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

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

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

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Address all general correspondence to the administrative headquarters at West Hartford, Connecticut.
"IT SEEMS TO US—"

INTERIM REPORT

There will be an official plan coming up soon providing for the employment of u.h.f. amateur radio in civilian-protection work under the Office of Civilian Defense. That much we can say pretty positively. Nothing has been drawn up in final form yet and all plans will have to run the gauntlet of DCB; but OCD has started reducing its communication intentions to black and white, there seems to be general agreement on principles, and we expect that we shall soon be able to tell you just what the task assignments are and how to go about discharging them. First plans will deal only with local shows on u.h.f.; the second phase will examine statewide nets on lower frequencies, concerning which it's still too early to say much of anything definite.

Some day we may have our own amateur manual of civilian protection. In the meanwhile the information is where you find it, but a few principles begin to emerge. Under OCD's plan for local organization, each community will have what is called a volunteer office, at which citizens enroll for assignment to the various ARP services, depending upon their qualifications. Some will be wardens; doctors will be assigned to emergency medical services, huskies to rescue squads, and so on. There is as yet no recognized place in this scheme for radio amateurs but one is presently being carved out and we'll let you know when you can enroll and be assured of a radio assignment. That is why we are asking our members to register meanwhile with the ARRL emergency coordinators, who in turn have been asked to provide temporarily the needed liaison between the amateur body and the local CD commander or coordinator. The citizens who make up the many ARP services are members of what is now called the Citizens' Defense Corps, with a commander at the control center. Under OCD plans he will have a competent communications man as one of his aides, charged with planning and managing the varied communications plans of the community. It is he to whom our gang will report and from whom we'll get assignments. Primary reliance is going to be on the major wire systems, the telephone and telegraph.

Beyond that there will be a secondary system made up of all local facilities in sight, including amateur radio. Under flexible guides, each community will erect its own communication plans, depending upon its needs and its facilities. It will be a teamwork job. Naturally we shall not be permitted to go off on our own, set up circuits of our own choosing, drum up traffic. Obviously we must be a disciplined part of a community whole, under a local leader who has responsibility for all communications and who shifts his forces as the situation requires. But our skill and experience will be valuable contributions and we can be sure of being used for many important links in the auxiliary system and of receiving quite a few primary assignments where mobility enters into consideration.

The OCD work won't all be 2½ meters. That will be the standard — for the gear that is to be available in quantities for average needs. But there is a place for 5-meter stations, too. Not necessarily superior in average range over flat country, they may be better in hilly country because they suffer less from shadows. Regulations have made 5-meter apparatus a different breed of cat but we'll need all available gear and no existing 5-meter self-powered stations should go to waste. As they are generally more complicated and less portable, it seems to us that the best place for them will be in fairly permanent locations, where gas-engine supplies could be made available, and perhaps using them for the higher-quality circuits, including those to nearby towns. Similarly, while we emphasize 112 Mc. for new construction because it can be simple with inexpensive tubes, a place should be made in local plans for all existing 1¼-meter stuff. We should mention, too, that a job is foreseen for the 2½ sets that are permanently installed in cars, although we advise the replaceable-unit scheme for new construction. Finally, walkie-talkies will be found definitely useful. This covers about everything except home stations, but we imagine that a warden who expects to lose his wires will have made a mental cataloging of even the fixed ham stations in his beat, just in case.

Many of you fellows haven't any u.h.f. equipment and have never operated on 5
meters or below. You probably think we’re mildly crocked on the subject, the way we keep preaching u.h.f. not only for OCD jobs but for home-station equipment in general. One reason we’ve been doing so recently is that it is possible to visualize certain circumstances under which we’d still be operating u.h.f. when we couldn’t on any other frequencies. We think every amateur ought to build himself sufficient of a u.h.f. station to ensure his enjoyment of amateur radio on 5 and below. Now — while there’s leisure to study up and do a good job. Now — while parts are still available. It’s a fascinating field, the future of which hasn’t been scratched. It is certain that most of the new art will center there. Amazing things are going on right now. When you read of a “secret device” it’s almost certain to be u.h.f. These developments offer us assurance of astonishing increases in the working ranges of very short waves when this war ends, if not before. We already know two hams, one on each side of the Atlantic, who are planning just how they’re going to bridge the pond in two-way ultraligh, and we know just enough about the new techniques to be entirely confident that they’ll succeed. As far as that goes, have you noticed the remarkable ranges that are being regularly attained by the new f.m. broadcasting stations and some of the other services that are using f.m.? They’re good, better than you’d ever think for u.h.f. We hams haven’t yet got into f.m. and given ourselves a real treat, but the basis for that too is u.h.f.

Everything points at u.h.f. — fun, future, community service, the new art. Regardless of what has been your major interest in amateur radio, we again urge you to establish yourself somewhere in the u.h.f. ham picture.

K. B. W.

---

**A Correction — and the Answer to a Question**

A popular ham indoor sport just now is to call our attention to the fact that the diagram and text in the article “A 112-Mc. Emergency Transmitter” in December *QST* disagree as to how the screen grid in the 6V6GT is connected. The text is right; the screen and plate are connected together. We’re sorry, fellows; it was one of those too-obvious things that occasionally slip by in spite of careful checking. The circuit will oscillate with the screen and control grid tied together, but the plate current will be too low.

A number of the gang have been curious about the possibilities of exciting an 815 from the oscillator to make a stabilized m.o.p.a. transmitter. On paper it looks OK, since the oscillator output is at least six times the theoretical driving power taken by the 815 under ICAS plate-modulated conditions. However, dielectric and other losses run pretty high at 112 Mc., and in an ordinary link-coupled circuit it has not been found possible to obtain sufficient grid current under load to drive the 815 at full ratings. The 815 can be used at reduced input — we found that it would modulate satisfactorily with a plate input of 300 volts at 85 to 90 ma., or around 25 watts, which gives a carrier output of approximately 15 watts. The grid current under these conditions was between 1.5 and 2 milliamperes. Possibly a more efficient grid coupling system would improve the picture, but time has not permitted further experimental work.

Whether or not an improvement in frequency stability is obtained by the m.o.p.a. arrangement is entirely a matter of adjustment. The grid load changes considerably during the modulation cycle, and when the load on the oscillator shifts its frequency also shifts. The magnitude of this effect is of the same order as and may be even greater than the frequency shift caused by changing the oscillator plate voltage to give equivalent modulation. The only answer to this is to use loose coupling between the oscillator and modulated amplifier. With careful adjustment, it is possible to reduce frequency modulation appreciably below that of the modulated oscillator alone, so that the overall stability is improved.

Even though the 815 has to be run at reduced input, the 15-watt carrier represents an increase of 11 or 12 db. in signal strength over the oscillator alone, which sounds worthwhile. And the 815 will last longer with lower input!

— G. G.
Power Supply for Emergency Equipment

Building Vibrator-Type Supplies for 300-volt 100-ma. Output

BY GEORGE GRAMMER,* WIDF

In the emergency equipment design considerations outlined last month emphasis was placed on the necessity for providing for the use of either 115 volts a.c. or 6 volts d.c. as the source of power. The a.c. supply presents no design problems. Our troubles, if any, are likely to arise in equipping ourselves with storage-battery operated supplies of adequate rating.

Some investigation of the vibrator-supply situation showed that the picture is about like this: Complete 300-volt, 100-ma. units such as the VP-552 Vibrapack are available in limited quantity — better, perhaps, than we had hoped for earlier — but when the existing supply is exhausted no more can be made available without priorities. At the moment amateurs have no priority rating. On individual components, we should be able to get all the vibrators we need, and the same is true of other components which need most frequent replacement in auto radio sets such as rectifier tubes and buffer condensers. The catch is in the transformer situation; in the replacement line there is nothing really suitable, since the average auto receiver seems to require no more than 250 volts at 60 ma. or so, an output which is considerably below the power level we want. Even if the lower power were tolerable, it is general opinion that only small quantities of replacement transformers are to be found on dealers' shelves, since it seems that transformers stand up so well that replacements are infrequent. The special transformers for vibrator-type transmitting supplies carried in the lines of several manufacturers have never been big-quantity items and the existing number is probably rather small. There is a reasonable possibility that more of these can be manufactured to meet the demand as it arises, but at the same time copper and steel are daily getting more "critical."

The question, then, is whether or not satisfactory substitutes can be found should the normal sources of components dry up, or be unable to take care of our needs with the speed with which we need to equip ourselves. This involves something more than just assembling components already designed for the purpose; it will be necessary to modify parts, particularly transformers, salvaged from the junk box or discarded apparatus, or purchased solely with alterations in mind. Our own experience has shown that this scheme is perfectly practical, and as things stand now there does not appear to be any lack of means of making up entirely suitable vibrator-type supplies. In fact, even the excuse of cost is hardly valid; most of the essential parts can be taken from obsolete broadcast receivers which can be picked up at almost any dealer's for a couple of dollars at most, while the special components such as the vibrator, rectifier, and buffer condenser which probably will have to be purchased new should not run over three or four dollars.

A.C. Supplies

For the benefit of those who want a circuit diagram, Fig. 1 shows a representative power supply for a.c. only. It has the standard output cable connections, but is conventional in every other respect. The power transformer should have a high-voltage secondary rated at 350 to 375 volts (a.c.) each side of the center tap and should be capable of delivering a rectified current of 100 ma., through the usual condenser-input filter. To take care of heaters in receiver, modulator and transmitter, the 6.3-volt filament winding should be rated at 3.5 to 4 amperes; should a combination transformer having this filament rating not be readily available a separate filament transformer can be incorporated in the power supply unit.

A two-section filter such as that shown will reduce hum to a minimum in the receiver, but by

* Technical Editor, QST.

Fig. 1 — Typical a.c. power supply.

C1, C2 — 5-mfd. electrolytic, 450 volts.
C3 — 16-mfd. electrolytic, 450 volts.
R1 — 50,000 ohms, 10 watts.
T1 — 350 to 375 volts each side center tap, 100 ma.; 5 volts, 3 amp.; 6.3 volts, 3.5 to 4 amp.
L1, L2 — 10–12 henrys, 100 ma.
S1 — S.p.s.t. toggle.
V — 80, 5Z3, 83V, etc., depending upon permissible voltage drop.

January 1942
using large filter capacities in a single-section filter it is possible to bring the hum down to a satisfactory level. Since the output voltage should be 300 at a load of 100 ma. it may be necessary to drop the voltage in the supply itself should the transformer used give more than the desired voltage. This usually can be accomplished by choice of a suitable rectifier tube; the 80 will give most drop, the 5Z3 an intermediate value and the 83-V the least. Use a 3000-ohm resistor (preferably 25-watt size or larger) as a test load; the supply is giving the standard output when the voltage across the resistor measures 300.

A straight a.c. supply is a very useful thing to have but must be accompanied by a similarly-rated battery supply, which means duplication of a considerable number of parts and hence the least economical system, overall.

**Battery Supplies**

Undoubtedly the simplest and least troublesome way to secure a battery supply is to purchase a ready-made unit having our 300-volt, 100-ma. standard rating, such as the VP-552 already mentioned. Since these come complete with hash filtering and shielding, as well as coordinated design to give efficient operation, the headaches have been borne by the manufacturer and there is little to do except assemble the unit with a suitable smoothing filter and the necessary controls. A circuit diagram based on such a unit is shown in Fig. 2. Ready-made fully-shielded smoothing filters also can be bought as separate units designed to go with the Vibrapack, and can replace the filter assembly shown in the diagram. In this circuit provision is made for cutting the "A" supply to the vibrator unit, leaving the heaters in operation to keep the station ready for operation during periods when it does not have to be actually on the air with either the receiver or transmitter. While a separate switch could be provided for the heater circuits, it is just about as convenient to take off one battery clip for this purpose.

A supply of this type is shown in the group photograph. It should give no hash trouble if the battery leads are twisted together for their entire length. A separate pair of twisted leads can be used for the heater supply if desired; this is advantageous if two batteries are available, one for the heaters and the other for the plate supply. The leads should be at least No. 14 and preferably No. 12; flexible rubber-covered wire of the type sold for lead-ins or ground wires is very good for the purpose since it lends itself readily to even

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**Fig. 2 — Battery supply using made-up vibrator unit.**

- C1 — 8-µfd. electrolytic, 450 volts.
- C2 — 32-µfd. electrolytic, 450 volts.
- L1 — 10-12 henrys, 100 ma., not over 100 ohms (Stancor C-2303 or equivalent)
- S1 — Heavy-duty toggle (10-12 amp. rating)
- F — 15-amp. fuse.
Fig. 3 — Combination 115-volt and battery supply.

C₁ — 0.5-µfd., 50-volt rating or higher.
C₂ — 0.005 to 0.01 µfd., 1600 volts (see text).
C₃ — 32-µfd. electrolytic, 450 volts.
C₄ — 32-µfd. electrolytic, 450 volts.
C₅ — 100-µµfd. mica.
L₁ — 10-12 henrys, 100 ma., not over 100 ohms (Stancor C-2303 or equivalent).
R₁ — 5000 ohms, ½ or 1 watt.
RFC₁ — 55 turns No. 12 on 1-inch form, close-wound.
RFC₂ — 2.5-mh. r.f. choke.
S₁ — S.p.s.t. toggle, heavy duty (10-12 amp.).
S₂ — S.p.s.t. toggle.
F — 15-amp. fuse.
VIB — Mallory 500P, 294 or equivalent.
T₁ — Special vibrator transformer with 115-volt and 6-volt primaries, to give approximately 300 volts at 100 ma. d.c. (Stancor P-6166 or equivalent).
T₂ — 6.3-volt filament transformer, to be used when 6.3-volt filament winding on T₁ is not heavy enough to supply all heaters in both transmitter and receiver.

Note — All ground connections are made to a single point on the chassis.

X — Insert series resistor of suitable value to drop output voltage to 300 at 100-ma. load, if necessary. With transformers giving over 300 volts d.c., a second filter choke may be used to give additional voltage drop as well as additional smoothing.

Combination Supplies

A supply built from individual components offers more problems, since it is necessary to filter out hash and to adjust the wave-form to minimize sparking at the vibrator contacts. When such a supply is built around a manufactured transformer it is advisable to secure the type which has both 115-volt and 6-volt primaries, thereby making an a.c.-d.c. supply which uses the minimum of parts for both purposes. Such transformers are available in various ratings, some of which fall quite close to the 300-volt, 100-ma. figure we have adopted as standard. A suitable circuit diagram is given in Fig. 3, and a supply built to this circuit is shown in the group photograph.

The "interrupter" type of vibrator, or one which does not also have synchronous contacts for rectifying the high-voltage, is used in this circuit in preference to the synchronous type. At current prices, the simple vibrator plus a rectifier tube cost less than a synchronous vibrator, and the tube is needed anyway for straight a.c. operation. The change between a.c. and battery supply is made by providing duplicate rectifier and output sockets, the heater voltage being supplied by the transformer in the one case and by the storage battery in the other. Switches could be used for the same purpose. "A" in the diagram indicates that the ungrounded heater lead on one 6X5 rectifier socket is connected to the ungrounded side of the filament winding for a.c. operation, and "B" that the same lead on the other socket is connected to the ungrounded battery lead. All other connections on the two sockets are paralleled. In case the 6.3-volt filament winding is too lightly rated for the total heater load, a separate 6.3-volt transformer may be used as shown.

Getting the right capacity for the buffer condenser, C₂, is of first importance. Under no circumstances can this condenser be omitted, since without it there will be excessive sparking at the vibrator contacts and the vibrator life will be short. Proper values usually are between 0.005 and 0.01 µfd., the condenser being rated at at least 1000 volts. The optimum value can be determined by trial, observing the vibrator sparking as the capacity is changed. For this purpose it is advantageous to get a vibrator which is mounted in a large tin can, since this type is easily taken apart, the top and base being held together by a "Goodman, "Vibrator Power Supplies," QST, November, 1941.

If all active amateurs who do not already possess emergency power supplies should decide that it is a patriotic duty for them to equip themselves with such supplies immediately, there would be a serious shortage of the necessary manufactured components — a shortage which might or might not be remedied in time. Nevertheless, a little ham ingenuity can overcome this problem, as it has many others. If you can’t get ready-made parts, here’s how to “roll your own” — at very small cost.
few spots of solder which easily can be softened. The more compact type having a narrow metal can crimped around a bakelite base can be pried apart with some effort, but it is pretty difficult to get it back together again in presentable shape. Aside from the size, we prefer the larger type anyhow because the larger amount of sponge rubber inside the can helps reduce the mechanical noise.

When the system is operating properly there should be practically no sparking at the vibrator contacts. There may be an intermittent spark of small amplitude, barely visible in daylight, but nothing resembling a continuous arc. A further check on the operation can be secured with an oscilloscope having a linear sweep circuit which can be synchronized with the vibrator. The vertical plates should be connected across the outside ends of the transformer primary winding to show the input voltage waveshape. Fig. 4 shows an idealized trace of the optimum waveform, when the buffer capacity is adjusted to give proper operation throughout the life of the vibrator. The horizontal lines in the trace represent the voltage during the time the vibrator contacts are closed, which should be approximately 90% of the total time. When the contacts are open the trace should be partly tilted and partly vertical, the tilted part being 60% of the total connecting trace. The oscilloscope will show readily the effect of the buffer capacity on the percentage of tilt. In actual patterns the horizontal sections are likely to droop somewhat because of the characteristics of the vertical amplifier in the scope and also because of the resistance drop in the leads to the battery as the current builds up through the primary inductance.

The 5000-ohm resistor in series with the buffer condenser in the diagram has no noticeable effect on the operation, being there simply to limit the secondary current in case the condenser should fail.

R.f. filters for reducing hash are incorporated in both the primary and secondary circuits. The secondary filter consists simply of a 0.01-µfd. paper condenser directly across the rectifier output, with a 2.5-md. r.f. choke in series ahead of the smoothing filter. In the primary circuit a low-inductance choke and high-capacity condenser are needed because of the low impedance of the circuit. A choke of the specifications given seems adequate, but if there is trouble with hash it might be beneficial to experiment with other sizes. In any event the wire should be large — No. 12 preferably and No. 14 as a minimum. Manufactured chokes such as the Mallory RF583 are more compact and give higher inductance for a given resistance because they are bank wound, but this type of winding is not very practical to make by hand. The by-pass condenser, C1, should be at least 0.5 µfd.; even more capacity may help in bad cases of hash.

The power supply should be built on a metal chassis, with all unshielded parts underneath. A bottom plate to complete the shielding is advisable. The transformer case, vibrator case, and metal shell of the tube all should be grounded to the chassis. If a glass tube is used it should be enclosed in a tube shield. As mentioned before, the battery leads should be evenly twisted; in our experience these leads are more likely to radiate hash than any other part of a reasonably well-shielded supply, and a little care in this respect is more productive than experimenting with different values in the hash filters. Such experimenting should come after it has been found that radiation from the leads has been reduced to an absolute minimum. We did not find that shielding the leads was particularly helpful, and since shielding was a nuisance as well as an expense it was omitted from the supplies shown. However, others may find shielding worth while, if other means fail.

The 100-µfd. mica condenser, C6, connected from the positive output lead to the "hot" side of the "A" battery, is helpful in reducing hash in certain power supplies. In some cases its use gives no observable improvement, so a trial is necessary to see whether or not it should be installed. It should be mounted right on the output socket.

Testing for methods of eliminating hash should be carried out with the supply operating a receiver. A transmitter is pretty tolerant in this respect, and hash which goes unnoticed on a transmitted carrier can make all kinds of QRM in reception. Since the interference is usually picked up on the receiver antenna leads by radiation from the supply itself and the battery leads, it is always advisable to keep the supply and battery as far from the receiver as the connecting cables will permit. Three or four feet should be ample. The microphone cord likewise should be kept away from the supply and the battery leads.

The smoothing filter for battery operation can be a single-section affair. However, there will be some hum (readily distinguishable from hash because of its deeper pitch) unless the filter capacity is fairly large. We found it necessary to use a 32-µfd. output condenser to eliminate this hum.

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Fig. 4 — Proper operation of the vibrator supply is indicated when an oscillogram such as shown above is obtained with the vertical plates of the oscilloscope connected across the total primary winding. The dashed center line will not be shown on the screen; it is for reference only.

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* Mallory Radio Service Encyclopedia. This volume has a great deal of useful information on vibrator power supplies and their adjustment.
when the supply is used on a receiver, even with a poorly baffled speaker such as the units ordinarily put in small metal boxes to go with receivers.

Rewinding Transformers

Those who can’t get either complete vibrator assemblies or special transformers, or who want to assemble a vibrator supply at the least possible expense, certainly should be able to find the makings in the old broadcast receivers which are gathering cobwebs in the cellars of most radio dealers’ establishments. Receivers built before the midget craze started are the best bet—go back ten years or more when the average receiver had something like a pair of 45’s in the output stage. What is wanted is a power transformer with at least a 100-milliampere secondary; the voltage rating should be 350 or so with any transformer of this type, but the exact value does not matter too much. The high-voltage secondary must be in good shape, of course. Pick out a transformer with a case—the “fully shielded” type—but not one which is immersed in pitch, unless you have unlimited patience. When you acquire such a receiver you’ll also get a filter choke or two and the accompanying filter condensers, all of which may be in perfectly usable condition, plus an assortment of other parts which undoubtedly will be useful.

Before dismantling the transformer, check up on the output voltages of the various windings, if they are not already known. This will require a multi-range a.c. voltmeter, which is part of every service test kit, and it shouldn’t be difficult to get the measurement made by a friendly service-man or at the local parts store. These voltages must be known if the transformer is to be rewound to give the desired output voltage.

Next take the transformer apart, being careful to avoid damaging the windings or bending the core pieces. The filament secondaries are practically always on the outside of the coil assembly, so remove the outer layers of paper to expose the uppermost filament winding. Count the number of turns and divide this figure by the output voltage of the winding to find the number of turns per volt. Most small transformers of this vintage have about three turns per volt. Jot down the exact figure so it won’t be forgotten and then remove the remaining filament secondaries, leaving only the primary and high-voltage secondary.

When this has been done, slide one of the core pieces inside the coil and see how much space has been made available by removing the low-voltage secondaries. The primary to be put on will not have many turns, but the wire should be large to keep the losses low, so generally two layers will be required. The current to be carried will be in the vicinity of 8 amperes at full load, but since the primary is to be center-tapped each half of the winding carries current only half the time. Thus the heating effect is equivalent to 4 amperes. We used No. 12 wire in the transformers we rewound, but this is probably more conservative than is necessary; No. 14 certainly will not get too warm and the losses should not be appreciably greater. It would not be advisable, however, to use smaller wire than No. 16, and that size only when a larger size will not fit the space. Some room is taken up by insulation; friction tape is convenient to use but is a little bulky. If the space is too small, there is no alternative but to remove the 115-volt primary; in some half-dozen transformers we rewound, taking off all windings except the high-voltage secondary left ample room for a new primary of No. 12 wire, but in no case was it possible to get in such a new primary without removing the old one.

If the normal transformer output was 300 volts at 100 milliamperes through an ordinary filter (this should be ascertained before taking the transformer apart, by hooking up a power supply and making a d.c. measurement) it is certainly good sense to save the old primary if possible, since such a transformer can be used for a combination a.c.–battery supply. However, it does not pay to skimp unduly on the size of the 6-volt primary wire; the efficiency and regulation will be better with larger wire sizes. Separate transformers readily can be built into a single supply which uses the same filter, thereby at least approaching the economy and convenience of a single-transformer unit.

Whether the old primary is inside or outside

A below-chassis view of the battery supply using rewound transformer, circuit for which is given in Fig. 5. The various components can easily be recognized in this view.
the high-voltage secondary is a matter of luck; we have encountered both types. If the old primary is on the inside and it is necessary to remove it, the job can be done readily enough by pulling the outermost layer through the side of the assembly, after which the rest can easily be unwound. One half of the new primary should be wound directly on the insulating sleeve into which the core fits, then the high-voltage secondary slipped over it, and finally the second half of the new primary wound on top. Both halves should be wound in the same direction so that the end of the first half can be connected to the beginning of the second to give a center tap with the proper polarities. If separate leads are brought out from each half (this is usually the most convenient method) it is easy to check the polarities after the transformer is reassembled. Connect two leads together for trial, then apply 115 volts across the high-voltage winding. If the voltage across the outer ends of the new winding is twice that of each half, the polarity is correct. A filament voltmeter can be used for this check since the voltage will be low. To obtain 300 volts at the rated current of 100 ma., from the supply, through a 6X5 rectifier and a filter having a choke with a resistance of about 100 ohms, it has been found by trial that the secondary/primary turn ratio should be 70:1, assuming an even 6 volts from the storage battery. All the transformers we revamped were wound to this ratio and the outputs were practically identical. This is where the turns-per-volt figure comes into play. Multiply the original a.c. output voltage of the high-voltage secondary by the number of turns per volt to find the total number of turns, then divide the product by 70 and you have the proper number of turns for the primary. For example, if the output voltage was known or measured to be 750 volts a.c. (375 each side of center tap) and the transformer had three turns per volt, the total number of secondary turns is 750 x 3, or 2250. Dividing 2250 by 70 gives 32 (dropping the fraction) as the total number of primary turns, so there will be 16 each side of the center tap.

The new windings should be sufficiently well insulated so that there is no possibility of a short-circuit to the core or secondary, but otherwise no special precautions are necessary since the voltage is low. Reassemble the transformer, interleaving the laminations. It is advisable to use no more than two laminations on a side before interleaving from the other side, but it is not necessary to interleave them singly. With careful packing it should be possible to get back all the core pieces that came out.

Once the transformer is rebuilt the remainder of the supply is constructed and adjusted as previously described. If the job has been done properly the efficiency should be about normal for vibrator supplies. Individual transformers we rewound varied somewhat, in that for the standard d.c. output the battery current ranged from 7.5 to 9 amperes with the different units. This does not include the current taken by the rectifier heater. Because of this current and the power loss in the plate-cathode circuit of the rectifier tube, the overall efficiency of the tube rectifier type of supply is not quite as high as with the synchronous vibrator, but the parts are cheaper. With no load on the supply the battery current is about 1.5 amp., and under these conditions the output voltage is 425. The regulation is therefore considerably better than with an a.c. supply having a condenser input filter.

Replacement Transformers

The same alterations can be applied to universal replacement transformers as to units salvaged from old broadcast receivers. Suitable units can be picked from the various manufacturers' catalogs, and these transformers should be fairly easy to get since they are made in large quantities. The types having 5-, 2.5- and 6.3-volt filament windings offer the possibility of operation without alteration at all, since the 5-volt winding and one-half of the 2.5-volt winding can be connected in series to give 6.25 volts and used as one half of the battery primary winding, with the regular 6.3-volt winding as the other half. These windings are a little light for the purpose if operated at ratings, since 8 amperes is about the normal limit for the lowest-current winding. This would hold the battery current down to about 6 amperes, or an input of 36 watts. At an efficiency of 60%, or so the output would be slightly over 20 watts. Transformers used in this way work very well, but generally deliver lower voltage than is wanted. As an example, a transformer which on

(Continued on page 54)
**U. S. A. CALLING**

**"RADAR" IN THE NAVY**

The Navy is going in for radiolocation in a big way and needs 5000 men as technicians and Radar maintenance men. To obtain applicants with radio experience who can be trained in the secret new work in the shortest possible time, the Navy wants amateurs! Naval recruiting officers have the details.

- Applicants must be high-school graduates; must hold or have held an Amateur Class A or B license; or, if no ham experience, must be engaged in radio repair work or have had experience of h.f. communication. Enlistment is as radioman second class, USNR, with immediate orders to active duty for the purpose of receiving six to eight months schooling in the new technique. A new Radio Material School for this purpose will soon be opened on Treasure Island in San Francisco Bay. Until it is completed, students will go to the naval radio training school at either Los Angeles or Noroton, Conn. Upon successful completion of the course, men will be candidates for promotion up to and including chief radioman, depending upon qualifications.

These high ratings and the creation of the special schooling indicate the great importance of this service and give point to the Navy's desire for skilled amateurs to man it. It is a field in which you'll meet many ham buddies.

**WAR DEPARTMENT OPERATORS**

There is a continuing and urgent need for high-speed radio-equipment operators in the fixed service of the War Department. Over 200 positions paying $1620 a year are now open at various Army posts throughout the United States and territories. These are Civil Service jobs called Junior Communications Operator, High-Speed Radio Equipment, and are covered by Announcement No. 20 and an amendment thereto. Particulars and forms may be had from major post offices or the Civil Service district offices: see page 28 of November QST.

The requirements for JCO have just been relaxed. Applicants must be citizens not over 48 years old, must have at least one year of experience as radiotelegraph operator in commercial or government systems, which must have included at least three months' experience in the operation of high-speed equipment. Training at a service school may be substituted month-for-month for the operator experience except the three months required in the high-speed field. Candidates must be capable of reading, and transcribing to typewriter, syphon-recorder tape at a sustained speed of 40 w.p.m.; operate perforators at 40; copy audio English to typewriter at 30 and code groups at 20; be capable of "touch" typing at a sustained speed of 50. Unassembled examination, open until further notice.

**RADIO MECHANIC-TECHNICIANS**

On page 28 of our November issue, we gave some details of the Civil Service's solicitation of radio mechanic-technicians now needed in large number for a variety of positions in numerous government agencies, as per Announcement No. 134. At that time the offer was open only until November 6th, but an inadequate number of applications were received and the closing date has been removed — applications will now be accepted until further notice.

Originally in five pay grades from $1440 to $2300, a new grade of Chief Radio Mechanic-Technician has been added at $2600. At the same time, the experience requirements have been modified somewhat downward, and education may be substituted for part of the required experience. Details may be found at your post office or local Civil Service office. Ask to see both Announcement 134 and its amendment.

(Continued on page 64)
PHOTOCOPYING

Some amateurs report to us the unwillingness of photostat houses to make copies of amateur station licenses, apparently in the suspicion that some sort of monkey-business is being attempted. While the original of the operator license is always required in one's possession when operating, FCC regulations contemplate the copying of the station license, and this is in fact essential when communication is to be established between one's portable and one's home station, as is explained in more detail in the License Manual. We believe that any photocopyer's doubts in the matter can be resolved by showing him Sec. 12.67 of the FCC regulations on the posting of station license, which state that "The original of each station license or a facsimile thereof shall be posted by the licensee in a conspicuous place in the room in which the transmitter is located or kept in the personal possession of the operator on duty. . . ."

MISCELLANY

It is to be expected that FCC Order 77, waiving proof-of-use of licenses until the end of the year, will receive a husky extension.

Does Order 72 forbid communication with Cuba? It does. FCC advises us that some amateurs cited for violation of 72 have professed ignorance of the fact that Cuba is a foreign country and have alleged that they were under the impression that Cuba is a territory or possession of this country. With apologies to the CM/CO gang, we point out that Cuba is a sister republic.

The AARS is handling some message traffic from service personnel in the Caribbean defense command, confined to urgent personal messages. The traffic is handled over War Department circuits from the various bases to San Juan and is there picked up by WLM and fed through the AARS. As the messages originate in "foreign countries," amateurs are inquiring whether it is OK for them to be handled. The answer is yes. The amateurs are not working foreign countries, which is what is prohibited, and the traffic is American.

FINANCIAL STATEMENT

The third quarter of the year regularly shows a loss in the business affairs of the League, because it is the time of least activity and income, while expenses continue. This year, however, because of better income and reduced expenses, the loss was less than usual, a little under $2000. At the instructions of the Board, the operating figures are here presented for your information:

<table>
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</thead>
<tbody>
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<tr>
<td>Telecommunication and collection charges</td>
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<tr>
<td>Net Revenues</td>
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STATEMENT OF REVENUE AND EXPENSES, EXCLUSIVE OF EXPENDITURES CHARGED TO APPROPRIATIONS, FOR THE THREE MONTHS ENDED SEPTEMBER 30, 1941

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<table>
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</table>

Net Loss before expenditures against appropriations | $1,866.38
ing on page 27 of last month’s QST and file it with us.

If you are in the military service in communications work, please report the fact for the ARRL roster. See page 34, November QST.

Voting membership in the League is confined to licensed amateurs residing in ARRL divisions. To permit properly classifying you, please show whether you have an amateur license (either station or operator) when joining the League or renewing membership. Since these data do not customarily accompany applications received via magazine subscription agencies, licensed amateurs should send their applications or renewals direct to ARRL headquarters.

ELECTION NOTICE

To all members of the Southeastern Division:

You are hereby advised that no eligible candidate for Southeastern Division alternate director has been nominated under the recent call. By-Law 21 provides that if no eligible nominee be named, the procedure of soliciting and nominating is to be repeated. Pursuant to that by-law, you are again solicited to name a member of the Southeastern Division as a candidate for alternate director. See the original solicitation published at page 30 of September QST and page 21 of October QST, which remains in full effect except as to dates mentioned therein: nominating petitions must now be filed at the headquarters office of the League in West Hartford, Conn., by noon E.S.T. of the 20th day of January, 1942. Voting will take place between February 1 and March 20, 1942, on ballots to be mailed from the headquarters office the first week of February. The new alternate will take office as quickly as the result of the election can be determined after February 20, 1942, and will serve for the remainder of the 1942-1943 term.

You are urged to take the initiative and file nominating petitions.

For the Board of Directors:

K. B. Warner,
Secretary

November 3, 1941

Lock-in Tubes for the Ultra-High Frequencies

New Special Tubes for the Range Above 200 Mc.

A new series of tubes recently announced by Hygrade Sylvania should prove to be of considerable interest to the u.h.f. experimenter because of their application to u.h.f. receiving and low-power transmission problems. A novel departure from past special tube construction is the use of an ordinary-sized lock-in envelope and base to house the miniature tubes, so that a receiver using the tubes might look like it had the more standard types of lock-in tubes. However, the elements are only slightly larger than those of the “acorn” tubes and they are mounted at the very bottom of the envelope, supported by the wires sealed in the base of the tube that are used as pins. The short lead length results in minimum lead inductance and enables the triode types to be operated as oscillators up to as high as from 600 to 750 Mc. Multiple cathode leads are used in some of the cathode types, and in the cathode-type triode the pin connections are designed to work into a double-ended transmission line with the tube in the center of the line. Incidentally, this pin arrangement does away with the difficulties encountered with many tubes of not being able to get perfect symmetry in a push-pull arrangement.

In the new series, a triode, diode and r.f. pentode are being made with indirectly-heated cathodes (6.3-volt heaters), and a triode and double triode with 1.4-volt filaments. An indirectly-heated cathode diode is listed for 1.4-volt operation. The 6.3-volt triode will deliver useful output as an oscillator at 600 Mc. and has been made to oscillate as high as 750 Mc. The diodes will operate as detectors up to 600 Mc. and are also useful in discriminator circuits where maintenance of capacity stability is important. The r.f. pentode will operate as high as 250 Mc., and three cathode leads are brought out the base for reducing de-

(Continued on page 64)
The receivers to be described in this article represent suggested units which comply with the requirements for the standardized 112-Mc. design mentioned last month. They are not to be considered as representing something that must be rigidly adhered to, but rather as starting points for best utilization of parts and tubes that are available. Ideas from one receiver can be utilized in another, and the ingenuity of each constructor can be given full play while following the general principles.

There are three general avenues of approach to the problem of a 112-Mc. receiver which will satisfy the requirements demanded last month; a conventional superregenerative receiver designed to minimize (not eliminate) radiation, a superregenerative receiver with a stage of r.f. amplification ahead of it, and a superheterodyne receiver capable of handling the broad signals that may be encountered on 112 Mc. Regardless of the optimism and claims of some experimenters, to date the only known way to minimize radiation from a superregenerative receiver is to keep the input to the detector as low as possible, thus reducing the amount of power available to be radiated. Trick circuits which are claimed to "eliminate" radiation simply reduce it by operating normally at a low plate voltage. Most tubes that can be made to operate as 112-Mc. superregenerative detectors show approximately the same sensitivity, but there is little question that the tubes designed for the u.h.f. range will operate properly at an input low enough to give practically no interference to other receivers in the vicinity. Such tubes as the 955, HY-615 and the new 1012 can all be used in conventional superregenerative receivers without much trouble from radiation. Our particular problem is to use the more conventional tubes that can be found in any radio store, but we heartily recommend to anyone that he build his receiver around one of the special u.h.f. tubes, providing he lays in a supply of spares that will prevent his being caught with no tube replacements if and when the time comes for him to furnish a receiver for extended periods of operation.

The t.r.f. receiver has no radiation, but here we are up against the problem of a suitable tube for the r.f. amplifier. None of the tubes that are likely to be found in any radio store show anything but a loss at 112 Mc. and, for this reason, the idea of trying to build a good t.r.f. from standard tubes was discarded from the start. On the other hand, excellent t.r.f. receivers can be built using the special u.h.f. tubes (954, 956, 9001, 9003, 1204, and possibly the new 7W7), but here again we advise not to build one unless you plan to lay in at least one or two spare tubes.

In the superheterodyne field, the logical arrangement is a simplified version of the receiver described last month by W6OVK. The use of a
converter feeding into a superregenerative detector tuned to around 20 Mc. results in a non-radiating receiver that is capable of receiving the better modulated oscillators used on 112 Mc. However, here again we meet up with the old tube bogie plus the fact that our receiving system begins to run into more tubes than the simple superregenerative type. The bare minimum of tubes would be three — combination oscillator and mixer, superregenerative second detector and high-gain audio — and this in no way eliminates the need for tuned circuits with their consequent coils and variable condensers. Further, none of the combination oscillator-mixer tubes is worth a hoot at 112 Mc., and the receiver will have a high noise level and consequent poor sensitivity. Using separate tubes for the oscillator and mixer, the outlook isn’t so bad, and a superheterodyne can be made that will give sensitivity comparable to that obtained with the simple superregenerative receiver plus somewhat better selectivity and no radiation. The 6S7 can be used for the mixer, but it doesn’t begin to compare with the 6AC7/1852 type of tube. The 6AC7/1852 is not a particularly common tube, and it isn’t inexpensive, but the amateur interested in preparedness wouldn’t let this detail stop him. The new 7W7 may work out to be a better mixer than the 6AC7, but at the time of writing none is available for experiment.

Here are several companion receivers for the 112-Mc. emergency transmitter described last month. Two of the receivers are superregenerative jobs using standard receiving tubes, and the third is a 5-tube superheterodyne with one non-standard tube (a 6AC7/1852) in it. If you have already completed the construction of the transmitter described last month, you can finish your emergency station with one of these receivers and a power supply described elsewhere in this issue. If you haven’t started on the transmitter or anything, get out your December issue of QST and find out what the thing is all about.

Three receivers are described in this article and, as mentioned before, they are not to be taken as anything ultimate but simply examples, using more-or-less standard tubes, of what will work and be satisfactory. One is a compact superregenerative receiver using a 6J5 detector and inductive tuning (to eliminate one tuning condenser). Another uses a 7A4 (a slightly better but less common tube) for the detector and has a built-in loud speaker. The third receiver is a superheterodyne, using a 6AC7 mixer and a

The left-hand side of the small receiver shows the tuning-loop assembly and the placement of some of the parts. Note the power-supply plug and the speaker binding posts at the rear of the chassis.
built-in loud speaker. All of the receivers use resistance-coupled audio amplifiers to eliminate coupling transformers, and they all include an on-off switch that can be used to control the transmitter as well, as outlined in the previous article. They are designed to operate at 300 volts (the standardized value) but they will also work at lower voltages with little or no change.

We have tried to hold down the cost of the units, by eliminating components considered to be unnecessary, and some may criticize the use of air padding and trimming condensers when the small mica compression type might have been used. If one is content to reset the trimmers every day or so he can get away with using mica trimmers, but it would seem to be more important to have a receiver which will hold its calibration more closely than is possible with the mica type of trimming condenser. Trimmers and padders are necessary to obtain adequate bandspread and to avoid too-close trimming of the coils.

**The 6J5-Detector Superregenerative Receiver**

A list of the tubes most likely to be found in every store handling radio tubes shows the 6J5 to be the only triode suitable for a 112-Mc. superregenerative detector, and consequently the most fundamental design is built around this tube as the detector. The 6F6 and 6V6 are also found in the list and are logical choices for the output tube, with the 6F6 the favorite because the screen voltage can be the same as the plate voltage at high values, thus eliminating a drop-ping resistor and by-pass condenser. The 6J5 also makes a good first audio stage for headphone output.

As can be seen from the wiring diagram in Fig. 1, the basic design consists of a 6J5 superregenerative detector followed by resistance-coupled 6J5 and 6F6 audio stages. The only unconventional thing about the circuit is the inductive tuning of the detector and possibly the resistance coupling throughout. Inductive tuning of the detector was used to eliminate one condenser and to reduce crowding in the small box into which the receiver is built. If the thought of using inductive tuning frightens anyone because of its possible complications, we hasten to assure him that the complications consist only of cutting a piece of insulating rod at a 45-degree angle and cementing a small copper washer to the cut face of the rod. But more about that later.

The receiver is built in a 3- by 4- by 5-inch metal box, with a 3- by 4-inch face serving as the panel. The panel controls are the tuning knob and the regeneration control, and the headphone jack is also mounted on the panel for convenience and symmetry. The power cable plug is mounted at the rear of the box, as are the speaker terminals. The on-off switch and the antenna terminals are mounted on the left-hand side of the box.

The detector trimmer condenser, C1, is fastened to the upper face of the box and can be adjusted from the top of the receiver. The quench-frequency r.f. choke, RFC2, is supported off the

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**Fig. 1 — Circuit diagram of the compact 112-Me. receiver.**

C1 — 25-µfd. air trimmer (Hammarlund APC-25).
C2 — 50-µfd. midget mica.
C3, C6, C7 — 0.01-µfd. paper, 600 volts.
C5, C7 — 10-µfd. electrolytic, 25 volts.
C8 — 8-µfd. electrolytic, 450 volts.
R1 — 5 megohms, ½ watt.
R2 — 25,000 ohms, ½ watt.
R3 — 0.25 megohms, ½ watt.
R4 — 1500 ohms, ½ watt.
R5 — 50,000-ohm wire-wound potentiometer.
R6, R7 — 50,000 ohms, 1 watt.
R8 — 0.1 megohms, ½ watt.
R9 — 500 ohms, 1 watt.
R10 — 2000 ohms, 10-watt wire-wound, or higher. See text.
J — Closed-circuit jack.
S1 — S.p.d.t. toggle.

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20 QST for
under side of the upper face of the box by a long screw, with a brass sleeve over the screw furnishing sufficient spacing from the box. Incidentally, this r.f. choke is rather important in all of the receivers in this article because the resistance-coupled amplifiers show but slight attenuation of the quench frequency, and the quench voltage can get through and overload the output audio tube long before the signal has overloaded it. When transformer coupling is used between detector and first audio stage the transformer keeps most of the quench out of the following stages and consequently the quench-frequency choke is not always necessary.

The wiring of the unit is quite conventional and requires only brief mention. A soldering lug at each socket furnishes a convenient ground for the components of that stage. All condensers and resistors are mounted by fastening directly to the sockets and other terminals, with the exception of one side of the coupling condenser \( C_b \), one side of which must be run down to the headphone jack through an extra length of wire. The wires running to the toggle switch should be made of extra-length flexible wire so that the side of the box can be removed without unsoldering the wires to the switch. All of the wiring should be completed before the coils \( L_1 \) and \( L_2 \) are put in place, for convenience.

The detector coil is made by winding the wire around a \( \frac{1}{2} \)-inch diameter drill or dowel for a former. The coil is then removed and the ends trimmed and bent until the coil can be soldered into place in proper alignment with the panel bushing used to support the tuning loop shaft. In our particular version we connected the plate lead of the tube socket to the rotor of the trimmer condenser by means of a short length of wire, and the coil \( L_1 \) was connected to the center of this wire and to the stator connection of the condenser. A length of \( \frac{1}{4} \)-inch shaft pushed through the shaft bearing served as a guide in soldering the coil in place, and the axis of the coil should make an angle of 45 degrees with the shaft.

The inductive tuning consists of a small copper washer cemented to the end of a \( \frac{1}{4} \)-inch shaft of insulating material (Lucite or bakelite). The end of the shaft is cut at an angle of 45 degrees to mount the washer at 45 degrees with respect to the axis of the shaft and, consequently, 180-degree rotation of the shaft turns the copper washer from a position coaxial with the coil to one at right angles to it. The copper washer, acting as a single shorted turn, decreases the effective inductance of the coil as it becomes more closely coupled and consequently tunes the system. The copper washer is made by drilling a \( \frac{3}{4} \)-inch or so hole in a small piece of sheet copper and then cutting around the hole to form a washer of \( \frac{3}{16} \)-inch outside diameter. The washer is fastened to the angled face of the shaft by Duco cement. Because the copper washer is larger than the shaft, the shaft must be pushed through the panel bearing from the inside of the box, but this can be done easily by loosening the panel bearing while sliding the shaft through. A fiber washer should be placed on the shaft before it is pushed through the panel bearing — the washer is later cemented to the shaft to serve as a collar to prevent the shaft's pulling through the bearing.

It is easier to check the performance of the receiver before the tuning loop is added, and with the large trimmer condenser used one should have no trouble hitting the 112-Mc. band after one or two tries. The trimmer will be set at about two-thirds capacity if the coil is right. The detector should go into the hiss condition when the regeneration control is advanced not more than two-thirds of its travel. It is well to try different values of capacity at \( C_a \), using the one which allows the detector to be worked at the minimum setting of the regeneration control without bypassing too much of the audio.

When the receiver is working and the tuning loop installed, the tuning range of the loop can be adjusted by moving the shaft in the panel bearing so that the loop is nearer to or farther from the coil. Moving the loop closer will increase the tuning range. It will be found that the tuning rate is slow when the loop is at right angles to...
The 7A4 superregenerative receiver with built-in speaker has the detector trimming condenser mounted on the side. The audio gain control is mounted next to the tuning control (extreme left) and the regeneration control is between the volume control and the 'phones jack and on-off switch.

spread, the fiber washer can be fastened to the shaft with Duco cement. When this is dry, the dial or knob can be attached to the outside end of the shaft. Unless you are lucky, there will be some play of the shaft in the bearing, resulting in a "sloppy" feeling to the tuning control. This can be cured by slipping two metal washers and a half-slice of rubber grommet on the shaft before the dial is slipped on. The dial set screw should be tightened when the shaft is being pushed out from the inside — the spring of the rubber grommet will then hold the collar (fiber washer) tightly against the inside of the panel bearing and will result in a tuning control that is firm without being sticky and which will stay put in any position. Fortunately, a common size of rubber grommet has a ¾-inch hole so that the whole thing works out nicely. Don't put the grommet between the two washers — put the washers on first and the grommet next to the dial. If desired, a paper scale can be glued to the box and the megacycle and half megacycle points marked on it, for ease in spotting other stations and for convenient resetting.

The antenna coupling should be adjusted with the antenna connected, and it should be made as

The coil and becomes faster as the loop and coil become more nearly coaxial. It is therefore advisable to set the band and bandspread so that the receiver tunes from about 111.5 to 119 Mc., since this will spread the amateur band over the main portion of the dial. When the shaft position has been found that will give the proper band-

Fig. 2 — Wiring diagram of the 7A4 superregenerative receiver.

Antenna

Amb. — L2

7A4

6J5

6F6

Speaker

To Heaters

MALE PLUG

C1 — 25-μfd. air trimmer (Hammarlund APC-25).
C2 — 5-μfd. tuning condenser (National UM-15 with 2 stator plates and 2 rotor plates removed).
C3 — 50-μfd. midget mica.
C4 — 0.006-μfd. mica.
C5, C6 — 0.01-μfd. paper, 600 volts.
C7, C8 — 10-μfd. electrolytic, 25 volts.
C9 — 8-μfd. electrolytic, 450 volts.
R1 — 5 megohms, ½ watt.
R2 — 5,000 ohms, 1 watt.
R3 — 0.5-megohm volume control.
R4 — 50,000-ohm wire-wound potentiometer.
R5 — 1500 ohms, ½ watt.
R6 — 50,000 ohms, 1 watt.
R7 — 0.1 megohm, ½ watt.
R9 — 500 ohms, 1 watt.
R10 — 2000 ohms, 10-watt wire-wound, or higher. See text.
R11 — Closed-circuit jack.
RFC1 — U.h.f. r.f. choke (Ohmite Z-1).
RFC2 — 80-mh. r.f. choke (Meissner 19-2709).
S1 — S.p.d.t. toggle.
T1 — Output matching transformer.
Speaker — 4-inch p.m. speaker.
L1 — 1¾ turns No. 14 enam., ½-inch inside diam., spaced diam. of wire.
L2 — 3¾ turns No. 14 enam., ½-inch inside diam.
tight as possible consistent with some reserve in the regeneration control, to take care of low voltages and other variables. As a final touch, several different detector tubes can be tried—the one which operates with the minimum setting of the regeneration control will be the best and will give the least radiation. New tubes of one make don’t vary much, but old tubes and tubes of different manufacture will vary somewhat.

Our particular rig gave somewhat smoother regeneration by the addition of a 0.002-µfd. condenser from the audio side of RFC2 to ground, but this may not be necessary in every case and so wasn’t shown in the diagram.

A 7A4 Superregenerative Receiver With Built-In Speaker

The second receiver, shown in the photographs and in Fig. 2, is a slightly more elaborate affair which differs from the first receiver mainly in the inclusion of an audio volume control and a built-in loud speaker. Minor differences include the use of a 7A4 detector (a slightly better but less common tube than the 6J5) and condenser instead of inductive tuning.

The receiver is built in a 10- by 5- by 3-inch chassis, with the tubes and speaker mounted on the 5- by 10-inch face. One side is used for a panel and the opposite side is left clean, in case one wishes to operate with the receiver resting on this side. The antenna terminals and the detector padding condenser are mounted on the left-hand side, and the four-prong power plug is mounted on the right-hand side. The only care necessary in laying out the chassis is to mount the tuning condenser and the padding condenser in such positions that their respective terminals come close together, to make the leads as short as possible. The tuning condenser, C1, is supported back of the panel on long (1½-inch) 6-32 screws, and the padding condenser is mounted directly on the side of the chassis. A bakelite shaft extension is fastened to the tuning condenser shaft and brought out through a panel bearing. The quench r.f. choke, RFC2, is supported between the two audio tube sockets on a ½-inch pillar.

Holes for the speaker can be arranged in any design that suits the aesthetic taste of the builder—the main thing is to provide enough opening for the speaker to work through. In both of the receivers described here with built-in speakers the grille cloth is backed up by ¾-inch mesh wire screen to reduce the chances of damage to the speaker cone.

The same rules for wiring are followed in this receiver as in the first one described—each socket has a soldering lug placed under one screw, and all of the grounds for that particular stage are made to the lug. Most of the resistors and condensers can be mounted directly on tube or variable resistor terminals, and the entire wiring is sturdy, with the possible exception of the long speaker-transformer leads.

The coil, L1, can be trimmed slightly by squeezing the turns together or pulling them apart until the desired amount of bandspread is obtained, but aside from this and the adjustment of the antenna coupling there should be no need for any work on the rig. The antenna adjustment is made by moving the antenna coil, L2, closer to L1 until the regeneration control must be set at about 2½ on for “supering” to start. This adjustment is of course made with the antenna connected.

For the experimentally inclined, different values of C4 can be tried, in an effort to bring the regeneration point down to as low a setting as possible on the control. As pointed out before,
A five-tube superheterodyne receiver for 112-Mc. The large dial controls the main tuning condenser and the small dial is for adjustment of the mixer input tuning. The tube just above the mixer tuning is the 6AC7 mixer—the i.f. adjustment is for the 6J5 detector. The tube directly above the main tuning dial is the 6J5 high-frequency oscillator—to its left can be seen the oscillator padding condenser control. The two small knobs control volume (left) and regeneration.

A Superheterodyne for 112 Mc.

The superheterodyne shown in the photographs and in Fig. 3 is somewhat more complicated and expensive than the receivers just described, but it is entirely free from radiation (in the 112-Mc. band) and it has more selectivity than a simple superregenerative receiver. Its sensitivity is comparable to that of either of the other receivers, and its only possible drawback, aside from its expense and slight complication, is the fact that it uses a 6AC7/1852, a more expensive tube than any of the others and one that is not to be found in every radio store. More common tubes were tried as the lower the input to the detector, the less will be the radiation from the receiver.

Fig. 3 — Wiring diagram of the 112-Mc. superheterodyne receiver.

- C2 - 30-µfd. variable mica trimmer (Hammarlund MEX or equivalent).
- C3 - 10-µfd. midget variable (Hammarlund HF-15 with one stator and one rotor plate removed).
- C4 - 25-µfd. air padding condenser (Hammarlund APC-25).
- C5, C6, C7, C8 - 0.005-µfd. midget mica.
- C9, C10 - 50-µfd. midget mica.
- C11 - 25-µfd. air trimmer (Hammarlund APC-75).
- C12 - 25-µfd. low-drift mica.
- C13 - 0.006-µfd. midget mica.
- C14, C15 - 0.01-µfd. paper, 600 volts.
- C16 - 10-µfd. electrolytic, 25 volts.
- C17 - 8-µfd. electrolytic, 450 volts.
- R1 - 300 ohms, ½ watt.
- R2 - 10,000 ohms, ½ watt.
- R3, R4, R5, R11 - 0.1 megohms, 1 watt.
- R6, R7 - 10,000 ohms, 1 watt.
- R8 - 4 megohms, ½ watt.
- R9 - 50,000-ohm wire-wound potentiometer.
- R12 - 0.05-megohm volume control.
- R13 - 1500 ohms, ⅜ watt.
- R14 - 50 ohms, 1 watt.
- R15 - 50 ohms, 1 watt.
- R16 - 750 ohms, 10-watt wire-wound, or higher. See text.
- J - Closed-circuit jack.
- S1 - S.p.d.t. toggle switch.
- T1 - Output matching transformer.

- Speaker - 4-inch p.m. speaker.
- RFC1 - 2.5-mh. r.f. choke (National R-100).
- L2 - 2 turns No. 18 enam. interwound with L1 at ground end.
- L3 - Same as L1; cathode tap ⅜-turn from ground end.
- L4 - 8 turns No. 18 d.c.c. close-wound.
- L5 - 12 turns No. 18 d.c.c. close-wound.
- L6 and L7 are wound on ¾-inch diam. polystyrene form (National PRE-3 and are spaced ¾-inch apart. See text.
mixer but the performance was so inferior that it could not be accepted. However, the receiver is highly recommended to any group which expects to be working at real close quarters where receiver QRM might be a problem. The improvement in selectivity is quite noticeable when the receiver is compared with a straight superregenerative receiver having similar bandspread, and the superheterodyne would be well worth considering by groups in large population centers because of the possibility of many nets working on different frequencies at the same time.

As can be seen from Fig. 3, the mixer is a 6AC7/1852, tuned to the 112-Mc. band by $C_1$, and the oscillator is a 6J5 tuned approximately 20 Mc. lower. The difference signal is coupled to the second detector (a superregenerative 6J5) through the transformer $L_4-L_5$. It will be noted that this i.f. transformer uses one fixed condenser and one variable condenser for tuning, since it doesn’t much matter what the i.f. works out to be within rather wide limits. The primary is simply resonated to whatever frequency the secondary coil/condenser combination happens to hit. The 6J5 second detector then works into a two-stage resistance-coupled amplifier as in the other receivers.

The receiver is built on a 5- by 10- by 3-inch chassis. A good idea of the arrangement of parts can be obtained from the photographs, and only a few points need mentioning. The oscillator coupling condenser, $C_2$, is supported between the mixer tuning condenser and the oscillator bandset condenser. The i.f. transformer is fastened to the side of the chassis. Its coils are wound on the polystyrene form and held in place by cement, the ends of the coils not being run through holes in the form as is usually the case. It is a simple matter to wind the coils with extra wire at either end and bring these ends away from the coil, and then the coil proper can be fastened with cement or dope. The quench choke is supported on a brass pillar as in the other receivers.

Lining up the receiver is a relatively easy affair and shouldn’t frighten even the newest amateur strange to the ways of the superheterodyne. The 6J5 oscillator tube should be removed from its socket during the first trials and no antennas need be connected. As the regeneration control is advanced, the detector should start to work as any conventional superregenerative detector, and a hiss will be heard. Tuning the primary condenser of the i.f. transformer, $C_9$, it will be found that the hiss stops and that the regeneration control will have to be advanced further. Juggling the two controls, the setting of $C_9$ should be used that requires the maximum advance of the regeneration control, since as the primary is brought into resonance the voltage will have to be increased on the detector to make it “super.” If the coupling is too tight between $L_4$ and $L_5$, a setting of $C_9$ will be found at which it will be impossible to make the detector “super,” and $C_9$ should be set a little to one side or the other of this setting, at a point where the regeneration control must be well advanced. If one makes the primary ($L_4$) capable of being slid along the form (as we did), the coupling can be varied until the proper coupling is obtained, but if one follows the dimensions in Fig. 3 no trouble should be experienced. If one has an absorption-type wavemeter or an all-wave receiver he can check the frequency of the second detector — if it is around 18–22 Mc. it will be satisfactory.

Once the second detector is lined up as de-

(Continued on page 80)
Fort Monmouth's Own Ham Station

W20EC Operated at Signal Corps Radio School by Soldier Hams

BY S. GORDON TAYLOR, W2JCR*

The hundreds of amateurs who have contacted W20EC and the many hundreds of others who are likely to do so in months to come may be interested to learn something of this unusual station and its mission in life.

* 2505 Aqueduct Ave., New York City.

W20EC is located at the Radio School of the Signal Corps Replacement Training Center at Fort Monmouth, N. J. It is entirely government equipped and owned, yet is strictly a ham station in every sense of the word. It contacts only other ham stations, operates only on the ham bands, and is even licensed under the name of the in-

Upper right — The antenna site at W20EC is a swampy area several hundred feet from the shack. Two of the four 70-foot poles which support doublets for the 20, 40, 75, 80 and 160 meter-bands may be seen. The wood runways in the foreground carry the concentric lines out over the swamp from the point where they emerge from the ground.

Upper left — The rotary beam used for 20 meters has been elevated on a 65-foot pole since this picture was taken.

Lower left — General view of the two operating positions at W20EC. In the foreground Staff Sgt. M. L. Fisher is scanning the ether at the controls of the SX-28 while Tech. Sgt. Foster types incoming and relay traffic at the NC-200 position. The black cabinets in each position are the HT-5 preamplifiers.

Lower right — A code class at Fort Monmouth. There are five such classes of 120 men each. These are graded for different code speeds, and trainees progress from one to another as their speed warrants.
individual officer in charge — himself an old-time ham. It is likewise operated entirely by licensed amateurs drawn from the rookies in training at the Radio School and other schools of the Replacement Center, and from the Radio School’s staff.

Its major variance from the typical ham layout is found in the completeness of the equipment, the flexibility of operation and in the efficient planning of everything pertaining to the station. Its purpose, too, is a little unusual in that it was established primarily to handle messages, via amateur radio, between the thousands of men in training at Fort Monmouth and their homes. Its secondary purpose is to provide operating practice and recreation for trainees who are licensed hams. These can assist in handling traffic, carry on personal rag-chews or participate in relay work, and are at liberty to operate the station during their leisure hours.

To insure effective facilities for traffic handling, W2OEC has two completely equipped operating positions, each with its own communications receiver and 450-watt transmitter. These transmitters are equipped for operation on all ham bands from 10 to 160 meters. Thus the two operating positions are entirely independent of one another so that two separate QSO’s can be carried on at the same time, providing normal precautions are taken so far as frequency separation is concerned.

One group of antennas is located several hundred feet from the shack and includes half-wave doublets for 20, 40, 75, 80 and 160 meters. These are suspended from four 72-foot wood poles arranged in a great diamond. They are fed by individual concentric lines extending underground from the shack to the antenna site where they match into low-impedance cables. Near the shack is a Mims’s 20-meter rotary beam. This is mounted atop a 65-foot wood pole and is rotated electrically from the operating table, where a coupled direction indicator dial shows the precise position at all times.

All feeders run to a terminal board in the shack. This accommodates terminal fixtures, relays, and the air filters and pumps by means of which the concentric lines are maintained automatically at an internal pressure of 50 lbs., dry air.

The station is under the supervision of 1st Lt. Preston W. Simms (W9DTF-W2KWH-W2OEC) and is in the direct charge of Tech. Sgt. A. L. Foster (K7BAQ-W7BAQ). The latter, after 27 years in Alaska as an operator in the Signal Corps and a ham of 13 years standing, still gets a real kick out of ham radio. The only drawback is that his code speed is getting slightly rusty — having tapered off to something in the vicinity of 50 w.p.m.!

W2OEC dispatches messages from the men at Fort Monmouth, accepts incoming messages for them, and is always ready to cooperate in general relay work. It also maintains schedules in both the Washington and New Jersey AARS nets.

To hams who are worried lest amateur radio be closed down during these troublesome times, the fact that the Signal Corps has established its own amateur station at this time should be encouraging. It certainly would seem to indicate that ham radio is to remain a going concern, at least so far as the Army is able to see ahead.

Lt. P. W. Simms, Officer in Charge of W2OEC, at the mike. The standard Hallicrafters HT-4 transmitter, which is duplicated in the other operating position, is shown at the extreme right. This operates on five bands and puts out 450 watts on c.w.; 325 watts on 'phone. At the extreme left is a Meissner de luxe Signal Shifter (only partly showing) and next to it a multiple frequency standard for c.c. frequency checking. Note the convenient layout, with a place for everything and everything in its place.

CHRISTMAS

Greetings

from the Crew

TO ALL HAMS

at Headquarters

BOUND VOLUME XXV OF ‘QST’

We have a limited number of Bound Volume XXV of QST. This volume is made up in two sections, each containing six issues of 1941 QST. Handsomely bound and gold imprinted the complete volume is priced at $7.50, postpaid.

P.O.W.

It is reported that the following amateurs are being held as prisoners of war:

F. Lt. F. H. Babcock, GSLI, Kingswood, Surrey A.C. 1 M. R. Campbell, VK3MR, West Coburg, Australia.

THANKS to the Carolinas' amateurs on 75 'phone who cleared the bands for us upon our recent 'invasion,'" says Dan Hamilton, op of the 68th Armored Regt., Ft. Benning, "especially though his QRM was causing us little trouble." The gentleman in Columbia who moved even recent 'invasion,'" says Dan Hamilton, op of the War Department could shouldn't be all picnic, either. 'phone who cleared the bands for us upon our chase us hams out if it wanted, you know. messengers let go unmolested by the opposing forcesthe presence of amateurs in channels being no one builds their bridges for them, nor are their messages let go unmolested by the opposing forces — and the radiocommunications work shouldn't be all picnic, either. Speaking of the maneuvers, Pvt. Bent, 1JPK, was operating for the 57th Sig. Bn. of Ft. Bragg, when his superior filed a message to a nearby station concerning an attack of "enemy" troops coming his way. OM Bent sent the message through terrific atmospherics, but the only portion of the acknowledgment he could copy through the X was, "I'm going to ZGR for chow." Seems as if the lad believed Napoleon's statement that "any Army marches on its stomach!"

SIGNAL CORPS


NAVY

In the services, hams can't get away from radio, apparently. RM3c Hanes, 9JX, was hospitalized at San Diego off the New Mexico; it wasn't long before he was placed in charge of the hospital radio installation with its 600 sets of headphone lines to the various rooms! At the Naval Training School in San Diego, 1st Ross, 6UGI, Vacovelli, 1KKB, and Schmidt, 5JYE, are studying communications subjects. At the Los Angeles school we find Lt. (g) Brooks, 6CHU; Ena. Baranger, 6MC0; RM3c Redler, 9UX; Spargo, 6BLY; Capt. Weiss, 6DVL; Bailey, 6ACM; Wilson, 9LTH; Blatchford, 6TZG; Byrds, 6UAS; Perkins, 6UAJ; McClellan, 6KDY; Morrison; Baker, 7HB; Russell, 6TPT; Stowe, 9WVS; and Worthey, 5JZP. Enrolled in special work at M. I. T. are Ensigns Headrick, 5CIB, and Conte, 5RJL. Students at the Naval Material School, Washington, include Sgt. Wade, 6UST (Marine Corpse); RM1c Reville, 1MVO; West, 9PZ; RM2c Welting, 9FDZ; and White, 7HFP. New arrivals at Noroton, Conn., are CRM Sowers, 2BYL; RM3c Redler, 9SDK; Seamen Honeycutt, 4IBF; Asher, 2NXB; Stangell, 2JZJ; and Roulland, 1MQD.

Reunion

Noticing the stray in November QST concerning William Low Watt Webster, W4HJQ, R. B. Murphy, W4IP, of Miami, began wondering if he could be a 1922 Navy buddy of the same name. He called "Doo" Kane, W4KK, to see if he chanced to know W4HJQ and was amazed to discover that "Doo" had a daily schedule with him. When W4KK referred to Webster as the "red-head," OM Murphy knew he was on the right track, and he was at W4KK's that very evening to work his old buddy on the schedule — a get-together for the first time since 1922 when they parted company in Canton, China.

Which reminds us that one evening recently, a consciencious amateur observer overheard W4HJQ talking about war matters, mentioning the location of battleships, telling of the transfer of Admiral — to the Pacific fleet, and so forth. We were aghast to learn upon receiving the observer's report that a Navy CRM would be discussing such subjects over the air and immediately wrote "Low Watt" please to discontinue that sort of conversation so's not to get the military departments peeved at us. Imagine our embarrassment to learn from Webster's reply that he was speaking of events in World War I, that the mentioned boats were since out of commission or under different names, and that Admiral — has been dead for fourteen years!

After attending the radio engineering school at Bowdoin College, Brunswick, Maine, these officers went to the Naval Radio Laboratories at Anacostia, D. C., for further duties in the post signal office at Ft. Benning, Ga. At Ft. Monmouth we find Lt. (g) Headrick, 5CIB; Ensigns Baluta, 2BMM; Mayer, 3FN; Rankin, 4EFU; Harlow, 5CVO; Spencer, 6INL; Bisy, 6NCO; Bookman, 6TIV; Hess, 9SRZ; and Burds, 9TZ. Ena. Brown, 8SMP-GHEL, is a new arrival at Bob­doin. Lt. (g) Cheek, 4ADN, is Asst. D.C.O. in San Juan, P. E. CRM Stein, 3CL, awaits completion of the Cape May radio station, whose operation he is to supervise. Lt. (g)
Predicted Distance Ranges for Amateur Radio Communication in January, February, and March, 1942

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D. C.

These predictions are for distance ranges in four amateur frequency bands, regularly useful for long-distance sky-wave transmission during January, February, and March, 1942. They are based on long-distance reception observations at various places and on ionosphere and field-intensity measurements at Washington. They apply specifically to paths traversing the latitudes of continental United States, but can also be used to indicate roughly conditions over somewhat wider latitudes. For information on radio-wave transmission see pamphlets obtainable from National Bureau of Standards, Washington, D. C., "Radio transmission and the ionosphere," and "Distance ranges of radio waves."

The graphs show both the upper limits of useful distance and the skip distances. The dotted-line graphs represent the upper limits of useful distance. In general, for greater distances the wave energy is so much absorbed that transmission is not good.

The solid lines on the graphs for 7 and 14 Mc. show the skip region; the horizontal solid lines shown at distances of a few miles indicate the upper limit of distance covered by ground wave only, and the remainder of the solid-line graphs

Fig. 1. Distance ranges for radio wave propagation via the regular layers of the ionosphere, predicted for January 1942. The solid-line graphs show the skip region; the dotted-line graphs show the upper limits of useful distance. The 28- and 56-Mc. bands will be useful only for local transmission (optical and quasi-optical paths).

Fig. 2. Distance ranges for radio-wave propagation via the regular layers of the ionosphere, predicted for February 1942. The solid-line graphs show the skip region; the dotted-line graphs show the upper limits of useful distance. The 28- and 56-Mc. bands will be useful only for local transmission (optical and quasi-optical paths).
indicates the skip distance. Good transmission is not regularly possible within this region, which is marked "skip" on the graphs, but sporadic and weak fluttery ("scattered") transmission is at times achieved there.

The dotted-line graphs are labeled "phone" and "c.w." They differ because a greater field intensity is needed for 'phone reception than for c.w. reception. These curves are based on 100 watts radiated power, both for 'phone and c.w. Higher-power transmitters can transmit to distances greater than shown by the graphs; lower-power transmitters to distances not so great. For example, in order to produce a good c.w. signal at the distance shown for 'phone, a power of but 2 watts would be necessary; to produce a good 'phone signal at the distances shown for c.w., a power of about 8 kilowatts would be required.

The graphs of upper limit of useful distance are shown as definite lines but they are merely averages of conditions which vary widely. Variations at the receiving station, of "static," type of receiver, antenna directivity, and other conditions may cause the distance ranges to vary by a factor of two or more. These graphs are for ionospherically quiet days; on days of ionosphere storms the distance ranges may be considerably less.

The skip-distance graphs are also averages for ionospherically quiet days, and may vary from day to day as much as 25% from the values shown. For example, at 6 P.M. on a day in March, 1942, the average skip distance on 14 Mc. will be 1200 miles; the skip distance will almost always be greater than 900 miles and almost never greater than 1500 miles. These variations are caused by changes in the ionosphere, and not by conditions at the receiving station. On ionosphere-storm days the skip distances will be considerably greater than the average.

As an example of the use of the graphs, let us consider the 7-Mc. band at 0800 in February, 1942. Ground-wave transmission will be regularly useful out to about 50 miles. From here out to 400 miles, transmission by the regular layers will not be possible because of skip. In the range from 400 to 1100 miles 'phone transmission will be good, and in the range from 400 to 1700 miles c.w. transmission will be good. The intensity decreases gradually with distance in this range, and beyond 400 miles for 100-watt 'phone and 1700 miles for 100-watt c.w., the intensity becomes too small, because of absorption, to be useful.

In using the graphs, the time to be used is the local time at the midpoint of the path. For example, a station in Nebraska wishing to transmit to Washington, D. C., at 0800 CST (about 0730 Nebraska local time and 0900 Washington local time) would have to consult the distance-range curves for 0815, while if he wished to transmit to San Francisco at the same time (0600 San Francisco local time) he would have to consult the curves for 0645. It should be noted, however, that transmission conditions are the same in opposite directions over the same path at the same time. Provided receiving conditions and apparatus are not widely different at the two ends of the path, if a station can be heard it can be worked.

Winter-type transmission conditions will prevail during January, February, and part of March; these include greater distance ranges because of low absorption and low "static," and skip distances short during the day and great at night, for transmission via the regular layers. No regular 28-Mc. transmission will occur, and indeed no more such transmission may now be expected for several years, because of the relatively low solar activity associated with the approaching sunspot minimum. The month of March will mark the beginning of a transition from winter to summer conditions, characterized by smaller distance ranges because of greater absorption and greater "static," and lengthening of the daytime skip distance and shortening of the night skip distance. In March, also, there may be expected an increase in ionospheric storminess, which is usually small during the winter; this causes both longer skip distances and shorter distance ranges, and thus decreases the distances over which good transmission is possible.

The 28- and 56-Mc. bands will be useful only for local transmission (optical and quasi-optical paths),
Perspective: There are to be more than 400 USO units over the nation, each near an Army camp or Navy base. Responsibility for their operation is apportioned amongst the agencies which constitute USO: YMCA, NCCS, Salvation Army, Jewish Welfare Board and YWCA — with National Travelers Aid Assn. collaborating. The facilities of all centers are available to any member of the military forces. NCCS has been the first agency to get going with amateur stations at the centers assigned to it. Some of the other agencies plan a similar course and are already utilizing amateur radio operators and facilities for establishing contacts between service men and their families. This article reports the NCCS program and the opening of its first station.

Amateur radio is playing a vital part in the program of those United Service Organization clubs which are operated by the National Catholic Community Service. Early in November, the first USO amateur radio station in the nation was dedicated in the USO club operated by the NCCS at New London, Conn. With the approval of the chairman of FCC and the general staffs of the Army and Navy, NCCS has entered the field of amateur radio both as an adjunct to its wide educational program and as a service to the men of the armed forces. Its rapid progress is accounted for by a brief glance at its personnel. Dr. Franklin Dunham, its executive director, is on leave of absence from the educational directorship of the National Broadcasting System. Working with him in administering the nationwide radio project is Martin H. Work, NCCS radio consultant on leave from Hollywood writing-producing duties.

The American public officially began hearing about the program with the nationwide broadcast of the dedicatory ceremonies of the first USO amateur station at New London, November 10th. Warmly received by army and navy officials, the station was assigned the call WINTV. During the Mutual Broadcasting System broadcast of the ceremonies, Major General Dawson Olmstead, chief of the Army Signal Corps, spoke via a special hook-up from the studios of WOL in Washington. His message was given in connection with the thirteenth annual Armistice Day message contest as transmitted from the AARS net control station WLM–W3USA. Others on the broadcast were Rear Admiral Clark H. Woodward, attached to the Office of Civilian Defense; W. Spencer Robertson, chairman of the executive committee of USO; and Miss Carol Bruce, screen and stage star. The station was blessed with the liturgical ceremony used last by Pope Pius XI in dedicating the Vatican radio station HVJ.

As indicated in a recent issue of QST, the USO-NCCS stations will work in conjunction with ARRL nets and the AARS. Using these two networks to relay messages, NCCS installs its specially-constructed stations in its clubs located next to military and naval posts and bases. The equipment is placed at the service of the man in uniform as a means of providing him a message service to his family and friends, and many soldiers have contacted and received answers from their families within a 20-minute interval. The use of the amateur net-works will prove a great aid in maintaining morale, according to Army and Navy officials.

Novel equipment for the USO-NCCS stations is nearing completion at Erco Radio Laboratories (Edward Ruth), Hempstead, L. I. The NCCS expects to install at least 125 of these standard stations throughout the United States and possessions, at a cost of about $400 each. The new gear houses both transmitter and receiver in one modernistic steel cabinet, compact enough to sit on a standard writing desk with plenty of space

(Continued on page 60)
EXCEPT for a brief opening of the five-meter band on the evening of November 1st, the Ninth U.H.F. Roundup was a rather quiet affair. Over most of the country there was little, if any, atmospheric bending, with the result that long relays (except for a few which were completed by snappy work when Five was open) were almost completely lacking.

A message from W9ZHB, Zearing, Ill., addressed to W1HDQ, made the grade when W2BYM worked ZHB. Another, addressed “to any East-Coast station” by W9NFM, Solon, Iowa, was taken by W3AXU and relayed, via your conductor, to W1DJ, Winthrop, Mass. A complete round-trip from W3AXC, South Boundbrook, N. J., to W1MEP/1, Glastenbury Mt., Vermont, and return consumed less than fifteen minutes. Out in Arizona, W6Q1Z/6, W9KBM/6, W6PCB/6, and W6QVK had a circuit of nearly 300 miles functioning entirely on 112 Mc. Some very respectable scores were run up on 112 Mc. in the New York, Boston, and Chicago areas, and we even had some reports of 112-Mc. participation by W4’s AQ, HAD, FYI, and BYR in Tampa. But on the whole the response was not all that we had hoped for.

These Relays always thaw out quite a bit of extra activity, but very few operators seem to go in for active participation, and even fewer take the trouble to report results. Whether these u.h.f. contests are continued or not will depend upon you — the fellows (and girls, for we have a few u.h.f.-minded YLs now) who work the various u.h.f. bands. Do you want this sort of activity? If so let’s have your suggestions — and your reports! The Marathon, thoroughly established as a successful and popular activity, will be continued in 1942 with only minor changes. Rules appear elsewhere in this issue.

Aurora and sporadic-E DX were combined in one evening on Oct. 31st. Distortion of ‘phone signals coming over anything but purely visual paths was in evidence most of the time between 7 and 9 p.m., and quite a number of c.w. contacts were made over the usual aurora distances in W1, 2, 3, 8, and 9. In general it was a mild workout in comparison to the splurge of Sept. 18th and activity quieted down by 9:30. Suddenly, around 10:45, Ten began to show some really short skip, and a “CQ-DX” on Five netted your conductor a new state when W9RBK, Newport, Ky., came back. Yes, it appears that band openings can happen anytime! Apparently Five was open for a period of about thirty minutes, but activity was practically nil and no other contacts have been reported, though skip signals were heard by W1LSN and W2BYM at this time.

Realization of the part that u.h.f. operation must play in civilian protection, and a general awakening to the fact that actual real-life use of our services may not be far off, have resulted in some very serious effort directed toward perfecting our local organizations in many parts of the country. Here are scattered progress reports:

Schenectady, N. Y. — W2HZL, Assistant E. C. for u.h.f., reports 112-Mc. drills each Wednesday night. W2’s BRS, BKW, MJT, IOP, KUG, GYV, NAD, KSA, GTO, CYW, MSX, HCV, HZL, W8SFC/2, W8EOP/2, W8SVA/2 and W1MEP, getting practice in handling plain and numbered-text messages. Outlet to New England via W1MEP, Glastenbury Mountain, Vermont.


New Jersey — AARRS 112-Mc. New Jersey Net meets Mondays at 7:45 following ZCVA and ZCZV rebroadcast by W20EN and W3HOI. Ten members at present.

Rochester, N. Y. — W2NNT/8 reports 112-Mc. Net in process of organization. About twelve stations to start, with more soon.

Chicago — W9PNV reports appointment of W9FXK by Mayor Kelly as coordinator of CD communications. Ten fixed and four mobile stations at present taking part in drills, with a great increase in participation expected in the near future.

No close spacing for W2CUZ, Yonkers, N. Y. Radiator is “T” fed, with reflector and two directors ¼-wave spaced. Elements are two-inch copper pipe. Note bonding wire connecting center of each element for complete grounding.
Waialua, Hawaii — K6MVV reports that he and K6PR are equipped for mobile service on 56 Mc. W6PCF and K6EWA have gear for 56 Mc. nearly completed. This group is interested in making connections with stations in and around Honolulu for emergency work on Five.

Springfield, Mass. — 56-Mc. Net demonstrated, in first workout Nov. 6th, that it offers Springfield a reliable auxiliary cruiser-car system. W1KK, operating a 25-watt rig from Municipal Tower, directed mobile stations AZ, NE, DNT, AVK, IOZ, and DY to spots which are notably difficult for the city's cruiser cars. The boys came through in such convincing fashion as to leave no doubt of their dependability in any emergency which might disrupt the local police radio system. Complete mobilization of all amateur facilities now under way in regular meetings and over-the-air discussions.

One of the greatest problems we have to face is the lack of suitable emergency power supplies in anything like the quantity we need. One solution lies in the salvaging of the vibrator packs and genemotors are already hard to get, and soon may be completely unavailable. We shall have to learn to be resourceful in our adaptation of existing gear, once more, as were in anything like the quantity we need. One over-the-air discussions.

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The 4-element array of W6CIR, Aliquippa, Pa., is 82 feet above ground. It is of the W6QLZ design.

the band. Those 600 watts to TW-150s, Hallcrafters S-27 receiver with acorn preselector (a re-vamped National One-Ten), and 8-element vertical array don't do any harm, either! Other 4-element arrays are seeing service at W3AXU, Trenton, N. J., and W3OR, Easington, Pa. The latter has his rigged up so that it can be used in any position; horizontal, vertical, and points in between. The whole structure weighs 375 pounds and has stood an additional human load of 857 pounds! It is 57 feet off ground.

One of the huskiest 112-Mo. signals from out on Long Island is that of W2GAH, Westhampton Beach. Joe runs about 100 watts to 812s feeding a dipole 50 feet off ground. A beam of some sort is soon to go up to 110 feet. W3HOH, more than 100 miles distant, reports reception of W2GAH consistently. Ken says that numerous crystal rigs of moderate power, many of them using 815 finals, are appearing on 2½; and converters are becoming more popular, particularly on the New Jersey side of the Hudson.

W2OEN, Middletown, N. J., is now using f.m. With about five watts of carrier, excellent reports are being received from stations having f.m. or r.c. superhet. "Mid" notes an increase in the use of m.o.w. on 2½. W3BBBD/2 has a 75-watt f.m. rig at Eatontown, N. J. He hails from Fargo, N. D., and is now at the Signal Corps Lab. at Ft. Monmouth.

North Carolina has been one of the few states having no representation on Five in recent times. This condition is now remedied by W4HEH of Greensboro, who got going in the September aurora session to give W0ZHB another state. W2AMJ was heard, but a dinner was scheduled for ARR'L's Budlong that night, so Smith could not get in on all the fun. (Note to League officials: Stay out of North Carolina during aurora displays — that's one state we haven't got yet!) Rig at W4HSF ends up with T-40s at 250 watts, feeding a 4-element Ozark-Net array.

**HERE AND THERE:**

This emphasis placed on working DX on Five in recent years has undoubtedly brought many to the band who would otherwise never have taken the trouble, but it has had one bad effect — it has caused many of us to lose sight of the fact that, after all is said and done, Five is still a local band. DX is swell, but unless we keep our own local circle active the population of the band dwindles to a point where no stations active when the conditions break. And local activity, by itself, is worth some real effort to keep going.

Activity, like charity, begins at home. Such was the idea in back of the organization of "The Horsetraders" as a local Five-meter group back in 1935. This nebulous organization, unique in that it has no constitution, no bylaws, no officers, and no treasury, has served well the ideal of good fellowship on Five. It has now grown to include members scattered from Boston to Washington, D. C., with "honorary members" all over the country. It even boasts two British members in G2IS and GM6RG. Each Tuesday night the gang convenes on Five under the guidance of local key stations: W1FLA in the Connectisc Valley, W2AMJ in the New York-New Jersey section, and W9OR for the W9s. Participation in these roundups is not confined to actual members; the meetings are open to anyone interested in the promotion of activity on Five. Want to renew acquaintances, ask some questions, try out a new antenna, or just enjoy a friendly evening with the gang? Then put that rig on Five next Tuesday at 7:30 and watch for "CQ Horsetraders" from one of the three stations mentioned above.

You'll have plenty of company! Probably the most duplicated directive array in use on Five is the 4-element "W6QLZ Beam." Following its description in QST last May this antenna has appeared in all sections of the country. Probably no user has been more successful than W2BHY, Lakehurst, N. J. A glance at Mel's Marathon score, especially the states-worked column, is ample proof of the performance of the antenna. It also proves that here is one of the most on-the-job guys on Five. We doubt if Mel has missed a single band opening this year and his local coverage is the best of any W2 now active on the band. Those 600 watts to TW-150s, Hallcrafters S-27 receiver with acorn preselector (a re-vamped National One-Ten), and 8-element vertical array don't do any harm, either! Other 4-element arrays are seeing service at W3AXU, Trenton, N. J., and W3OR, Easington, Pa. The latter has his rigged up so that it can be used in any position; horizontal, vertical, and points in between. The whole structure weighs 375 pounds and has stood an additional human load of 857 pounds! It is 57 feet off ground.

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For those who have listened expectantly for hours, hearing nonstop "other haywire, we blush to admit; but here and there this 2½, too many curtain rods, fishpoles, and beams are doing good work, both with and without parasitic gear and antennas at each end, has helped to bring a vertically-polarized signal finally made the grade on the grade on 107 Mc.; W6QLZ using a coaxial, with W6OVK and W6SLO using vertical extended double Zeppas.

It has been weeks since we’ve received a word from any of the W7’s. There must be some activity out there, fellows — how about letting the gang in other sections of the country know about it?

W9PNV, Riverside, III., finds that, for gain without directivity, four extended halfwaves, vertically stacked, are a splendid indicator of band conditions. The f.m. broadcast stations are quite reliable barometers, too.

After a promising start, with a successful contact on the first try, the W6F—W1HDQ skeds or 66 Mc. have been a washout since the favorable inversion conditions of early fall left us. They will be continued each Tuesday and Friday night at 8 P.M., however, with the hope that occasional contacts may be made.

A contact on 112 Mc. between W8HNN, Niagara Falls, N. Y., and W2NNT/8 of Rochester on October 20th served as an stimulus to activity in both cities and in the surrounding country. W8HNN runs crystal-controlled HR-24s, while the rig at W2NNT/8 is a 3TS. Now active on 2¼ in Rochester and vicinity are W6’s PK, JIC, VOX, OGC, NOL, WME, WII, MYT, TNR, UIB, and AFQ. The 75-mile work of W2NNT/8, the result of efficient gear and antennas at each end, has helped to bring in the gang beyond the transceiver stage, with some real effort being directed toward the erection of effective antenna systems to replace the all-too-popular indoor contraptions. W8KE is the only crystal-controlled station in this group to date.

Another station just converted to crystal control is W9LM, who is running 25 watts to a 3ST. Think it’ll stand it, Frank? He asks what sort of antennas the boys in the East use for 2½. Too many curtain rods, fishpoles, and “other haywire, we blush to admit; but here and there this 2½, too many curtain rods, fishpoles, and beams are doing good work, both with and without parasitic elements. Your conductor’s 8-halfwaves-in-phase arrangement (see May QST) is popular. The folded doublet (see December QST) is popular. The extended double Zepp as two half waves in phase for 2½, too many curtain rods, fishpoles, and beams are doing good work, both with and without parasitic elements. Your conductor’s 8-halfwaves-in-phase arrangement (see May QST) is popular. The folded doublet (see December QST) is popular.

antennas and other gear. In the year of daily contacts well over 500 skeds have been kept, with losses due to natural causes. Tests have been conducted at every hour in the day and night. In all kinds of weather. They now feel free to assume that this 107-mile hop can be called consistent! And enough work has been done on 2½ to indicate that this is an any-day-any-time proposition anywhere.

Unlike other sections of the country, in Arizona the winter season produces the best signals, levels averaging about two S-units higher in winter than in summer. Until November 16th, all work had been with horizontal antennas, but on this date a vertically-polarized signal finally made the grade on 112 Mc.; W6QLZ using a coaxial, with W6OVK and W6SLO using vertical extended double Zeppas.

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W9PNV, Riverside, Ill., finds that, for gain without directivity, four extended halfwaves, vertically stacked, (Continued on page 68)
ARMY-AMATEUR RADIO SYSTEM ACTIVITIES

War Department, Office of the Chief Signal Officer, Washington, D. C.

AMATEUR STATIONS FOR CIVILIAN DEFENSE

Comments recently received from the Commanding Generals of the various Army units and from Corps Area commanders indicate that all are in general agreement on the value of the amateur for civilian defense purposes. The particular part that amateurs will play in the civilian defense picture is still under study by the Office of Civilian Defense and the Defense Communications Board.

It is suggested that Army-Amateurs turn their attention to using u.h.f. equipment, particularly on the 2½-meter band. Local 112-Mc. AARS nets should be organized to tie in with the existing 160-, 80- and 40-meter c.w. nets as well as with the 160- and 75-meter 'phone nets. This will provide for state-wide coverage for civilian defense usage and, in addition, will serve as a connecting link with the Army and Corps Area nets of the AARS. In this connection, it is essential that the net control stations of these 2½-meter AARS nets also be able to operate on the lower frequencies assigned to their respective 160 or 80 meter State nets.

U.S.O. AMATEUR STATION DEDICATION

The first station in a network of United Service Organization amateur stations, to be installed at army posts and camps and naval stations, was dedicated at the USO club house of the New London, Conn., naval base on November 10th. Major General Dawson Olmstead, the Chief Signal Officer, participated in the dedication ceremonies, which were broadcast over the Mutual Broadcasting System, delivering a short address from the MBS studios in Washington. These USO stations, to be operated by the National Catholic Community Service, will be affiliated with the Army-Amateur Radio System to serve as another link for civilian defense as well as to handle messages for the service men.

ANNUAL CODE-SPEED CONTEST

The annual AARS Code-Speed Contest is scheduled for Monday night, January 5th. Army-Amateur Net Control Station WLM/W3USA, Washington, will make automatic tape transmissions simultaneously on 3497.5 kc. and 6990 kc., starting at 10:00 p.m. EST. These transmissions will begin at 20 words per minute, increasing 5 w.p.m. about every five minutes to 65 w.p.m. Similar transmissions, using a different text, will be made by WLV, Ninth Corps Area NCS, San Francisco, starting at 10:00 p.m. PST on 3497.5 kc., so that all interested amateurs in the United States will have equal opportunity to participate.

This competition is open to all amateur operators. Solid copy for one minute is necessary to qualify at any speed. Send your received copy to your Corps Area Signal Officer for scoring before January 10th.

The Veteran Wireless Operators Association, the national fraternal organization of professional radio operators, has indicated that it will again present a Marconi Memorial Award for Code Proficiency to the winner of this contest. Amateurs who by profession are government or commercial radio operators are not eligible.

ANNUAL ARMISTICE-DAY MESSAGE

The 13th annual Armistice-Day message from the Chief Signal Officer was broadcast from WLM/W3USA on November 10th at 7:00 and 10:00 p.m. for the attention of all Army-Amateurs. The 3497.5, 6990 and 3680 kc. frequencies were used. All amateurs were requested to copy and mail to their respective Corps Area Signal Officers for scoring. Following is the text:

(Continued on page 68)

Major General Dawson Olmstead, the Chief Signal Officer, with Colonel O. K. Sauller, Chief of Operations Branch, OCSigO (right), and ARRL President George W. Bailey, during broadcast over MBS on November 10th of the ceremonies dedicating the first USO amateur station at New London.

January 1942
BIAS SUPPLY FOR "ZERO BIAS" MODULATORS

Batteries proved to be noisy nuisances when used for grid bias on my Class-B 805s which require about 15 volts. The solution to the problem turned up a novel use for a mercury-vapor rectifier as a regulator in conjunction with my regular a.c.-operated bias pack furnishing voltage to the grids of the r.f. amplifiers. Except for supplying the mercury tube with filament power, the action is the same as that of the well known 874, or its more-modern version, the VR-105/30. In this case, however, the output voltage is about 15 volts because of the mercury vapor tube's constant voltage drop of that value.

The circuit diagram of the combination bias supply is shown in Fig. 1. Resistor $R_1$ should be of such value that the mercury vapor tube draws only enough current to glow dimly, but reliably, with the biased stage not drawing grid current (about 20 ma. in the case of an 83 tube). The rectifier tube to be used will depend on this resting current plus the peak grid current of the biased stage. The sum of these currents should not exceed the maximum d.c. output current rating of the tube.

Using an 83 tube to regulate a circuit in which the grid current varies from 0 to 40 ma., the voltage is held steady to within 0.1 volt or so, which is better than the batteries used to do. Substitution of an 866 brought the variation to an even lower value, but this refinement is certainly not needed.

Bias for the r.f. tubes is taken in the usual manner from the output voltage divider.

—Charles Affelder, W8HLM.

B.C. INTERFERENCE IN THE HAM BANDS

For the past six months, the writer has been troubled with steadily-increasing interference in the amateur bands from commercial broadcasting and c.w. stations. The interference finally reached a point where the 160- and 80-meter 'phone bands were almost useless, and even 40- and 20-meter c.w. was difficult to receive. At times, as many as three local b.c. stations and one local commercial c.w. station could be received at the same time on any one of dozens of different frequencies throughout the high-frequency spectrum. Just imagine trying to work anything but your next door neighbor through interference like that and you can readily see what I was up against. Disconnecting most of the antenna from the receiver caused most of the interference to disappear, but it caused most of the desired higher-frequency signals to disappear also.

The receiver in use here (S-16 Skyrider) has one stage of preselection. It has always had good selectivity. Until about six months ago, no interference in the way of commercial harmonics or images was encountered at this location with exactly the same antenna arrangement. Even when the interference was at its height, moving the receiver to a new location with a different antenna cleared up the trouble immediately. It hardly seemed likely, therefore, that the receiver itself was responsible for the trouble.

The next step, then, was to investigate the difference in the two receiving locations and antenna systems. An entirely new receiving antenna was installed at the permanent location, and the interference disappeared. This was an undesirable solution, however, for a number of reasons. The trouble rocked along until it dawned on the writer that the antenna which was causing the trouble was connected to the receiver through an a.c. change-over relay which was always closed when interference was noticed, while neither of the other two antennas had been connected to this relay. This relay is a d.p.d.t. relay which is normally open (transmitting position) and is closed in order to switch the antenna to the receiver. A

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Fig. 1 — Circuit diagram of the combination bias supply described by W8HLM. The branch with the 83 rectifier supplies a regulated voltage of 15 for Class-B modulator tubes.
shunt was promptly placed across the relay contacts and the receiving troubles just as promptly disappeared. Turning the relay off and on had no effect on the received signals when the shunt was in place, but, with the relay closed, the instant the shunt was removed the interference returned. Furthermore, moving one contact around over the other caused the interference to vary suddenly and markedly in intensity, in exactly the same way that the output of a crystal detector varies as the cat-whisker is moved around over the crystal.

Thorough cleaning of the relay contacts with steel wool cleared up the trouble.

From the above findings the author has derived the following explanation for the difficulties:

The receiver is located in the vicinity of a large petroleum refinery, where the air contains considerable quantities of hydrogen sulfide and sulfur dioxide. The relay contacts are of silver alloy, and the receiving position contacts are almost continuously exposed to the action of the sulfur-laden atmosphere. The layer of silver sulfide, which formed on these contacts, apparently had rectifying properties similar to those of the ordinary lead-sulfide (galena) detectors, and was thus feeding the receiver rectified but untuned signals. Either the r.f. and i.f. sections of the receiver exhibited very-low impedance to these rectified signals, thus letting the strongest ones through on many frequencies, or the strongest signals were able to by-pass the r.f. and push right through to the audio section. In other words, dirty or corroded relay contacts may sometimes be responsible for peculiar "bugs," and it is hoped that this article may help some fellow-sufferers clear up their troubles.

— Nugent F. Chamberlain, W5AUE.

**"FREQUENCY-HALVING" WITH THE GRID-PLATE OSCILLATOR**

In the September, 1941 issue of QST, the writer suggested a simple method of obtaining increased harmonic output from a 6L6 "grid-plate" oscillator. Further experiments have demonstrated that this extremely versatile "grid-plate" circuit will also function as a "frequency-halving" oscillator, thus permitting 160-meter operation from 80-meter crystals. The necessary modification of the original circuit to permit this type of operation is shown in Fig. 2. It will be noted that the only change is the connecting of a tuned circuit between the crystal and ground. This tuned circuit is made to resonate at half the frequency of the crystal with a capacity of approximately 150 µfd. With this capacity, a coil consisting of 45 turns No. 22 enameled wire, close-wound on a 1½-inch diameter form will be required for the 160-meter band. One corner of a rotor plate of $Ca$ may be bent over to short out the tuned circuit when fundamental or harmonic operation is desired. It may be of interest to note that if an 80-meter coil is substituted for the 160-meter coil in this circuit, variable frequency operation may be obtained as described by W3GHR in April, 1940, QST.

Although it was not found necessary in the test transmitter, an additional connection between the switch and the crystal side of the tuned circuit, as shown by the dotted line, might prove worth while with some crystals.

In operation the switch is set on the "harmonic" side. Adjusting is done by setting the monitor, or receiver, at half the crystal frequency and adjusting $C_1$ until the crystal is heard to "lock in." $C_1$ is adjusted until the crystal exercises the greatest control over the output frequency. Additional instruction on adjustment will be found in the excellent articles on "frequency-halving" oscillators in September, 1941, QST. As a warning, remember that all "frequency-halving" oscillators are capable of "self-excited" operation and great care must be taken to see that they are properly adjusted before putting a signal on the air.

— Ed Preston, W8CSE.

**STATION DATA FILE**

Around the station a considerable quantity of loose diagrams and data accumulates and is usually filed away, hither and yon, only to evade our fingertips just at the time we need some particular item. In order to have all avail-
able information at my fingertips, several inexpensive items have been of considerable value.

For filing away loose information, I find a letter-size utility expanding file of invaluable aid. This cardboard accordion-folded file of 21 lettered compartments will expand to approximately 2 feet in length if necessary. Space is also provided for insertion of your own subject titles. I find two of these files of invaluable aid; one is used for filing manufacturers' data sheets and catalogs and the other for filing tube-data sheets and other miscellaneous information which we all acquire. This latter I have indexed similarly to the yearly index of QST which serves as the key for proper filing. These files, available at most local stationery stores, cost approximately fifty cents each.

Several months after a change has been made in our rigs, we usually have to crane our necks to determine what circuit is being used. One simple means of recording wiring circuits is on three-inch by five-inch library cards filed alphabetically by subject matter. Two cards are made out for each stage, one with circuit diagram, showing values and voltages, and the other listing the manufacturer's catalog number and nameplate data. Two years from now this file will determine for you whether that bias transformer you installed was a 70- or a 100-ma. job and whether the green-yellow wire was filament- or a high-voltage lead. These files may be obtained in the dime store and should not cost more than twenty cents, including 100 cards.

'Phone operators always make notes while most c.w. operators copy down what they are receiving. This means reams of paper lying around at your fingertips. Available today are these "miracle blackboards" that can be scribbled all over and the upper sheet lifted and dropped and you can start all over. Recently I purchased two of these eight-inch by ten-inch re-usable pads at a cost of ten cents each. Now it isn't necessary to jump in the waste-paper basket while trying to pick up the scrap paper that has fallen out of the already-full basket.

Most of us have limited facilities for our stations. The above items I have found extremely helpful from time, space and "find-what-I want" angles. — C. Deane Kent, W2JFA.

25 YEARS AGO THIS MONTH

The January, 1917, issue of QST crows over much recent increase in the average range of stations and says the League now has several hundred that can work 1000 miles, whereas only a year ago there was a mere handful that could work 500. Ships in the Gulf report amateur signals at distances over 1000 miles, and the organiza-

The formation of the League three years ago has greatly facilitated the interchange of technical information amongst amateurs, and that is one reason why ranges are increasing. There is growing consciousness of the importance of the ground connection. 2LK describes his complicated earth system and maps the improvement it has made in his results. "Dr. Radio," in Part II of his current article, also discusses ground, leads and antennas. The leading article by Charles S. (now C. Stuart) Ballantine, "The Measurement of High Frequency Currents," deals with errors in hot-wire ammeters and their correction, a subject which the editor says is a very important one. He announces with much regret that he is omitting the mathematics "as the majority of readers assume an injured air if they discover any mathematics higher than arithmetic" — which expression might have been written in 1941!

The great trouble is the intense QRM. It is the only difficulty in the way of the success of the transcontinental relay. Everybody is plagued with it. To escape it, the eastern trunkline manager proposes getting up early and clearing the hook before breakfast. Some of it comes from "small boys" with spark coils, but much of it is plain unnecessary conversation. Since this is intolerable with apparatus which permits only one station in a town to operate at a time, the editor suggests that the League do something to make it bad form to engage in long conversations, proposing the use of boycotting if necessary. Even The Old Man devotes himself to that topic in one of his most famous stories, "Rotten QRM," the yarn which first introduced to us the word hong, the rettysnitch, the ugerumf and the biurgmph (which reminds us that to this day there is no word for it). T.O.M.'s story, by the way, was reprinted on page 25 of our December, 1940, issue).

Thousands of amateurs within a hundred miles of New York recently heard the wireless telephone concert sent on 800 meters from the experimental laboratories of Lee deForest at Highbridge. The entertainment lasted for more than half an hour and consisted of phonographic records of operatic selections and popular music. Notice was sent out several days in advance so that amateurs were waiting with receivers on their ears. The tests will continue and reports are solicited. Indeed, it is the plan of Lee deForest to establish a sort of wireless newspaper, to which every amateur with an instrument can subscribe. In this way, news can be telephoned and the interesting happenings of the day can be sent to listening ears "hot off the wire."
The criterion of success in any amateur operating activity is a simple figure representing the number of participants. When that figure runs into four digits we really have something to rave about! The Ninth Annual ARRL Field Day, held last June 7th and 8th, was by far the biggest single contest activity ever to be held in these good old United States! A total of at least 2180 individuals (This represents a minimum figure, since all logs do not list the exact number of operators and helpers. — J. A. M.) journeyed afield for a week-end of enjoyment in this yearly testing of self-powered portable-emergency radio equipment. Reports were received from 163 clubs and 119 non-club stations. The "FD" demonstrated once again our will to keep abreast of the times in developing operating and technical skill. We are justly proud that the institution of amateur radio, in line with the current emphasis on preparedness, stands ready to do an efficient communicating job should emergency face us.

In 1940 we adopted a policy of classifying stations according to number of transmitters in simultaneous operation at any one FD set-up. Competition is considered to be among stations in each group alone. The score listings elsewhere in this issue credit the leaders in each classification. We would like to give you all the details on how each of these functioned but would need to take more space than we have available. However, since there always seems to be an intense interest by most participants in what groups had the highest all-around totals, we'll try to give you an idea of what some of the all-time highs were. The previous record of 8406 points set in last year's FD was topped by no less than five groups this time.

Consistently a strong contender, the Tri-County Radio Association of Plainfield, N. J., W2GW/2, established a new record with the tremendous score of 13,968 points; 35 operators made a total of 1112 contacts, 415 with other portables and 697 with fixed stations! Eleven complete units were used on all bands from 1.8 through 112 Mc. The TCRA log shows 163 stations worked on 1.8 Mc., 447 on 3.5 Mc., 245 on 7 Mc., 144 on 14 Mc., 32 on 28 Mc., 20 on 56 Mc. and 61 on 112 Mc. Contacts were almost evenly divided between 'phone and c.w. — 570 on c.w. and 542 on 'phone. Power on all transmitters was limited to 30 watts and supplied by four gas-driven a.c. generators ranging in capacity from 300 watts to 3 kw. Say the gang, "This year TCRA had the best Field Day ever. The club set up in exactly the same location as last year. As a result of using the same QTH and the same equipment as last year, we were able to profit from many of last year's mistakes. The effect on our score is self-evident." Our hearty congratulations to you, TCRA! A superlative showing!

Those Jersey lads certainly went into the FD with a vengeance! Second highest score was that of W2AER/2, Jersey Shore Amateur Radio Association. It was, incidentally, the third consecutive year this group have placed second. They're doing an admirable job of holding up against tougher competition each year. Twenty-

Upper left: "FD" location of W4CDC/4, Chattanooga Amateur Radio Club. Upper right: W9RT (left) and W91WZ tend the gas-driven a.c. generator of W9RT/9 located at the ski slide in Ryan's Woods, Chicago, Ill. Upper center left: The "super de-luxe" portable generator used by the Amateur Radio Operators of Denver. The large clock in the upper center of the power panel is used to record elapsed time of generator operation. Upper center right: The Canton Amateur Radio Club of Ohio operated W8MWL/8. Seated in the 7-Mc. tent is W9QVK. Lower center left: Participating members of the Nashville Society of Licensed Radio Amateurs station W4GNN/4 set up in Warner Park, Nashville, Tenn. Lower center right: We don't imagine the Tri-County Radio Association was bothered much with visitors. Note the signs on the walls of one of their operating positions! Lower left: W9OXX (left) and W9RSI, power attendants at the 350-watt Kato-light generator used to run the 7-Mc. set-up at W9SBT/9, Iowa City Amateur Radio Communications Club Field Day station. Lower right: Members of the Jersey City, N. J. L/C Club who kept W2WC/2 on the air. Left to right: W2GKE, W2WC, W2FVB, W2NBE, W2EQS, W2LST.
five operators accounted for a score of 12,348 points (921 contacts, 425 portables), with nine units in simultaneous operation; 65% of all QSOs were by c.w. A 5 kw. portable gas-driven a.c. generator provided current for operation of all equipment and transmitter inputs ranged from 11 to 30 watts. FB, JSARA!

The West Coast took honors for the third highest total. W6VX/6, operated by twenty members of the Society of Amateur Radio Operators, made 515 QSOs (241 portables) for a score of 10,571 points. It is interesting to note that 52% of all contacts were made by 'phone as contrasted to the other leaders who made the majority of their QSOs on c.w. Seven transmitters, each using e.c.o. frequency control, were worked on the following bands: 1.8-, 3.9-, 14-, 28-Mc. 'phone and 3.5-, 7- and 14-Mc. c.w. Probably accounting for a great deal of SARO's success were the very efficient antennas used. These included Sterba curtains, four half waves in phase and half wave systems. Input on all units was kept between 25 and 30 watts except the 112-Mc. rig which ran 5 watts.

Next in line we find the Frankford Radio Club, W3BKX/3, with 9765 points. Sixteen operators knocked off 644 contacts, 412 with portables. Four units were employed on six bands. Receivers were powered from batteries and transmitters from a Homelite a.c. generator. All rigs used e.c.o. The FRC also entered separate groups in the one, two and three transmitter classifications, leading in the first and placing third and second respectively in the latter.

Fifth highest score submitted was that of the York Radio Club, 8829 points. Eight units were kept between 25 and 30 watts except the 112-Mc. rig which ran 5 watts.

Among the non-club groups, W9VX/6, had top score, 4904 points. Four transmitters, manned by 21 individuals, were kept in simultaneous operation. W9ERU/6, with 16 operators and three rigs, placed second with 4793 points. Third highest was W8OFN/8 — 4509 points, one transmitter, five operators. Following these, with scores over 3000 were W3WJ/6, 4465; W9AY/9, 4050; W8DNO/8, 3798; W9RR/9, 3816; W7YQ/3, 3744; W1ELH/1, 3542; W5BB/5, 3227; W9WGL/9, 3087; W5DV/5, 3011.

We extend thanks to club secretaries and those who sent us the reports of participation in the biggest and best "FD" yet. Keep up the good work, hams, and have that gear, whose reliability you proved on Field Day, in tip-top shape for any occasion when you may be called upon to use it under actual emergency operating conditions! — J. A. M.
Got Your ARRL Emergency Corps Registration in ... for Civilian Defense Availability? Membership in ARRL has shown a nice increase in the past year, possibly indicating the appreciation of amateurs for the need of support of the one organization to represent them consistently over the years. There have been an increasing number of letters from amateurs wanting to "do things" contributing to the national interest in the emergency. The institution of Amateur Radio more than ever to-day needs every licensee to pull his own weight by proper participation fully in the programs dedicated to the public interest. Unity is essential. The various groups can get nowhere by working in a dozen different individually determined directions, but with all hands acting as a part of organized amateur radio itself in support of the programs, we can go a long way.

The Corps needs every amateur radio licensee. The interest of the nation and the amateur fraternity alike calls for every licensed amateur to add to the capabilities of amateur radio to perform for natural disaster relief or civilian protection (defense) alike by personal registration in this program. The Emergency Corps (Form 7) blanks may be obtained from Hq., or your nearest SCM, EC, or Western Union office. If you haven't already forwarded such forms to get the card identifying you with the Corps, send a radiogram or postal card for these blanks to-day.

Emergency Coordinators in scores of localities have already established contact with the local civilian defense authorities, reporting the availability of amateur operators to serve in establishing radio facilities in support of fire-fighting, police-services, medical-and-first-aid groups, rescue-squads, utilities, those maintaining vital services such as departments of public works, water supply, sewer, streets, shelters, buildings, etc., if and whenever necessary. It takes many operators to put a set up on a 24-hour basis in real emergency. With many possible secondary, and some primary jobs, as much u.h.f. gear as possible should be available. Moral? Build u.h.f., as well as using or converting all existing gear possible. Reports from a number of amateur groups that already have set up "defense" equipment for demonstrations and tests appear (in brief) through these pages. The coordinators reporting are highly enthusiastic about the fun and profit amateurs are finding in working out these plans for building practical community service to the highest possible efficiency.

Please register on ARRL blanks to-day, if you haven't. Build u.h.f., to realize the most in fun that this new field offers, and to make sure you can contribute your part if called upon. See designs in this QST and the December issue!

Emergency Corps Re-registrations. The annual re-registration of Emergency Corps members will proceed in a few weeks from receipt of this QST. Re-registration forms will be mailed to all Corps members who registered before November 15th. This annual overhaul is more than ever essential this year as a check on the readiness of every member to perform. There have been location moves by members engaged in defense production. Lots of new u.h.f. equipment and self-powered units have been added to be reported in this survey. Each year we have to drop from the record those who report inactivity or who do not return the special colored forms direct to Hq. after receipt. Newly filed information is placed at the disposal of coordinators through whom contact and planning with local civilian defense officials is going forward at present. It is important that every Corps member who is in a position to give any effort and time (however small) to emergency preparedness re-file the blanks immediately on receipt. That will permit brand new registrations to make extensions in our total emergency-organized strength, a measure of our ability to render emergency radio service.

Warning ... Precautions Necessary in 7-Mc. 'Phone Work. The December 20 changes permit some daytime amateur sharing of the 3800–3900 kc. pilot training frequencies for amateurs in 26 listed northern and eastern states if no practical interference results. In 1800–1900 kc., amateur 'phone operation must cease under the F.C.C. Order or citations are sure to arrive swiftly. Those interested in the newly authorized 7250–7300 kc. radiotelephone band should be especially watchful to avoid trouble, too. All amateur radio transmitters are required by the F.C.C. to be "as free from harmonics as the state of the art permits." ARRL Official Observers will assist by notifying off-frequency operators, if and when observed. There should be no voice-modulation components below 7247 kc. or above 7300 kc. Every station before going into operation on 7-Mc. 'phone should be checked for radiation of parasites or of harmonics falling between 14,500
and 14,600 kc! Adjustments should be carried out for minimum perceptible radiation of any harmonics. Balancing of push-pull amplifiers, adjustment of bias, and installation of Faraday shields will help in harmonic suppression. In these times a high degree of responsibility should be displayed by all amateurs in all frequency bands to avoid possible interference with other radio services. All F.C.C. regulations should be observed to the letter at all times.

160-M Band Warming W.A.S. Party, Jan. 9th-10th-11th. See details of this activity elsewhere in this month. Get on c.w. in the 1750-1900 kc. sector from Dec. 20th to see what it’s like there! Make some regular traffic skeds, support your Section network on that band, advise the SCM by card that you are all set to work “160” and will serve as a c.w. outlet for your community for trainee traffic, or for state defense protection net operations, if possible to be designated for such work. From now on it appears that “80” will be increasingly full of interference as more “moving over” is necessary. Get on “160” to get around this. We hope there will be lots of successful Feb. 7th-8th work in this band in the 5th ARRL QSO Party coming up, too. First, try to do your best in the WAS-Band-Warm-Up, and report results for QST mention.

Code Proficiency Program and New Year’s Resolutions. This is the time of year for review of our individual progress and usefulness as an amateur operator. It should be a time of dedication to new accomplishments and objectives and activity. Aim to be as active as possible in every amateur radio program through which organized amateur radio can make itself of value to the community or the nation. By so doing you may automatically increase your profit and enjoyment in amateur radio fourfold for the constructive efforts you put forth. Get ARRL Awards, apply for ORS or OPS appointments, get into u.h.f. and defense-emergency, and the trainee-tf.c. and CP programs.

If you haven’t one of those Code Proficiency Certificates now displayed in thousands of amateur stations yet, lock up the W1A/WB1TCC code practice and qualifying run schedules (see QST index to this issue) and plan to send in the copy at any speed you can get down in black and white. If you have an initial certificate don’t rest until you have stickers showing your ability all the way through the 35 w.p.m. class. This program is not aimed at picking out a few fellows who are a whiz at code, but at lifting the average ability of all amateur operators, and demonstrating to government officials that every single amateur licensee without exception is interested in qualifications beyond those minimum qualifications proved by the license examination! Add your name to our records of those whose speed above the license minimum is “certified.” Each name at 18-per adds to the program goal (58,000 certifications) as much as one at 35-per. Do your part in the demonstration of amateur qualifications to the government. Get the recognition of what you can do that is due you. Send in copy of the very next qualifying run!

A brand new year is starting. Resolve to participate in all the ARRL programs directed toward patriotic and useful amateur objectives. Organized amateur radio can only be as strong as each of our efforts makes it. Help amateur radio to help you. — F. E. H.

ARTICLE CONTEST

The article by Mr. Alden Smith, W2AFJ wins the CD article contest prize this month. We invite entries for this monthly contest. Regarding subject matter, we suggest that you tell about what activity you find most interesting in amateur radio. Here you will find an almost limitless variety of subjects. Perhaps you would like to write on working for code proficiency, Emergency Corps planning, traffic work, working in Section Nets, "Phone and Teletype operating procedures, holding a League appointment, working on radio club committees, organizing or running a radio club, the most interesting band or type of ham activity, or some other subject near to your heart.

Each month we will print the most interesting and valuable article received. Please mark your contribution "for the CD contest." Prize winners may select a bound Handbook, QST Binder and League Emblem, six logs, eight pads radiogram blanks, DX Map and three pads, or any other combination of ARRL supplies of equivalent value. Try your luck!

The Mother (?) Tongue

BY ALDEN SMITH, W2AFJ*

This period of geographical restriction upon our communications activities provides a particularly valuable opportunity for increased experimentation in new fields. Many of us are discovering that there are really stations on bands other than those to which we have devoted our attention in the past. Others are finding (or soon will have too) that when the radio store doesn’t have what we need, nine out of ten times the amateur can work out something with his own hands that will do the job as well as or better than the commercial product.

This ability to improvise and to experiment is as much a part of the real radio amateur as was Kitty, of mellow memory, part of The Old Man’s shack! Why not undertake some further experimentation in our use of words, in speech at the mike or with the key? Too many of us are craftsmen only until the last connection in the rig is soldered, and what we put on the air thereafter fails to do justice either to ourselves as individuals or as a group.

Dispose of the obvious matters first, such as profanity and stories that would be unsavory in an abattoir. We can all anticipate that through the regulatory agencies of government the operator who puts such stuff on the air will undergo speedy liquidation. More important is the language used by all too many who are operating in every respect within the law but who have simply grown careless in their speech.

* 706 Burns St., Forest Hills, N. Y.
Calling-Signing Precautions for Network Operators

The new FCC regs that make identification of both stations necessary in radio contacts have been a bit confusing to some network operators. When FCC's Sec. 12.83 (p. 28, Aug. '41 QST) is accepted for just what it says, however, there can be no possible confusion. When there is use of break-in it is prescribed that for bursts of transmission up to but not over three minutes, the calls need be put in identifying the transmission only once every ten minutes, besides at the very beginning and termination of correspondence. There does have to be intermediate identification at 10-minute intervals, or oftener if one terminates his correspondence or if he sends for more than 3 minutes. If you have short exchanges of less than 2 minutes duration (and if you do not terminate the correspondence), then in such exchanges you do not have to identify — until the clock gets up around the TEN-minute mark.

The first responsibility of netters and everyone else in these strenuous emergency-times should be, even at a little inconvenience, to operate so as to help minimize monitoring time for identifications. We can thus contribute as fully as we can to those requirements set by the FCC that help keep us on the air. The Commission has made some concessions to help practical break-in work, but its rules adhere to the steadfast purpose of facilitating monitoring identification. It is one of the essentials of the FCC's Defense Office on the side of national security. Break-in for time-saving in fast nets can still be used even though the FCC has stepped up its identification requirements to help keep the dials turning in the expanded defense monitoring service!

The main things to be kept in mind by netters to avoid FCC citations while saving time in network operations are the following points or precautions:

1. Open a transmission, when using break-in, with "BK" or any other identifier that tells the monitoring officers why no dual identification by calls is given at that point.

2. In intermediate exchange in sequence (shorter than 3 minutes) be careful not to terminate with VA (end of work), or other "ending signals" which identify formal end of transmission or of correspondence, and according to the appropriate definitions might definitely call for IDENTIFICATION OF STATIONS. (If 21s stop after sending "IIW" "QSL?" "AR" (end of message), "B," etc., not employing an end-of-correspondence signal, back and forth exchanges of under 3 minutes duration are facilitated.)

3. When a transmission runs more than 3 minutes, remember to add both "call identifications as required by the FCC.

4. Regardless of the duration of short-burst exchanges, identifications are required at least as often as 10-minute intervals in such correspondence.

5. At the beginning and termination of correspondence full identification (calls of both corresponding stations) is required by the FCC, for example, as ending identification: 

   "...VA WGTI DE WBDL... "...CL WJMJY DE WJNM."

--- ARRL-ORS Bulletin.

BRIEFS

The Charlotte Amateur Radio Club were host to the North Carolina Floating Club on December 9th. The meeting was held at the Charlotte Women's Club and was attended by over 250 amateurs. Included in this group were about 70 soldiers of the Army Signal Corps who were on maneuvers near Charlotte at the time.

The Chess Wireless Association (OWA) meets every Sunday at 3:30 p.m. CST. W9VDY is NCS and the object is to split up into pairs and spend a pleasant Sunday afternoon playing chess with a worthy opponent for away. All amateurs interested are invited to call into the net (7240 kc), or, if you can't be on Sunday afternoons, drop W9VDY a card expressing your interest.

--- QST for
W1AW/W9HCC Code Proficiency Runs

Qualifying runs and practice transmissions are sent from W1AW simultaneously on 1761-3576-7150-14,254-28,301 and from W9HCC simultaneously on 3532-7058 and 14,312 kcs. Above frequencies is sent nightly except Friday starting from W1AW simultaneously on 1761-3576-7150-14,254-28,301 kcs. The code practice, about 10-minute practice at each speed, is sent progressively at 15-20-25-30-35 words per minute, automatic tape transmission being employed. One can also get 15-20-25 w.p.m. practice from the W1AW official messages sent at 8:30 P.M. EST and midnight daily.

W9HCC practice, also tape-sent, may be copied on Tuesday, Thursday, and Friday, between 8:30 P.M. and 9:30 P.M. CST, and includes 20-, 25-, and 30-word-per-minute speeds on each transmission.

For sending (or to enable self-checking of practice copy received) the W1AW text sent on Sundays, Tuesdays, and Thursdays is identified in a listing on one of the pages in the Operating News section of QST. The new list of Press Schedules there listed can be used for getting practice at other transmission speeds. All amateurs are urged to practice copying on a mill as well as by pencil-and-paper. By either method it is chiefly a matter of getting practice in coordination between hearing and writing.

Strive to become a good operator, and qualify for ARRL's Code Proficiency Certificate Award for your self-demonstrated ability to write down what you hear!

Qualifying Runs: The next qualifying runs will be sent from both W1AW and W9HCC, at the same time, on all the above-listed frequencies. Here is the starting time for different dates:

Daylight Runs of Jan. 4th, Feb. 1st, and March 1st:
1:30 P.M. EST, 12:30 P.M. CST, 11:30 A.M. MST, or 10:30 A.M. PST.

Evening Runs of Jan. 22nd, Feb. 16th, and March 20th:
7:45 P.M. EST, 8:45 P.M. CST, 7:45 P.M. MST, 6:45 P.M. PST.

Copy the test text sent on these dates at the best speed you can, note which station you copied, and on what frequency. Check your copy for 89, 119, 149, 179, or 209 consecutive correct characters-and-spaces as required in the copy sent in to make the required whole minute of solid copy.

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If you copied by ear, without any assistance, also if you are working for first certificate or for any endorsement (awarded to all amateurs who subsequently qualify for ARRL's Code Proficiency Certificate Award for your self-demonstrated ability to write down what you hear), start after one of those fine operating achievements at the best speed you can, note which station you copied, and on what frequency. Check your copy for 89, 119, 149, 179, or 209 consecutive correct characters-and-spaces as required in the copy sent in to make the required whole minute of solid copy.

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Brass Pounders' League

(March 11-November 15)

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del.</th>
<th>Rel.</th>
<th>Credit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9UJU</td>
<td>535 509 570</td>
<td>794</td>
<td>2721</td>
</tr>
<tr>
<td>W5DFR</td>
<td>166 509 570</td>
<td>270</td>
<td>325</td>
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<tr>
<td>W7EBQ</td>
<td>237 1754</td>
<td>165</td>
<td>2256</td>
</tr>
<tr>
<td>W4PL</td>
<td>49</td>
<td>1800</td>
<td>11</td>
</tr>
<tr>
<td>W5OW</td>
<td>103 1574</td>
<td>150</td>
<td>1656</td>
</tr>
<tr>
<td>W2SC</td>
<td>743</td>
<td>1263</td>
<td>129</td>
</tr>
<tr>
<td>W6MN</td>
<td>139 912</td>
<td>212</td>
<td>1364</td>
</tr>
<tr>
<td>W6WFI</td>
<td>106</td>
<td>1079</td>
<td>105</td>
</tr>
<tr>
<td>W3BBT</td>
<td>50</td>
<td>797</td>
<td>78</td>
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<td>W4FJU</td>
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<td>934</td>
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<td>W5DR</td>
<td>85</td>
<td>778</td>
<td>80</td>
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<td>W95Z</td>
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<td>965</td>
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<tr>
<td>W4AOB</td>
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<td>633</td>
<td>113</td>
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<td>W4OBD</td>
<td>133</td>
<td>476</td>
<td>119</td>
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<tr>
<td>W8BDQ</td>
<td>12</td>
<td>17</td>
<td>672</td>
</tr>
<tr>
<td>W9LIU</td>
<td>35</td>
<td>606</td>
<td>20</td>
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<tr>
<td>W2BB</td>
<td>54</td>
<td>545</td>
<td>20</td>
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<tr>
<td>W4KKG</td>
<td>6</td>
<td>42</td>
<td>69</td>
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<td>W5MN</td>
<td>41</td>
<td>402</td>
<td>79</td>
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<tr>
<td>W5GFF</td>
<td>19</td>
<td>529</td>
<td>19</td>
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<td>W6LI</td>
<td>17</td>
<td>597</td>
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<td>569</td>
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<tr>
<td>W5NSI</td>
<td>8</td>
<td>556</td>
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<td>W4FVZ</td>
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<td>30</td>
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<tr>
<td>W5HQS</td>
<td>19</td>
<td>512</td>
<td>11</td>
</tr>
<tr>
<td>W5CRL</td>
<td>6</td>
<td>17</td>
<td>594</td>
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<tr>
<td>W5W</td>
<td>21</td>
<td>502</td>
<td>18</td>
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<td>W4DD</td>
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<td>0</td>
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<td>24</td>
<td>474</td>
<td>23</td>
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<td>W9WRL</td>
<td>14</td>
<td>469</td>
<td>17</td>
</tr>
<tr>
<td>W5GRL</td>
<td>12</td>
<td>458</td>
<td>17</td>
</tr>
<tr>
<td>W4DG</td>
<td>0</td>
<td>0</td>
<td>594</td>
</tr>
<tr>
<td>W9OUD</td>
<td>21</td>
<td>370</td>
<td>20</td>
</tr>
</tbody>
</table>

More-than-One-Operator Stations

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del. Rel.</th>
<th>Credit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1HJR</td>
<td>190</td>
<td>125</td>
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<tr>
<td>W9USA</td>
<td>131</td>
<td>2577</td>
</tr>
<tr>
<td>W1AW</td>
<td>30</td>
<td>146</td>
</tr>
</tbody>
</table>

These stations "make" the B.P.L. with total of 500 or over. One hundred deliveries + Ex. Del. Credits also rate B.P.L. standing. The following one-operator stations make the B.P.L. on deliveries. Deliveries count.

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del. Rel.</th>
<th>Credit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE9BO, 244</td>
<td>W9GPA, 132</td>
<td>W9ZL, 115</td>
</tr>
<tr>
<td>WE9OS, 207</td>
<td>W9FJG, 129</td>
<td>W9SOZ, 112</td>
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<tr>
<td>W6ZZ, 203</td>
<td>W91AZ, 125</td>
<td>W9AGC, 109</td>
</tr>
<tr>
<td>W6CFN, 183</td>
<td>W2K1, 154</td>
<td>W99HN, 105</td>
</tr>
<tr>
<td>W7Y9C, 110</td>
<td>W2CC, 121</td>
<td>W9HJX, 104</td>
</tr>
<tr>
<td>W1MM, 176</td>
<td>W670, 109</td>
<td>W9L6L, 103*</td>
</tr>
<tr>
<td>W6DUPH, 149</td>
<td>W6SC0, 117</td>
<td>W9SMW, 102</td>
</tr>
<tr>
<td>W9YOS, 135*</td>
<td>W8JW, 116</td>
<td>W9USD, 5,101</td>
</tr>
<tr>
<td>W9OUD, 101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. A. R. S.

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del. Rel.</th>
<th>Credit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLMR (W6GPB)</td>
<td>257</td>
<td>614</td>
</tr>
<tr>
<td>WLN (W2S0)</td>
<td>70</td>
<td>588</td>
</tr>
<tr>
<td>WLYT (W6RGO)*</td>
<td>47</td>
<td>386</td>
</tr>
<tr>
<td>WLMF (W6CDA)</td>
<td>5</td>
<td>535</td>
</tr>
</tbody>
</table>

WLLY (W6RGO) made the B.P.L. on 105 deliveries.

More-than-One-Operator Station

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del. Rel.</th>
<th>Credit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLM (W3USA)</td>
<td>275</td>
<td>2857</td>
</tr>
</tbody>
</table>

A total of 500 or more or 100 deliveries + Ex. D. Cr. will put you in line for a place in the B.P.L.

---

BRIEFS

Attention amateurs in the vicinity of Boston: Company A, 1st Military Police Battalion of the Massachusetts State Guard is desirous of recruiting several radio operators for its signal unit which is in the process of formation. The State Guard was formed to replace the old National Guard and is built along similar lines. If you are interested in becoming a radio operator with a military organization, drop in on one of the drills Monday evenings at 7:30 P.M. at the Commonwealth Armory, Commonwealth Ave., and Pleasant St., Allston, Mass.

January 1942
October ’41 O.R.S.-O.P.S. Parties

The fall ORS/OPS Parties were humdingers! A large gang of both the ‘phone and c.w. boys turned out and scores slipped into second place and W9IU, a newcomer to the top activities by applying for appointment as ORS or OPS. Every active qualified operator should get in these enjoyable below for an FB showing.

Led the ORS gang. W3DGM, who was top man last time, placed first in the OPS group, followed by that five-party champ, W4DCQ. Congratulations to all the operators listed below for an FB showing.

<table>
<thead>
<tr>
<th>Official Relay Station Scores (October)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Station</strong></td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>W1TS</td>
</tr>
<tr>
<td>W4DGM</td>
</tr>
<tr>
<td>W9UJ</td>
</tr>
<tr>
<td>W9BRD</td>
</tr>
<tr>
<td>W9DIR</td>
</tr>
<tr>
<td>W9GFF</td>
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<tr>
<td>W9GQX</td>
</tr>
<tr>
<td>W9QY</td>
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<tr>
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<td>W9UX</td>
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<td>W9WBJ</td>
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<td>W9XZ</td>
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<tr>
<td>W9XZ</td>
</tr>
</tbody>
</table>

The next quarterly ORS/OPS Parties are scheduled for January 31st-February 1st. Mark your calendar now and plan to get in on the fun.

F.C.C. Disciplinary Actions

Crime does not pay!” Witness the actions of the FCC as recounted below. This is no time for monkeyshines.

The Federal Communications Commission on October 7, 1941 suspended for a period of three months the amateur radio operator license of Harry J. Van Gorden, Flushing, L. I., N. Y. for violation of the Communications Act and Commission Rules and Regulations.

(Continued on page 51)

NEBRASKA EMERGENCY

The hams of Nebraska had their first taste of emergency work for 1941 on October 31st and November 1st when a heavy wet snow fell, followed by a quick freeze that took all communications lines out in eastern part of the State.

Fremont was completely isolated from the outside world for several hours. First communication lines were established by W9OED, Fremont. This was accomplished on 1,75-Mc. ‘phone. W9OED called “CQ Omaha, Urgent Traffic,” was answered by W9OYB, Omaha, who in turn called up W9VKT, Omaha, on the land line and informed him OED was calling him. W9VKT contacted the Associated Press office, and the night news for the Fremont Morning Guide was transmitted by VRT to OED. Immediately following completion of this effort, BNC, Omaha, called OED, Fremont, for traffic west to Grand Island for the A. T. & T. When contact was finally established in round-about way, BNT in the meantime had gotten into Grand Island via Kansas City, Julesburg, Colorado and North Platte.

The following morning, lines still being out of order, OED scheduled BNC for United Press news for the Present Daily Tribune. The October 31st news was handled at OED’s with the assistance of RCII and his XYL, who copied the press in shorthand. Saturday morning on the BNC schedule, the local newspapers furnished a stenographer and the press transmissions were handled without a hitch. The U.P. had a direct landline to the home of BNC, who had an amplifier on the telephone and rebroadcasted the U.P. office reading of the news direct to OED, who merely sat and watched the stenographer take it down in shorthand.

The telephone, telegraph and teletype lines all went out and came back at about the same time.

All Western Union telegraph traffic in and out of Fremont was handled by VK3, who, with the assistance of BQP, passed 18 messages in a short time.

The Pioneer Radio Club of Nebraska are now all building 56- and 112-Mc. equipment, so that if and when another call comes for amateur radio assistance, they will be more than ready to fill the bill.

—Scott E. Davison, W9OED

Trainee Traffic Stations

The following are additions to the lists appearing in the October, November and December issues of QST.

W1NQX—Sgt. J. H. Carroll (W3ILL), Bangor Air Base, Bangor, Me., operates on 7 and 14 Mc.
W2JZY—Capt. Robert E. Kearney, Fort Belvoir, Va., schedules AARS nets and is prepared to handle traffic.

In order to participate more actively in the next ORS/OPS Parties, W1AW will cancel Official Broadcast and Code Practice schedules on January 31st and February 1st.
Merry Christmas
and
Happy New Year
from
National Company

which includes

Lester Harris . . . . W1AOP
George Leal . . . . W1ARN
T. P. Leonard . . . W1AUL
Herman Bradley . . W1BAQ
James A. Ciarlene W1BH
Dana Bacon . . . . W1BZR
C. F. Hadlock . . . W1CTW
Harvey Poore . . . W1DKM
Seth Card . . . . W1DRO
Gene Simms . . . W1DXD
Albert Oliver . . . W1EAQ
John Bartlett . . . W1EU
George Ringland . . W1EYZ
Donald Hinds . . . W1FRZ
Robert J. Murray . . W1FSN
John A. Baxter . . W1HKR
David M. Smith . . W1HOH
Vincent Messina . . W1HRW
Jack Ivers . . . W1HSV
Matthew J. Sokolowski W1ISR
Sumner Herrick . . W1JDF
Edmund C. Harrington W1JEL
Kenneth C. Nagle . . W1JGD

Alfred Zerega . . . W1JMK
Robert Williams . . W1JOX
Harold Fowler . . W1KUX
Robert Maguia . . W1KLB
Frank Lopez . . W1KPB
Richard Gentry . . W1LEN
John Stanley . . . . W1LFF
Francis Waden . . W1LNV
Richard Thurston . . W1MFZ
Frank J. Nault . . W1MKC
Charles Levine . . W1MOJ
Carl Beckman . . . W1MPF
Edmund Ogden, Jr. . W1MTO
Richard Gysan . . W1MUO
Maynard Wentzel . . W1NBV
George Vasil . . . W1NBW
John M. Wondergem W1NDA
Bruce Rich . . . . W1NKO
William Doyle . . . W1TV
Arthur H. Lynch . . W2DKJ
Myrl B. Patterson . . W5CI
Herb Becker . . . W6QD
John Prusak (amateur operator license but no call)
"Approved"

Consider the term "Approved" as applied to a radio part. It means:

- The product has been time-tested and proved satisfactory.
- The product has been accepted by design, production, and inspection engineers.
- The product is uniform... made to close production-tolerances.
- The product is honestly priced, leading to its universal acceptance.
- The sponsor of the product has a fair and equitable sales-policy, recognized by the industry.

That the term "Approved" has been earned by Mallory products, is evident by the long list of users, a veritable Who's Who of the radio industry. Since it costs no more to have industry's stamp of approval on the parts you use, always specify Mallory "Approved" Precision Products.

P. R. MALLORY & CO., Inc.
INDIANAPOLIS, INDIANA
Cable Address - PELMALLO

Defense U.H.F. Nets

N. Y. 112-Mc. Emergency Net Activity

For the first time in New York City the ARRL Emergency Corps of Queens County worked in conjunction with the Police and Air Raid Protection Service of Civilian Defense.

On Thursday afternoon, November 13th, a mock air raid was scheduled to be held at Bayside, Queens County, New York City. At a prearranged signal, a portable mobile unit, operated by W2DE with an assistant operator, W9JPY, was rushed to the scene of the supposed bombing. Another portable mobile unit operated by W2KIV and W2JSM was dispatched to the Zone Warden's Headquarters and a portable station operated by W3KDO and Asst. E. C. W2EZ was rigged up at the 11th Precinct Police Station at Bayside, L. I.

Working under the assumption that the telephone lines were out, these amateur stations served as the only means of communication during the test.

The portable mobile unit at the scene of the disaster, acting under orders from the officials already there, contacted the Police Station telling them what had happened and what assistance was required. Police Cars and other emergency units were immediately dispatched to the scene.

During operations another portable mobile unit with operators W2MJL, W2JUV and Asst. E. C. W2NDQ reported in at the Police Station and stood by in readiness to answer over should their services be required.

The Air Raid Drill lasted for thirty minutes during which time all operators got a thorough workout under conditions approximating a real emergency with a couple of automobiles wrecked in the roadway, the telephone emergency trucks working on their lines, the Dept. of Sanitation trucks cleaning up the wreckage and the Red Cross Units caring for the injured.

Howard E. Smith, W2GDP, Queens County Emergency Coordinator

Garden City Radio Club

U.H.F. Program

GARDEN CITY, N.Y., Nov. 18. — Active work looking to a close tie-up with National Defense measures was started here last night at the regular meeting of the Garden City Radio Club; appointment of three committees by Dr. L. J. Dunn set the wheels in motion for an all-out effort which it is confidently expected will result in organization work that will set the pace for similar effort all over the country.

Actual work on the program starts Friday evening, November 31, when Dr. Dunn (W2CLA) will call the organization together for a roll-call and preliminary drill at 8:30 p.m., frequency used will be in the 112 Mc. band. Next regular meeting of GCRC, at which it is expected to complete an effective organization, will be held in Village Hall, Garden City, on the evening of Wednesday, December 3.

In the meantime, a General Committee to work out details of the program and to suggest suitable candidates to take over the work of actively heading the group, up to now aggressively handled by Dr. Dunn whose other National Defense activities no longer permit him to carry on this work, includes these amateurs: Chairman John Heins, Captains Win. Allen and John Herlands. A second committee, to work with Chairman George Wies, will work on a Civilian Air Defense program and includes Bill Measner,
THE selection of "Super-Pro" receivers for use in WABC's new station on "Columbia Island" is one more proof of their approval among leading engineers. "Super-Pro" receivers are widely used by leading broadcasting stations; press services; various departments of the U. S. Government, and by many foreign govern-

ments throughout the entire world. Dependability alone has built the fine reputation enjoyed by the "Super-Pro". Its ability to stand up over long periods of time, and give top performance under the most difficult operating conditions, has made it a leader in the field. The next time you have a difficult receiving problem try a "Super-Pro" and your worries will be over.

Send for 16-page booklet  

Diversity Receiving Installation at WABC

Send for 16-page booklet

Diversity Receiving Installation at WABC

THE "SUPER PRO"

Hammarlund

424-438 West 33rd Street, New York City, New York
A AGAIN we pause, at the threshold of a New Year, to reminisce and give thanks for the many new friends we have acquired and for the old and loyal ones who have worn so well. All too easily do we take for granted those about us, and not until wars appear close around us do we realize their true worth.

A man, and a company, are judged by their associations, and it behooves us at this time to stand still while we give thanks that we have been so fortunate.

If our small part has added to the ultimate goal of our country’s desires, then we know that our rewards are great.

At no time in past history has our, “Peace on Earth, Good Will to All Men,” been more sincere.

Peace On Earth
Good Will To Men

Arthur Lynch and Jim Tynan. This committee will coordinate portable mobile flying work and ground stations for observation tactics in defense work. Finally, a technical committee, headed by Ed. Ruth, will work out details for equipment of the most suitable type for the work in hand. Other members of this committee are Jack Andries and Jim Tynan.

W2HZL, Asst. Secretary of the Schenectady Amateur Radio Assn., reports that the club is conducting a 112-Mc. emergency net drill weekly. The first meeting, held on November 12th, was attended by fourteen stations.

Mr. Louis Melbert, W1FSH, is being recommended by the Manchester Radio Club for the post of Emergency Coordinator. Eight 112-Mc. stations under his direction recently demonstrated a set-up covering the community using portable and portable-mobile units, and handling messages “planted” by the control car based on various simulated contingencies. A good start has been made on plotting the community for possible dead spots. Regular Air Warden blanks such as used in Britain have been prepared for filing ARP message-reports to the Report Centers.

FLORIDA EMERGENCY

On Sunday, October 5th, a storm was reported off Miami, Fla., with a wind velocity of 100 miles per hour near its center. At this time all emergency nets in the state on all bands became alert for the apparent emergency that was to come.

The storm was supposed to strike Miami in the early morning hours and the nets were busy getting organized with the various net control stations getting set for whatever traffic that they could handle when the occasion arose. Governor Holland had requested the amateur radio system to keep him posted on the storm at all times and it was then a matter of getting an outlet at Tallahassee for all traffic that would be coming in for the Governor and various state officials.

That detail taken care of, the nets settled down for an all night vigil of waiting for something to happen. At about 5:30 on the morning of October 6th the storm struck about 20 miles south of Miami but did not do as much damage as was expected. It then crossed the southern part of the state and was apparently forgotten as the nets disbanded about 8:00 A.M. on Monday morning. The storm had run into the Gulf of Mexico.

On Tuesday morning, October 7th, the people of Tallahassee, Fla., awoke to find themselves in the middle of the worst storm in the city’s history. At about 5:30 A.M. the amateurs in Tallahassee found that all communications with the outside world were out. There was a report that eight people had lost their lives in Tallahassee and surrounding areas.

The job of setting up headquarters for communications in Tallahassee fell on the shoulders of W4GAA and W4BOW. On checking the damage done to their antennas, W4GAA found that the feeders on his 1.75-Mc. antenna were down; on getting his 1000-watt a.c. generator going, he could raise no one using his counterpoise. It was then decided to shift the generator to W4BOW’s QTH and put his 450-watt rig on 7-Mc. c.w. This being done, W4BOW raised W4PL in Sheppard, Tenn., who took the first traffic from him to the Red Cross in Washington, D. C. Traffic was handled with W4PL until he faded out in the early afternoon. The following stations were then on the alert for W4BOW’s traffic until 7-Mc. started skipping out late in the afternoon: W4DRD in Miami; W4FQZ in Ft. Myers; W4FZW in Jacksonville.

In the meantime, W4GAA had gotten the cooperation of the local fire dept. and had gotten his antenna feeders back up. He then raised W4FOP in Bessemer Ala., who took his first traffic.

At about 8:30 in the afternoon the Florida 1.75-Mc. AARS net was to have a drill. W4GAA knew that as soon as they got on, the net would take the responsibility of clearing the frequency and getting organized.

About 7:00 p.m. W4BOW came in with the report that 7 Mc. was skipping too much for best results and was returning the generator to W4GAA, which was a good thing as W4GAA was operating on 6-volt storage batteries driving a 325-watt converter generator taken from a local juke...
There are a number of reasons why the "HQ-120-X" has won such universal approval among leading amateurs. From start to finish it was designed with one thought in mind—performance. Six bands are used to provide low C tuning circuits with maximum gain and uniform sensitivity. The antenna compensator provides maximum signal-to-noise ratio with a given antenna system. A Hammarlund patented variable selectivity crystal filter provides just the right degree of selectivity at all times. High stability is maintained with voltage regulation and drift compensation. There are, of course, a number of other features such as calibrated band spread dial; automatic noise-limiter, and the usual beat oscillator, send-receive switch, phone jack, etc. There is nothing fancy about the "HQ"—it's all receiver.

HQ-120-X

Hammarlund

Hammarlund Mfg. Co., Inc.
424 W. 33 St., New York City

Please send "HQ-120-X" booklet

Name: ________________________________________
Address: ______________________________________
City: __________________________ State: ____________
organ, and the batteries were getting very weak. About 6:15
W4GAA raised W4GVH in Panama City, a member of the
1.75-Mc. AARS and on getting set to start handling traffic,
W4GVH, State Alternate Control Station, called in to take
over. The following stations helped W4GAA handle traffic
within the net: W4GUI, W4BJF, W4GHV, W4HLC and
W4FRP.
Traffic was handled throughout the day by W4GAA and
W4BOW for The Coast Guard, State Officials, City and
County officials, Airlines, the CAA and the telegraph
companies.
W4GAA and W4BOW were given splendid support and
help with the handling of all traffic during the emergency
by W4EIC and W4IDN and stations in states all over the
country who helped to keep the frequencies clear. They did
a swell job and deserve a lot of credit.
—Raymond Soundrup, W4BOW, and
Tommy Blalock, W4GAA

F.C.C. Actions
(Continued from page 46)
The amateur radio operator license with Class B privi­
leges of Karl Kocca, Toledo, Ohio, was suspended on Octo­
ber 7th for a period of six months for violation of the Com­
munications Act and the Rules and Regulations of the Com­
mision governing amateur radio stations and operators.
On November 18th the Commission suspended for a pe­
riod of one year the radio operator license of Kenneth
Kangas, Minneapolis, Minn., for operating a transmitter on
premises controlled by an alien in violation of the Com­
munications Act.
The amateur radio operator license of Joseph Tenore,
Quincy, Mass., was suspended for the remainder of the
license term, for, while operating W1LKT, communicating
with D4ARR located in Germany, in violation of Commia­
aion Order 72.
On November 25th the amateur operator license of Ed­
ward D. Wells was suspended for violating emergency regu­
lations (Order Number 72) by using station W3AOO to
communicate with stations XE1AM and CE1OM in Mexico.

WIAW SENDING PRACTICE SUBJECTS
AND QUALIFYING RUNS
Daily-except-Friday WIAW Code Practice
starts at 9:45 P.M. EST. Simultaneous trans­
mission on: 1761, 3575, 7150, 14,254, 28,510,
58,960 kc.
The subjects given below will be followed each Sun­
day, Tuesday, and Thursday, December 23rd to February
1st, and the text is identified to make sending practice avail­
able. To get sending help, hook up your own key and buzzer
or audio oscillator, turn to the
QST
material, tune in W1AW,
and attempt to send right in step with the tape signals. Ad­
just your spacing in the manner the received signal indicates
necessary for improvement.

Date Subject of Practice Text from Dec. QST
*Dec. 23 Vibrator Power Supplies, p. 44.
**Dec. 20 Evening Qualifying Run, 9:45 P.M. EST. un­
announced copy.
*Dec. 28 Hints and Kinks, p. 52.
*Dec. 30 A Coupling Unit for Continuous Antenna Rota­
tion, p. 15.
Jan. 1 Cutting Bias Supply Size and Cost, p. 29.
**Jan. 4 Daylight Qualifying Run, 1:50 P.M. EST. un­
announced copy.
Jan. 6 112-Mc. Emergency Gear, 3rd par., p. 11.
Jan. 13 The Oscillator Circuit, p. 17.
Jan. 15 The Modulator, p. 68.
Jan. 18 What the League Is Doing, p. 22.
**Jan. 22 Evening Qualifying Run, 9:45 P.M. EST. un­
announced copy.
Jan. 23 A Compact Receiver for 112 Mc., p. 31.
Jan. 27 An Experimental 112-Mc. Receiver, p. 36.
Jan. 29 A Modern Vacuum-Tube Voltmeter . . . ,
p. 40.
* November, 1941, QST.
** W9HCC sends same text at same time on 3532, 7058,
and 14,912 kc.
Always NEW!

A radical plate design in 1936 greatly improved power capabilities and efficiency of 250T.

In 1941 further improvements and still greater efficiency.

Veterans of many outstanding achievements in radio, yet there's no such thing as an OLD tube type at Eimac. Past achievements paved the way for present leadership in the field. Leadership made possible by "heads-up" developments in tube construction and performance capabilities. The plates in Eimac tubes today are not the same, by a long way, as those originally used. And yet basically they are the same. Note the pictures above. See one of the early models and the improvement in the modern design which represents greater efficiency. By such constant improvement, Eimac tubes are kept "always NEW"...always a step ahead of the needs of the industry. Each tube has behind it the successful years of its predecessors...radical departure from conventional in tube design...ability to perform without strain where many others failed. Such is the Eimac 250T. Originally the Eimac 150T, it surprised the industry by performing so easily, the task of much larger tubes that, with slight modifications, its rated capabilities were boosted by more than 60%. The record today shows these comparatively small tubes being used in newer transmitters for jobs once thought impossible. Eimac tubes are like that, one and all. They are the only tubes on the market which carry unconditional guarantee against tube failures resulting from gas released internally.

Follow the leaders to

EIMAC

Plate Dissipation (normal) ........ 250 Watts
Filament Voltage .................. 5 to 6.5 Volts
Maximum Plate Voltage ............ 1000 Volts
Power Output at 1000 volts on plate .. 750 Watts

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Colo., Wyo., New Mexico, Arizona, Utah
RICHARD A. HYDE, 4255 Quitoit St., Denver, Colo.

N. Caro., S. Caro., Georgia, Tex., Okla., Ark.
JAMES MILLAR, 316 Ninth St. N. E., Atlanta, Georgia.

Texas, La., Okla., Ark.
J. EARL SMITH, 512 Live Oak St., Dallas, Texas.
Ohio, Mich., Ky., Ind., Illin.
N. Caro., S. Caro., Georgia, Tex., Okla., Ark.

PEEL SALES ENGINEER
ING CO., R. E. Peel, 154 E. Erie St., Chicago, Ill.

Export Agents: Frazier & Co., Ltd., 301 Clay Street, San Francisco.
Peace on earth...

Certainly, at a time like this, we are not attempting to be facetious. In complete seriousness, our thoughts and our hopes are for peace and goodwill for all men. . . . It's Christmas time!

And the day will come, soon, we hope, when our laboratory and our factory will be enabled to release better-than-ever CARDWELL products . . . in normal volume . . . for your amateur and commercial applications.

W ith Sincere Best Wishes

THE ALLEN D. CARDWELL MANUFACTURING CORPORATION
83 PROSPECT STREET - BROOKLYN NEW YORK

Emergency Equipment Power Supply
(Continued from page 14)

a.c. gave the desired 300 volts at 100 ma., put only 70 ma. at slightly over 200 volts into the same load resistance when operated from a battery. If it comes to a matter of necessity, of course, this method of operation at least is better than no battery supply at all. But with a little forethought and very little trouble it is readily possible to get the higher output.

In fact, we don’t believe, now, that emergency power supply need give us any real concern. If one source of supply fails, there are enough alternatives — including that reservoir which the future may see us tapping for lots of our needs, the two-decade accumulation of outmoded b.c.l. sets.

U. S. A. Calling
(Continued from page 15)

FREE RADIO ENGINEERING TRAINING

In our last issue, page 26, and in the November number, page 29, we reported the availability of free technical schooling in a large number of educational institutions in cooperation with the U. S. Office of Education. An announcement from the University of Maryland brings to hand a specific example.

There is urgent need of radio engineers and other technical radio men in defense work. If a sufficient number of applicants can be found, the university plans to convene on January 5th a full-time day course in radio engineering, continuing through August 7th. The course will deal with advanced theory and practical radio engineering, the student spending a minimum of forty hours a week in lecture room and laboratory. Tuition expenses are borne by the government, the student paying his own living expenses. Requirements for admission include a degree in electrical engineering or a minimum of three years’ E.E. training at a recognized college. The appearances are that all students completing the training will receive good offers of employment. Application forms and an outline of the proposed curriculum may be had from Dean S. S. Steinberg, College of Engineering, University of Maryland, College Park, Md.

Lock-in Tubes
(Continued from page 17)

generative effects. The filament-type double triode will provide a usable signal source up to 250 Mc. in a long-line oscillator circuit, while the filament-type triode will operate up to 350 Mc.

Another tube of interest to the 56- and 112-Mc. gang is the 7W7, a new high-frequency amplifier pentode identical to the 7V7 except that it has two cathode leads brought out at the base. This cathode lead arrangement is said to triple the input resistance at the higher frequencies, and the 7W7 is a useful amplifier up to 200 Mc. When employed as a mixer tube using signal-grid injec-
AISiMag steatite ceramic insulation combines these outstanding properties: high dielectric strength with low dielectric loss, high mechanical strength with excellent resistance to atmospheric conditions. Leading manufacturers of radio equipment use AISiMag from microphone to loudspeaker to be sure that insulation is NOT the weak link in the chain of materials used in their equipment. If you want to know that you have the best in insulation, specify AISiMag insulators when ordering your equipment.
For TRIPLETT Customers Only

LONG BEFORE the state of emergency was proclaimed, the Triplett Company was getting ready to do its part in building our national security. We knew that we must meet important new responsibilities. At the same time, we felt keenly our continuing obligations to our customers—old friends with whom we have had happy business relations through many years.

We doubled—then tripled—our output to fill the needs of our old accounts. We added to our production facilities ... hired many more men ... are working extra shifts at time-and-a-half.

All this has not been enough. We have been called on to produce more and more for national security. We knew that we must meet "for the duration":

FIRST: We will continue to serve you by our service to our mutual responsibility—the national emergency.

SECOND: We will continue to do everything we can to fill orders from our regular customers, even though some deliveries may be temporarily delayed. No business from new accounts has been nor will be accepted until after our old friends have been served, except where priorities make it impossible to do so.

THIRD: Our engineering and research departments will continue to work on the development of superior equipment and improved methods to serve you still better when we can resume normal operations.

The present emergency is incidental and as we work towards the future, we will do our best to continue to merit your confidence and loyalty.

P. H. Triplett
President
The Triplett Electrical Instrument Company

Manufacturers of Precision Electrical Instruments

1201 Cathode Type High-Frequency Triode
- Heater voltage: 6.3 volts
- Heater current: 0.150 amperes
- Plate voltage: 120 volts
- Grid voltage: 150 volts
- Mutual conductance: 3000 µmhos
- Plate resistance (approx.): 12,000 ohms
- Amplification factor: 30

1203 Cathode Type High-Frequency Diode
- Heater voltage: 6.3 volts
- Heater current: 0.150 amperes
- Plate voltage: 10 volts
- Control grid voltage: -2 volts
- Plate current (average): 3.5 ma.
- Plate voltage: 250 volts
- Plate resistance: 1200 µmhos
- Plate resistance (approx.): 800,000 ohms
- Amplification factor: 21

1204 Cathode Type High-Frequency R.F. Pentode
- Heater voltage: 6.3 volts
- Heater current: 0.150 amperes
- Plate voltage: 100 volts
- Control grid voltage: 0 volts
- Plate current: 5.2 ma.
- Grid voltage: 300 volts
- Amplification factor: 3000 µmhos
- Amplification factor (approx.): 12

7W7 High Frequency Amplifier Pentode

Condition I | Condition II
- Heater voltage: 6.3 volts
- Heater current: 0.450 amperes
- Plate voltage: 300 volts
- Screen supply voltage: 150 volts
- Screen series resistor: 40,000 ohms
- Suppressor current: 0 ma.
- Cathode bias resistor (min.): 150 ohms
- Plate resistance: 0.3 megohm
- Mutual conductance: 5500 µmhos
- Plate current: 10.0 ma.
- Screen current: 3.9 ma.
- Grid voltage for cathode current cutoff: -6 volts

Resonant frequency: 613 Mc.

Amplification factor: 21

Plate voltage: 1.42 1.71 volts
Plate current: 0.220 amperes
Power output at 21 Mc.: 1.4 1.67 watts
FLEXIBLE COUPLINGS AND RF CHOKES

TX-1  Leakage path 1".  Net $0.66
TX-2  Leakage path 2½".  Net $0.75
Flexible couplings, isolantite insulated.
TX-8  Non-flexible coupling. Isolantite.
Net $0.51
TX-9  Flexible, Steatite insulation 1⅝" Dia.
Net $0.75
TX-10 Flexible coupling with canvas Bakelite insulation. 1 1/16" Dia.
Net $0.36
TX-11 The flexible shaft of this coupling connects shafts at angles up to 90°. Not insulated. Length 4½".
Net $0.42
TX-12 Length 4½"  Net $0.84
TX-13 Length 7½"  Net $0.99
Flexible shaft couplings like the TX-11, but with isolantite insulators at each end.
All couplings above fit ⅛" shafts.

R-100  Without standoff insulator.  Net $0.30
R-100U  With standoff insulator.  Net $0.36
RF Chokes R-100 and R-100U are identical electrically, but the latter is provided with a removable standoff insulator screwed on one end. Both have isolantite insulation. Inductance 2½ mh., distributed capacity 1 mmf., DC resistance 50 ohms, current rating 125 ma.

R-300  Without standoff insulator.  Net $0.30
R-300U  With standoff insulator.
Similar to the R-100 series above in size and construction, but current rating is 300 ma. Inductance 1 mh., distributed capacity 1 mmf., DC resistance 10 ohms.

R-152  For the 80 and 160 meter bands. Inductance 4 mh., DC current 600 ma., DC resistance 10 ohms. Isolantite core.  Net $1.50
R-154  For the 20, 40 and 80 meter bands. R-154 and R-154U are the same except for mounting (see illustration). Inductance 1 mh., DC current 600 ma., DC resistance 6 ohms. Isolantite core.  Net $1.50
R-154U  Net 1.20
R-154  For the 20, 40 and 80 meter bands. R-154 and R-154U are the same except for mounting (see illustration). Inductance 1 mh., DC current 600 ma., DC resistance 6 ohms. Isolantite core.  Net $1.20
R-154U  Net 1.20
R-154  For the 20, 40 and 80 meter bands. R-154 and R-154U are the same except for mounting (see illustration). Inductance 1 mh., DC current 600 ma., DC resistance 6 ohms. Isolantite core.  Net $1.20
R-154U  Net 1.20
R-175  For parallel feed as well as series feed in transmitters with plate supply up to 3000 volts modulated or 4000 volts unmodulated. Reactance is high throughout the 10 and 20 meter bands as well as the 40, 80 and 160 meter bands. Inductance 225 µh., distributed capacity 0.6 mmf., DC resistance 6 ohms, DC current 800 ma., voltage breakdown to base 12,500 volts.  Net $1.80

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In the Services (Continued from page 28)

To assist in gathering data on licensed amateurs in military service we have prepared return postcard form for registration purposes. If you are located where there are more than a few amateurs and will undertake to arrange for the distribution of these cards, we'll gladly send a supply to you. Let us know.

Faries, 3AOA, is on active duty at the Customs House in Philadelphia. Ens. Keener, 3AJS, is A.C.O. of the Washington. CRM Mundy, 3DBR, is assigned to the Naval Radio Station at Tugua, American Samoa; Lovering, 1FDV, to that at Winter Harbor, Me.; and Eckford, 8BNP, at Midway Island. Lt. Jordan, 3TU, and Eignere Gladding, 1GW, are three more lads in the Navy Dept., Washington. Biz Gilson, 9WYN, is enrolled in the Indiana University Radio School. On the Radio we find CRM Bowen, ITW, and Lt. (jg) Eglit, 2EB; on the Moffett, R1m Simmonds, 8SPT; on the Munroo, Lt. Johnson, 9GT; on the Mattole, RMLs Baker, 4CQX; on the Wasp, Patton, 9BBV; on the Hughes, RM4o Gooch, 9VJC; on the Seymore, Blankmann, 7DEU; on the Cyane, Lt. Johnson, K7IFU; the Currit, R2m Owls, 7SPT; the Idaho, Ens. Duke, 4FMZ; the Dubuque, Ens. Stevens, 8WHO; the St. Michael, RM4c Westland, 8NDR; the Rock, RM1c Conner, 9HCE; the Gridley, RM3c Hassett, 8PVB; the Honolulu, Comdr. Murphy, 3MFN, OM Beecher, 2JLE, of electronic key fame, is at the training station in New Orleans. At the section base in Astoria, Ore., are located RM3s Savage, TGSO, and Wyke, 7DIIH. Lt. Graverson, 2LJ, is on active communications duty in the Third Naval District. RM3s Hamilton, 1MBV, is now assigned to the naval air station, Kanoone Bay, T. H.; Ens. Bonnell, 9MEM, to that at Jacksonville, Fls.; Rodger, 4FR, at Alameda, Calif.; CRM Fredericksen, 2FLD, Floyd Bennett Field; and Ens. Clark, 6QGC, Johnston Island, T. H.

ARMY


In the Marine Corps we find Capt. Smith, 3GKN, at Washington headquarters; Pvt. Paley, 2LQM, in the Navy Yard at Washington; Pfc. Thompson, 6UFB, at Camp Elliott, Calif.; and M. Sgt. Masters, 9HEF, at the aviation station in Quantico, Va.

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BUY AT '41 PRICES . . . PAY IN '42!

HAMMARLUND HQ 120X
$42 DOWN!
Balance $16.69 Per Month for 8 Months
Cash Price $168.00 Complete
(Speaker Cabinet $3.90)

ORDER NOW . . . DIRECT FROM THIS AD. Every Item 100% guaranteed. You must
be satisfied or money back. If you don't see what you want, ORDER IT anyway. We can
supply it. Be sure to send down payment and credit references when you order a receiver.

HALLICRAFTERS SX 28→
$44.88 DOWN!
$17.34 Per Month
for 8 Months
Cash Price $179.50 less speaker.
Regular PM23 Speaker in Metal
Cabinet $15.00.

$43.62 DOWN!

NATIONAL NC 200
$17.34 per month for 8 months
Cash Price $174.50 Complete

Brand New . . . for '42
NEWARK'S CATALOG—FREE TO YOU!
The radio equipment "Book of the Year." 1942 edition, now ready! Over 5000 items, parts, supplies, accessory sets, receivers, P. A. systems, transmitters, etc.
If interested in radio, sound recording, etc., YOU
NEED THIS CATALOG! Send for it . . . NOW.

NEWARK Electric Company
323 W. MADISON ST.
Dept. Q CHICAGO, ILL.

Robert Leach, 1GFP, is with the foreign branch of the Civil Service at Trinidad, B. W. I., while his brother Arthur, 1GFP, is with OPM in Washington. Pvt. Flynn, 2ILG, is an Air Corps enlistee learning the ropes at Keesler Field. Miss. Cpl. Donovan, 9QZW-6UAA, maintains AWS equipment at Hamilton Field, Calif.


Pvt. Christ, 9ALU, is finishing up the radio course at Ft. Bragg, N. C. Staff Sgt. Arsie, 2MCF, teaches radio at Ft. Dix, N. J.

Soldiers and Sailors

(Continued from page 51)

Carol Bruce, Hollywood movie actress, decorates the dedication scene at WINTV. Right, RMIC Henry Kurtz, president of the ham club.

left for auxiliaries. As the stations will be operated by many different amateurs, with differing operating desires, it was necessary to incorporate great flexibility of operating frequencies as well as simplicity of control. The transmitter provides a 75-watt carrier on c.w. and phone, either crystal-control or e.c.o., with all controls from the front of panel, including band-switching and accurate tuning of the final. Normal phone operation will be push-to-talk but provision has been made in the construction for break-in operation where essential. A simplified doublet antenna provides a standardized sky-wire.

Hand-in-hand with the amateur units are radio recorders which NCCS has already installed in a great many of its clubs. A hundred thousand discs have been distributed to offer the soldier an opportunity to record his message and send home "A Letter on a Record."

Wired radio is the next major project in USO-NCCS clubs. Complete broadcasting studios are installed by NCCS under this nationwide plan. A low-power transmitter is set up in sound-proof rooms. Programs, written and produced by soldiers, are then taped into the electric wiring system of the nearby post and the soldier-productions are then dialed-in by the soldier-listener as he sits inside his quarters. Preliminary scripts have been issued. Recording libraries are in the process of being selected. Radio clubs are being formed. The NCCS "Band-Wagon" is going places!
The Year's Best Sellers!

TAYLOR TUBES

T40 and TZ40
$350

866/866A
$150

Wishing all the gang
A MERRY CHRISTMAS and a HAPPY NEW YEAR

W9ECA
W9LIP

MORE WATTS PER DOLLAR

Taylor CUSTOM BUILT Heavy Duty Tubes

TAYLOR TUBES, INC., 2341 WABANSIA AVE., CHICAGO, ILLINOIS
On the Ultra Highs

(Continued from page 54)

work out very nicely on 214. Top and bottom sections are 63½ inches long; center sections 70¾ inches. Stubs made of ¼-inch copper tubing spaced 2 inches are 14 inches long. Feeders, attached to the center stub at 9 inches from its shorting bar, are of number 12 wire, spaced 2 inches.

The Second U.H.F. Marathon has just come to a close. Participation during 1941 ran far ahead of 1940, and increased activity in many sections has resulted in higher scoring. Not everyone can win, of course, but the Marathon is fun for all. It provides a fine opportunity for each u.h.f. enthusiast to check up on his accomplishments and compare them with others similarly situated. We’d like to see every seriously-interested u.h.f. operator represented in the monthly reports in 1942. Why not send for those report forms now?

Thus we come to the end of two years of “On The Ultra-Highs.” We hope that you’ve enjoyed it and found it useful as well. Please remember that your conductor’s function is that of a reporter and editor. What you find in this space each month is mainly the result of many of you having taken the trouble to send in reports, suggestions, photos, and technical and operating hints. Your cooperation has been appreciated no end. Holiday Greetings to you all, and success on the Ultra-Highs in 1942!

A. A. R. S. Activities

(Continued from page 55)

To All Army-Amateurs:

In the past, Armistice Day has been the occasion for us to remember the close of a great world conflict. This year war again is raging in the world and it is vital that we look to our ramparts to ward off and defeat the aggressors. Radio communication is a most essential medium of defense and it is imperative that all who are in a position to render service in this important field should make themselves available for our country’s defense. The Army-Amateur Radio System, comprised of radio amateurs throughout the nation trained in Army radio procedure, is a valuable civilian auxiliary to the Signal Corps. I am very glad of this opportunity to express my appreciation of the voluntary and spontaneous services which Army-Amateur members and other cooperating amateurs are giving to strengthen our communications.

DAWSON OLMSTED, Major General, Chief Signal Officer of the Army.

Report on the results of this contest will appear in a future issue.

NEW ASSISTANT LIAISON OFFICER

First Lt. William L. Montgomery, Signal Corps, recently was assigned as Assistant Liaison Officer, AARS, in the Office of the Chief Signal Officer, Washington. Lieut. Montgomery, W8EPL, has been an active amateur in Pittsburgh and an AARS member since 1927. He has been with the Pennsylvania National Guard for eleven years, serving with the 28th Signal Company, Intelligence Company. Recently was assigned as Assistant Liaison Officer and later with the 101st Signal Radio Company, comprised of radio amateurs throughout the nation trained in Army radio procedure, is a valuable civilian auxiliary to the Signal Corps. I am very glad of this opportunity to express my appreciation of the voluntary and spontaneous services which Army-Amateur members and other cooperating amateurs are giving to strengthen our communications.

WINES S. OLMSTED, Major General, Chief Signal Officer of the Army.

Report on the results of this contest will appear in a future issue.

NEW ASSISTANT LIAISON OFFICER

First Lt. William L. Montgomery, Signal Corps, recently was assigned as Assistant Liaison Officer, AARS, in the Office of the Chief Signal Officer, Washington. Lieut. Montgomery, W8EPL, has been an active amateur in Pittsburgh and an AARS member since 1927. He has been with the Pennsylvania National Guard for eleven years, serving with the 28th Signal Company, Intelligence Company. Recently was assigned as Assistant Liaison Officer and later with the 101st Signal Radio Company, comprised of radio amateurs throughout the nation trained in Army radio procedure, is a valuable civilian auxiliary to the Signal Corps. I am very glad of this opportunity to express my appreciation of the voluntary and spontaneous services which Army-Amateur members and other cooperating amateurs are giving to strengthen our communications.

DAWSON OLMSTED, Major General, Chief Signal Officer of the Army.

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If Spike and Joe make a habit of stopping at hams’ homes, they will find a lot of amateurs using GL-807’s “just like the cops.” For your sake, we hope they don’t start collecting them instead of silver.

The GL-807 will give you record-breaking performance as a grid- or plate-modulated r-f amplifier, crystal oscillator, doubler, quadrupler, modulator, or buffer. It’s being used extensively in FM broadcast transmitters and police communication systems. You can’t buy a more versatile performer for $3.50. Less than half a watt drives a pair; ICAS cw output: 100 watts!

Ask your dealer to show you the GL-807. And for your other tube needs, too, try G-E’s—measure the difference yourself.

FREE!
DATA BOOK ON RECEIVING TUBES

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Address........................................................................
City............................................................. State...............

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Electronic Power Supply for 112-Megacycle Emergency Gear

- Simplicity, low cost and unfailing dependability immediately recommend an Electronic Model S-1040 Vibrator-Type Power Supply for use with your 112-Megacycle Emergency Gear... as outlined by Technical Editor George Grammer in December QST, page 9. (If you missed his article, it will be worth your time to check back.)

The Electronic Model S-1040 operates both transmitter and receiver from either car battery or 115-volt AC... measures only 4¾x6x9¼ inches... weighs 12¾ pounds, approximately... and conforms exactly with Editor Grammer’s recommended specifications:

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Los Angeles
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100 Varick St. 1406 S. Grand Ave. 660 King St., W.

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**Field Day Scores**

(Continued from page 41)

- **W4OPX/8** with the W4QPG-CEPT-EXP.
- **W4RKM/8** with the W4SCF-OYD-Z6M-WZ-REH-HLE.
- **W4WOP/3** with the W4WOP.
- **W4WQ/7** with the W4WQG.
- **W4YOM/9** with the W4YOM.
- **W4YQ/2** with the W4YQG.
- **W4ZJ/3** with the W4ZJG.
- **W4ZJQ/5** with the W4ZJQ.
- **W5DDJ/3** with the W5DDJ.
- **W5DDY/3** with the W5DDY.
- **W5DDZ/3** with the W5DDZ.
- **W5DDZG/3** with the W5DDZG.

---

**Two Transmitters Operated Simultaneously**

- **W3WFWH/3** with the W3WFWH.
- **W3WWF/3** with the W3WWF.
- **W3WWJ/3** with the W3WWJ.
- **W3WWG/3** with the W3WWG.

---

Net price to amateurs, $18.50 complete, Indianapolis.
Communication established - but not without transformers! Dependable transformers!

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THORDARSON ELECTRIC MFG. CO., CHICAGO, ILL.
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LEARN TO SEND AND RECEIVE

Learn to send and receive code signals, like operators on ships at sea and at commercial and amateur land stations. Intercept distress signals, news flashes, bulletins, and dozens of other kinds of interesting radio communications.

MASTER TELEPLEX teaches you to receive code exactly the way the world's best operators do — by sound. A specially prepared paper tape, run through a machine, operates an automatic key which sends messages to you, at any speed you desire. There are no PERFORATIONS — NO INK. A marvel of simplicity. As you improve in speed, the machine sends faster, gradually preparing you for top-speed amateur and commercial signals. With the new all Electric MASTER TELEPLEX you learn to send by sending and the signals you send are repeated back to you, exactly as you sent them, thus enabling you to correct your own errors. We furnish a complete course, lend you the improved All Electric MASTER TELEPLEX, and give you personal instruction with a Master Operator. Write for Free FOLDER "Q.T-1".

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W2LKW/2 Nine ops. 44- A- 973
W4COP/4 W4YB-WOP. 40- A- 916
W2RPH/8 W2OM-OM-ON-OW-OP-OT-OU. 40- A- 916
W2SO/3 W2AXZ-HRTK-MKMT. 47- A- 788
WHIHY/1 W2HY/TOM-5TVF-IV-AU-1PZ. 48- A- 659
WHY/6 W2MM/KRTT. 37- A- 859
WHY/1 W2HY/JJ. 38- A- 465

Three Transmitters Operated Simultaneously

W2ERU/9 WAGY-AIC-BNO-BRY-BTQ-ERRU-
ESEO-FOQ-HOQ-MAN-MAU-
NTV-PQK-RT-5TB. 470- A- 4793
W8BB/5 W8SE-GOS-GQQ-DNN-END-HIK-
TJK-5EN-MIC. 140- A- 3227
W8ARU/9 W8AEK-AU-ARY-FQK-PRK-
CMN-RNP-MNZ-ZTV-ZWQ. 101- A- 1092
W9EB/9 W9AYE-TVQ-FPQ-DPO-PMQ-
BIN-JPY-MMP-WZP-RPX-R. 21- A- 514
W8BTR/8 W8BCY-GBR-MID-RIQ-UVQ-UM. 30- A- 495

Four Transmitters Operated Simultaneously

W9VX/9 W9CLB-XS-5P-PST-FUS-PUS-JOQ-
RBN-HXY-XSO-5DD-LQO-
MNO-URQ-SZT-5TB-TZQ-
FMZ-XEP-Z6P-RPM-ZPQ. 310- A- 4061
W9JU/9 W9бир-ONM-2ZV-GUU-HUD-3JU-
KVI-JAG-5OT-TTV-5TV-
TUX-5AL-ZP5-RPM-ZPQ. 255- A- 3816
W8WS/8 Ten ops. 79- A- 1633

Six Transmitters Operated Simultaneously

W9AOY/9 Fifteen ops. 281- A- 4053
W9DNO/8 Sixteen ops. 305- A- 3728

HOME STATION SCORES

W91WM. 185 WIMEM. 34 W8SQ5. 5
W9DE. 179 W9KCA. 20 W9MOG. 5
W9WQ. 174 W9HNE. 9 W9GQ. 4
W9NFU. 91 W9GQ. 17 W9GQ. 17
W9KKX. 42 W9ANC. 14 WJLY. 1

Club Stations

One Transmitter Q5'S+Power-Score*

W3BGS/3 Frankford Radio Club 1. 403- A- 6488
W4DC/4 Chattanooga Tenn. Amateur Radio Club 1. 188- A- 3240
W3UI/8 Elmhurst Amateur Radio Association 1. 190- A- 2720
W11NF/1 Providence Radio Association 1. 157- A- 2320
W8CL/6 Radio Club of Arizona 1. 86- A- 2341
W8HUY/4 Tri-County Radio Club 1. 134- A- 2223
W1MK/1 Pittsfield Radio Club 1. 123- A- 1974
W1LXT/1 WPA-Farm Dept. Recreation Radio Club 1. 108- A- 1935
W4KZ/4 Greenville Amateur Radio Club 1. 119- A- 1908
R8P/RK/8 Midwest Amateur Radio Club 1. 44- B- 1674
W8CWI/8 Dayton Mike and Key Club 1. 32- A- 2418
W9QR/7 The Electron Club 1. 49- A- 1394
W9NCC/7 Gila Valley Radio Club 1. 65- A- 1337
W9JX/9 Phoenix Area Mini Radio Club 1. 69- A- 1300
W1QM/1 Lowell Radio Operators Club 1. 73- A- 1233
W9MGO/9 Northwestern Illinois Communications Club 1. 68- A- 1134
W9SDC/5 California Amateur Radio Club 1. 78- A- 1103
W8DPA/5 Houston Amateur Radio Club 1. 34- A- 1058
W2HVR/2 Westchester Amateur Radio Association 1. 61- A- 1040
W7AS/7 Yamin Radio Club 1. 26- A- 915
W9YR/2 Sheridan Amateur Radio Club 1. 65- A- 902
W9TH/8 Sioux City Amateur Radio Club 1. 89- B- 800
W4GKD/4 Palmetto Amateur Radio Club Inc. 1. 63- A- 802

* The "power classification" used computing the score is indicated by A, B or C after the number of members. A indicates the power up to and including 30 watts (multiplier of 1); B indicates power over 30, up to 100 watts (multiplier of 2); C indicates power over 100 watts (multiplier of 1). More than one letter means that the same different times power inputs fell within different classifications.

Port Arthur College 8- Personal op.
W9CHU/8, DZC, TOQ, UBE, 11 WIDDY, HRC, JER, 
KKI, LCH, LCD, LLY, YER, MNR, RTM, INN, W8CME,
W7MR, WFTS, W2HY/JJ, W2MM/KRTT, W2SO/3, W8BB/5,
TIO, VYM, W2KM, KCO, MPP, MPO, JRT, W2EAX,
F, JYA, LXP, M22, M2P, N2R, M2K, TGU, MH,
WIAAS, DAM, HAD, FNS, FYL, GCO, HPG, HEP, 
W8QW, 16 KRAY, BAY, FYS, HVE, W8QG, 11 W3FL,
W9JMG, 10 Participants not indicated, 9 W9GCS, ORA,
10. JOC, JED, Brooks, 5 Fifteen ops, 4 W8JDN, FJK, 4
Fifty ops, 3 W2EI, YS, 30. Twenty ops, not stated.
W3QIN, GVR, JBE, LUP, 
NWA, Ten ops, plus 8 other club members, Twelve ops.
NEW Quick-Reference Catalog 18 on Rheostats • Resistors • Tap Switches

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Especially useful today! Gives complete up-to-date information on the wide range of Ohmite stock resistors, rheostats, chokes and switches used in all types of applications—Lists over a thousand stock items, including new developments—Gives descriptions, ratings and prices—Helps you select the right units for each job, easily, quickly. Get your copy of this handy new Catalog 18 now! It's FREE.

Handy, Useful Ohm's Law Calculator

Figures ohms, watts, volts, amperes — quickly, easily. Solves any Ohm's Law Problem with one setting of the slide. All values are direct reading. Does not require any slide rule knowledge. Size 4¾” x 9”. Yours for only 10c to cover handling cost.

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NEW ENGLAND DIVISION

CONNECTICUT — SCM, Frederick Ellis, Jr., WICT — W1AW continues BPL listing. LJY is going to town with traffic and handles the Norfolk end of the Nutmeg Net. He handles a lot of traffic into the New York City area. You phone him on 152 Mc. from Hartford if now State Police radio dispatcher at Canaan. MMN sends in his first report. BDI is back home after a 4-week contact trip through Okla., Minn., So. Dak., Wis., and Mich. EAO is active in the Charter Oak Net. Net is being held in Bloomfield. LOA says they need more stations on the Charter Oak Net, so any of the gang that can get on 5090 kc. should give him a buzz. On Armistice Day eve Elston had a rehearsal for housing and hospitalizing 650 from Bridgeport if a war-created disaster should ever strike that City. Emergency Coordinator APA set up his portable rig at headquarters in the Town Hall. GRU had an Abbott MRT3 in his car for mob­iliating the gang if needed. GRU will be in his car for mobile work if a report to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and de­fenders will be in position. GRU radioed to APA that 15 persons had been injured in a mock attack on Beacon Hill. Ambulances, fire apparatus and def"
NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTY — NH AARS recently held a meeting in Lebanon with a dozen or so members present. We understand that the Farfalla of Brookline, who visited 88BV on his vacation, JAF insisted on a modulator for awhile, is also wrestling with 112 Mc. installation for car. It’s the hope you all have a Merry Christmas and a Happy New Year. 73.

BUCS at W1BOR 315 (W1LQJ) MIM 372 BHY 211 (W1QN 67) A2W 204 (W1GDH 44) FOJ 147 MND 143 LUA 100 BVR 108 (W1LQA 104) NKN 96 JAH 93 (W1GH 23) KZS 80 DUS 40 BXY 46 AJ 45 MIV 35 NZJ 34 MKR 36 MJP 39 LHJ-FWA 25 NLL 31 MBT 26 FNY 25 TNE 24 JTW 22

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THANKS TO W1FOR — BHJ and JDV are active in Nashua on 56 Mc. Evidence Emergency Network is beginning to work smoothly. Here’s hoping you all have a Merry Christmas and Happy New Year. 73.

Committee’s work on 112 Mc. emergency apparatus. IIE of Dartmouth to work on emergency u.h.f. rig for local fire department. MJP 28 LHW-JFA 25 NLL 31 MBT 26 FNY 25 TNE 24 JTW 22

ITF is recovering from an operation of Emergency Coordinators throughout the State, and endorsement. BHJ and JDV are active in Nashua on 56 Mc. MDP and MZS are having FB time playing for less than $15.00 and all parts are available at this writing.

THE MOST AMAZING RESISTORS ON THE MARKET TODAY

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Koolohms give you many advantages available in no other resistor types—yet Koolohms cost no more! Sold by leading jobbers. Catalog free. Sprague Specialties Co. (Resistor Division), North Adams, Mass.

UP-TO-DATE PRESS SCHEDULES

We are indebted to F. E. Charlton, RM2c, U.S.N., Transmitter Bldg., Naval Air Station, Seattle, Wash., for the following data on Press schedules. It is suggested that amateurs interested in boosting their code copying ability use the transmissions for practice. We remind you that addressed information may not be divulged except to the addressee. Do not use such transmissions for anything but code practice.

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| *0430 | KIU/KHI | 6340/11,340 San Francisco 25
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| 0500  | WID     | 8560       | New York      | 30    |
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| *0550 | JUB     | 8925       | Wash., D.C.   | 30    |
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| 0700  | NJS     | 9250       | New York      | 35    |
| 0700  | JUP     | 13,085     | San Francisco | 20    |
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| 0800  | KPH     | 12,785/12,280 New York 25
| 0800  | KUH     | 8150/126    San Francisco 25
| 0800  | JAU     | 7365       | Manila        | 25    |
| 0800  | JYT     | 8360       | Japan         | 20    |
| 0800  | JYT     | 8360       | San Francisco | 25    |
| 1030  | KOM     | 18,550     | New York      | 50    |

(Continued on page 38)

THE WIRE IS INSULATED BEFORE IT IS WOUND

Koolohm wire with section of ceramic insulation removed.

Progressive winding. — Single layer winding

SPRAGUE KOOLOHMS
TOTALLY DIFFERENT—OUTSTANDINGLY SUPERIOR
"It's Overloading That Ends the Life of Most Amateur Parts"

K. B. WARNER'S EDITORIAL IN QST FOR DECEMBER, 1941

Hytron's engineers verified the soundness of this statement years ago. When intermittent ratings were popularized, Hytron stood alone as an advocate of continuous-service ratings exclusively. Although the conservative continuous-duty ratings of its tubes did not have spectacular appeal, Hytron has remained firm in pleading for ratings which it considered to be in the best interests of the amateur.

Mr. K. B. Warner's plea for tube conservation, we believe, is particularly apt in this time of National Emergency. At our own expense, and to give additional prominence to these timely words of wisdom, we quote Mr. Warner:

"It's overloading that ends the life of most amateur parts. Conversely, underloading vastly extends their lives — indefinitely. There is no blinking the fact that it's going to be hard, if not downright impossible, to get some components. When they go blooie under our customary overloads, there may be no replacement. We therefore propose that all amateurs who value their place on the air immediately reduce power, say to three-quarters or half of what they are using now. We don't believe there would be any detectable difference in signal strengths and we know that gear would last much longer — particularly tubes, and especially rectifiers.

"If you'll cut down on that plate voltage that now rips hunks out of filaments and electroplates it onto grids, you'll be just as happy and you'll stay on the air a whole lot longer. Tubes deserve particularly loving care. Keep your filament voltages exactly right. Warm up plenty. Avoid frequent cooling and reheating of filaments; if you're going to use the transmitter again within two hours it will be cheaper in the long run to leave the filaments on. Treat each item in your station as if you never expected to see another like it. You'll be glad you did."

ADVERTISEMENT
LSD's new QTH is 61 Grant St., Tonkawa, N. Y. Niles is al­ ready the club's station and the second call of the club. All mem­ berships, new appointments will be made until a new SCM is elected to fill the office vacated by W2LU, who is serving with the U. S. Navy.

Traffic: W3BQG/1 58 MHW 43 LSD 24 NGO 10, NEW YORK CITY AND LONG ISLAND — SCM, Ed. L. Baunach — W2AZV — LUY is now ORS. NEE is out for ORS appointment. LZR is located at 34–16 43rd St., Astoria. FAQ got up his 40-foot mast, and built a new an­ tenna. JGO is making great plans for an active season on 112 Mc. Newcomer to the section is W3GBB/2 who is on "ith 125 watts to T40 final from Jersey City. The 112-Mc. Net which has been working hard to get a 2-Mc. Net going. KTA re­ ports a new station, QJY, on 112 Mc. NYC is putting in 100TH final for all-band operation. OAP is on 112 Mc. with KOU’s transceiver. KJY is now located at 322 E. Walnut Lane, Philadelphia, Pa, is on 7 Mc. BO and SC make BPL. JGF enjoyed his ten-day furlough, and reports that IGO is now one of the beneficets. KFC is in the Coast Guard, HMY is building for 112 Mc. MID is back on 28 Mc. ATJ, BGO, QFC are working on new antenna. W2HTM is working on his high gun. RWA traffic has shown considerable increase on the A.P. Trunk Line. Traffic for Washington, D. C., can be given to KI dually. There is a tremendous amount of activity now going on in the Washington districts. W2OOG and W2OOG, N. Y. C. GDF, EC for Queens County, worked in connection with the N. Y. C. Police Dept. during the Nov. 13th Mock Air Raid. All work was on 112 Mc. DTE, KIV, JSM, EYM and RYK held their monthly party. Asst. Ec’s on 112 Mc. in respective counties. IYX, Asst. Ec for Huntington, is getting stations on 28 Mc. lined up and DOG, Asst. Ec for Riverhead, has a complete tie in with the defense council and is a member representing amateur radio. All stations who are not in on any of these activities should get in touch with me or their respective county EC for active work.

Traffic: W3CQ—1767 (WLN 801) BO 605 AYZ 342 LZR 304 (WLN 80) BGS 206 KI 198 DW 174 JZX 104 BGO 100 AYZ 97 GP 72 M2B 66 OFS 53 LUY 41 IYX 38 EC 37 DBQ 36 NT 29 NDT 23 FAQ-NAZ 13 GTZ 13 DOG 9 BYL 7 BCS 6 AV-FF 5 I-LBI-MS 4 HGO 3 CEKU-CET-2 RZ 2 AOC-2

NORTHERN NEW JERSEY — SCM, Edward Gurksy, Jr., W2LMN — PAM, 21XL, RM. 2WCCG, 2W2CO, 2W1YQ. New appointment: ORS, 2WSES (W4GQN/2). ASST, WMH. Maryland is going "Disis. DC resident, 2B1MK and his station have moved in almost immediately from W4GQN and W4HFP, W4GNQ and his XYL, W4HZP, are now signing W2ESO and W2OLJ respectively. MIG left for active service Nov. 10th. NGO is at the Gulf’s Island Radio School. Another newcomer to the section is W3GBB/2 who is on 125 watts to T40 final from Jersey City. The 112-Mc. Net which meets at 8 p.m., Tuesday’s, boasts the following members: HJH, JME, KF, LTF, NLY, NYN, 3SEW, and 3JU. All stations have self-powered equipment in addition to regular. HFN, joined AAR8 NJ40 Net. EKU is putting HT8Y on 112 Mc. AOQ is working on a new 28-Mc. beam. The L/C Radio Club of Jersey City is looking for invitations to visit other clubs in the section. The club is in close cooperation with National Defense and is organizing traffic routes to Army camps. ESO would like to hear from the fellows who are interested in forming a 1.75-Mc. C.W. Net. Those interested need to present an active allotment for this band. W2SO is building for 112 Mc. at a distance of 20 to 24 miles. RM/PAM 3AQN extends his thanks to all the E. Pa. Traffic Net members for their excellent cooperation. SEU visited SATF for a protracted rag chew in person. SATF reports AEC in Schuylkill County going strong on low and high frequencies. 3FPC lost his antenna, but exp­ected to erect a new one shortly. 3XN needs Utah for WAS. Let’s work hard to get a band going and W2HTM. Army camps. Keep on the air.

Traffic: W3CFU 1044 3AO 291 3GK 210 SHCT 34 3IXN SPFIE 4 3DRO 7 SFXZ 8 3OML 5 DQUE 43 3BC 24 3ADE 31 3AGQ 127 3BES-SDMQ 1 SATF 69

MARYLAND-DELAWARE-DISTRICT OF COLUM­ BIA — SCM, Herrman E. Hobbs, W3CIZ — RM, 3BBT. Regional Coordinator, W3ZD — On Nov. 15th the Wash­ ington Radio Club held a hamfest at the Continental Hotel, on Union Square. It was primarily a ham and equipment, however, those interested in forming a C.W. Net on Union Station Plaza, Wash., D. C. One hundred and 28 all-band stations were present. Seven districts were represented as well as Philadelphia and Baltimore. 3ZD was toastmaster. The speakers were George W. Bailey, W1KH, ARRL President; Brad Martin, W3QV, Regional Coordinator, W3ZD.

Traffic: W3FJU 1044 3AO 291 3GK 210 SHCT 34 3IXN SPFIE 4 3DRO 7 SFXZ 8 3OML 5 DQUE 43 3BC 24 3ADE 31 3AGQ 127 3BES-SDMQ 1 SATF 69

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — W3BYF is working on emergency coordina­ tion from the u.h.f. angle in Allentown, under the direction of W3FJU. Don is doing a fine job for the ARRL in this section and deserves the active support of the gang around Allentown, 3HDL of Mansfield, Ohio, is now ORS in E. Pa. W3BJ works for Westinghouse and lives in Norwood. 3AOO expects to be on the air on W6 on in the near future. W3YJ is the local net there. Wotsa? AOC, HFE and QV attended a ham­ fest at Washington, D. C. and while there visited WLM, 3C2E, 3ZD, 3CQG and 3HAI. FQX has a new Vibroplex "Disis. DC resident, 2B1MK and his station have moved in almost immediately from 7 Mc. W6 in the area and BPL… continued. W3YJ is the local net there. Wotsa? AOC, HFE and QV attended a ham­ fest at Washington, D. C. and while there visited WLM, 3C2E, 3ZD, 3CQG and 3HAI. FQX has a new Vibroplex "Disis. DC resident, 2B1MK and his station have moved in almost immediately from 7 Mc. W6 in the area and BPL… continued.
**1.75-Mc. state nets was stressed by the speakers, especially that of u.h.f. for emergency service by the military and naval representatives. U.h.f. emergency nets are in process of organization in this section and the gang in Washington will soon be on the air. BAK keeps in touch with the members of his family who are away from home by short wave radiophone. 3GB is now located in the City where he is operating a 100-watt rig there with T40 final. DLC has new HRO. ECP gets on the air now and then, when he can spare time from his official duties. FE will shortly be on the air with a low-powered 'phone, LD hopes to give his personal antenna the go-ahead and will be on hand for any Xmas traffic schedules. JMC/3 added a vibroplex to the station equipment.**

**Traffic: WB5EZK 101 WBT 1044 CIZ 415 D1C 11 DRD 202 WRM 306 KOM 206 HWI 7 JAS 502 F2W 37 JHW 5 JMC 30 PV 70 USA 3555.**

**SOUTHERN NEW JERSEY — SCM, Lester H. Allen, W3CCO — Asst. SCM, W3ZT. Regional Coordinator in charge of Emergency Coordination, WB3BQA. RMS: AVJ, ABS, GMY, GNY, ITU, PAM, EUL. Section Net frequencies: OPS, 1980 kc.; ORS, 1850 kc. In order to increase progress with the two nets in our Section, you will note that we have some new calls in the RM ranks. These fellows have been chosen on their past merits and on their shoulders rest the operations of our traffic nets. As SCM I ask all netters to cooperate 100% with these new appointees and I am sure our Section will reach the top in activity and traffic handling. WB3BK is new WGOEW at Kearny. Congratulations to W3GOZ. Here is the first new net 100% attendance record. AQ recently worked KBRLD on 3.9-Mc. 'phone and, during the same week, received report from South America of being heard on 1.75-Mc. 'phone. ARV has new 60-Mc. muting. EBJ has completed his 40-Mc. rig and will soon be on the air and when he gets the boys lined up, will be NCS. 9CAC is visiting 3FM. ZT is general chairman for the 10th Annual Banquet of the DVARA. HAZ made BPL on the air and will have 112-Mc. rig working 3.75 Mc. 'phone. ABS has an antenna working FB on 28 Mc. 'phone. BWF completed 3-element rotary for 28 Mc. AEJ has e.c.o. working FB on 1.75, 3.5 and 3.75 Mc. 'phone. BJT has 6-element Yagi for 1.75 Mc. 'phone and, during the same week, received report from South America of being heard on 1.75-Mc. 'phone. BTM has been assigned the call WLNI.**

**Traffic: W3DVY 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**WESTERN PENNSYLVANIA — SCM, E. A. Krall, W3SKRO/WLQI. — Asst. SCMs W3SK/KVA/WLQI and W3SK/TVQ. ACTIVE, Rev. R. H. Taft. SCM: GMY. Section Net frequencies: OPS and ORS 550 kc.; ORS and ORS 550 kc. Section RMs: AQ, ABS. The following are running the emergency nets in the section: RME has taken over Bill's job on 1.75 Mc. and will be on hand for any Xmas traffic schedules. JMC/3 has a new antenna and a 2P2. Members of the Allegheny county AEC held a meeting. Oct. 29th. ROU and QGN are stationed in Ireland. RTX has a new Abbott P300 transceiver. RMR has his 110-volt generator about finished. RKM resigned as NCS of the 3.5-Mc. net. BJO, State Radio Aide, has had his hands full trying to keep up with the flood of AARS applications. RME has taken over Bill's job on 7 Mc. and has been assigned the call WLI.**

**Traffic: W3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**Traffic: W3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**Traffic: WS3SV 204 HAZ 155 EWE 128 AVJ 68 IDZ 65 OCN 64 A4 CNO 56 BWI 41 AEJ 37 ASQ 17 ABS 15 ACC 12 TL 9 JBO 8 JHA 6 JAY 5 ITU.**

**Traffic: WS3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**Traffic: WS3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**Traffic: WS3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**

**Traffic: WS3ADV 23 AMO 17 BLO 190 CSE 78 DII 128 DLU 14 DSS 24 FOG 52 JIW 140 KYR 312 MNW 7 NCJ 199 TOJ 230 RMR 27 SB 16 SBV 67 SVB 48 VFG 59 VNM 15. (Aug.—Oct. WSMC 72.)**
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Home Defense is Vital... TODAY

Tomorrow may be too late. Get your 2½ meter gear immediately, and join your fellow amateurs on the "Civilian Defense" band.

ABBOTT TR-4
TRANSMITTER-RECEIVER for 2½ METERS

A compact, efficient unit, designed for either fixed station or mobile operation. Transmitter and receiver sections are completely separated. The 5 inch PM speaker is self-contained. Single inter-connected switch permits use of a common antenna for both transmitter and receiver. The TR-4 requires a 6 volt battery or 110 volt, 60 cycle AC power supply.

The receiver portion of this Abbott TR-4 incorporates a specially designed circuit in addition to numerous mechanical refinements, including front of panel control variable inductive coupling, variable sensitivity control, audio volume control, etc. Receiver radiation is necessarily reduced to a minimum.

**Abbott TR-4**

- Overall size 9" x 8" x 4½", less tubes and power supply, list price (subject to amateur discount) $65.00

**Abbott MRT-3**

- High power (30 watts input), 2½ meter Transceiver for automobile, truck, boat or airplane. Simple to install and operate, with a satisfactory operating range of from 5 to 50 miles.
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### Abbott TR-4 Transmitter-Receiver

Here is an extremely compact 2½ meter transmitter-receiver that has been expressly designed for government, commercial and advanced radio amateur requirements. Features separate receiver and transmitter with HY-615 in output, ideal for fixed station or mobile use. Range of 2 to 30 miles.

**NET PRICE—less tubes and power supply $38.22**

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Completely self-contained battery operated 112 mc. portable transceiver, utilizes only two inexpensive tubes. Will satisfactorily cover 5 to 75 miles. **NET PRICE—less accessories $18.82**

### Abbott MRT-3

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**Mail Orders Filled Promptly**

**New York's Oldest "Ham" House**

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### Four Transmitters Operated Simultaneously

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<td>MRT-3</td>
<td>$28.81</td>
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### Sales and Service of High Quality Transceivers

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<tr>
<td>MRT-3</td>
<td>$28.81</td>
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</tbody>
</table>
KITS

FOR THE

112-Mc. Emergency Transmitter

described by George Grammer in December QST

OSCILLATOR—Complete kit of Parts including drilled Box, Tank Inductance and Tube. Only $7.35

MODULATOR—Complete kit of Parts including drilled Chassis, Tubes and Microphone Batteries. Only $10.15

MONITORING METER—Simpson 27S—3” Square Meter mounted in matching cabinet with cord and plug. Only $6.30
Complete set of Instructions Furnished Free.

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Radiant 300 volt—100 mill DC Vibrapack $14.70
AC supply 300 v—100 mill 19.20

We will have available in kit form all official OCD designed 2½ meter equipment as it appears.

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See your Radio Parts Jobber or write for Catalog
New ABBOTT TR-4 TRANSMITTER-RECEIVER

This separate transmitter and receiver is designed specifically for 112 mc. (2½ meters) operation — an emergency mobile or fixed station unit. The efficient receiver circuit, employing an HY-615, helps to reduce receiver radiation to a minimum. A powerful 20 watt output HY-75 is used in the separate transmitter with its own 6L6G modulator. Net to amateurs. $38.22

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A battery operated “walkie-talkie” companion unit for the TR-4. Net to amateurs. $18.82

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RCA Type 9002 tubes are in stock. Net. $2.00

MILLEN calibrated U.H.F. Wave meter (30 to 14 mc.) Net. $2.65

JOHNSON 2½ Meter Q Antenna, Net. $3.82

W21JL • W2LJA • W2PL • W2KMY

(Continued from page 15)

described above, the oscillator tube can be returned to its socket and the tuning condenser, C₄, set to near its full capacity position. By adjusting the oscillator bandset condenser, C₃, it should now be possible to tune in a signal at the low-frequency end of the 112-Mc. band. One’s own transmitter will furnish a handy signal if no other is available.

The tuning range of the oscillator can now be checked by tuning in a signal at the high-frequency end — if it comes in at the middle of the dial there isn’t enough bandspread and if it can’t be heard it indicates too much bandspread.

Too little bandspread means the turns of L₂ are too close together, and they should be spread apart a bit — vice versa for too much bandspread.

The only other adjustments necessary are to make sure that the mixer resonates to the band and to adjust the voltage from the oscillator to the mixer. Since the mixer tuning will “pull” the oscillator slightly, it is not always possible to simply peak the mixer tuning on a signal without detuning the signal, but by retuning the oscillator it will soon be apparent whether or not the mixer is resonating to the signal or whether it is tuning to a higher or lower frequency. If the maximum signal is obtained with the mixer condenser, C₁, set at either its minimum or maximum setting it will be well to adjust the coil L₁ until the signal peaks at about the center of the mixer condenser range. The oscillator voltage coupling, controlled by C₂, should be adjusted to give an oscillator voltage at the mixer of just slightly less than the mixer cathode bias voltage. One can cut into the tuned-circuit ground return and measure grid current, loosening the coupling just past the point where grid current is obtained but, lacking facilities for this method, one can set the condenser at the point which gives loudest signals as judged by the amount of silencing when a signal is tuned in.

During operation the mixer tuning condenser control can be set for the center of the band and will probably not have to be touched unless receiving stations at the edges of the band. Thus for all normal operation the receiver will handle like the usual superregenerative receiver with the exception that it will tune a bit more sharply and — a decided advantage — the regeneration control will not have to be touched for any settling of the tuning control.
STANCOR 112-T
For mobile or portable operation on 2½ meters. The 112-T Kit will perform to your liking. Uses Hy 75-6J5 and 6V6, 10 to 15 watts input. Built in 3" PM Speaker. Complete Kit including cabinet...$26.95

STANCOR 10-P
The 10-P Transmitter operates on 10-160 meter bands. Delivers 12 watts phone—20 watts CW, input to final. No complicated tuning procedure is necessary and a minimum number of controls are used. Complete Kit including cabinet. $26.95 (Less meter, tubes and coils)

STANCOR 20-N
A complete phone and CW Transmitter to operate from 20 to 160 meters. 20 watts input on phone, 30 watts input on CW—Write for details. Complete Kit (less accessories and cabinet)...$52.25

ABBOTT TR-4
This 2½ meter Transceiver designed specifically for governmental, commercial and advanced amateur applications, the ABBOTT TR-4 incorporates the latest advanced design refinements. Less power supply and $38.22 tubes, net price. AC Power Supply...$19.20 Vibrator Power Supply...$14.70

HALLICRAFTERS • NATIONAL and HAMMARLUND RECEIVERS

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<td>9.87</td>
<td>7.46</td>
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The RADIO SHACK
167 WASHINGTON ST., BOSTON, MASS.. U.S.A.
Yes sir, you'll want these prong-base electrolytics for the same reason manufacturers have turned to them. Mighty compact. Neat mounting in surrounded or insulated elliptic washers. Readily wired. Easy to check and replace when necessary.

Ask your jobber for them. Ask for catalog. Or write direct...

Unique rubber sealing of terminal tabs prevents internal and external corrosion. Adequate venting.

Square-shoulder can (instead of usual sloping shoulder) eliminates shearing of cathode tab. Firmly riveted terminals.

Extreme compactness yet no undue sacrifice of capacity, voltage rating, service life.

Wide choice of standard voltages, capacities, combinations.

The American Radio Relay League
West Hartford, Connecticut

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick and practical method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 3 to 40 W.P.M. Always ready, no QRM, beats having someone send to you.

MACHINES FOR RENT OR SALE

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands have used and endorsed the Instructograph System. Write today for full particulars and convenient payment and rental plans.

INSTRUCTOGRAPH COMPANY
4709 Sheridan Road, Chicago, Illinois

The two receivers with built-in speakers will give better low-frequency response if a bottom plate is fastened to the chassis, although speech is perfectly understandable without the plate. However, it also serves as protection for the wiring and thus makes a nice addition to the unit. The two super-regenerative receivers are not non-radiating. However, their interference range is about a half mile under normal city conditions. As pointed out previously, the radiation can be reduced still further by using special u.h.f. tubes for the detectors, but under normal conditions with stations spotted several miles apart there should be no trouble from receiver QRM.

WWV Schedules

IMMEDIATELY after the standard frequency station WWV of the National Bureau of Standards was destroyed by fire November 6th last, a temporary transmitter was established in another building and partial service was begun. The service has now been extended, although still with temporary equipment. It is on the air continuously at all times, day and night, and carries the standard musical pitch and other features. The radio frequency is 5 megacycles per second.

The standard musical pitch carried by the broadcast is the frequency 440 cycles per second, corresponding to A above middle C. In addition there is a pulse every second, heard as a faint tick each second when listening to the 440 cycles. The pulse lasts 0.005 second, and provides an accurate time interval for purposes of physical measurements.

The 440-cycle tone is interrupted every five minutes for one minute in order to give the station announcement and to provide an interval for the checking of radio measurements based on the standard radio frequency. The announcement is the call letters (WWV) in telegraphic code.

The accuracy of the 5-megacycle frequency, and of the 440-cycle standard pitch as transmitted, is better than a part in 10,000,000. The time interval marked by the pulse every second is accurate to 0.001 second. The 1-minute, 4-minute, and 5-minute intervals marked by the beginning and ending of the announcement periods are accurate to a part in 10,000,000. The (Continued on page 86)
THE MINILOG
It's New!

► THIS POCKET-SIZE LOG BOOK has been designed by the American Radio Relay League to answer the special needs for compactness and convenience in portable and portable-mobile amateur operation. Taking maximum advantage of all short-cuts permitted by the regulations this log still meets all of the requirements of the Federal Communications Commission. The F.C.C. regulations are as binding on portable and portable-mobile stations as on fixed ones.

► This log has a page size of 4 x 6 inches and consists of 60 log pages, leatherette-paper cover and spiral-bound at the end. The whole book has been designed with thought to utmost convenience.

THE PRICE IS 25 CENTS PER BOOK FROM YOUR LOCAL DEALER, OR DIRECT FROM A.R.R.L.
WEST HARTFORD, CONNECTICUT

RADIO OPERATING QUESTIONS & ANSWERS
Nilson & Hornung's new edition covers all FCC commercial license exam elements. Standard handbook 20 years. $2.50, postpaid. Money back if not satisfied and book returned in 10 days. Send check or money order ... not cash. Free circular on request.

NILSON RADIO SCHOOL, 51 East 42nd St., New York

Hams, Defense School Students and Gov't Men

are learning the code the right way, quickly and easily with the all electric Ayers machine. Built by Code-champion McElroy for our future champions. Largest selection of tapes in World available with each machine. Low monthly rental. Tapes for MacAutos, recording slip and special Illux for sale.

Ayers Automatic Code Machines
Dept. Q-1, 711 Boylston Street, Boston, Mass.

AMATEUR
TYPE PR-X IN "ALSIMAG" HOLDER
40-80-160 M. BAND
ONLY.......................... $3.00

PETERSEN RADIO CO., Council Bluffs, Iowa

EXPERIMENTAL RADIO

By R. R. Ramsey, Prof. of Physics, Ind. Univ. The experimenter's manual: Measurements, Tests, Calibrations, with ordinary radio and physical apparatus. "Measure and know."

FUNDAMENTALS OF RADIO
(2nd Edition, 426 pages, 430 figures.)

Modern radio explained with a minimum of mathematics. "You find it in Ramsey's." Experimental, $2.75. Fundamentals, $3.50 postpaid.

RAMSEY PUBLISHING CO.
Bloomington, Indiana

DAVEN
POPULAR PRICED ATTENUATORS

Compact low impedance mixing and gain controls for use in portable amplifiers, broadcast equipment and public address systems ... similar in construction to our larger and costlier units ... are specifically designed for popular priced systems.

Literature upon request
THE DAVEN COMPANY
158 SUMMIT STREET • NEWARK, N. J.
For better service to our patrons, Terminal Radio Corp. three years ago opened its doors at 68 West 45th Street. This move placed us in a better position to render quick and more convenient service to a greater number of customers in different parts of the city. The present emergency now dictates another move to maintain our record of service to the radio industry.

For better service ... we are now consolidating the stocks of radio parts and equipment from our two stores into new and larger quarters at

85 Cortlandt Street
After January 1st, at our new address—12,000 square feet on one floor—we will maintain New York's largest and most dependable source of supply in the radio field. By concentrating our ample supplies under one roof we hope to expedite deliveries of essential merchandise under present conditions.

You are cordially invited to visit our new home which will incorporate all the latest innovations in radio merchandising. In the meantime, we will conduct business as usual at our present addresses until December 31st.

For radio sets and records only, we will continue at 70 West 45th Street, in a completely modernized store under the capable management of Jack Haizen.

The New Terminal Set-Up

85 Cortlandt Street

After January 1st, our new home for radio parts and equipment, amateur apparatus. All the latest transmitters and receivers on display and in operation.

Ham Shack: A rendezvous for hams to congregate amid all the newest developments in radio communication.

Record Department: A complete stock of records and recording equipment.

70 West 45th Street

After January 1st, a completely modernized store devoted exclusively to radio sets, records and accessories, under the management of Jack Haizen.

Enlargement of facilities providing more and larger listening booths, larger stock of records and accessories. No radio parts and equipment will be available at this store.

New York's Largest Exclusive Radio Supply House

Terminal Radio Corp.
THERE IS NO TOMORROW!

TOMORROW NEVER COMES—is certainly a true saying, and waiting for tomorrow to better yourself will never pay dividends. Radio Code Operators are in constant demand by the Army, Navy and in civilian industry. You can prepare yourself now without leaving your own home. Find out today how the famous Candler System can put you in these higher paying positions.

DELAYS DON'T PAY!

Write Today

Start training at home—learn code the easy, practical way—the way thousands have been helped to better jobs.

FREE—52-page BOOK OF FACTS—there’s no obligation—Mail The Coupon TODAY!

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Dept. Q-1, Box 928, Denver, Colorado

Please Rush my FREE Book of FACTS

Name...........................................

St. and No.................................

City...........................................

State........................................

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Write Today

Start training at home—learn code the easy, practical way—the way thousands have been helped to better jobs.

FREE—52-page BOOK OF FACTS—there’s no obligation—Mail The Coupon TODAY!

A.R.R.L. HEADQUARTERS OPERATORS


The following calls and personal signs belong to members of the ARL Headquarters gang:

W1AL, J. J. Lamb, “Jim”
W1BAW, R. T. Beaudin, “rb”
W1BDI, F. E. Handy, “jh”
W1CBD, C. B. de Soto, “de”
W1DF, George Grammer, “gg”
W1EH, K. B. Warner, “ken”
W1GS, F. C. Beeley, “beek”
W1INF, ARL Headquarters Operators Club
W1JEQ, Vernon Chambers, “ve”
W1JFN, A. L. Budlong, “bud”
W1JMY, J. A. Mooney, “joe”
W1LPE, Byron Goodman, “by”
W1LTD, Hal Bubb, “hal”
W1LVQ, L. John Huntoon, “jh”
W1MEC, W. J. Fricker, Jr., “bill”
W1MFA, Harold K. Islam, “hi”
W1NIM, George Hart, “geo”
W1SZ, C. C. Rodimon, “rod”
W1TS, Don Mix, “don”
W1UE, E. L. Battey, “ev”

Designed for Application

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Catalogue Upon Request

SILENT KEYS

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

Joseph A. Barkley, W3SL, Wilmington, Del.
John F. Baurer, jr., W3ATK, Lancaster, Penna.
Lindsey G. Doherty, W5CQV, Vivian, La.
Fred C. Driffeld, K7QS, Bellingham, Alaska
Rosewell Stanley Flower, W9ZIG, Springfield, Mo.
John LeRoy Hansen, W6KSM, Los Angeles, Calif.
J. Gordon Kerr, GMSQD, Glasgow, Scotland
L.A.C. J. M. Macdonnell, VE3AKM, Toronto, Ont.
Orrin B. Nelson, W9DZE, Eau Claire, Wis.
Major R. E. L. Pirtle, K6OAY, ex-W9SZ, Schofield Bks, T. H.
W. Bradley Plummer, W2CMI, K4HBY, Toms River, N. J.
Wade F. Renner, W8DVX, Massillon, Ohio
J. R. West, WSBAM, Detroit, Mich.
A directory of suppliers who carry in stock the products of these dependable manufacturers.

Listings on this page do not necessarily imply endorsement by QST of the dealers or of other equipment sold by them.
For National Defense—
For personal pleasure—

Go 2½!

For proven construction—
For good results—

Go ABBOTT!

For prompt service—
For full value—

Go HARRISON!

HERE, at UHF Headquarters, we have in stock every-thing you need for 2½—complete units, packs, parts to roll your own, accessories, etc. Tell us just what you want to do and we'll supply the proper equipment—economically.

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THE NEW ABBOTT TR-4
Transmitter—Receiver

Complete, ready to plug in and operate,—with good tubes, Abbott 6 volt mobile power supply, bias battery, power cable with plugs, and instructions. $65.49

Same, but for 110 volt AC operation ................ $65.43

With two power supplies, for operation on both 6 volt DC and 110 volt AC ....................... $83.95

American hand microphone with plug ............ $3.49

Johnson 2½ meter "Q" Antenna ........................ $3.90

Vertical ¼ λ mobile antenna ........................ $1.75

Belden weatherproof coaxial cable feeder. 13¢ per foot

Of course! We have the MRT-3 and the DK-3 in stock, too. $28.81 and $18.82. TR-4 stripped—$38.22.

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HARRISON RADIO COMPANY
12 West Broadway • New York City
Telephone WOrth 2-6276

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Up-to-Date Press Schedules

(Continued from page 70)

<table>
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* Known to send regularly at time indicated. Stations not marked thus are known to send, but time is only approximate.

---

Strays *

Although a quarter-inch arc could be drawn from the chassis of a neighboring b.c. receiver when his transmitter was operating, W3DEJ swears that no trace of interference could be found! — W3EVH.
Bill wishes you —

A Very Merry Christmas

AND A

Happy New Year!

Make it HAPPIER

with a HALLICRAFTERS

from HARRISON!

This is the time to buy a new receiver. Right now we have practically all models in stock for immediate delivery (unbelievable, but true).

And with Bill's well known policy of lowest prices always, easiest payment plan, highest trade-in allowances, and 100% cooperation, it is to your advantage to get it from —

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73

Bill Harrison

W2AVA

MEN IN THE SERVICES!

ON LAND — ON SEA

IN THE AIR

No matter where you are (even in defense bases) Harrison delivers the goods! Receiver, transmitter, parts, tubes, everything you need supplied promptly and economically. Shipped safely, fully insured at from 2c to 12c per pound. Credit extended to officers —to others with guarantor.

HARRISON RADIO CO.

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HE BOUGHT AN ECHOPHONE EC-1!
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Gear is short. You can sell your old and extra gear through Ham-Ads.

QUARTZ - listed importers from Brazil of best quality pure quartz suitable for making piezoelectric crystals.


QSLS, FLOWERS. 185 St. Johns Place, Brooklyn, N. Y.

TELEPLEXES, Instructographs bought, sold. Ryan's, Hanmil, Mo.

WANTED: Will pay cash for Mims Deluxe 3 element 20 meter antenna, HRU, and 2000 volt tubes. QSQR, Columbia, Mo.

QSLS, samples, prices on request. W2ABY, 385 Elmore, Elizabeth, N. J.

OLD QSTs. Bought — traded. 1915/41. WSN.

NEW transmitting kits all phone and CW from 15 watts up to 150 watts. Also new ECO unit for $39.50. New 40 meter phone transmitter reasonable. Also plenty of 40 meter crystals. Write for details today. Leo, W9GFG.

RECEIVERS — all types — new and reconditioned. Easy terms. Free trial. Send for big list and other specials. Get acquainted with Leo, W9GFG.

TRANSMITTING headquarters on latest Stancor, Thorson, and other tubes generally wired at low cost. New 70 watt transmitter kits complete only $35 — speech amplifier modulator up to 80 watts at $39.50 — up to 150 watts $49.50. New 70 watt transmitter in cabinet; National 100X receiver. Cash or trade for Speed Graphic. W9SFG, Brownsburg, Ind.

LEO, W9GFG, offers the hams more and a better deal all the time. Lowest terms without red tape; lowest prices; ten day trial; personal phone service anytime for anything. Bob stocks hundreds of amateur receivers of all makes and models for positively immediate delivery. Henry Radio Shop, Butler, Mo.
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Day and Evening Classes in Code and Theory

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406 Monroe St., Valparaiso, Indiana

RADIO COURSES

Start January

RADIO OPERATING & BROADCASTING • CODE RADIO SERVICING • TELEVISION

• ELECTRONICS — 1 year day course; 2 years part-time

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MASS. RADIO SCHOOL

18 Boylston Street Boston, Massachusetts

Your OPPORTUNITY in Radio
Success depends on your training. Nilson's
MASTER COURSE in RADIO COMMUNICATION

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Illustrated Catalog on request.

RCA INSTITUTES, INC. Dept. ST-42

A Radio Corporation of America Service

75 Varick St., New York 1184 Merchandise Mart, Chicago

WHAT'S A MINILOG?

(See page 83)
Your Nearby Dealer Is Your Best Friend

Your nearby dealer is entitled to your patronage. He is equipped with a knowledge and understanding of amateur radio. He is your logical source of advice and counsel on what equipment you should buy. His stock is complete. He can supply your needs without delay. His prices are fair and consistent with the high quality of the goods he carries. He is responsible to you and interested in you.

One of these dealers is probably in your city—Patronize him!

<table>
<thead>
<tr>
<th>ATLANTA, GEORGIA</th>
<th>HOUSTON, TEXAS</th>
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<tbody>
<tr>
<td>Radio Wire Television Inc.</td>
<td>R. C. &amp; L. F. Hall</td>
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<tr>
<td>265 Peachtree Street</td>
<td>1021 Caroline Street (C 0721)</td>
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<tr>
<td>&quot;The World's Largest Radio Supply House&quot;</td>
<td>&quot;Specialists in Amateur Supplies&quot;</td>
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<td>24 Central Avenue</td>
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<td>&quot;Everything for the Amateur&quot;</td>
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<tr>
<th>BUFFALO, NEW YORK</th>
<th>NEW YORK, N. Y.</th>
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<tr>
<td>Radio Equipment Corp.</td>
<td>Harrison Radio Company</td>
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<tr>
<td>326 Elm Street</td>
<td>12 West Broadway</td>
</tr>
<tr>
<td>&quot;Ham service and sound equipment&quot;</td>
<td>Harrison Has It! Phone WOnth 2-5276 for information or rush service</td>
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<tr>
<th>BUFFALO, NEW YORK</th>
<th>PHILADELPHIA, PENNSYLVANIA</th>
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<tr>
<td>Dymac, Inc.</td>
<td>Eugene G. Wile</td>
</tr>
<tr>
<td>1531 Main Street — Cor. Ferry — GA. 0252</td>
<td>10 S. Tenth Street</td>
</tr>
<tr>
<td>One of the Largest Ham Supply Houses in Western New York</td>
<td>Complete Stock of Quality Merchandise</td>
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<tr>
<th>HARTFORD, CONNECTICUT</th>
<th>PROVIDENCE, RHODE ISLAND</th>
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<tr>
<td>Radio Inspection Service Company</td>
<td>W. H. Edwards Company</td>
</tr>
<tr>
<td>227 Asylum Street</td>
<td>85 Broadway</td>
</tr>
<tr>
<td>&quot;What do you want? We have it... Radio exclusively&quot;</td>
<td>National, Hammarlund, Hallicrafter, Thordarson, Taylor, RCA</td>
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<tr>
<th>HARTFORD, CONNECTICUT</th>
<th>WATERBURY, CONNECTICUT</th>
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<tr>
<td>Hatry &amp; Young, Inc.</td>
<td>Hatry &amp; Young, Inc.</td>
</tr>
<tr>
<td>203 Ann Street</td>
<td>199 South Main Street</td>
</tr>
<tr>
<td>Stores also in Bridgeport and New Haven</td>
<td>Time Payments for Connecticut Hams</td>
</tr>
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YOU CAN BE SURE WHEN YOU BUY FROM QST ADVERTISERS

"Advertising for QST is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's advertising rate card.

Every conceivable need of a radio amateur can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff.
Now is the time TO TRADE-IN . . .

I can give you the best trade-in value on your old communications receiver — if you get right now! Believe it or not, down here in Butler I am the largest distributor in the country of amateur communications receivers, yet I give my personal attention to each order and see that you are 100% satisfied with your purchase.

You can't beat my easy 6% terms. I finance all the orders myself which lowers your cost and does away with red tape, and best of all you get a 10 DAY FREE TRIAL — I want you to see what you are buying and be entirely satisfied.

Why don't you write to me today, tell me what you want to buy or what you have to trade-in. You will be agreeably surprised at the money I save you.

If you live in the western states, you may write to my brother Ted at:

HENRY RADIO SHOP
2335 WESTWOOD BLVD.
WEST LOS ANGELES, CALIFORNIA

Bob Henry
W9ARA
HENRY RADIO SHOP, BUTLER, MISSOURI
WORLD'S LARGEST DISTRIBUTOR OF AMATEUR RECEIVERS
Yes — we are proud of our submersion type units. They are now available in a wide range of sizes to cover practically every requirement in defense and non-defense applications.

These units are designed to take the most extreme of Navy tests, which consist of five complete submersion cycles under salt water over a very wide range of temperatures.

The same engineering development which perfected these units can be applied to the solution of your transformer problem.

MAY WE HAVE AN OPPORTUNITY TO COOPERATE?
The NC-200 has ten calibrated coil ranges. Six of these ranges provide continuous coverage from 490 KC to 30 MC. The remaining four ranges cover the 10, 20, 40 and 80 meter bands, each band being spread over the major portion of the dial scale.

An improved wide range crystal filter is used in the NC-200. Selectivity is adjustable in six steps corresponding to band widths from 200 to 7600 cycles. The phasing circuit provides rejection ratios as high as 10,000 to 1 when the interfering signal is only a few hundred cycles from the desired signal.

RF and oscillator coils, together with their associated padding condensers, are completely inclosed in separate pockets in a heavy cast aluminum shield. This shield moves bodily on a track, bringing the desired coils into operating position directly below the tubes and condenser, and taking the unused coils out of the way.

Typical of the refinement in the NC-200 is the provision for operating standard AC models on batteries for emergency or portable use. All that is necessary is to plug in a battery cable in place of the dummy plug supplied with the receiver. This makes all connections and leaves the speaker and standby switch in operation.
Although every RCA division has a vast amount of Defense work, it is worthy of note that the percentage of total Transmitting Tube production going for Defense is greater than that of any other division. This means that priorities are the order of the day. It means that we’re busier than ever before. It doesn’t mean, however, that we’re too busy to cooperate wherever we can with our old friends—or to pause at this holiday time to extend our sincere wishes for the Season’s Best to all.

These are priorities reserved for our many old friends of peace time days. They are ones we can, and always will, deliver in fullest measure.
WAR COMES!
We Take Our Posts in the Country's Defense

In time of emergency, amateur radio steps forward and applies its specialized knowledge to the task of replacing and restoring and supplementing the normal communications system. That is our traditional responsibility—a tradition we have ourselves built and a responsibility we have ourselves sought. War is the gravest emergency of all, and it is now our duty to discharge that traditional responsibility in the war emergency with discipline and patriotic devotion.

Since December 7th, amateur radio has been operating under wartime controls. Eight hours after the first bomb fell in Pearl Harbor, amateur radio as we have known it in peacetime was suspended for the duration. In its place, in the past five days, the volunteer communication system upon which the civilian defense of these shores will be built has begun to take form.

FCC's order suspending normal amateur radio, with its hamming and chewing, should be examined simultaneously with its announcement of a mechanism under which amateur stations whose operation is essential to national defense are being returned to the air:

ORDER NO. 87

At a session of the Federal Communications Commission held at its offices in Washington, D. C., on the 8th day of December, 1941;

Whereas a state of war exists between the United States and the Imperial Japanese Government, and the withdrawal from private use of all amateur frequencies is required for the purpose of the National Defense;

IT IS ORDERED, that except as may hereafter be specifically authorized by the Commission, no person shall engage in any amateur radio operation in the continental United States, its territories and possessions, and that all frequencies heretofore allocated to amateur radio stations under Part 12 of the Rules and Regulations BE, AND THEY ARE HEREBY, WITHDRAWN from use by any person except as may hereafter be authorized by the Commission.

By order of the Commission:
— T. J. Slowie,
Secretary.

FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C.

December 8, 1941

NOTICE TO ALL AMATEUR LICENSEES

All amateur licensees are hereby notified that the Commission has ordered the immediate suspension of all amateur radio operation in the continental United States, its territories and possessions. Under this action all amateur radio operation in the continental United States, its territories and possessions is prohibited until further notice. In any instances where amateur radio operation is deemed to be required in connection with the national defense, appropriate authorization to engage in such operation will be issued but only upon application by a duly authorized federal, state, or local official made to the Defense Communications Board.

Pay particular attention to the language in the latter portion of the notice: The way is open for every amateur whose services are desired by proper officials to get back on the air and help. We should perhaps say “desired and needed,” because hams aren’t going to be able to get back on the air simply because they want to or because they are “willing to help” or even because they can get some small-fry or “unofficial” official to certify them. Chiseling is definitely discouraged and there must be a bona-fide defense need to be served. But once there is, the route is open. Our situation, then, is that rather than being off the air we are being resifted in what amounts to a species of relicensing under DCB whenever it is apparent that a competent official needs our help. Already, as we write, numerous amateur groups and nets have been activated and returned to the air for a purely defense purpose. It’s a new kind of amateur radio but it is still the familiar picture of amateurs and their gear and their traditional skill and loyalty.

SPECIAL AUTHORIZATION

Here is some practical information on the mechanism that is permitting defense activities to retain the services of amateur radio—although we should emphasize that in a
rapidly-changing situation the information we have to-day may not be entirely reliable by the time this is in print. (Suggestion: Check official broadcasts from W1AW.)

When an authorized public official, such as a governor or a mayor, wires or writes DCB or FCC a description of his proposed communication plan and a statement of why he has to have it, together with the names, calls and addresses of the amateurs he desires to serve in it, he may reasonably expect to receive a prompt response to the effect that the named amateurs are authorized to work in his system until further notice, as an exception to Order 87, for communications directly connected with national defense activities primarily relating to the defense work in his charge. A copy of that authorization will be sent to each individual amateur concerned and will be his operating credentials.

Note carefully that no authorizations are issued direct to an amateur or simply because an amateur wishes to offer his services. Application for the activation of amateurs may be made only by a duly-authorized federal, state or local official, and must spring from a need. Moreover, that official cannot be given a blanket authorization to permit operation by any amateurs he wishes. He must first explain his plan and show that the requested operation is necessary to perform a special national-defense function, and then he must name the individual amateurs concerned — not only their calls but their names and addresses as well. One reason for this is that Washington and the monitoring services must have a record of who has been authorized; another is that authorization from DCB must be sent to each individual amateur.

It will be noted that no stipulations of frequencies are required. The thought at the moment is that it is proper and desirable to permit the use of any band needed by an authorized official. Therefore when operation is authorized it is subject to all the usual FCC regulations and the special orders that have recently governed us, but all the usual amateur bands are made available. Most of the nets that have been authorized these last few days have been voice systems on 2½ and 5 meters but some are 80-meter c.w. operation and some are 160-meter and 75-meter 'phone nets, with or without connecting u.h.f. networks at each city.

While it is not permitted the individual amateur to get back on the air solely under his own auspices, there is of course no objection to amateurs, groups, nets and clubs explaining the present mechanism to competent officials who have need of amateur assistance; or to their doing some of the manual work of typing the requests for the signature and certification of the official. Certification, by the way, is not confined to any stated language: when a proper official asks authorization and asserts that he needs a certain amateur arrangement for a specified defense purpose, that is sufficient certification. There is no standard form, and requests may be telegraphic or by mail. The state defense systems are better known and better organized than many of the local ones and in some states OCD organization is not very far advanced. If there is room for any doubt about the recognition that DCB would give some particular local coordinator of civilian defense, it would be better if the request came from the mayor of the town, or from the chief of police if that is a proper function of the latter in the local plans.

A word here about DCB. Under an Executive Order recently signed by the President, all the latter's wartime powers over communications are lodged with DCB. It is at the very top of the wartime communications picture. But DCB is a board, not a commission with extensive personnel, and much of its work will be done for it by FCC personnel. Net result is that the applications we are talking about may be filed with either the Defense Communications Board or the Federal Communications Commission at Washington. Headquarters urges that all League officials who have contact with authorities who are using amateurs, or who ought to be using them, bring to their attention the mechanism whereby amateur stations may be reactivated and assist them in making requests in proper form. We urge all amateurs to develop an association with a defense activity that will permit them to be returned to the air for that purpose, and then to do their best in the discharge of such duties. Radio amateurs are needed — in some places desperately. We believe we can count upon the amateurs of the country to see their duty, to devote themselves to patriotic service, and willingly to get back on the air for that purpose in large numbers.

SOME CAUTIONS

THE nation is at war. Complete Naval censorship of outgoing international correspondence was instituted December 7th. Ama-
teurs in defense work are on their honor to censor themselves similarly. The permits now given amateurs rigidly confine them to defense operation. No ragchewing will be tolerated and the fellows who engage in it will fare much worse than simply to lose their permits. The NDO monitoring service daily receives lists of the amateurs whose return to the air has been authorized and it is a safe bet that FBI will walk in pretty promptly on any gatecrasher who is not specifically certified for defense operations. As we value our return to the air, let there be no monkey business about this. If we are undisciplined or just playing around, or are incautious in our remarks, the War Department is practically certain to wash us up promptly and permanently and we would thereby forfeit our one chance to be on the air. They can’t take chances with us if we don’t show ourselves to be absolutely trustworthy. We’ll all have a serious purpose but we mustn’t even be careless, not even for a moment.

It is also emphatically worthy of notice that the suddenness of the emergency has given us tasks that were not originally contemplated for us, so that we are in the presence of our one big chance to make good. Let no careless amateur spoil this!

There are no specified details on what a net or group may or may not do. The agency for whom the group is authorized is in charge of its operation. If that agency says there may be no closing of switches until there is traffic of that agency to be handled, then there is no closing of switches. If that agency orders daily or hourly testing of the net, that testing is proper. If mayors or other proper local officials handling civilian protection work say that u.h.f. rigs must be installed and tested, that makes it proper for authorized amateurs to do so. But testing means disciplined testing and there must be no idle gossiping and chewing the fat.

Let it also be clearly understood that the amateur regulations are in full effect on those who are put back on the air. That means, among other things, that only licensed amateur operators may control the equipment; that the required log must be kept; and that great care must be taken to prevent unauthorized persons from having access to the apparatus.

CIVILIAN PROTECTION

When war came, OCD’s planning for civilian protection in air raids was still incomplete. Naturally this work is now being accelerated tremendously, particularly on the seaboards. Within a few weeks it may be expected that every vulnerable community will have its organization well in hand. We learn that each local coordinator of civilian defense is being called upon to appoint a competent communications administrator with the duty of creating and managing the community communications plan. It is under this official that we amateurs will participate in the ARP work. Thinking over the communications facilities that exist in cities with which we are familiar, it seems to us that the only systems that satisfy the need for the primary network are the wire telephones and the municipal signaling systems. Other facilities inevitably will be pretty random and catch-as-catch-can. It is imperative that the community possess a secondary system to go into operation whenever the primary one is interrupted — or, for that matter, whenever it begins to near its capacity, so that there may be retained in it some elasticity for the traffic of higher priorities. The backbone of this secondary system necessarily is amateur radio with its u.h.f. Thousands of us are needed with our home-built low-powered gear, to aid the communities in which we have lived and worked. Our job will be to bridge the gaps that occur in the primary system, to deal with critical overloads, and to provide portable or mobile service for incident officers, wardens and so on.

OCD is according definite recognition to amateurs. Instructions are being sent the local volunteer enrollment centers that will soon make it possible for all radio amateurs reporting locally for registration to be “earmarked” exclusively for communications work. In the meanwhile, we repeat that all amateurs interested in the protection work in their community should register themselves with the local ARRL Emergency Coördinator, which is our only way to have a group spokesman to represent us until the time the communities open amateur enrollment and appoint the local communication aide to the CD chief. Our Emergency Coördinators have now been instructed by the League to report at once to the local coordinators of civilian defense to arrange something to serve during the critical period until organization can be perfected, or to lay the facilities of our gang before the mayor or chief of police in cities where OCD work is not yet sufficiently advanced. See pages 7 and 8 of this issue for more information.
In the current situation no city in America can feel itself entirely safe and some are definitely anything but immune. We can see our job: if trouble comes to our home town, we'll be needed, for we are the only ones who can help when the wires go dead. We must build movable self-powered u.h.f. sets after the general prescriptions of QST — build them by the thousands! We must enroll for operating work with our gear — temporarily with our own ECs, later through the volunteer centers. We must help our communities in the actual job of organizing and lend them aid in securing the required special authorization for amateur communication assistance.

**DISASTER RELIEF**

All the foregoing arrangements relate to defense communications in the military emergency. At the moment of writing, no provision exists for the usual amateur aid in the event of interruption of communications by natural disasters such as floods, hurricanes or earthquakes. The activation of a defense net for this purpose would seem to be unauthorized unless the agency for whom the net was organized could establish that the disaster was also imperiling national defense.

Officials of the League are urgently endeavoring to obtain government approval of a formal plan whereunder amateurs may maintain their time-honored duties in this field, in the knowledge that Nature is no respecter of military emergencies. Should a disaster occur before such a plan is put into effect, the League will urge FCC to broadcast special authority to *all* hams in the affected area to get on the air and help. If this occurs, we can do the usual job, but it will be no excuse for a clambake and again we must confine ourselves strictly to the job in hand. Meanwhile all amateurs must distinctly understand that unless they do receive some such authority they may not come on to the air for this purpose, even though communities are suffering.

**WATCH FOR WIAW**

The regulatory situation is likely to change from day to day, hour to hour. New rules may come out at any time. By special federal authority, our headquarters station WIAW is remaining indefinitely on the air, conveying government announcements to amateurs and watching over our bands. Whenever there are new needs or new rules affecting the amateur in defense work or disaster work, it may be expected that WIAW will bring you the news faster than any other means. Keep an ear out for it.

**TEARS AND CHEERS**

If we had the time, in our rush to get these special pages to press, we'd pause to shed a tear over the fact that for the first time in over twenty-two years the fun and camaraderie and rough-house of the amateur bands are stilled. Instead, we have a call to arms. If we could afford the luxury of a more leisurely mood, there are some deep-down-in-the-heart remarks we might make about that situation, and some pointed ones we'd like to get off on the cause of it all. But QST is basically the medium of our particular art and we are already a group of people schooled in industry, patience and conscientious application to our responsibilities. In the position of America to-day, Headquarters sees no need for flag-waving when it addresses the membership of the American Radio Relay League. We are a mature group and our emotions toward our country need no artificial stimulus. The field of the League is amateur radio and we have here confined ourselves to practical considerations in the application of that skill to the nation's needs. The dear glad days are necessarily gone for a while and there is no time or place for tears. Instead of the old kind of amateur radio, our actions are now directed solely to the assistance of the defense of the nation, at the urgent request of competent officials. Our stations, our operating ability, our devotion are being summoned for innumerable communications tasks of the sort that only we are prepared to discharge. We are now engaged — all of us — in the traditional duty of amateurs: supplying all-essential communication in an emergency. Let it be our high resolve that we shall never be found wanting!

*December 12, 1941*  
K. B. W.

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**Strays**

For the first time since conscription began, it is now possible to enlist in the Signal Corps. The Army needs operators — many of them. Any licensed amateur or commercial operator who presents his license to an Army recruiting officer will be permitted to enlist and will be assured of radio work.