, 6T2, KG5U 16, U5D, U5D, UJX 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PQC, OW: FLE. AFX has new RME-50 to go with the RME-45. JM is building an FB console for the station. BY5 is smoothing out the mobile rig. MPY is looking over 460 Mc. SMM is planning a new mobile rig. SSS is experimenting with a “J” antenna. SQG has some high power and is ready to turn loose. N5P has an FB mobile signal. UQG is doing FB with JY5C’s old rig. UX7 has another new rig. RWD is bird-dogging a coax whip for the KARS Club. SXX. The Ham is still reporting in for drills. RKF is getting set for mobile operation. The I Scream Net drills Monday night on 29,500 kc. TTM has been studying for the Advanced Class this week. NOX and NYZ have been handling G.L. traffic. BBF proves that you can operate on 14-Mc. ‘phone with low power. ACO is getting his layout up again. R5C hands RDL, 661. MMC is putting up three elements on 14 Mc. as well as ten elements on 144 Mc. WN4UYe is working on a recovery. UTP and VCS are members of the I Scream Net. UGCO/A have been heard on 28 Mc.

GEORGIA — SCM, James P. Born, Jr., W4ZD — The...
The NEW Hallicrafter Transmitter
A versatile, completely TVI-proof transmitter with commercial performance at amateur prices! Complete band-switching 10 to 160 meters, 10-position crystal selector switch. Spurious radiation at least 90 db. below full output. RF network output for 50 ohm coax with special low pass filter. OUTPUT of 115 Watts CW or 100 Watts phone at continuous operation rating. Provision for external VFO and many other new features making this the most outstanding transmitter kit ever offered! HT-20 complete with all tubes $449.50 We regularly stock the complete line of Hallicrafter receivers.

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Here's the latest and the greatest of the famous NATIONAL HRO series! Features dual-conversion plus 12 permeability-tuned IF circuits! Many, many other newly designed features to make this the outstanding communications receiver value of the year! Matching Speaker $16.00 NC 183 D $369.50 Matching Speaker $16.00 SW-34 Built-in Speaker $49.95
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The complete 4-watt output receiver (not a converter) which has created such a sensation among the "mobile" gang! Covers 10-11, 20, 75 and 80 meters. Ten tuned circuits, 6 tubes, with 500 KC IF's to give better than 1 micro-volt sensitivity. Exceptional selectivity. Built-in BFO and ANL. Full 180° electrical bandwidth easily read on accurately calibrated full-view dial. Requires 250 volts at 85 Ma.
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Viking II complete with all tubes $279.50 Viking II complete with tubes, wired and air tested $324.50 Viking VP-30 worth $350.00 $42.75 Viking Mobile Kit, up to 60 Watts input for that rig-on-wheels $99.50 Viking Low Pass Filter, 6 section, 75 DB Att., handles a KW $16.50 Viking TVI Kit, everything to TVI-proof the Viking I $24.75

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Atlantic General Depot Amateur Radio Club was formed at a meeting held Aug. 4th at the Depot conference room at Conley, Ga. The Club starts with a membership of 34. Officers are as follows: CFJ, p.p.; MIF, vice-pres.; Norma Luallen, secy.-treas.; WN4UMK, secy.-at large; WN4B and WN4WEA are new hams in Savannah. The Callonion Radio Club members made an enjoyable tour of the General Electric Anniston Tube Works in Anniston, Ala., and any club or group interested in visiting the tube works should write Mr. W. M. Nance, Manager, P. O. Box 1400, Anniston, Ala. For an appointment, write the Club to make arrangements. A grand bazaar and a girl, WLP, is building new 800-watt r.f. with p.p. 810 in final and modulator OPE has a new 815 final r.f. and is active in traffic handling. W4USA is active on 10-meter DX. Congratulations on his FB traffic count of 1508 this month. The Brass Pounders Net meets every Saturday night at 1930 EST on 3760 kc. The net is a slow-sounding net and all are urged to meet it as often as possible and hope to our Route Manager, OSE, make the coming fall and winter season a highly successful one. MTS and QST have their Advance Class tickets. WN4WTD and WN4WMP are new hams in Atlanta. KA6I has a new rig on 10-meter, p.p. 4-125A in the final. Traffic: W4USA 1568, EJ6I 28, FOI 59, ZD 40, MA 25, OPE 12, HWY 17, KLJ 15, OSE 12. WEST COAST IDEOS - SCM, K6DJ, SEC: ES, Welcome to new ARRL members HV, SK, TC, TF, and W3OIG/K4P. TF was W4JFP. KD returned after last State day's vacation visiting friends. KD was declined from the States with ulcers. QO in CAP station at Iola, Grande Anet. GN is installing 76-meter mobile, AEC 3928 kc. net listed emergency traffic from Washington to re-establishment of medicine. WIUJ is visiting KP4. VP7JN and KG4AF report to 3559 kc. AEC net Mon. 8 p.m. with two members, GP, and D. KP4AF was active on 600-ohm lines for all bands. WPX has a new YL jr. operator, DX, and KP are assembling Heathkit sets. AZ is building 75-kw. 'nudge' and participated in s.d. test Aug. 8th for Dr. Carroll, FODA Chief for Territories. Mobiles in San Juan Area were DZ, DX, HF, OW, and FR. Fixed stations in the island stations test were AK, CB, CP, ESJ, GO, HG, ID, JD/KP4, MO, N, NJ, QJ, RO, QR, and ZT. Traffic: KP4DM 12, ID 12, CP 10, PR 6, DV 5, HZ 2, ES 3, QO 2, HG 1, QR 1, ZK 1.

SOUTHWESTERN DIVISION

LOS ANGELES - SCM, Samuel A. Greenoo, W6ESR - SEC: K6X, RMJ, FYW, GMG, MGR, LSN, FMG, Section Traffic nets: LA, A Section Traffic Net (LSN) Mon. through Fri., 8 a.m., 8300 kc. at 2300, El Cajon Net (ECCN), 8300 kc. at 5900 Mon., through Weds., this month was made by GHY, HK, KY, and WPF. Onds this month to FYW - the maker of traffic men. Through his adminis-
tration of the El Cajon Net, many of us from Florida to Maine and westward from Illinois to St. Louis, stopping off at ARRL Headquarters, too KD and QM received thank you Day certificates. Delegate from the States with ulcers. QO in CAP station at Iola, Grande Anet. GN is installing 76-meter mobile, AEC 3928 kc. net listed emergency traffic from Washington to re-establishment of medicine. WIUJ is visiting KP4. VP7JN and KG4AF report to 3559 kc. AEC net Mon. 8 p.m. with two members, GP, and D. KP4AF was active on 600-ohm lines for all bands. WPX has a new YL jr. operator, DX, and KP are assembling Heathkit sets. AZ is building 75-kw. 'nudge' and participated in s.d. test Aug. 8th for Dr. Carroll, FODA Chief for Territories. Mobiles in San Juan Area were DZ, DX, HF, OW, and FR. Fixed stations in the island stations test were AK, CB, CP, ESJ, GO, HG, ID, JD/KP4, MO, N, NJ, QJ, RO, QR, and ZT. Traffic: KP4DM 12, ID 12, CP 10, PR 6, DV 5, HZ 2, ES 3, QO 2, HG 1, QR 1, ZK 1.

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C) BC-213, 5¾" x 2½" x 2½" aluminum, 1 standard open-circuit jack, 1-3-circuit mike jack, 15,000 ohm volume control, 4-position switch, 8-contact banana plugs and jacks.

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200 ohms D.C. resistance choke. 2¼" wide, 2¼" high, 2½" mounting centers...

8½/8 MFD.
500 V. D.C.
Triple 8 mfd, 500 volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 3½" x 3½" x 2½". A one-time buy...

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75 mfd, 4250 peak voltage, ceramic button insulation, adjustable spacing, straight-line capacity, precision construction, 3¼" long, 1¼" wide, shaft ¼" x 1/4", adjustable tension, double-bearing...

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Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines... let us know what you need.

72, Jack Burnett, WBBWE
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RUM 32, QH 28, EBW 15, RRM 15, TD 15, KPH 12, UPP 10, TVG 2.

OKLAHOMA—SCM, Jesse M. Langford, W6GMY—AGM, RM; QOQ, PAM: UZ, ZER, ATL; The M-Phone in Fort Sill Radio Club held its annual hamfest and barbecue at Craterville Park near Lawton attended by 150 hams from all over Oklahoma and Texas. Included in this group were V59WZ and family, who were vacationing in the States. The SEC, Claude Gardner, and a group of Oklahoma City amateurs brought 2 Mr. Galvin, competition officer for State Civil Defense, to the barbecue, where he became better acquainted with the Oklahoma amateurs. The following portable rigs were in evidence: HEN, PAA, a panel truck with emergency radio equipment from Oklahoma City. QXW is new 75-meter 'phone. QJR and LWF are back in Chickasha after a tour duty with the Third Division. QJR soon will be operating 75-meter 'phone from Norman. LWF is building 10-meter rig. KIN is a new rig in Tulsa, with TVY, assisted by the Oklahoma Advanced Class license. A new AEC net has been organized at Tinker AF, SLC has been averaging two new members a week. SWN was DeWolf and JIN was 75-meter 'phone. REN is moving to W-Land. DKX is working 75-meter 'phone with a 16-foot whip antenna with excellent results. OLE has been active for the winter on 3822.5 kc. Mon. through Fri., 1800 to 2000 CST. LCN, El Reno, was killed in a plane crash in West Texas. The SEC, W6GZK 210, ROX 109, QOQ 95, PA 91, PML 76, MFX 50, KY 25, UVY 16, EHC 14, BVR 9, HPE 8, BW 7, OKG 7, SOUTHERN TEXAS—SCM, Dr. Charles Fernaghi, W5JRT—MN skeds H & B on 7150 kc. each am. and pm. on WFAA at 4:45 A.M. NVY is looking good for activity this fall. AQE is working in Odessa now and fighting bad QRN. FZ7S has been in Massachusetts most of the month. IFT is the 2-meter actor in the Odessa area. The SARC party at the Rotary Club and Hixson Brewery—plenty of cold 80's. HARG held a hamfest at QFJ's place on Old River. OFM found the 10-meter transmitter hidden by CCM. OUF has called in the radio transmitter hidden by NUD. Plan now to attend the Convention in Houston—July 11-12, 1934; JIF, General Chairman, Zone 2 STSN had its annual dinner at Bellville and everyone had an FB time. WID now has a new Viking. OB8 is an Engineer at KERA and is a senior E.S. student at SMU. He is particularly interested in 2 meters. AC, the A. M. Radio Club, plans to be on all bands. RAA is rebuilding his King rig with 4-92A for final and modulator. TPF, who does recording, is at present in college and working 80-meter c.w. 4 PMQ is at San Marcos A. B. It is on 10 meters and mobile. WBC is in Houston for the first time. WYC is mobile on 10 meters and also works 80-meter c.w. Our good friend LJT was transferred to Washington, D. C. He is with the 89th, and was in Houston for several years. An excerpt from my letter to him in behalf of So. Tex. hams: "You have long been considered a friend of the hams and have done much to cement the bond between us and the FCC. The FCC is indeed wise to select men of your caliber and the caliber of your associates to represent us. Your association with us in both official and social capacities will long be remembered by all of us who have had the good fortune and pleasure to know you." I quote the letter because it is of concern to Southern Texas, "I wish to express to you, and to the Houston and Southern Texas amateur through you, my thanks for your foresight and the letters of appreciation which were forwarded to the Commission. In reply to these gestures of goodwill I can only repeat my previous statement—"that the future prospects of the Southern Texas Area were the most enjoyable in my Commission experience." We all wish George and Mrs. Ashenden the best of luck. Traffic; WSM 222, P22 32, NYT 3.

NEW MEXICO—SCM, Robert W. Freeman, W6NXE—SEC; PLK, RM: NKG: PAM; BW: Nels, Tues. and Thurs., at 7:30 P.M. on Sun., at 7:30 A.M. on 3888 kc. Mon., Wed., and Fri. on 3633 kc. JST now has 400 watts on the 80-meter c.w. net. NKG has high-power final station for net. RLL checks on TVY in front of appliance store with a TV in the show window. JST now has new end-fed Zepp and a new 60-meter antenna. LDO is working the first registration for the State Hamfes. BVW now has the 10-20-meter beam up after four years' planning. LDO is back on 75 meters in new QTH, KQI, and modulator. PXA is now mobile on 75 meters. MUR is the proud pappy of a new harmonic. JYX has been transferred to DJ4 and OYX has moved to Artesia. JAY has found a new job. TOU is on 2 meters and now is Glenn A. LEE has a new rig and the touch on c.w. 6K0Z now is in Los Alamos. The Pees Valley Club had a picnic with an excellent attendance. Traffic; W6NKG 50, RMR 17, UXZ 14, JZT 5.

CANADA

MARITIME DIVISION

MARITIME—SCM, A. M. Crowell, VE1DQ—SEC; FQ, RM: OM, Thanks to FQ for place-hitting for your (Continued on page 100)
BEGINNERS! Welcome to our Hobby! Start Off Right... with the Right Gear from "Ham Headquarters Since 1925"

PHILMORE TRANSMITTER KIT

LYSCO TRANSMITTER
FB for Novice (and even Extra Class!) Hams! Covers all bands, 10 thru 160, 40 watts input. Uses 6V6GT xtal oscillator, 6V6GT, 6L6GC amplifier, 6L6GC, 6L6GD, 6U6G rectifier. RF output indicator and internal antenna coupler for line fed antenna. All stages metered. Cabinet 9x15x11". Factory wired and tested, with tubes and coil for 80 meters, ready to operate. (Loss only crystal and key).

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- National HR60 Sixty  483.50
- Hammarlund SP600JX $985.00; HQ129X  199.50
- Johnson VFO kit (wired $17.00)  42.75
- Johnson mobile xmitter  99.50
- Johnson Viking II and tubes  279.50
- Gonset xmitter $124.50; Gonset Triband  47.60
- Morrow 3BR $64.95; 2BR $54.95; 1BR  44.95
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Some prices higher on west coast

Gonset, Stancor, Millen, National, Hallicrafters, RME, Bud, Vibroplex, Monkey, B & W, Johnson, RCA, Hy-Line, Workshop, Elmar, Jensen, Elmar, UTC, Thordarson, Astatic, Turner, Billey; I have everything for the amateur.

Collins equipment stocked:
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- Collins 32V3 xmitter  775.00
- Collins 35C2 filter  40.00

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summer working on his new house. AE has moved to within one block of MJ. DZ has been having receiver trouble but is back in business again. WS has equipment installed in new ham shack and is about ready to try out his new QTH. CJ has been heard working mobile from Cow Town.

This column is only made possible by your reports to your SCM. Let him know what’s happening in your area. Trafle: V6HEM, 170, OD 98, (DJ 25, MJ 11). BRITISH COLUMBIA — SCM, Wilf Moorhouse, VE7US — DJ, CX, AOB, AJJ, QC, AC, and AMJ reported this month. The Nanaimo Club was host to members of the ARC at a hamfest gathering in Nanaimo attended by 29 amateurs at which a discussion took place re ARC activities. The SCM, SEC, and ECs AOB, QC, and DE attended. The Vancouver e.d. heads are planning to set up communications and to use ARC members. UA’s 200-watt rig is now the property of AP at White Rock. QC visited PNE and Vancouver and the VI gang for a few days. The PNE exhibit was considered good and thanks are due to to AOB and his helpers. The BCARA is attempting to reorganize its function. The Fraser Valley Amateur Radio Club reports the ARC Net is on 2 meters every Monday evening. AMJ is on with 300 watts. JB is handling Rothman’s Marimex items. TM is on 75 meters with a good signal. OD spent his holiday throughout the interior with good fishing results and with AKD for company. The SCM is solidifying ARC organization with up-to-date roster lists for all interested officials. BD and the SXP Net still is operating daily. OD was host to 6WB, who was in British Columbia for the holidays. FB was quite active around Vancouver. AOB, Vancouver EC, is active with his mobile and his planning for ARC in his metropolitan area. Trafle: V6TCQ 40, DH 25, AOB 18, AC 8, AMJ 3.

PRAIRIE DIVISION

SASKATCHEWAN — SCM, Harold R. Horn, V6SHR — During the annual regatta at Wakaw and Saskatoon the following hams took part handling communications: BE, YF, FY, CJ, JP, and DJR. RV at Creighton, had a crowd around his ear listening to the events as they took place. A big rig with CJ ran 1/2 watt. 4NR now signs V6SH at Saskatoon. SWM visited Saskatoon and will be a VE4. FG will be OM by the time you read this, so watch your signals and don’t be sending you a card. 4YW visited Saskatoon and informed us that Manitoba plans to have a provincial hamfest next year; he also wanted information on SAE for the VE4 gang. DR built a ZL special and is very pleased with the results. PR now is on phone. Mobile puts an FB signal on 75 meters to cover the section. SY won a transmitter at the Regina Hamfest. AS, SS, and MK made in three of a kind, with the addition of a daughter to each family. Congratulations. TL “11” will resume this winter after being inactive last year and will clear any traffic. Frequency is 3000 kc. If you wish to join a S.A.G. net, contact TE. Trafle: V6SHR 16, GO 8, P7 3, TE 6.

Strays

How times change! Compare the implications of this text from 1927’s November QST —

— with the fact that this QST, 25 years later, has four W3s listed among the eleven stations which make up our DXCC Honor Roll.

Is W5LCA trying to drive us batty? While reading up on some animal lore he was particularly intrigued by the cleverness of bats in their application of radar principles and techniques. He inquires:

“When bats by the hundreds fly out of a cave how do they escape disastrous QRM? When two bats are zero beat which bat QSMs and in what direction, higher or lower? Do bats get away with chirpy signals? Are young Novice bats rock-bound?”
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10 WATTS
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• Full 10 watts at less than 5% distortion.
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TERRIFIC VALUE!! NATIONAL TURRET BOOSTER
Excellent as a Turret Booster or as a converter for 10, 15, 20, 40, 80, and 160 meters. (See QST July 31.)

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WILL ROTATE WEIGHTS UP TO 1000 LBS.
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COMPLETELY WEATHERPROOF.
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ORIGINAL DESIGN FOR 10 METER VERTICAL BEAM FOR HOMING DEVICE.
WEIGHTS 12 VOLTS D.C.
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Precision engineered, completely assembled and adjusted. All match 300 ohm lead except those marked * which are for 52 ohm coax.

AMATEUR XMTR ANTENNA FILTERS
1 KW Low Pass

TV-30-40LP—10—150 mtrs. $12.95
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Mobile Antenna Patterns
(Continued from page 18)

we changed db. readings to actual power ratio by use of the formula:

\[ db = 10 \log (\text{ratio}) \]

This isn’t as complicated as it seems. You simply take the db. figure, divide by ten (move the decimal point one place to the left), and then see (by use of a log table or a slide rule) what number has that as its log. That number is your power ratio. The last step is then to plot points and draw your curves, as in Fig. 1.

It should be pointed out that the pattern will be affected by the shape of the ear, and the position of the antenna on it, and that some installations will probably have patterns radically different from the one shown here.\(^1\) My thanks and half the credit for this article go to Bud Young, W7IIMQ, for his assistance in compiling the data.

\(^1\) It should be pointed out that these observations do not tell the entire story about your mobile antenna, which will probably have both vertically- and horizontally-polarized components. If the receiving antenna is a horizontal 3- or 4-element beam pointed at the ear, and its feed line is well balanced, the resultant pattern will be that of the horizontally-polarized component from the ear, and will represent the type of response to be expected when working fixed stations that use horizontal beams. If the receiving antenna is a vertically-polarized one, such as a vertical quarter or half wave, with a feed line that has no pick up, the resultant pattern will represent the response to be expected when working stations that have predominantly vertical polarization.

Further, the above statements are true only for short-haul work that doesn’t involve the sky wave, since ionospheric propagation can be responsible for changes in the planes of polarization.

And, last but not least, the 8-meter calibration is only approximate on most receivers, and must be checked or recalibrated for any close work. — Ed.

---

The United States (W/K) has common borders with but two DXCC countries. China (B, C) and French West Africa (FF8) are adjacent to fourteen and eleven, respectively.

---

Systematic forecasts of radio propagation conditions in the North Pacific and Alaskan areas are now being issued by the National Bureau of Standards Radio Propagation Field Station at Anchorage, Alaska. Disturbances affecting radio propagation have long hindered communications in the Alaskan area (as any KL7 will agree!) and this North Pacific Radio Warning Service will serve the same function for this area as is performed by the North Atlantic Radio Warning Service based at Washington, D. C. The Anchorage station is staffed by specially-trained forecasters and observers and will eventually operate on an around-the-clock basis.
"There's one thing we must put down as fundamental. *QST* is not a magazine published on the same basis as 'other radio magazines.' It is the official journal of ARRL. It is only one of the things you buy with your membership dues....

"Remember, your ARRL is a noncommercial, non-profit organization, whose only purpose is to promote and advance the welfare of amateur radio... The members of the ARRL are its owners... The dividends you receive from the operations of the ARRL are in the form of a multitude of services and an unceasing effort to improve the status of amateur radio in all its many aspects." (*QST* editorial, April 1949)

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Dues in Canada, $4.25, $5 elsewhere

The American Radio Relay League, Inc.  •  West Hartford 7, Conn.
Utilizing Small Transformers

(Continued from page 106)

tive high voltage and ground in the normal wiring of a transmitter, thus making the peak heater-cathode voltage on each 6X5GT close to 1000 volts. Hence a separate small filament transformer was used for these two tubes, with the secondary connected to the center tap of the high-voltage winding as shown in Fig. 1. This reduces the peak heater-cathode voltage on each tube to about 500 volts, slightly over the rating but not excessively so.

To use the bridge rectifier with a transformer having appreciably higher secondary voltage would require two extra filament transformers instead of one, so that each rectifier cathode could be connected directly to the filament and thus eliminate the heater-to-cathode voltage problem. The insulation requirement is thereby transferred from the tube to the filament transformer.

Filters

The higher output voltage from the bridge rectifier of course necessitates filter condensers having higher working ratings than the ordinary electrolytic. For economy's sake this power supply uses a single-section filter, the input choke, \( L_1 \), being a type also standard with several manufacturers and rated at 10.5 henrys at 110 ma. d.c. Although the total current through it is normally around 150 ma. there is no danger of burning it out, because the intermittent-operation considerations apply equally as well to the choke as to the transformer. Since a bleeder is a necessity, a pair of resistors, \( R_1 \) and \( R_2 \), is used to divide the voltage equally so that electrolytic condensers can be used in series.

This power supply uses an old stunt that seems to have dropped out of use in recent years. The d.c. voltage at the center tap of the high-voltage winding is approximately half the d.c. output voltage from the bridge rectifier (with the 6X5GTs, the secondary forms an "inverted" center-tap rectifier system) and so offers a convenient means for taking off a lower voltage to run an oscillator, the amplifier screen, and so on. This tap is provided with a filter of its own, since good smoothing is needed for the low-level stage or stages in a transmitter. Only the input choke, \( L_1 \), is common to both filters. It was made common to both in order to save the cost of an extra choke. Entirely separate filters, with both input chokes in the positive lead (as is customary) could be used instead. A comparison between the circuit shown and separate filters with individual input chokes in the positive lead showed some differences for which we are unable to account completely; putting the choke in the negative lead seems to give some of the characteristics of both choke- and condenser-input filters. We mean by this that the output voltage from the bridge rectifier is higher than it should be, theoretically, with a choke-input filter, although it is not as high as with condenser input. With the choke in the positive lead the load voltage comes down to
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$7.50

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The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

Note: This Receiver and Transmitter is equipment which has been returned from the field, modified and re-built for Amateur Service.

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Amater Sales Dept. QST — November
1327 W. Washington Blvd. — Chicago 7, Illinois
Attention: Harry Harmon, W9UX, Tel. Taylor 9-2200 Ext. 161

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• 3 E 10F - - - - - - $42.40
• 3 E 10T - - - - - - $41.80
• 3 E 15T - - - - - - $59.00
• 2 E 20T - - - - - - $47.95
• 6 E 10-20T - - - - $98.95

Complete catalog on request: Dept. Q112

The proper value. The transformer capacitance shunting the choke when it is in the negative lead has been suggested as an explanation, but tests show that it does not begin to account for the whole effect. The net result is that with a 100- ma. load the output voltage is 600 with the choke in the negative lead as against slightly over 500 with it in the positive lead.

Heating

Several heat runs were made on the unit under representative operating conditions, using it to power a 6V6-807 transmitter in which both tubes were keyed. In a typical run of several hours during which the transmitter was kept on the air as much as possible in ordinary rag-chewing, the secondary winding showed a temperature rise of approximately 35 degrees C. over an ambient temperature of 27 degrees C. (80 deg. F.) and the primary a rise of 31 deg. The plate input to the 807 was adjusted to 53 watts (630 volts at 85 ma.), the figure at which the tube happened to work most efficiently. The measurements were made by the resistance method, and allowing the customary 10 degrees for hot spots gives a final secondary temperature of a little over 70 degrees — far below the 95 degrees generally considered the maximum safe temperature for the type of insulation used in these transformers. In another more severe test the unit was operated with the same load on continuously for a half hour, off 15 minutes, and on continuously for another hour. The secondary showed a temperature rise of 66 degrees after this test, still within safe limits. For comparison, a small transformer operated at its ratings in a condenser-input receiver supply also was measured after a few hours of continuous operation, and the temperature rise was measured to be 61 degrees C. Like most transformers in such supplies, the temperature of the small unit was such that the hand could not be held on it continuously. The transformer in the supply shown here, on the other hand, while noticeably warm, was by no means too hot to hold continuously, after the “half-hour on, etc.,” test described above.

Output Voltages and Currents

The 40,000-ohm bleeder on the high-voltage tap holds the no-load voltage at about 770 volts (with a line voltage of 117). The no-load voltage on the low tap is held at about 300 by the input choke and high-voltage bleeder, and so the low-voltage bleeder is used simply to discharge the filter condensers. There are no set current ratings on this unit, but as more current is taken from one tap less should be taken from the other. Bear in mind that the current from the low-voltage tap has a greater heating effect on the secondary because it is coming from a center-tap rectifier. The transmitter we have used with the unit happens to take about 30 ma. from the low-voltage tap, at which current the output voltage is 240. Another 20 ma. could easily be taken for an additional buffer or frequency multiplier.

On the high-voltage side the voltage drops off (Continued on page 110)
The Ole Timer has a right to be thankful! He just completed a Walter Ashe "Surprise" Trade-In deal on his used communication equipment for a brand new National HRO-60 Receiver. You'll be thankful too when you take advantage of the one and only "Surprise" Trade-In Allowance on used (factory-built) communication equipment for the new National Receiver of your choice. Don't delay, get your trade-in deal working today. Wire, write, phone or use handy coupon below.

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NATIONAL HFS
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   (indicate make and model number of used equipment)

☐ Send new 1953 catalog.

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☐ for new National (identify by model number)

Address ________________________________

City ___________ Zone ___________ State ___________

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RADIO CO.
1125 PINE ST. • ST. LOUIS 1, MO.
as the load current is increased, principally because of increased drop in the rectifier tube. Because of this the practical limit was about 60 watts with the particular transformer used. This is a quite satisfactory power level for a small transmitter. The filtering is more than adequate to bring "pure d.c." reports, the ripple measuring 0.4 per cent on the low-voltage tap and 3 per cent on the high voltage, at the load currents mentioned earlier.

35 Watts for 80 and 40

(Continued from page 24)

the reading will be much lower, dipping to just a few ma. at resonance.

Remember that both $C_{12}$ and $C_{22}$ tune through the entire range between 3.5 and 7.4 Mc. This means that in addition to tuning to the desired second and fourth harmonics of the oscillator frequency, both the doubler and amplifier circuits can be tuned to the third harmonic, which is not in a ham band. The third harmonic (5250 to 6000 kc., depending upon the oscillator frequency) is tuned near the center of the range, while the desired second and fourth harmonics are tuned near maximum and minimum capacity respectively. Avoid the center of the dial, then, unless you want to operate outside of the ham bands! It is suggested that a little red paint, or nail polish, be used to blank out the "out of bounds" portion of the two dials. This is especially important if the equipment is to be used as auxiliary gear by operators not familiar with the equipment. The safest course is to check the output frequency with a wavemeter.

Close-up of the oscillator box, showing the shock mounts and general parts placement. The adjustment shaft for $C_{9}$ comes through the top to the right of the 6AG7. All parts for the oscillator grid circuit are mounted on the inside of the cover of the box. Also shown is the shielded lead running from the plate of the 807 through the top of the chassis.

With the doubler plate circuit tuned to 3.5 Mc., about 3 ma. grid current flows in the 807 stage. Somewhat less than this is to be expected when the stage is tuned to 7 Mc., but at least 1.5 ma. is required for efficient operation. If grid current is much less than this, it can be improved materially by using a 50-ohm choke for $L_{3}$, paral-
# Uncle Dave's Bargain Corner

- **J-38 hand keys, Each**: $1.29
- **7" Heavy duty pyrex antenna insulators, Each**: $1.40
- **Carbon micros, single button, push-to-talk switch on handle, similar to Army J-178, Made in England, Each**: $3.95
- **4, 6 or 8 pin ceramic sockets by Johnson, Each**: $0.20
- **Buffington vibrator s 414, Each**: $10.95
- **Clarinet 4 watt wirebound potentiometers, set of 3, Each**: $2.25
- **10 mfd. 600 volt oil condensers, Each**: $1.95
- **15 mfd. 1000 volt oil condensers, Each**: $5.95
- **2 mfd. 1000 volt oil condensers, Each**: $2.95
- **2 mfd. 2000 volt oil condensers, Goodman, Each**: $3.95
- **4 mfd. 3000 volt oil condensers, GE3344, Each**: $9.95
- **25 mfd. 1000 volt battery oil condensers, Each**: $25.95
- **15 mfd. air trimmer padding condensers, Each**: $1.25
- **25 mfd. air trimmer padding condensers, Each**: $3.50
- **GE plate circuit relay 8000 ohm DPDT contacts close @ 8 ma, Each**: $1.95
- **Sprague 120 Watt 120V non-inductive resistors—2500, 7500, 10000, 25000, or 50000 ohm ehr value, Each**: $2.50

## Receivers

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>National HR-60T</td>
<td>$499.50</td>
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<tr>
<td>National NC-240D</td>
<td>$85.00</td>
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<tr>
<td>National NC-240D</td>
<td>$150.00</td>
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<tr>
<td>National HFS with power supply</td>
<td>$164.43</td>
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<tr>
<td>National SW54</td>
<td>$49.95</td>
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<tr>
<td>National SW54</td>
<td>$214.00</td>
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<tr>
<td>Hallcrafters SX-62</td>
<td>$289.50</td>
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<tr>
<td>Hallcrafters SX-67</td>
<td>$199.50</td>
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<tr>
<td>Hallcrafters SX-76</td>
<td>$169.50</td>
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<tr>
<td>Hallcrafters R-69 speaker for Models SX-62-SX71 and SX-76</td>
<td>$19.95</td>
</tr>
<tr>
<td>Hallcrafters S-39C</td>
<td>$49.95</td>
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<tr>
<td>Hallcrafters S-408</td>
<td>$99.95</td>
</tr>
<tr>
<td>Hallcrafters S-577</td>
<td>$59.95</td>
</tr>
<tr>
<td>Hallcrafters S-59A</td>
<td>$79.95</td>
</tr>
<tr>
<td>Collins 7SA2 with speaker</td>
<td>$440.00</td>
</tr>
<tr>
<td>RME-250 with speaker</td>
<td>$213.50</td>
</tr>
<tr>
<td>Sonar SK-9 receiver less power supply or speaker—specify 2, 6, or 10 meter band</td>
<td>$72.45</td>
</tr>
<tr>
<td>Edico 2 meter receiver less speaker</td>
<td>$49.95</td>
</tr>
<tr>
<td>Monitoradio police alarm receiver 30-50 meg</td>
<td>$44.50</td>
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</tbody>
</table>

## Transmitters

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson Viking I kit less tubes, mike or crystal</td>
<td>$209.50</td>
</tr>
<tr>
<td>Johnson Viking II kit with tubes, less mike or crystal</td>
<td>$279.50</td>
</tr>
<tr>
<td>Elmac A-54 with VFO less carbon mike or crystal</td>
<td>$139.50</td>
</tr>
<tr>
<td>Elmac A-54H with VFO less carbon mike or crystal, trans.</td>
<td>$149.50</td>
</tr>
<tr>
<td>Edico 2 meter transmitter less mike or crystal</td>
<td>$79.95</td>
</tr>
<tr>
<td>Sonar NM-21 2, 5, 10 meter battery band</td>
<td>$72.45</td>
</tr>
<tr>
<td>Harvey-Wells TBS-50C bandmaster Sr.</td>
<td>$111.50</td>
</tr>
<tr>
<td>Harvey-Wells TBS-50D Bandmaster Deluxe</td>
<td>$137.50</td>
</tr>
<tr>
<td>Collins 32V3 less crystal or mike</td>
<td>$775.00</td>
</tr>
<tr>
<td>Hallcrafters HT-20 less crystal or mike</td>
<td>$449.50</td>
</tr>
<tr>
<td>Lyco 600 less crystal or crystal</td>
<td>$143.95</td>
</tr>
<tr>
<td>Lyco B-129 10 meter transmitter less tubes</td>
<td>$29.95</td>
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<tr>
<td>Lyco A-175 75 meter transmitter less tubes</td>
<td>$39.95</td>
</tr>
<tr>
<td>Lyco A-120 10 meter band transmitter less tubes</td>
<td>$29.95</td>
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<tr>
<td>Web Jr, Ten meter transmitter 30 watt or 50 watt on peak</td>
<td>$39.95</td>
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</tbody>
</table>

## Used Equipment

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tr>
<td>Hallcrafters S-20R</td>
<td>$50.00</td>
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<tr>
<td>Collins 75A</td>
<td>$390.00</td>
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<tr>
<td>Collins 75A</td>
<td>$230.00</td>
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<tr>
<td>Harvey-Wells TBS-50A transmitter</td>
<td>$80.00</td>
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<tr>
<td>Hallcrafters HT-9 transmitter with 10 and 80 meter bands, each</td>
<td>$200.00</td>
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<tr>
<td>Hallcrafters HT-9 transmitter with 10, 20, 40, 80, 160 meter and 11 crystals</td>
<td>$275.00</td>
</tr>
<tr>
<td>Hallcrafters S-72 portable receiver AC, DC, battery</td>
<td>$85.00</td>
</tr>
<tr>
<td>Hammond SP-200 with speaker and power supply</td>
<td>$175.00</td>
</tr>
<tr>
<td>Gonset two meter converter</td>
<td>$39.00</td>
</tr>
</tbody>
</table>

## Miscellaneous Equipment — New

- **Collins 75A (demonstrator) used very little with speaker** | $390.00 |
- **Collins 32V3 (display model) never used, original box, new in box** | $710.00|
- **RME-7D with built-in preselector DB-20** | $120.00|
- **HRO-5 with power supply, speaker ABCDEFI coils, complete** | $200.00|
- **Materick 150-B transmitter with full set of coils including buffer doubler and exciter for 10 meters** | $300.00|
- **Johnson Viking I complete with tubes—not TVI'd** | $225.00|
- **Johnson Viking I complete with tubes—TVI proof** | $250.00|

## Miscellaneous Equipment — Old

- **Collins 6M11 grid dip oscillator** | $61.50 |
- **Edico grid dip oscillator kit form** | $34.95 |
- **Edico grid dip oscillator with tested** | $47.95 |
- **Edico antenna coupler** | $39.95 |
- **Edico electronic bug** | $29.95 |
- **Marrow Converter 10-75 meter bands with built-in noise clipper** | $44.95 |
- **Marrow Converter 10-75 meter bands with built-in noise clipper** | $44.95 |
- **Lyco 318VFO** | $26.95 |
- **Lyco 407 modulator** | $19.95 |
- **RME-DB-22A preselector** | $86.00 |
- **RME HFIQ-20 converter** | $92.00 |
- **RME-VP-152A converter** | $92.00 |
- **Instructional, Jr. Code teacher** | $17.50 |
- **Instructional, Standard Code teacher** | $17.50 |
- **Mallory Vibro-Pak VP-55H input 6 volt DC output 300V @ 150 ma** | $33.63 |
- **Mallory Vibro-Pak VP-55H input 6 volt DC output 300V @ 150 ma** | $33.63 |
- **Sonar 5R-3 triband converter** | $89.95 |
- **Harvey-Wells TBS-50 AC supply** | $39.50 |
- **Elmac A-54 AC power supply** | $39.50 |

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Unexcelled for over-all smoothness of response and high quality performance. Exclusive slotted metal method of acoustic phase shifting provides superior, uniform directional characteristics—from to back pickup differential of approximately 15 db, dead to sound from rear for practical purposes. Its multi-impedance transformer and selector switch for operating impedances of 30, 200, 500 and 1200. Dynamic element floated in rubber against shock. Output level, —54 db, range, 40 to 10,000 c.p.s. 18" shielded 2-conductor cable, detachable cable connector. With or without off-on switch (hinge ferrule strengthened with S-switch housing a built-in, fixed part of the ferrule.)

Model Code List Price
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*With Off-On Switch.

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---

leliting it with a 3- to 30-mfd. compression trimmer, and then tuning the circuit to produce maximum current in the 507 grid circuit. This alternative method results in considerably sharper tuning of the doubler stage, with frequent peaking of C12 needed as the oscillator is tuned from one end of the band to the other. With the 1000-ohm choke specified in the parts list, the circuit is fairly broad, and C12 need not be peaked so often.

Representative operating data for the transmitter are given in Table I. Once you have checked the operation of the doubler stage by measuring its cathode bias, no further metering of the stage is needed unless wide differences between the tabulated reading and the ones obtained are noted.

The transmitter may be operated with any of the usual antenna couplers, depending upon the type needed by your particular antenna set-up. Output circuit is capable of working into a fairly low impedance load without the use of a coupler, but one is recommended even in this case as a harmonic-reducing measure.

---

Results

The rig has been tested on the air, and reports have been excellent. The first two stations contacted gave tone reports of T9X before they even knew that a new rig was being tested, and all subsequent reports have been T9 or better. There is no chirp when the signal is keyed, and key clicks are below the level where they could be called objectionable. It is inevitable that there be a slight click on both make and break in any keyed-oscillator rig, but by minimizing the current drawn by the oscillator tube, and using somewhat less than cut-off bias on the amplifier, clicks are kept well below the point where filters are needed. The fact that the rig runs only about 30 to 35 watts input is no drawback at all, with contacts being easy to make and hold. It could be that the "clean" signals get the best results. We like to think so, anyway, and we're pretty sure that it is true.

---

The design information needed for suitable couplers can be obtained from the ARRL Antenna Book, The Radio Amateur's Handbook, or from the following QST articles: Smith, "Getting the Most Out of Your Antenna," QST, July, 1952; Smith, "Practical Antenna Couplers for the Novice," QST, August, 1952.

---

Reception of Single-Sideband

(Continued from page 99)

incoming signal, and increase the amplitude of carrier injection to a point that approximates the amplitude of the s.s.b. signal. When this point is reached, the S-meter will no longer swing with modulation. Carefully adjust the frequency of the external oscillator until the voice sounds natural. Rock the receiver bandspread dial back and forth across the carrier. You will easily be able to tell which sideband is being transmitted. As you leave the carrier, on one side the audio will drop off; as you swing on the other side, the

(Continued on page 112)
ATTENTION HAMS—IT’S BRAND NEW!
THE WRL GLOBE SCOUT
(50 WATTS PHONE — CW)

The WRL GLOBE SCOUT is the latest triumph of the WRL engineering staff. It is a beautiful, compact XMTR, completely self-contained, including power supply — BH X 14½W X 8½D. Contains new 6146 tube in final; covers 160M thru 10M. Metering provided for final grid and final plate circuits. Complete kit includes all parts, chassis, panel, power supply, cabinet, tubes, meter and one set of coils. Can be used for mobile work with suitable power supply. (Auxiliary socket provided.) An ideal XMTR for the novice or the experienced ham.

GLOBE SCOUT ACCESSORIES

<table>
<thead>
<tr>
<th>Kit Form</th>
<th>Wired (By our engineers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$89.95</td>
<td>$99.95</td>
</tr>
</tbody>
</table>

REV. E. K. BRYANT PRAISES GLOBE KING XMTR

Here are some excerpts from a recent letter received from E. K. Bryant, W7CWC, Minister of the Longview Church of the Nezazane, Longview, Washington.

“I have had my GLOBE KING around 3 years and am entirely satisfied with it.”

“Even with poor antennas I really get out with it.”

“I am completely sold on it — and have always enjoyed honest and fair dealings with WRL.”

Reports like the above are reaching us, in every mail, from satisfied GLOBE KING owners in all parts of the world! The GLOBE KING offers top performance with more watts per dollar — send for free illustrated catalog sheet.

NEW WRL 400B GLOBE KING XMTR

<table>
<thead>
<tr>
<th>Kit Form</th>
<th>Wired-Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>$475.00</td>
<td>$495.00</td>
</tr>
</tbody>
</table>

A CHICKEN IN EVERY POT
A GLOBE KING XMTR IN EVERY "SHACK"

Jump on Leo’s bandwagon—NOW is the time to trade for a new receiver or transmitter. Our stocks are complete — our prices are LOW. TAILOR-MADE TERMS — LIBERAL TRADE-INS — COMPLETE STOCKS — PERSONALIZED SERVICE. We Finance Our Own Paper — No Red Tape — No delays. Special Attention Given To Foreign Orders. Deal with WRL—"One of the World’s Largest Distributors of Amateur Radio Transmitting Equipment."

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WRL
CATALOG

160 METER CRYSTALS
1822-2000 K. C.
$1.50
each while they last

80 METER
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3615-3699 K. C.
3754-3916 K. C.

40 METER
7025-7099 K. C. 79c each while they last
7150-7425 K. C.

5675-6975 K. C.
7425-8591 K. C.

All crystals mounted in FT-243 holders and checked for activity before shipment. Crystals will only be furnished within the range of frequencies shown above. Will furnish as close to desired frequency as possible. When these are gone, no more available.

RADIO REFERENCE MAP

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Please send me:

☐ New Log Book
☐ Free Catalog
☐ Globe Scout Info
☐ Globe King Info
☐ Globe Champion Info
☐ Used Equipment List

Name:

Address:

City:

State:

113
audio will come up. The more selective the receiver, the more pronounced this effect.

An s.s.b. signal suffers a certain amount of nonlinear distortion when demodulated by a linear rectifier. The amount of distortion produced is relative to the modulation depth of the injected carrier by the s.a.b. signal. Increasing the carrier injection above the 100 per cent modulation point will reduce the nonlinear distortion in the detector to a negligible amount. Increased carrier also helps to swamp out adjacent channel QRM and generally to improve the signal-to-noise figure.

The advantages of front-end carrier insertion are:

1) Stability of the received signal.
2) S-meter reports may be given on s.s.b.
3) It makes round tables including s.a.b. and a.m. stations practical, since the receiver remains in the a.m. position at all times.
4) Oscillators in the s.s.b. exciter may be used to furnish the stable carrier to the receiver, providing consistent "on frequency" operation of the transmitted signal.

Point 4 is very important from the standpoint of pleasurable operation and good operating practice of a s.a.b. station. Since the oscillators in the s.s.b. exciter furnish the carrier to the receiver, the transmitted signal is automatically on the same frequency as the received signal. This means that only one oscillator has to be adjusted to get both the receiver and transmitter on the same frequency. Of course, any large frequency shift would require resetting of the receiver bandspread dial. This method, if universally adopted, would make practical operation of single sideband as simple as operating an a.m. transmitter, by eliminating the extra tuning procedure. With amateur s.a.b. operation still in its infancy, elimination of a tuning operation may not seem of much importance. However, as new s.a.b. stations come on the air and spread out on the bands, the elimination of a tuning operation becomes more important. If all s.a.b. stations involved in a voice-controlled round table were using their exciter VFO for carrier insertion to the receiver, they would remain on the same relative frequency. Using this system, any drift occurring in the local VFO, or drift occurring in a VFO on the other end, is compensated for while-listening. It would not be necessary to halt the entire round table QSO every so often and realign on somebody's frequency.

Proof of the need for the adoption of this operational method can be obtained by listening to any large s.a.b. round-table QSO on 75 meters. Note the confusion and the lost time caused by off-frequency operation. Then, too, it is rather difficult to impress anyone that single sideband has come of age and can step in the same ring with a.m. after they listen to that sort of operation.

There is another advantage to VFO carrier insertion. Those who have used it have found that when they are in QSO using voice-control

(Continued on page 118)
IT'S Newark FOR HAMS WHO INSIST

AND IT'S LYSCO FOR TOP Amateur Equipment...

Latest in Low-Cost Ham Gear

All-Band TVI-Free Transmitter Model 600S. Features a built-in "clamp" tube modulator plus a switching arrangement whereby the power amplifier may be turned off to tune-up or zero-beat another signal without blocking the receiver or causing unnecessary interference to other stations on the frequency. This switch also provides a means for switching from phone to CW operation. Operates on 160, 80, 40, 20, 15 and 10 meter bands. Crystal or VFO operation possible on all bands. Temperature compensated. Uses 6AG7 oscillator, 6AG7 buffer, 807 amplifier, 5U4G rectifier. Power input, 35 watts. Output, low impedance 50 ohm line. Black wrinkle-finish steel case, 17"x8"x11". For 115 volts, 60 cycles. Wt., 50 lbs.

97F040. NET. 189.95
97F041. Model 600RS. As above, rack mounted 189.95

Mobile Transmitters for 10-11, 20 and 75 Meters. Series of compact mobile transmitters featuring 25 watts power, clamp type audio for 100% AM modulation, and built-in antenna relays for push-to-talk operation. All controls and crystal sockets on front panels. Have coax output for 50-ohm line. Require 500 volts DC at 125 ma and 6.3 volts at 1.35 amps. In black wrinkle finished case, 4x4x2.5". Available with tube lineup of 3-6AQ5 or 3-6V6GT. Supplied with tubes or less tubes—see listing below. Shpg. wt., 8 lbs.

<table>
<thead>
<tr>
<th>Band</th>
<th>Using 3-6AQ5's</th>
<th>WITH TUBES</th>
<th>LESS TUBES</th>
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<tbody>
<tr>
<td></td>
<td>Type No.</td>
<td>Type No.</td>
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<tr>
<td>10-11 Meters</td>
<td>A129T 97F050</td>
<td>A129 97F049</td>
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<tr>
<td>20 Meters</td>
<td>A114T 97F044</td>
<td>A114 97F045</td>
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<tr>
<td>75 Meters</td>
<td>A175T 97F054</td>
<td>A175 97F053</td>
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<table>
<thead>
<tr>
<th>Using 3-6V6GT's</th>
<th>WITH TUBES</th>
<th>LESS TUBES</th>
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<tbody>
<tr>
<td>10-11 Meters</td>
<td>B129T 97F052</td>
<td>B129 97F051</td>
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<tr>
<td>20 Meters</td>
<td>B114T 97F045</td>
<td>B114 97F046</td>
</tr>
<tr>
<td>75 Meters</td>
<td>B175T 97F056</td>
<td>B175 97F055</td>
</tr>
</tbody>
</table>

NET EACH 33.55 29.95

Model D11 Grid Dip Meter. Extremely versatile instrument that can be used as a grid dip meter, an absorption wave meter, a CW or phone monitor, a signal generator, or a field strength meter. Frequency range when used as grid dip meter, 3.4-160 mc; as signal generator, 3.4-300 mc. Includes 5 plug-in coils. Uses 225 tube. Size: 3x8x3½". Ready to operate, with meter, tube and power supply. For operation from 115 volts DC, or 110-120 volts, 60 cycles AC. Shpg. wt., 4 lbs. 39.95

97F043. NET.

Model 30 Noise Limiter. Fully adjustable peak noise limiter for use with any superhet receiver. Power requirements, 6.3 volts at 150 ma AC or DC, 100 ma at 6 ma DC. Uses 6AL5 tube. Size: 1½x2x1¼". Wired and tested, with tube. Shpg. wt., 1 lb. 6.95

97F042. NET.

Order from Department T-11

NEWARK ELECTRIC COMPANY
223 WEST MADISON STREET, CHICAGO 6, ILLINOIS

115
break-in operation, they can control the QRM situation very nicely. If they hear QRM come in on the low side, they merely move the VFO higher until the QRM disappears. If the QRM comes in on the high side, they move the VFO down until the interference disappears. With the tuning ease afforded by this system, rapid QSY is practical, providing a most effective way to dodge QRM.

Construction of signal-frequency carrier generators will be discussed in a subsequent article.

---

**YL News and Views**

(Continued from page 87)

ISL1EIBM Maria Maras, was the lucky recipient of a new antenna, the gift of Prince Talal, HZITA, son of Saudi Arabia's King Ibn Saud. The Prince flew to Sardinia to meet Maria after a year of QSOs.

CR7LU, Lucia Tome, at right, is the only YL in her country who operates c.w. There are only two other licensed YLs in Mozambique—CR7AL, Maria, and CR7IV, Tina, and respectively they work twenty and ten phone only. Lucia uses an S-36 receiver and runs 50 watts on twenty c.w. She's generally on 14 Mo. from 1200 to 1400 QCT. DXers might give a listen.

Kay Burke, W3QPI, YLRL chairman of the Third District, recalls her earliest concern about amateur radio was keeping her OM's (W3AIAX) first rig, which incorporated a 460-ohm chemical rectifier, out of the living room and in the attic. It wasn't until the shack graduated to the house proper that she became earnestly interested. (This deserves consideration, OMs, or are you already in the dining room?) In 1950 she obtained her General Class license, and the following year became Advanced Class. No problems at all now—Kay loves to operate all bands from 10 through 80 using her Collins 32V-1 and HR0507T. She's a member of the Amateur Transmitters Assn. of Pittsburgh, the AEC, RCC, the Pole Cat Net, and she has received two ARRL Public Service Certificates. This year she demonstrated her enthusiasm for YLRL activities by placing third in the YL-QM contest.

---

**Strays**

D. C. Watts is W5NIR. . . . W. A. S. Case is VP4TAA. . . . I. Sparks is ZL1TD.

One ex-ham to another, sitting on a cloud up in Ham Heaven: "I ran a kilowatt for thirty years and only got shocked once!"—W2IHD

W4OFX escorted a busload of 36 Boy Scouts on tour from Tennessee to New Mexico and worked ten 'phone en route and back. Ottie had some nice QSOs in W5 while transmitting with his portable on the back of a pack mule. Next year it's California or bust!
RCA Tubes and Harvey Service... For Double Dependability!

HARVEY's line of RCA tubes is so complete, that HARVEY can fill virtually any requirement... right from stock... and deliver at almost a moment's notice.

This is particularly important to AM, FM, and TV Broadcasters, Industrial and Commercial users, Amateurs, and Service-Technicians, all of whom depend on tubes for sustained operation of important electronic equipment.

Write, Wire, or Phone, for Prompt Harvey Service.

HARVEY RADIO COMPANY, INC.
103 West 43rd St., New York 36, N.Y.
3-BAND MOBILE CONVERTERS designed by RME

Here is radio frequency conversion at its finest, not only complete three-band coverage, but also signal increase of about 25 db added to the gain of your car radio with either the MC-53 or the MC-61.

A noise clipper is built into these units as standard equipment, ready to wire to the car radio. The vhf MC-53 uses an OB2 voltage regulator, and the MC-61 has a special high stability oscillator circuit.

Each unit has a 25 to 1 worm gear tuning drive with side cabinet control knob.

A lot of care is a compact space, rigidly mounted. Must be used to be appreciated. Now priced at only $66.00 at your jobber for either the MC-53 or the MC-61.

Examine them
Hear them
See them
Write for literature

RME
RADIO MFG. ENGINEERS, INC.
Peoria, Illinois, U.S.A.

BE SAFE WITH Q-max

A-27 LOW-LOSS LACQUER & CEMENT

- Q-Max provides a clear, practically loss-free covering, penetrates deeply to seal out moisture, imparts rigidity and promotes electrical stability. Does not appreciably alter the "Q" of R-F coils.

- Q-Max is easy to apply, dries quickly, adheres to practically all materials, has a wide temperature range and acts as a mild flux on tinned surfaces.

In 1, 5 and 55 gallon containers.

Communication Products Company, Inc.
MARLBORO, NEW JERSEY
MONMOUTH COUNTY
Telephone: Freehold 8-1880

Turret Switching
(Continued from page 55)

Even the chassis and cabinet are homemade in this double-conversion turret-tuned receiver.

ments are complete, the coils are made secure with a thin coat of coil dope.

The front end was aligned by first adjusting the oscillator coil so that it would cover the desired frequency range (the limits are 1700 kc. added to the limits of the tuning range of the particular band). Then the r.f. and mixer coils were pruned until they could be peaked in the middle of the band, and the bandspread taps were then adjusted to cover the range.

Two positions on the bandswitch are not being used yet, but they are available for 21 Mc., 160 meters, the CAP frequencies, or even 50 Mc.

Tech Topics
(Continued from page 44)

favors the information from both ears. (Don Norgaard has mentioned this psychological effect.) With exalted-carrier reception, as you tune across a signal, the heterodynes seem to move right straight through your head. You know by "feel" which way to turn the tuning knob for oscillator lock-in.

With this binaural system, there seems to be a new realism. Voices (and music, too) seem to come to life. It is almost like walking into a broadcasting studio. Friends converse with me on this. I cannot understand why the difference should be so great nor why the binaural way is more pleasant. Adjusting the level of the 'phones independently proves nothing. Tests made with both 'phones on show a marked difference in "realism" when one 'phone is switched from one sideband to the other, yet tests with only one 'phone show no difference when that 'phone is switched in the same manner.

Properly operated, the YRS-1 with exalted carrier greatly reduces the harmonic distortion normally heard on foreign 'phones, and makes listening to music from such stations much more pleasant. However, the selective fades on such stations, which affect the sidebands separately and produce dissimilarities between them, give a very interesting "three-dimensional effect" when heard this new way. It is very difficult to describe. Perhaps you have heard it. I don't mean to con-
RADIO SHACK 2-IN-1 BARGAIN
FOR A HAM'S CHRISTMAS!

AUTOMATIC, ELECTRIC 2400-HOUR CLOCK
WITH HUGE 10" DIAL AND SWEEP SECOND

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+ $2.50 U.S. Federal excise tax

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A MERRY XMAS BONUS at no extra cost (sells everywhere for $2), the A.R.R.L. map goes with this clock perfectly. It's printed in 6 colors; measures a giant 30" x 40"; heavy paper. Shows time zones, over 265 indexed countries, amateur prefixes. Accurate with 2% in miles and kilometers. Easily read from his operating position. The finest map of its kind, and FREE with each clock!

Map without clock, 42-803 .................................................. $2.00

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MODEL A-710 FM-AM TUNER: $34.50

Armstrong Circuit!
12 Miniature Tubes!
6-Section Condenser!
Tuned RF Stage!
Sens. 92 mc, 10 uv!
Sens. 106 mc, 12 uv!
88-108 mc FM!
540-1800 kc AM!
Ultra Compact Size!
Fully Guaranteed!

Big $28.75 Savings!

The greatest special-purchase of high fidelity equipment ever made by a single company! Approved's true FM features 2-stage limiter, genuine discriminator circuit separate rf and i.f. channel. The A-710 requires separate power supply: 6.3V AC @ 4 amps, 150V DC @ 40 ma, 170V DC @ 20 ma (see box at left). Chassis is 8⅛" W, 5¼" H, 8" D. Ship. wt. 6½ lbs. Order No. 36-206, $34.50.

FREE 224-PAGE 1953 CATALOG
WRITE TODAY FOR YOUR COPY!
Our great 30th Anniversary catalog will save you money and make it easier to find what you want!
vey the impression that I am a dramatic type, but there is something mesmerizing about it. I have observed some interesting reactions and comments. Some people can’t get enough of it; others seem to be a little frightened by the eerie sounds.

This new venture into “three-dimensional music” is startling, at first. The sound seems to flow around inside your head. There is a tendency at times to turn as though looking for the source of music. Choral music is weirdly beautiful and exciting. Pipe organ recitals reverberate mysteriously, and make you feel you are sitting high up in the belfry of a cathedral. To quote E.T. Canby, switching from one to both sidebands gives “an impression of a tremendous bursting-outward into space.” Sound suddenly “jumps away in all directions as though the performers had leaped into the air. Suddenly they are more than room distance away and fully sized, alive.”

The usual question is, will it work with two loudspeakers? The answer is “yes and no.” The effect is not nearly so interesting with speakers because both ears hear both speakers. However, I do often use the receiver speaker on the left side and a separate amplifier and speaker on the right side, and find it an improvement. I would like to get some more opinions and expressions from others who have tried dual single-sideband reception, or can be induced to make the simple changes (it took about half an hour) to add one more feature to the YRS-1. — Al Dinsmore, W3AUN

* Audio Engineering, January, 1932,

Correspondence
(Continued from page 40)

eventually for the commercials by crowding us out of existence with stifling regulations. All are of the opinion that someone in Washington, the guy that gets all these ideas, should be fired, banished, throttled, or maybe boiled in transformer oil. We don’t like it. We deeply resent having a government agency, rather than the amateurs themselves, propose these things.

— Harvey B. Pierce, W9OPA

702 Oaklawn Avenue
Winston-Salem, N. C.

Editor, QST:

... The aspect of the proposal contained in Docket 10257 which is most disturbing to the amateurs whom I know is the expressed attitude of the Commission to tell the amateurs what is good for them rather than meet the request of amateurs for action to solve a specific problem...

... It is regrettable that the Commission no longer looks to organized amateurs as represented by the American Radio Relay League for proposals to changing requirements on the amateur bands.

— Roy C. Corderman, W4ZG

1000 Overlook Avenue
Chattanooga, Tenn.

Editor, QST:

... Why not consult with representatives of the amateur service prior to releasing controversial proposals? It is obvious that the proposal in question is not the result of collaboration, consultation or cooperation with the 100,000 or more amateurs whom it would affect seriously and adversely...

In general, the activities of the Commission in recent years have not been creditable. The confusion and ill will resulting from Docket 9265 has left scars which will require some time to heal. The arbitrary attitude displayed in im-

(Continued on page 188)
NEWI JOHNSON VIKING II

The Johnson Viking II transmitter kit incorporates all the desirable features of its predecessor plus those required for effective TVI suppression. 100 watts output on phone and 130 watts on CW on all bands 10 thru 10 meters. New final amplifier uses parallel 6146 tubes. All parts supplied, including copper plated steel cabinet, chassis, wiring harness, all hardware and tubes. Complete construction and operation manual also supplied. Viking II Transmitter Kit $275.00

JOHNSON MOBILE TRANSMITTER KIT

New Johnson mobile transmitter kit, a band-switching 4 band rig. 60 watts input, 100% modulated (30 watts on 800 volt supply) 807 final, microphone input. Dynamic, crystal or carbon. Crystal or VFO control. Viking Mobile Transmitter Kit (less tubes) $99.50

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MODEL M-40—40 meter loading coil for using 75 meter antenna on 40 meters—NET 5.14
MODEL 92—18” Whip Extension—NET 3.18
MODEL 9-96—96” Economy Whip—NET 3.67

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RX-71 199.50
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S-76 169.50

NATIONAL

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NC 125 369.50
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Gonset No. 3002 2 Meter Converter ..................... NET 44.50

GONSET 3-30 MC SHORT WAVE CONVERTER Continuous coverage from 2-30 mc on three bands. For use in all-band mobile station installations. 1500 kw output. High sensitivity on short wave. 4 tubes. Uses power supply of receiver to which attached. Size: 3½ x 2½ x 5¾”. Shpg. wt. 4 lbs.

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Gonset Steering Post Mount 3005 .................. NET 3.90

Gonset 3005 Tri-Band Converter .................. NET 47.60

GONSET MODEL 3017 SINGLE BAND CONVERTERS

Available in 10, 15, 20 and 75 meter models (specify band) .......................... NET EACH 39.95
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CAMBRIDGE THERMIONIC COILS IN STOCK

These coils, now gaining wide popularity among hams throughout the country, are made by the famous Cambridge Thermionic Corporation.

LS3 STANDARD WINDING SLUG-TUNED INDUCTORS
1 mc. .91¢  10 mc. .84¢
5 mc. .87¢  30 mc. .84¢

ALSO AVAILABLE FROM STOCK
LS4 LS3 LSM LST
CTC Ceramic and Phenolic Coil Forms for High Frequency Use.

EDITOR, QST:

In reference to the FCC's proposed regulations concerning calling frequencies, I wish to say that I am definitely against them. It seems to me that the FCC is trying to put too many controls on amateur radio and make it more of a profession than a hobby. With more and more government rules, amateur radio is becoming so complicated that it will soon begin to lose much of its appeal to a very old tape.

There is absolutely no raison d'etre for the proposed regulations. There is too much government control now. The FCC should leave amateur radio alone for a while and stop trying to think up new regulations.

[Signature]

Please, FCC, no more new regulations for awhile!

— Sol Levine, W3IJV

MOBILE OPERATING

3145-A N. 48th St.
Milwaukee 16, Wisc.

Editor, QST:
The suggestions for short transmissions when working mobiles as printed in "Operating News" in the August issue of QST are a step in the right direction.
The use of more push-to-talk operation by fixed stations working other fixed stations has been recommended for many years and would certainly improve our use of the phone frequencies, our technique and the possibilities of other stations breaking in. However not a day passes but I hear rag-chews (?) so long-winded and without a "station break" (call letters to you) that they make the broadcasts of the national political conventions appear as a brief exchange of pet remarks by comparison! If some of these long-winded ham commentaries were to hear one other perform similarly in their living room they would have a very poor opinion of the long-winded chap!

Similarly, many mobile operators are making their transmissions far too long. Considering that practically 99.44/100 per cent of all mobiles are equipped with "push-to-talk" here is a group that should be using the fast, bright technique to improve their exchange of intelligence. Also it should be pointed out that very few dynamotors such as are commonly used for mobile plate supply are intended for continuous use. In fact the duty cycle for some commercial mobile equipment is as short as fifteen seconds!

Let the other guy get a few words in too!

— H. Charles Kaelter, W8SNK

160 METERS

Northwood
North Dakota

Editor, QST:

Evidently W6OZS has never tried operating in "The New Oil State," North Dakota. We have a high percentage of our hams working 160 meters.

Of the eleven nets operating on 160, North Dakota has two which give complete coverage to the entire state. The 75-meter net also checks cross-band to 160 meters for members operating there.

So if anyone wants to see real 160 operation, try North Dakota.

— Byron W. Engen

HOW TO WIN FRIENDS

517 West Wishkah
Aberdeen, Wash.

Editor, QST:

On a recent Saturday night, when the bands were filled to overflow capacity, two hams holding tickets higher than Novice Class came on the Novice band with high power and held a long QSO of only a casual nature. They were obviously taking too much of the band with their power, thus tending to keep us Novices with the limited space we have in which we may operate from enjoying even a half of a break. I realize these two amateurs were within their rights, but that

(Continued on page 184)
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Save money by constructing your own. All expensive wiring and assembly costs are completely eliminated.

Detailed construction manual shows clearly where each wire and part goes and tells exactly how to build the kit. Write for free catalog.

STOP
BEATING YOUR BRAINS!
See Page 114

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You can enter this unexplored, interesting field. Defense expansion, new developments in electronics demand trained technicians. Study all phases radio or electronics theory and practice TV, FM broadcasting; servicing; aviation, marine, police-radio. 18-month course equal to 4 yr. college, H.S. or equivalent required. Begin Jan., March, June, Sept. Campus life. Write for catalog.

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Pad (70 blanks) 35¢
Message Delivery Cards
each 2¢ plain, 4¢ stamped

The American Radio Relay League
West Hartford 7, Conn.

if this were brought to their attention they would gladly refrain from such practices.

This will not bother me much longer as I have passed my General Class examination and am awaiting it out until I am authorized to work on the other bands allotted or rather assigned to holders of General tickets. But there will still be Novice people working the small allotted space.

— Charles P. Gibson, N7TRH

PHONANTICS

Stow, Ohio

Editor, QST:
I seem to have trouble getting some of the boys to understand my call letters, so I use phonetics — but still I don't have much success. I use the following to identify my station: W8K as in Knight, X as in Xavier, G as in Gnat.

Why am I having trouble???

— Preston J. Jolley, W8KXG

FROM F.C.C.

Field Engg. & Monitoring Bureau
Washington 25, D. C.

Editor, QST:
Your letter to our Chairman transmitting a copy of the resolution adopted by the Board of Directors of the ARRL expressing their appreciation for services performed by the Field Engineering & Monitoring Bureau has been referred to my office for attention.

I am indeed most grateful for their recognition of the interest of our personnel not only in the affairs of the League but also as between our employees and the hundreds and thousands of individual amateur radio operators who are personally known to most of us.

We are most grateful for the very material assistance and cooperation which our field offices and stations have received from the amateurs through the years. This has been especially true in the recent past in connection with the development of a program for the solution of television interference.

On behalf of all the employees of the Bureau, please accept our sincere thanks.

— George S. Turner, Chief

"WELL DONE" DEPARTMENT

Abeskie, N. C.

Editor, QST:
I would like to take this means of expressing my appreciation to QST and your staff or writers for the fine work that you are doing for amateur radio. I have been a subscriber to QST for several years, and have thoroughly enjoyed the magazine. While I have not had the know-how so that I could appreciate the technical articles in the magazine, there are some of them that have assisted me in trying to become a ham operator. On April 52, 1932, I received my Novice Class license, and have been on the air since that time. The other publications of the ARRL have helped to a great extent, especially the License Manual.

Having been very much interested in Boy Scouting for a number of years, I appreciate the cooperation given to the Scouting organization through the articles that have appeared in Boys' Life magazine. They have been fine. Again thanking you, I am . . .

— Lowell Powell, WN4VSJ

Here lies the form of John McPoo, Who took off like a rocket When he ignored that basic rule, "Keep one hand in your pocket!"
MAKE THIS YOUR HOME FOR IMPORTANT WORK UNDER IDEAL CONDITIONS

- TV RECEIVER DESIGN ENGINEERS
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from high wages, a modern, air-conditioned plant, paid vacations and holidays, group insurance and a good chance for advancement.

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MR. E. O. COLE, DEPT. K

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GONSET “Super 6”

The only Converter manufactured covering the 10, 11, 15, 20, 40, and 75 meter bands as well as the 19 and 49 meter broadcast bands. The successor to the famous GONSET “TRI-BAND.”

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Features:
RF GAIN SWITCH
BUILT-IN BC TRAP
COMPACT - 5 1/4 x 5 1/4 x 3 1/2
SEPARATE BC ANTENNA INPUT
4 TUBES, 6CB6-RF, 6AU6-MIXER
6BH6-IF STAGE 6C4-Oscillator

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How's DX?

(Continued from page 67)

week end the "phones take over from 0001 GMT Oct 13th, to 2400 GMT, Dec. 14th. European stations will call "CQ, A.W. and "CQ ELV," and "CQ World" and "CQ Europe" on voice. Six-digit numbers will be exchanged on e.w., to consist of RST reports with three self-assigned numbers appended; for "phone, it's five-digit numbers (no tone report). Scoring: Non-European stations may earn 3 points per contact (8 for each number sent to each receiver to be multiplied by the sum of the sums of Euro- pean countries (per ARRL Countries List) worked each band. Logs must be mailed to EDR Contests Committee, Post Box 233, Annapolis, Maryland, postmarked not later than Dec. 31st, 1952. Write EDR or ARRL for any more detailed information desired. . . . . . . . . . .PA8MOT returned to Holland after an Offshore Communications Course at Fort Benning which ran from February through June. Will thank W6XAS for hospitality offered—especially W6XQO QGO and SWX. PA8MOT would like nothing better than to come back for a longer stay. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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M.A.R.S.
(Continued from page 58)

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Hints and Kinks
(Continued from page 59)

moved. There is ample room for the power supplies in the lower section of the box and the original panel for this section is used as the mounting surface for the control switches, the pilot light and the circuit breaker. — J. P. Eckhardt, W2CLC

FINDING INTERMITTENT CAPACITORS

We all dread the task of locating an intermittent capacitor which makes a set change volume or go entirely dead. Regardless of which capacitor is first by-passed with a spare, invariably the surge imposed on the circuit will restore the set to normal operation, perhaps for days. One way to eliminate erratic operation is to replace all of the capacitors, but it must be admitted that this is a highly uneconomical system. A more practical method of locating the trouble maker is outlined below.

The capacitor of doubtful quality is shunted by a series-connected RC combination consisting of approximately 25,000 ohms (not a critical value) and the proper value of by-pass capacitance. The purpose of the connection is to allow the intermittent capacitor to remain charged at the usual circuit voltage and to prevent the new unit from acting as a by-pass. Then, when
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the set finally acts up, the series resistor is shorted out with a screw driver or other tool having an insulated handle. In this way, the unit that has lost its by-pass capabilities will be found immediately. Naturally, more than one section of a set can be treated at the same time. — Robert B. Witschen, WØSV

TWO-BAND PI NETWORK

A simple method of switching a pi network for two-band operation is shown in Fig. 2. Constants shown are for operation at 7 and 14 Mc., but the same principle can be applied to any two adjacent bands. In this particular circuit, the effective inductance is 4 μH, and the capacitance is 600 μμF, with the control switch, S₁, set at the 7-Mc. position. At 14 Mc., the inductance and capacitance are reduced to 2 μH and 300 μμF, respectively. — Capt. R. R. Hay, USN, W4LW

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Answer to QUIST QUIZ on page 10—

[Continued...]

[Diagram of circuit diagram with labels]
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