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amateur radio



January

25^c

7th Inning—Time to Stretch

Of course you have a Handbook. Everybody has. But how long have you had that old one around the shack? It's outmoded, O.M. Things happen in amateur radio. Apparatus styles of yesteryear are like a pair of peg-topped pants. It's time to ditch the old reliable Handbook of earlier issues and take a chance on another dollar's worth of red-hot new information. You'll be surprised!

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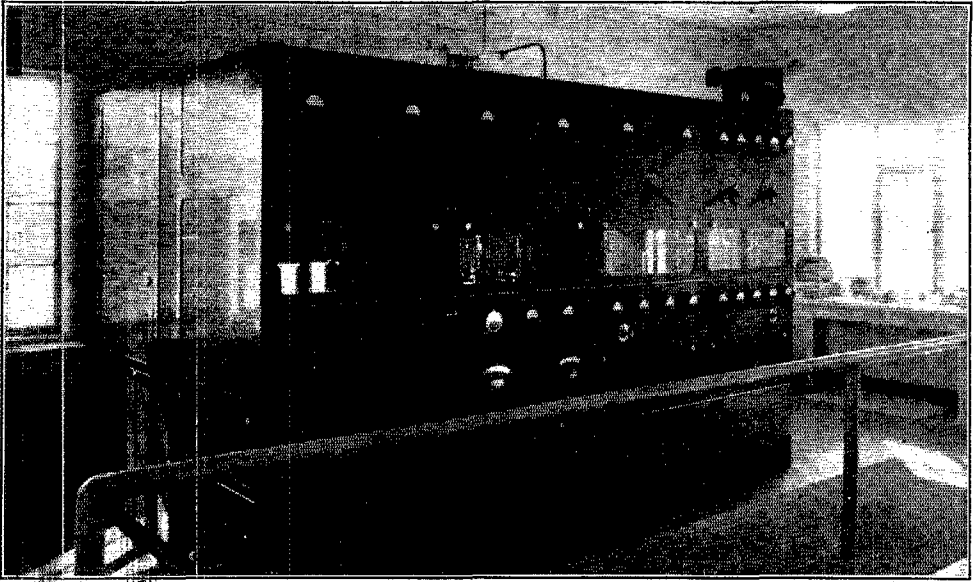
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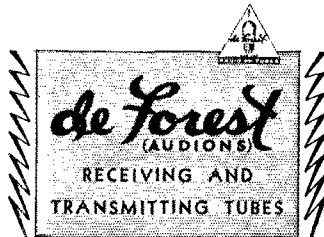
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JANUARY 1931

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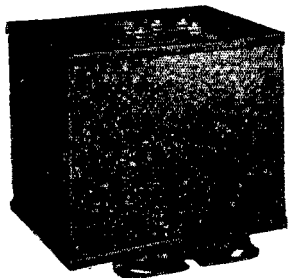
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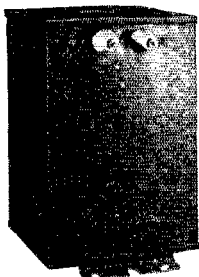
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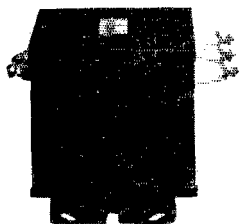
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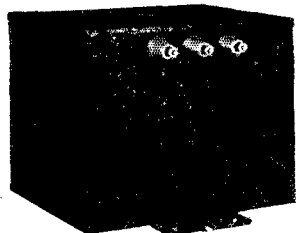


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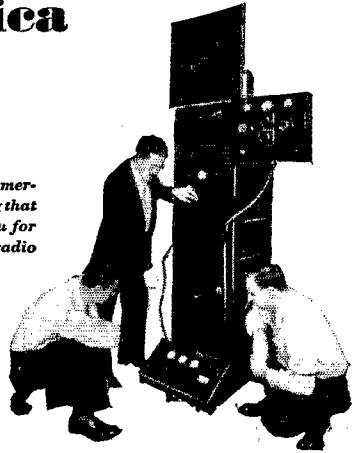
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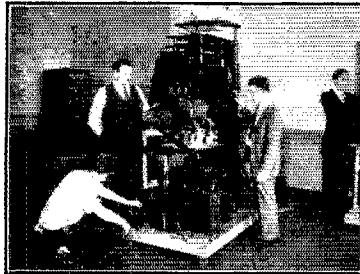


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• EDITORIAL •

IN the annual report of the Director of Radio of the Department of Commerce, mentioned elsewhere in this issue, there is a very significant paragraph:

During the year there was an increase of 2165 amateur stations. This is the largest year's increase since 1922. Last year there were 16,829 licensed amateur radio stations. There are now 18,994. In 1920 there were 5,719 stations.

Continued growth! More rapid growth than in many a year! This is the answer to those who have worried about a possible dwindling in amateur ranks, who have thought that the technical demands of modern amateur radio would discourage further expansion. It is interesting, too, to note that League membership has increased similarly. We have been too busy handling the applications to dig out the figures but we know that every month this year has been greater than the previous year.

Every amateur can take pride in these figures. Nineteen thousand of us now in this country alone! Far from being a disappearing race we emphasize our place as the largest group in radio communication, we increase the justification for our reasonable demands for facilities, and we improve our ability to make ourselves heard.

Amateurs have never shown any apathy about discussing their affairs and it is perhaps only natural that we have heard it argued that it is a tactical mistake to encourage growth in our ranks. The opponents say there are already too many amateurs for the bands and that some way should be sought to reduce the number of stations. Think of the added interference 2165 new stations will make, they say; regard how they, the inexperienced, will be the ones to wander out of bounds and cause trouble. It isn't discernible. We have plenty of trouble on both scores, to be sure, but we always have had. The fact is that our technique is keeping abreast of these problems and that we know how to get around them with modest expense and modest effort. All too frequently it is the old-timers who are careless in these respects; the new-comer has nothing to unlearn, he comes into the game aware of the importance of these things and how to overcome them. We must keep up our strength. If we were not able to show a profound occupancy of our bands we would have difficulty in retaining them. It is to be remembered, too, that amateur radio dies off at the top, not at the bottom. Largely the pursuit of the young man, it loses adherents chiefly to the business world as its devotees increase in years and responsibilities, get caught up in the mad scramble of earning a living and have less and less time for study and recreation. So new blood must come and naturally it must make a beginning. In our observation the youngsters who are now breaking in are a fine crew, well able to become the leaders of to-morrow, and offering a splendid promise for the soundness of our future.

The League has helped to enlist the new recruits in our ranks by the publication of a little ten-cent booklet called *How To Become A Radio Amateur*. Not intended primarily for the A. R. R. L., it has been advertised chiefly in other mediums, but League members will find it very helpful in initiating their friends in the mysteries and the romance of amateur radio.

K. B. W.

Transcons!

'Phone vs. C.W. Relay—3500-4000-kc. Band Only—Daylight and Evening—
Ends 11:30 p.m. Local Time—Dates: (Sundays) January 11, 18 and 25—
Everybody Can Take Part

RETURNS from our October O.R.S. questionnaire show interest in a 'phone-c.w. transcon, so here it is. Entries in advance are not required. Everyone who can work on 3500 kc. can take part. Just get on the air, listen for the official messages A.R.R.L. will start on each coast, relay and handle all you can, then report what you did and which side, 'phone or c.w. you are on. Representative 'phone amateurs challenge the c.w. men to battle. It's a relay with equal chances to all comers. Three engagements are to take place on three consecutive Sundays in January. Here's how!

Messages (the bones of contention) — The question to be decided isn't whether messages can be handled by relays. We know they can. But some of the c.w. men have been disparaging the ability of radio telephone stations when it comes to maintaining useful communication, or transferring information from one point to another accurately and reliably. The fellows who operate 'phones are insistent and enthusiastic in their contention that 'phone can work rings around c.w. and that they only look for the opportunity to show up these scoffers. The c.w. fellows may not know it, but out in the Midwest there is an "emergency 'phone net" of many fifth and ninth district stations coöperating in Signal Corps Army Amateur work. In the West active 'phone stations make "skeds." In the East (as reported elsewhere in these pages) the E.A.R.L. has its time for roll-call over the air by its district "net control" stations. So the time is ripe for a relay in which messages travel over all-'phone and all-c.w. routes. Both the speed and accuracy of relaying will count in the result. Detailed results will be published in *QST* with credit to all participating stations in the two groups. Which is the swifter, 'phone or c.w.? How about accuracy? The average time of handling of all our 'phone and all our c.w. messages should show something.

On each of the dates named an equal number (probably ten) of representative 'phone and c.w. stations on each coast will go on the air, just after sunrise their local time with an official test message. To make the operation on these dates more interesting the specific stations to start messages will not be listed in advance in *QST*. The messages will be addressed to ANY WEST COAST AMATEUR and to ANY EAST COAST AMA-

TEUR. When the messages get through, the recipients may start messages of acknowledgment back to the originating stations, these bearing the same serial numbers to identify them in the final report. The special designating numbers which will be assigned by Headquarters for tracing purposes will be prefixed by the words 'PHONE TRANSCON or C.W. TRANSCON indicating that the messages must be handled exclusively by the methods indicated, that is, messages must go strictly by voice or by telegraph. The texts will be in plain language, in all cases and signed by the name and call of the operator who starts the message (or returns an acknowledgment made up for the occasion). While messages are supposed to reach their destination across the continent before sundown, we are extending the absolute closing time for the relay to 11.30 p.m. local time to make the operating interesting to early evening operators on each of the dates in question. At 11.30 all messages are to stop wherever they are, and let us know where they stopped, too, please, for purposes of record.

Logs — We do not want complete logs. Participating operators are requested to send us exact copies of the messages handled, each message on a separate sheet with the information showing the time it was received, from whom received, the time sent, whether E.S.T., C.S.T., M.S.T., P.S.T., etc., and to what station the message was sent. Comments concerning further routing that may be known to you should be sent in, but please keep the messages on individual sheets so we can pin all copies of the same message together in making up the record. Tracers may be sent out by mail following each message but we are depending on you to promptly get your report in the mail each Monday morning after the transcon. If you do get a tracer, fill out and send along promptly to the next station in line please — or back to Headquarters, if you had the message when the clock got around to 11.30 p.m.

Calling — Stations having messages should go on the air with a directional CQ, i.e., CQ EAST or CQ WEST as per standard A.R.R.L. practice. (This is explained in the new 1931 Edition of the R. & R. Just send a postal for it if you need one — or if you hold O.R.S. appointment you will get one anyway with the mid-January bulletin.) It must be remembered that slow,

(Continued on page 88)

A Four-Band "Kitchen" Transmitter

Providing a Unique Solution to the Space Problem

By Ed. Glaser, W2BRB*

MOST of us have heard of transmitters being located in bookcases, table drawers or desks when room was scarce, but you probably have not heard of any being located under the kitchen stove, which was the only available space in the case of the new QRA of W2BRB. Not every apartment has a desk, bookcase or some other suitable piece of furniture available but they all have a stove, even these freak apartments. It might be suggested to utilize the space under the kitchen sink but then the transmitter would have to be waterproof! In addition to cramming all the necessary parts of this somewhat elaborate outfit into the scant space available, it had to be of such design and color as to blend with the kitchen and stove. (No need to tell who was responsible for this.) The parts used in building this kitchen adornment are from by-gone transmitters at W2BRB and W8AX, Muskegon, Mich., the author's QRA in 1929.

The transmitter consists of four units. The first (and most crammed) is the power supply unit which is the largest (34" x 15" x 10" high) and the one which contains all the meters. The second is the r.f. excitation unit which contains the oscillator and four intermediate stages operating on 3.5, 7, 14 and 28 mc., respectively. This unit, 30" x 10" x 10" high, was built over a year ago and used at W8AX during 1929. It was then rigged to feed a single 50 watt.

The only changes necessary to adapt it to its new habitat were to provide for feeding a push-pull p.a. and to paint it blue and white! The third unit contains the two 50-watt tubes and associated equipment mounted in breadboard fashion, 11" x 30". The fourth unit, 6" x 30" x 10" high, contains the a.f. amplifier, modulators and some extra resistances that were added

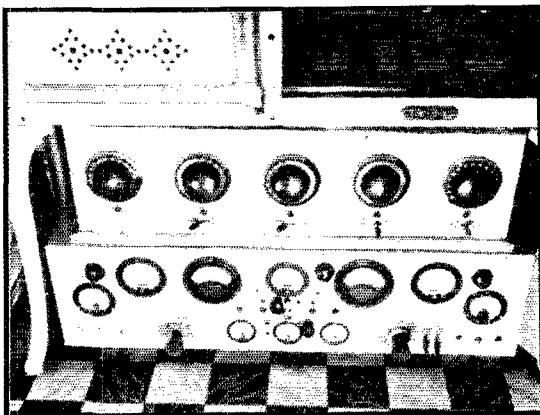
after the power supply had been built and in which no more room could be found for them.

THE POWER SUPPLY UNIT

Looking at the rear view of the power unit, from right to left, we see the line fuses, 900-watt power transformer, two Type '66 rectifiers, filter condensers, home-made filament transformer and choke, second filter choke and Heising choke, main filament transformer, 75-watt, 400 volt "C" supply transformer (which also supplies 180 volts "B"), Type '80 rectifier, home-mounted filter condensers and the resistor for the 2000-volt meter. The back of the unit is lined with binding post strips whereon terminate all "A," "B," and "C" voltages, 110-volt line, all switches, and key leads.

Referring to Fig. 1, the main switch throws over to transmitter or charger. The filament switch throws on all filaments and the small power unit. (The "C" voltages must be applied

before the "B" voltages or the tubes would be wrecked.) The plate supply switch controls the 1000 volts. A switch is provided on the panel for closing the key circuit in order to operate fully the transmitter from the floor when necessary, as after changing frequency, while tuning, or making other adjustments. The filament, plate and key switches just mentioned are duplicated at the kitchen table which is also the operat-



THE KITCHEN TRANSMITTER IN ITS OPERATING POSITION BENEATH THE GAS RANGE

The color combination matches that of the stove, making the outfit "hot" in every sense of the word.

ing table. The home made filament transformer supplies the Type '66 filaments, the 3.5-mc. stage filament, and has a spare tapped winding supplying 12 volts. A Thordarson 300-watt job supplies the filaments of the power amplifier, modulators, and three Type '10 intermediate stages, each of the latter having a one-ohm resistor in either leg. Each filament transformer has a Radiostat in the primary side, two being

* 209 East 16th St., Brooklyn, N. Y.

necessary because of the varying loads on the main one. The 1000-volt supply feeds all plates but the oscillator and speech amplifier and is quite conventional. An attempt was made to tune the first filter choke to 120 cycles but whenever the load was varied the inductance varied

the modulator and speech amplifier filaments for c.w. operation.

The 400-volt supply — which actually delivers 500 volts because of the light load (about 25 ma.) and large first condenser (5 μ fd.) — is split into 180 volts for "B" and 300 volts for "C." The 180-

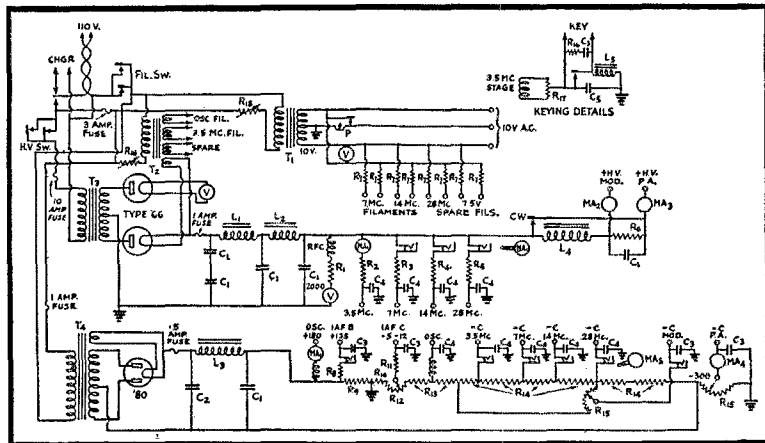


FIG. 1 — THE WIRING OF THE POWER SUPPLY AND BIAS UNIT

- T₁ — 300-watt, 10-volt filament transformer
- T₂ — Home-made transformer supplying 5 volts, 7.5 volts, 12 volts and 2.5 volts
- T₃ — 900-watt plate transformer, 1000 volts each side center tap
- T₄ — "B" supply transformer, 400 volts each side center tap, with 5-volt winding for Type '80 rectifier
- L₁ — 10 henrys
- L₂ — 6 henrys
- L₃ — 50 henrys
- L₄ — 20 henrys
- L₅ — 5 henrys (approximate)
- C₁ — 2 μ fd.
- C₂ — 5 μ fd.
- C₃ — 1 μ fd.
- C₄ — 0.5 μ fd.
- C₅ — 0.1 μ fd.
- R₁ — Voltmeter multiplier
- R₂ — 14,000 ohms
- R₃ — 10,000 ohms
- R₄ — 8000 ohms
- R₅ — 8000 ohms
- R₆ — 4000 ohms with one modulator tube
1900 ohms with two modulators
- R₇ — 1 ohm
- R₈ — 10,000 ohms
- R₉ — 30,000 ohms
- R₁₀ — 250 ohms
- R₁₁ — 100,000 ohms
- R₁₂ — 400-ohm potentiometer
- R₁₃ — 1000 ohms
- R₁₄ — 1500 ohms
- R₁₅ — 50,000-ohm potentiometer
- R₁₆ — 250 ohms
- R₁₇ — 100 ohms, center-tapped
- R₁₈ — Bradly Radiostat
- MA₁ — 0.50 d.c. milliammeter
- MA₂ — 0-200 d.c. milliammeter
- MA₃ — 0-500 d.c. milliammeter
- MA₄ — 0-25 d.c. milliammeter
- MA₅ — 0-5 d.c. milliammeter
- P — Pilot light

with it, making the arrangement wholly unsatisfactory. Each intermediate stage has its own plate resistor, allowing each tube to be worked at optimum without heating.

The home-made transformer and choke referred to were made similar to those explained in the A.R.R.L. Handbook, so do not warrant further comment.

The modulation choke (20 henrys at 300 ma.) was salvaged from an old Freed-Eisemann NR-11 power unit which used a 350 ma. Raytheon for "A" and "B" supply before the days of a.c. tubes. A tapped 4000-ohm resistor allows the power amplifier to be run at reduced voltage when using 'phone to permit a high percentage modulation. A Federal switch with two contacts in series shorts out the Heising choke and resistor in the c.w. position. A similar switch turns off

the modulator and speech amplifier filaments for c.w. operation. The 400-volt supply — which actually delivers 500 volts because of the light load (about 25 ma.) and large first condenser (5 μ fd.) — is split into 180 volts for "B" and 300 volts for "C." The 180-volt "B" supplies the Type '45 oscillator and '12-A speech amplifier, a resistance dropping the latter supply to 135 volts. The "C" voltages of the speech amplifier, modulator and power amplifier are variable by virtue of potentiometers which are mounted on the panel. The power amplifier requires a large size bias resistor, because it must carry the grid current in addition to the normal d.c. through it. A Carter 50,000-ohm large size potentiometer just about handles the load although a heavier one is recommended.

Potentiometers are generally used to get proper a.f. amplifier bias voltages but they are also a great refinement to an r.f. stage, especially the power amplifier, where they are not commonly used. Having the power amplifier bias come

from a separate arm has the greater advantage of not disturbing the voltage distribution of the network when grid current flows. The grid current of the intermediate stages tends to disturb the distribution somewhat as stages are added or cut out to change frequency, but the currents are small enough so that the changes are allowable. Of course, it would be ideal to have a potentiometer for each stage but that, to most hams, would be — just an ideal! The power amplifier potentiometer is also an excellent power control when using c.w. (when the r.f. input is not excessive).

Looking at the panel of the power unit from left to right and top to bottom, the following parts may be seen: Modulator potentiometer knob, Type '66 rectifier filament voltmeter, 110-volt switches, modulator plate (0-150 ma.) meter,

filament rheostat, main filament voltmeter, oscillator plate (0-25 ma.) meter, 0-5 ma. grid meter which may be plugged into r.f. intermediate stages or speech amplifier, potentiometer knob, power amplifier grid (0-25 ma.) meter, power amplifier plate (0-500 ma.) meter, main filament rheostat, 0-2000 voltmeter, c.w.—phones switches, power amplifier potentiometer knob, first intermediate stage (3.5-mc.) plate (0-50 ma.) meter, and three spare switches. The two plug-in meters have spare jacks for external and independent use which come in handy when trying something new. Pilot lamps are used to indicate what switches are thrown. So much for unit No. 1.

THE R.F. EXCITATION UNIT

Unit No. 2 consists of a 3.5-mc. crystal oscillator employing a Type '45, '12-A or '71-A, feeding four Type '10 stages, the first one (3.5 mc.) being neutralized. The '45 is a very good oscillator and is used in preference to the other tubes. Type '45's have been used also as frequency doublers but are not very good as such. A doubler should be fed a high plate voltage and given plenty of grid bias so that it will generate strong harmonics. (The bias also keeps the input power down.) This is an excellent procedure with the '10 but, unfortunately, not with the '45.

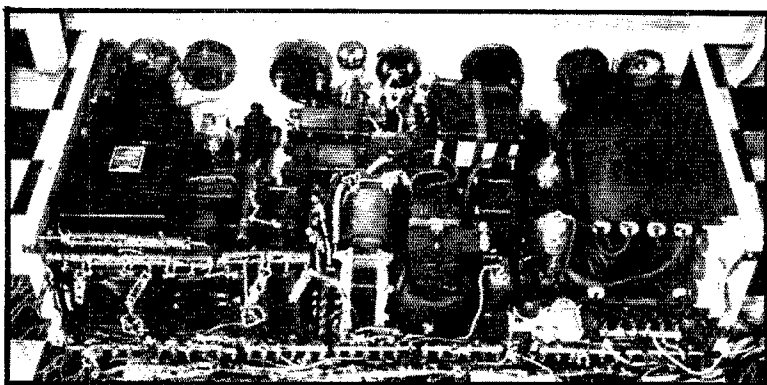
Referring to Fig. 2, the arrangement used at WSAX is seen where feeder 1 supplies r.f. to a single power amplifier tube and feeder 2 permits a short and direct ground lead to be obtained.

In order to adapt the unit to feeding a push-pull power amplifier, two feeders of opposite phase relations had to be obtained. The easiest and most practical method seemed to be inductive coupling, so this means was employed. Small coupling coils were added to each plate inductance and feeders 3 and 4 brought out to provide a link circuit coupling to the final stage. This was a boon to the 28-mc. stage as it removed a lot of shunt capacity (coupling condenser and r.f. leads) thus permitting the use of a much larger inductance with considerable improvement in efficiency. Not much time has been spent on the 28-mc. stage so that it is still in an experimental condition. With a little playing and juggling it will almost certainly take its place as an efficient amplifier alongside its big brothers, the lower frequency stages.

All plate inductances have been fitted with General Radio plugs to permit future modifications. Thus, the oscillator may be made to tune to the 1.75-mc. band and so may the buffer stage, should conditions warrant the change. The r.f. chokes perform satisfactorily at the lower frequency so need not be changed.

To change frequency to a different band, a switch is thrown and a slight adjustment made to the preceding tuning condenser. A fraction of a turn of the filament rheostat may be required also. The throw of the Federal switch lights the tube, feeds r.f. to its grid and cuts off the coupling coil (the feeder in the old case) from the previous stage. The switch in the succeeding stage must be in the "left" position to connect the coupling coil to the feeders. The switches of all unused stages are kept in the center or neutral position. Pilot lights are connected across the Type '10 filaments, a 15-ohm resistor being used in series with a 6-volt lamp.

Looking at the photo of the r.f. can, it may be seen that each stage is built separately on its own baseboard. The layout is a little crammed and, undoubtedly, stray fields are at work all over the place, but the plate coils and condensers are well spaced from other bodies so what's left may actually help the doublers along. Smaller diameter chokes would have been used had the forms been available. Shielding was tried between the oscillator and buffer stage, allowing ample space for the coils, but the only effect noticed



THE POWER- AND BIAS-SUPPLY UNIT

Here's an example of justifiable congestion carried to the limit!

was a reduction in oscillator output. To put a shield in now would introduce immense losses in the coils, so shielding has been given up as entirely unnecessary. Had a self-controlled oscillator been used, shielding would have helped frequency stability. The other stages being doublers, shielding was not even attempted.

A low-power oscillator was decided on because of less load on the crystals, better frequency

stability, and the advisability of using a buffer stage for 3.5-mc. 'phone. The '45 supplies ample power at 180 volts "B" and will work with less.

THE POWER AMPLIFIER

Unit No. 3 is the real pleasant part of the outfit. It is a clean bread-board arrangement with a tuned-grid tuned-plate self-neutralized push-

by-pass condensers are used, a noticeable improvement in efficiency resulting on all frequencies, the two condensers being located halfway between the tubes. A grid input circuit consisting of two r.f. chokes was tried instead of the tank circuit, but much more power was needed to drive the two fifty-watters. It was decided therefore that the tuned circuit was very much

worth while. It will be noticed that no input resistance whatever, either series or parallel, is being used. The amplifier is perfectly stable on all frequencies, even at 30 mc. Having no loss resistances gives the Type '10 pushing the big stage an easy job and this is appreciated at 30 mc. and even at 14 mc. A gain in efficiency of the link-circuit coupling is noticed when the feeders are twisted.

The two neutralizing condensers are homemade book-type ones which have been working perfectly. No adjustment whatever is necessary when changing to a different frequency band.

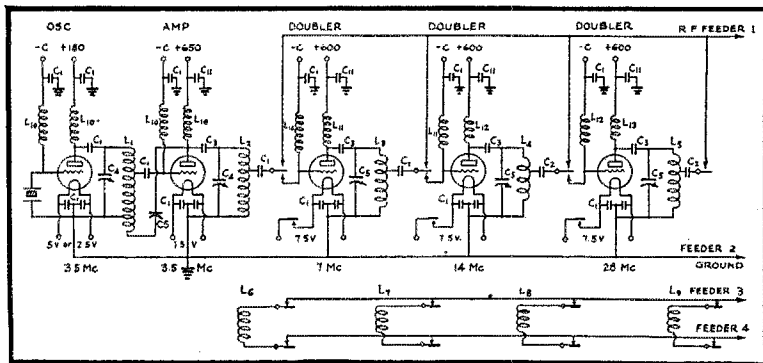
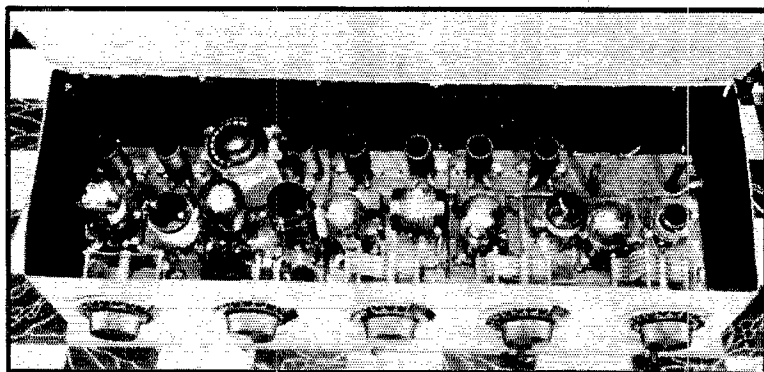


FIG. 2—CIRCUIT OF THE EXCITATION UNIT

- L₇—6 turns No. 14 on 1 1/4-inch diameter form, spaced
 - L₈—5 turns No. 14 on 1 1/4-inch diameter form, spaced
 - L₉—5 turns No. 14 on 1 1/4-inch diameter form, spaced
 - L₁₀—2 1/2-inch winding of No. 30 d.s.c. on 1-inch diameter form
 - L₁₁—1 3/4-inch winding of No. 28 d.s.c. on 1-inch diameter form
 - L₁₂—1 1/2-inch winding of No. 28 d.s.c. on 1-inch diameter form
 - L₁₃—1-inch winding of No. 28 d.s.c. on 1/2-inch diameter form
- All tubes are Type '10's except the oscillator, which may be either a '71-A, '12-A or '45.

- C₁—.002- μ fd. receiving condenser
- C₂—500- μ fd. receiving condenser
- C₃—500- μ fd., 1500-volt condenser
- C₄—250- μ fd., 1500-volt condenser
- C₅—100- μ fd. double-spaced condenser
- C₁₁—.002 μ fd., 1000-volt condenser
- L₁—26 turns No. 20, on 2-inch diameter form, tapped at 17th turn
- L₂—21 turns No. 14 on 2-inch diameter form, spaced
- L₃—14 turns No. 14 on 1 3/4-inch diameter form, spaced
- L₄—7 turns No. 14 on 1 3/4-inch diameter form, spaced
- L₅—4 turns No. 14 on 1 1/4-inch diameter form, spaced
- L₆—8 turns No. 14 on 1 1/4-inch diameter form, spaced

pull circuit. Referring to Fig. 3, the two r.f. feeders come in to two receiving type condensers, these condensers controlling the amount of power coming from the particular stage which is pushing the two 50 watters. A Cardwell type of 217-C dual 350- μ fd receiving condenser tunes the grid coil and also serves as a by-pass condenser. The plate circuit is similarly arranged, the condenser being a special Cardwell job with two T-199 sections in tandem, built as a single unit: This condenser has to handle the plate voltage and also the modulated r.f. when using 'phone. Filament



A PLAN VIEW OF THE R.F. EXCITATION UNIT

The 3.5-mc. oscillator is at the left and the line-up progresses to the 28-mc. stage at the extreme right.

The antenna circuit arrangement is taken up later. In changing frequency, the grid, plate, and sometimes the antenna coils have to be changed. Wing nuts save a little time.

THE AUDIO UNIT

The fourth and last unit is a conventional audio amplifier using a Type '12-A, transformer coupled to a DeForest 545 modulator. Two sockets have been provided with the hope of some day filling the second one and thereby giving the transmitter a better balance of a.f. to r.f. power. A desk type (single-button) microphone is used with a home-made microphone transformer, the microphone current being supplied by a six-volt storage battery. A Brunswick input push-pull audio transformer supplied the microphone core and secondaries. As much No. 30 d.s.c. wire as could be squeezed in took the place of the original primary, a tap being brought out somewhere about the $\frac{2}{3}$ mark so as to give three chances of matching impedances. One or both secondaries may be used. The entire primary and one secondary are being used at present. A quarter-megohm potentiometer provides gain control. The Type '12-A is fed 135 volts "B" through the primary of a General Radio 6:1 transformer. A Type '01-A was used first, so the primary of the audio transformer was not saturated when using 135 volts, in the expectation of a little more gain, but the '12-A gave more gain and sounded better—so there it is! The bias for each stage is controlled by a potentiometer in the power unit. Grid and plate circuits are religiously by-passed. A resistor is provided in each modulator grid to prevent any parasitic "monkey business" in this stage. No trouble is experienced with feedback.

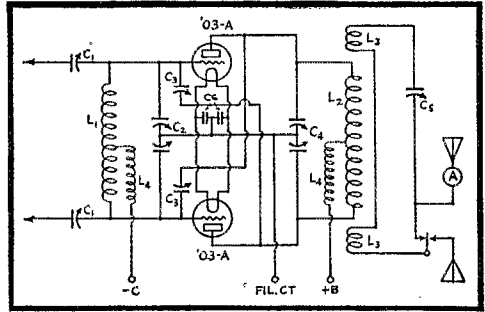
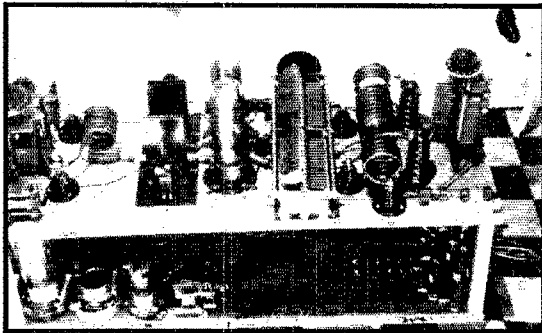


FIG. 3 — THE POWER AMPLIFIER CIRCUIT

- C₁ — 150 μ fd.
- C₂ — Split-stator condenser; 350 μ fd. each section
- C₃ — Neutralizing condensers; described in text
- C₄ — Two 330- μ fd. condensers rebuilt to operate with one shaft
- C₅ — 400 μ fd.
- C₆ — 0.01 μ fd.
- A — 0-1.5 r.f. ammeter

Coil Data

Band	No. Turns	Coil Diam.	Size Copper Tubing	Turn Spacing
L ₁ — 3.5 mc.	18	3 inches	3/16 inch	1/8 inch
7 mc.	14	2 1/2 "	1/4 "	3/16 "
14 mc.	10	2 "	1/4 "	3/8 "
28 mc.	4	1 1/2 "	1/4 "	1/2 "
L ₂ — 3.5 mc.	18	2 1/2 "	3/16 "	1/16 "
7 mc.	12	2 1/2 "	3/16 "	1/8 "
14 mc.	8	2 "	3/16 "	3/16 "
28 mc.	4	1 1/2 "	3/16 "	1/2 "
L ₃ — 3.5 mc.	6	3 "	1/4 "	1/16 "
7 mc.	6	3 "	1/4 "	1/16 "
14 mc.	4	2 "	1/4 "	1/8 "
28 mc.	2	1 1/2 "	1/4 "	1.8 "
L ₄ — 5-inch winding of No. 28 d.s.c. on 1/2" diameter glass tube				



THE FINAL PUSH-PULL POWER STAGE AND THE AUDIO-FREQUENCY UNIT

The neutralizing condensers are at the left of the power tubes on the top deck. Accommodations for two 545 modulator tubes are provided at the lower left but only one was in use at the time this photograph was taken.

THE ANTENNA SYSTEM

Without disarranging the complex pattern of B.C.L. aeriels on the roof, a 34-foot stretch was obtained at a large angle to most of them. Two

¹The modulator should have about 145 volts grid swing for full undistorted output and two stages of speech amplification would be necessary with a microphone less sensitive than the usual single-button type. — EDITOR.

20-foot 2x4's raised the half-wave 14-mc. antenna about 70 feet above ground. A single-wire feeder, some 60 feet long, joined the antenna just 4 feet 8 inches from the center. A 50-foot single wire section with 15 feet of lead-in was erected 10 feet above ground in a court almost under the antenna. The single-wire fed antenna, by itself, is used for 14 and 28 mc. The current-fed arrangement does a good job at 3500 kc. and will work at 7-mc. when large antenna coils are used with close coupling. Very little work is done at 7 mc. so this is no disadvantage. Many stations notice no difference between the single-wire fed Hertzian antenna and the longer current fed system on 14 mc., although the single-wire fed aerial is unquestionably the better.

Looking back at the power amplifier, the method of coupling the antenna is apparent.

To use the single-wire fed Hertz, the switch disconnects the court-yard section and closes the tank circuit. This is the simplest and most fool-proof means of coupling a push-pull stage to a single-wire fed type Hertz. It has graced *QST*'s pages on several occasions. When the switch is in the other position the tank tuning condenser becomes the antenna series condenser. For receive-

ing, a long single wire is used permitting break-in on frequencies sufficiently remote from the transmitter frequency.

OPERATION

The switches, keys, and microphone jack are mounted on a wood base which also holds the receiver. Two receptacles are provided, one for the transmitter cable and one for the receiver battery supply. The latter also carries the micro-

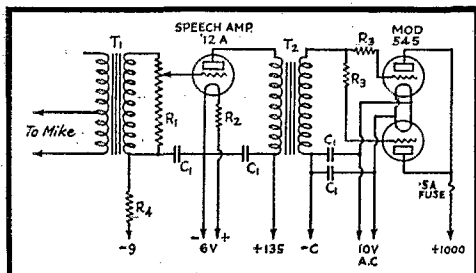


FIG. 4 — SPEECH AMPLIFIER AND MODULATOR

- T₁ — Microphone transformer; described in text
- T₂ — General Radio 6:1 audio transformer
- R₁ — 250,000-ohm potentiometer
- R₂ — 4 ohms
- R₃ — 500 ohms
- R₄ — 25,000 ohms
- C₁ — 1 μ fd.

phone lead. This assembly, under normal kitchen conditions, is located under the kitchen table. To get the station running, it is set on the porcelain table top which is of metal and is grounded. Both cables are removed from under the stove and unwound, each being connected to its receptacle, and the 110-volt plug connected. The entire procedure takes only a minute and a perfectly good, clean kitchen is transformed into a "messy radio station" according to the OW. Hi.

The entire transmitter, being on castors, can be rolled out into the open, new coils put in the power amplifier and the proper switches thrown in the r.f. unit. After adjustment the outfit is rolled back into its resting place beneath the stove and is all set for operation — a little clumsy but the best that could be done under the conditions. Tuning adjustments can be made while the transmitter is in its normal position, although they are a bit awkward.

Assuming the transmitter to be ready to go on the air for the first time, the following procedure would be followed: First, check all circuits for continuity and shorts (including grounds); throw the filament switch, turn up the filament rheostats, tune the oscillator and test for oscillation by noting the characteristic sudden change in plate current. Replacing the power transformer fuse with an electric iron or toaster, disconnect the high voltage from all tubes and throw the power switch, immediately noting the behavior of the high voltage meter. Take a cool drink and relax!

Proceed to neutralize the 3.5-mc. buffer stage. With all filaments and the oscillator turned on, plug the grid meter in this grid circuit and get it on scale by varying oscillator tuning. The bias of all stages should be set at about the half-way mark. Vary the buffer plate tuning condenser until a peak of grid current is noticed. Gradually increase or decrease the neutralizing capacity, keeping this grid current peak in view until it disappears or until it reaches a minimum and then picks up again. This will be the point of best neutralization. The oscillator tuning may have to be shifted slightly from one adjustment to another to keep the grid meter needle near the top of the scale. The oscillator plate meter may be used instead of the buffer grid meter; but the variations will be much less. The neutralization may be checked, and perhaps further improved,

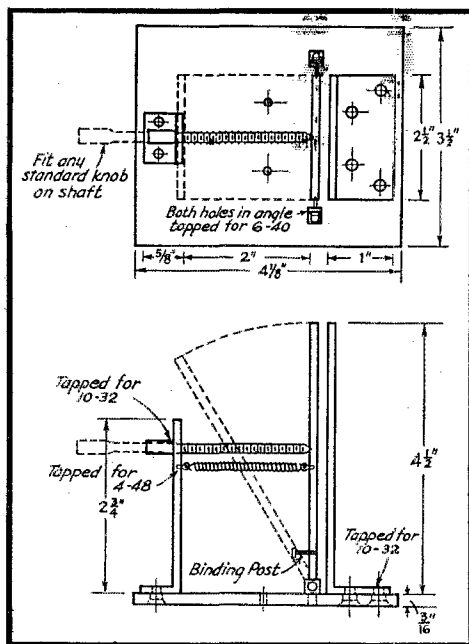


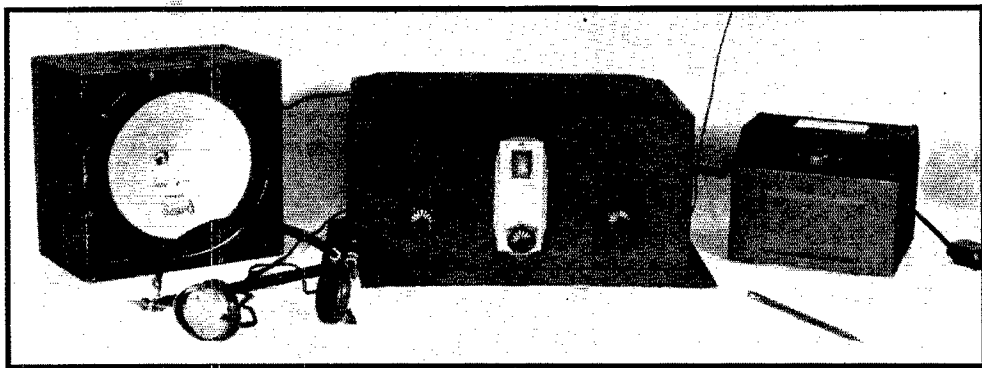
FIG. 5 — HOW THE NEUTRALIZING CONDENSERS ARE CONSTRUCTED

The minimum spacing between plates varies from $\frac{1}{8}$ inch to $\frac{1}{10}$ -inch with a corresponding variation of capacity from 19 to 24 μ fd. The break-down voltage rating is from 5000 volts to 4000 volts.

by coupling a sensitive thermo-galvanometer to the platecoil of the buffer and varying the neutralizing condenser until no current is picked up, this being done with caution so as to preserve the meter. Start with very loose coupling.²

(Continued on page 48)

² Further details of neutralizing methods are given in "Neutralizing Radio Frequency Amplifiers" *QST*, Oct., 1930, and in *The Radio Amateur's Handbook*, Seventh Edition, Chap. VII. — EDITOR.



"OUR NEW RECEIVERS SHOULD BE SINGLE-CONTROL SOCKET-POWER AFFAIRS. . . ."

Revising Amateur Tuner Design

By Robert S. Kruse*

A PARTICULAR piece of apparatus is of more interest than a purely theoretical story even when the theory is illustrated by line drawings. This article will therefore make free use of the National SW-5 receiver for purposes of illustration, although this is distinctly not an apparatus description.

THE REQUIREMENTS

A tuner that is merely different has no excuse for existence. A new design should have superior freedom from upkeep, and offer sensitivity, selectivity, audio fidelity and ease of handling. Except for portable work we certainly must agree that a humless socket power receiver is far better than a battery receiver with charger, hydrometer and water bottle. As to sensitivity, which is to say r.f. gain, I do not recall ever hearing of an amateur who did not want more of it. This calls for tuned r.f. and for a sensitive detector.

A lack of r.f. selectivity has been characteristic of amateur tuners for years. Good audio we have, and ease of handling also, but at the expense of using one tuned circuit. It follows almost automatically that our new receivers should be single-control socket-power affairs, with tuned r.f. for the sake of selectivity and sensitivity, a screen-grid detector for the sake of further sensitivity, and the ability to work at will in any amateur band with these advantages.¹ It also must be possible to use an oscillating detector reception for c.w. or to receive 'phone signals without working at the ragged edge of oscillation, and to

receive with headset or moderate loud-speaker volume at will.

THE TUNED CIRCUITS

In the old-fashioned amateur c.w. tuner there was but one tuned circuit and that one was connected to an oscillating detector. As long as the tube could be urged into oscillation, losses were largely compensated for. It is really funny that we stirred up the great "low-loss" fury while talking about those very tuners in which any sane loss did little more than roughen up the oscillation control.

In the modern amateur tuners this is not so at all. In the model shown in the illustrations and diagram Fig. 1, there are several tuned circuits, and not more than one of them can possibly be helped out by an oscillating, or even regenerative, detector. It follows that the tuned circuit must be really of low loss to give good performance. Again, our c.w. receivers with one lonely tuned circuit gave very much the same signal strength with a very large tuning condenser and small coil or with a very small tuning condenser and a large coil. Putting it differently, the L/C ratio did not matter very much. This, too, does not hold for our modern receivers with several tuned circuits; we must make a determined effort to reduce the tuning capacity to a low value, always being careful not to carry this to a point where it becomes impossible to maintain the single-control tuning.

The foregoing generalities do not demand any discussion of the tuning condenser. In the design used for illustration it was found convenient to use 90 $\mu\text{fd.}$ as a maximum capacity, which is enough to give each coil a tuning range of 1.75:1.

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¹ The superheterodyne type of receiver also can meet these requirements, of course. But that's another story. — ERROR.

This is entirely contrary to current amateur practice and belief, but it must be recalled that the condenser is of the 270-degree straight-frequency line type and is being driven by a silent high-ratio micro-dial; also that reception with a receiver using tuned ratio frequency amplification is at a signal level permitting more comfortable tuning. The practical effect is that either 'phone or c.w. may be tuned in with materially less effort than with the familiar one-circuit receiver, despite the latter's greatly exaggerated "band spreading." The statement is not a personal opinion. Though having been of that opinion we rather feared that most amateurs would disagree. However, those who have used tuners of the general type here referred to have quite uniformly dropped the older variety and in most cases have said that the change was in the direction of easier reception, whether "traffic" or "rag chewing" were considered.

At the same time there has been gained the very large advantage of a continuous tuning range. This will be remembered as one of the few good features of the short-wave coil kits of a few years ago.

The mechanical requirements for a satisfactory amateur tuning condenser are too well known to *QST* readers to make any discussion necessary.

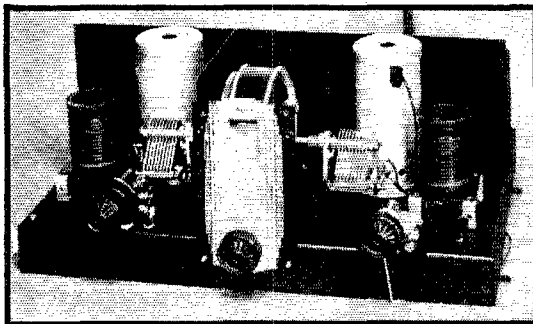
"LOW-LOSS COILS"

Because of frequent coil changes the requirements for amateur tuner coils are more severe mechanically than is the case in other classes of service. The coil must be tough as well as good. If it was not for this one would automatically think of a skeletonized or ribbed bakelite coil spool. Instead, a solid coil form with substantial walls is used in the SW-5. Far from perching the wire on ridges it is laid into a thread lathe-turned into the material. To secure additional sturdiness the wire of the tuned circuits is of large size. Not one of these things would be permissible with normal bakelite and therefore it is necessary to use R-29 low-loss bakelite composition, which has been mentioned in a previous article.² It is not claimed that such a coil is better electrically than

²"A Multi-Range Receiver With Four Tuned Circuits" *QST*, October, 1930.

a ribbed or skeletonized one, but it is as good and is stronger.

The losses in a coil depend not only on the spool and the wire but also on the shape of the coil and the losses which are unavoidably "coupled into" the coil. For mechanical reasons an ideal coil shape hardly can be maintained through the entire amateur range. As a practical compromise the coils for the 14-, 7- and 3.5-mega-



"... THERE ARE SEVERAL TUNED CIRCUITS. ..."

The drum dial rotates the r.f. stage tuning condenser at the right and the detector tuning condenser at the left. The trimmer condenser at the right is connected across the interwound "primary" turns of the antenna coupling transformer. The regeneration volume control is the potentiometer at the left. The r.f. and detector screen-grid tubes have individual shields and there is a baffle shield between the r.f. stage and detector. The audio equipment is behind the rear shield.

cycle (14,000-, 7000- and 3500-ke.) bands have been given a length very slightly over their diameter, while the coil for the 28-megacycle (28,000-ke.) band unavoidably has been made short. The primary windings of the r.f. transformers are "interwound," which is to say the primary turns are laid into the spaces between the turns of the heavy secondary wire. This is to minimize capacity transfers. As the number of primary

turns is increased the gain of an r.f. transformer of this type at first goes up rather rapidly and then slows down while the capacity transfer continues to rise. As a practical compromise the primary turns in this case are two-thirds as numerous as those of the secondary.

The purpose of using a primary rather than the "tuned impedance" scheme is to avoid several difficulties of the latter arrangement. Among these are the excessive interlocking and capacity transfer, the appearance of plate voltage at the tuning condenser and the extremely annoying type of instability which may be caused in a circuit of this type by very slight leakage (much under a micro-ampere) through the grid condenser of the detector. A third, or tickler, winding is laid in a narrow groove at the lower end of the coil form in the manner familiar to all amateurs.

To permit the ganging trick mentioned later it was found desirable to keep all windings independent, which required a 6-pin base. The socket is much like any tube socket except for the additional opening.

GANGING

No amateur will willingly tolerate a receiver which is *almost* single control; in fact the desire for true single control has probably kept alive the antiquated receiver with no r.f. amplification. Ganging can be achieved in two general ways,

both of which require nicely matched coils and condensers. One of these has been discussed in connection with an aircraft receiver.³ It is entirely satisfactory but hardly applicable to an

sensitivity. In all of the amateur bands, including the 1.75-megacycle (1750-kilocycle) band, the trimmer C_3 is purely "set and forget." In most cases it is not changed when shifting coils.

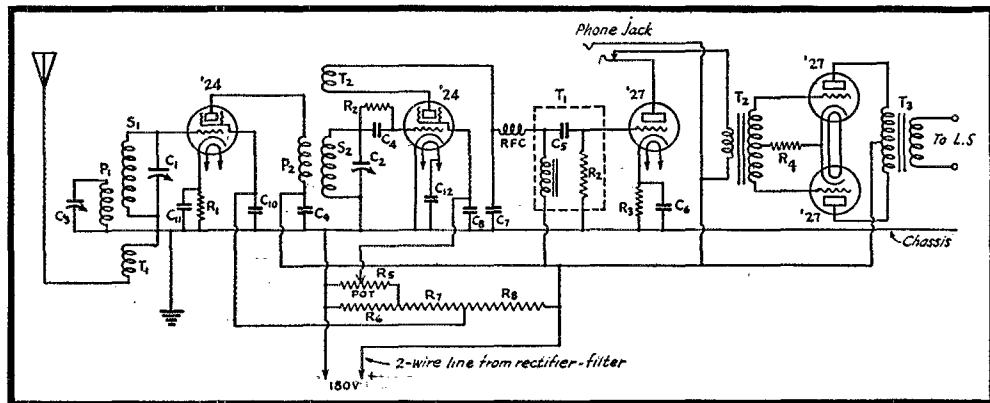


FIG. 1 — THE TUNED R.F. RECEIVER'S CIRCUIT

C_1 and C_2 — Special 270-degree tuning condensers, 90- μ fd. maximum
 C_3 — Midget "trimmer"
 C_4 — 100- μ fd. mica grid condenser
 C_5 — Coupling condenser, .005- μ fd. or so
 C_6 — 0.5 to 2- μ fd. paper
 C_7 — 100. to 250- μ fd. mica
 C_8 — 0.5- μ fd. paper
 $C_9, C_{10}, C_{11}, C_{12}$ — 0.01- μ fd. mica
 P_1, S_1, T_1 — Windings of antenna input transformer

P_2, S_2, T_2 — Windings of detector transformer
 R_1 — 350-ohm bias resistor
 R_2 — Grid leak, 5 megohms or so
 R_3 — Audio bias resistor, 2000 ohms
 R_4 — Second audio bias resistor, 1000 ohms
 R_5 — Regeneration-volume control potentiometer, 50,000 ohms
 R_7, R_8, R_9 — Voltage divider or "B stick." Total 12,000 ohms; tapped at 3100 and 5100 ohms from negative end

amateur with two tuned circuits. The other scheme was worked out by the engineers of the National Company to permit the use of one type of r.f. transformer for each frequency range, rather than the two types usually encountered in tuners of the plug-in variety. Reference to the general diagram will make it clear, as far as it applies to this particular circuit. The coils S_1 and S_2 (see Fig. 1) are the heavy-wire tuned secondaries. The coils P_1 and P_2 are those interwound with the S coils. The coil P_2 couples into S_2 some of the plate circuit capacitance of the first tube and thus introduces capacity loading. A similar effect is produced upon S_1 by means of the trimmer of C_3 shunted across P_1 and therefore coupled into S_1 . This method has several advantages over connecting C_3 directly across C_1 . It is further obvious that other capacities influence the tuned circuits. The antenna capacity effect is limited by using the groove winding, T_1 , as an antenna coil, and by using a small antenna which is made possible by the rather good sensitivity. The arrangement will, however, "go through trim" with an antenna as large as the normal broadcast antenna. As just implied, the groove winding is not coupled very closely to the S winding so that difficulty in the detector from this cause is avoided. The loading effect of the grid-circuit capacity for the r.f. and detector tubes is minimized by using tubes of the same type which, incidentally, is a desirable combination for good

REGENERATION CONTROL

Since amateur receivers must be useful for both modulated and c.w. reception without the necessity of learning two methods of control, it is con-

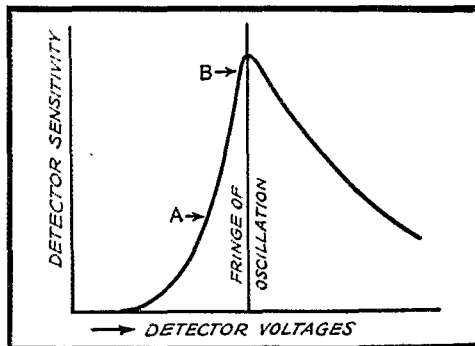
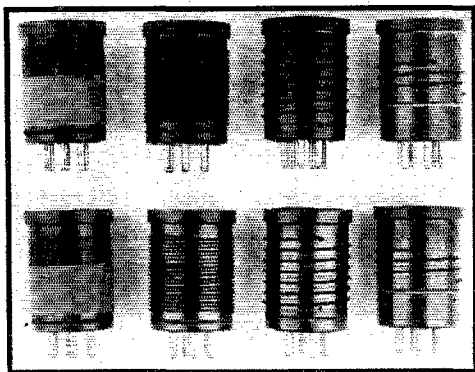


FIG. 2 — WHY A REGENERATIVE DETECTOR IS SO SENSITIVE TO HUM VOLTAGES

venient to have a single knob which combines the functions of volume control for 'phone reception and regeneration control for c.w. reception. This can be done by controlling the screen voltage of the detector tube by means of a potentiometer, R_5 . The small tuning effect produced does not disturb 'phone reception and only changes the

tone moderately on c.w. Even this shift can be avoided if one wishes to set the slider at the top of R_5 and to shunt a variable high resistance



THE R.F. AND DETECTOR TRANSFORMERS FOR EACH BAND ARE EXACTLY ALIKE

One above the other at the left are the transformers for the 3500-kc. band; progressing to the right, the 7000-kc., 14,000-kc. and 28,000-kc. coils are next in order. The forms are of R-29 low-loss dielectric.

across T_2 , but this scheme of control is not very good in the 28-megacycle band, and fails altogether with some tubes. If it was not for this one might use such a control to govern regeneration and vary the voltage of the r.f. screen to control volume on modulated signals.

AUDIO SYSTEM

Though not as high as that of a bias or plate circuit detector, the impedance of the Type '24 grid-leak detector is still too high to work into an ordinary transformer. A resistance coupling is not too practical, since it drops the voltage rather considerably, and full voltage is needed to secure smooth regenerative action. The special coupler shown in the diagram meets these objections, since it is possible to place on a core of reasonable size one single winding of an inductance higher than would be possible for a transformer primary. There would be no objection to a resistance coupling if one cared to raise the plate supply voltage to about 300.

The Type '27 first audio tube has its output brought to a 'phone jack for headset reception, but a magnetic loud speaker, permanently connected to the output of the second stage, may be cut in at any time by simply withdrawing the 'phone plug. The '27 tubes of the second audio stage, as used here, permit an output about equal

to that of a single Type '71-A. The reason for using them instead of '45 tubes lies in the fact that they permit the bias resistor R_4 to remain completely out of all other circuits, whereas the '45 tube unavoidably connects one end of this resistor to the filament system and thereby introduces some hum, no matter how careful the balance. This hum is usually noticeable in a headset connected to the output of the second audio stage. (There are people with cast iron ear drums who really use a headset in that way.) However, the worst effect is not felt until regeneration is raised near the oscillating point. At this point there takes place a very rapid rise in detector sensitivity as suggested in Fig. 2. If, for instance, we were working the detector at point A a very slight hum voltage which had crawled into the detector plate supply via the bias resistor of a '45 tube would cause the detector sensitivity to oscillate up and down a great deal, thereby modulating the signal then passing through the detector. This super-regenerative action (it may easily become that if the detector is previously brought very close to oscillation as at B) makes a distressing noise out of a hum which would pass unobserved in another type of receiver. It must be remembered also that in headset reception one will find objectionable an amount of hum equal to about 1/300th of that which is barely audible with a good

loud speaker. If one's standards of freedom from hum are high, any plain filament tube anywhere in the set seems to be out of the question, where a headset is used.

FIDELITY

While on the subject of audio, attention is called to the curves of Fig. 3. Curve A is that of the last two tubes and the

output transformer of a typical set. This is a good audio curve by any standard, except that it goes high enough to introduce more noise than is pleasant. Curve B shows the transmission through the first and second audio stages when the condenser C_6 has a capacity of 4 μ f. Reducing the capacity of this condenser will gradually cut off low pitches. Curve C is obtained when this condenser is removed entirely. This is a useful dodge in headset reception with sets having excessive hum. As is well known, the radio amplifier and detector in any receiver transmit high frequencies less well than a good audio system. When a modulated r.f. signal is fed through the receiver, that part of the overall curve (meaning the fidelity for the entire receiver) to the left of 400 cycles in Fig. 3 will lie between B and C, depending upon

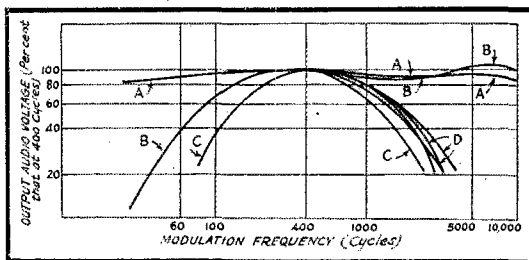


FIG. 3 — FIDELITY CURVES

A is that of a good, b.c. receiver. B and C are for the receiver under conditions described in the text.

the capacity of C_6 , while to the high frequency side of 400 cycles one of the group of curves marked D will occur, depending on several things such as the capacity of C_6 , C_8 and C_7 , and the constants of the detector plate choke as well as the capacity of C_4 and the value of the associated grid leak.

SENSITIVITY

The equipment available for measuring sensitivity is usually designed to work in the broadcast band of 500 to 1500 kilocycles. In Fig. 4 the curve A is that for the receiver here described when equipped with a pair of coils covering the 900- to 1500-kilocycle region. The curve is taken with the regeneration-volume control set for optimum sensitivity (below the point where audible distortion begins). The other curves are representative broadcast receiver curves taken from various sources. These receivers had from 2 to 4 r.f. stages. Curves have been taken at amateur frequencies, but there is some reason to suspect the reliability of the measuring apparatus, and the reader is, therefore, asked to be content with an indirect comparison, by noting the position of curve A among those of modern broadcast receivers and then considering the difference between the performance of such receivers and the old single-circuit broadcast receiver, which is almost exactly the equivalent of the commonest type of amateur c.w. receiver using one tuned circuit. That statement, of course, refers to sensitivity only.

BY-PASSING

The various fixed condensers have been numbered mainly to permit the references that follow.

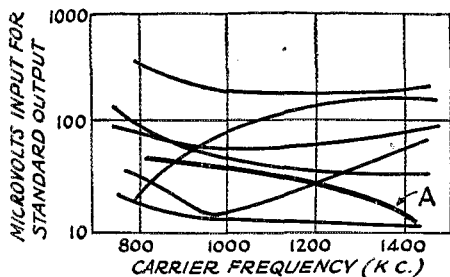
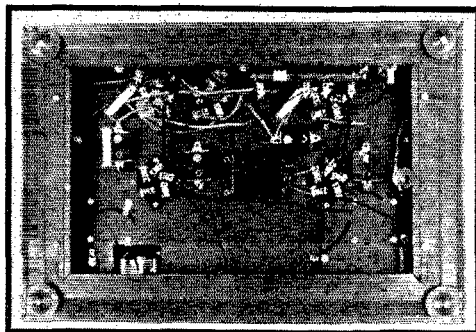


FIG. 4 — SENSITIVITY CURVES

Curve A is representative of the sensitivity for frequencies in the broadcast band.

The business of C_7 , C_8 , C_9 , C_{10} , C_{11} and C_{12} is to route r.f. voltages to the chassis so that they may be kept from creating undesired regenerations or — what is exactly as bad — degenerations. Though these jobs are the same as in a broadcast receiver the treatment cannot be the same because of the frequency range to be covered. If, for instance, C_7 is replaced by an average 0.5- μ fd. paper condenser the set will develop a stubborn

fringe howl. If a similar condenser is placed at C_9 the set will become very insensitive at some frequencies and at others the r.f. tube will oscillate enthusiastically.



SUB-PANEL SOCKETS AND A FALSE-BOTTOM CHASSIS

make it possible to locate by-pass condensers and resistors below their associated circuits. The "B"-supply voltage divider is at the upper right.

Similar occurrences in broadcast receivers some years ago caused Radio Frequency Laboratories to make a series of measurements on paper by-pass condensers. The method used illustrates a point of interest here. The condensers with their connecting leads were put into the circuit of Fig. 5A, which will be recognized as the ordinary voltmeter-ammeter or IR drop method of measuring impedances. There was no attempt to measure the nature of the impedance, since a low-impedance path of any sort is usually satisfactory as a by-pass. Thus in Fig. 5B all three of the resistors are by-passed very effectively at 1000 kc. It is only the necessity of keeping d.c. from flowing through the by-passes which ever makes us consider the use of condensers at all.

In trying to get down the impedance of a by-pass condenser one naturally thinks of making the capacity large — and thereby may quite possibly increase the impedance instead of decreasing it. Paper condensers, even of the "non-inductive" type, have appreciable inductance and resistance. The inductance certainly (and sometimes the resistance as well) increases with the size of the condenser. One does not go very far

Condenser	Resonant Frequency, Kc.
Sangamo (Mica) .006 μ fd. with 6.5 inches of wire	5450
" " " " " 3.5 " " " " "	7690
" " " " " 3.5 " " " " "	6380
" " " " " 3.0 " " " " "	6980
" " " " " 2.5 " " " " "	7690
" " " " " 2.0 " " " " "	8820
RCA " " " " " 10.5 " " " " "	6900
" " " " " 8.5 " " " " "	8120
" " " " " 7.5 " " " " "	8500
Philco (paper) .015 " " " 2.5 " " " " "	9370
" " " " " 0.15 " " " 1.5 " " " " "	13,630
Ford A " " " " " 2 " " " " " "	8820
Tobe " " " " " 2 " " " " " "	8570

until the amateur-frequency impedance of the condenser is going up instead of down, especially since the larger condenser demands longer leads because it cannot be put so near its job because of its size. Even in broadcast receivers condensers of more than 0.5 μ fd. capacity may get into

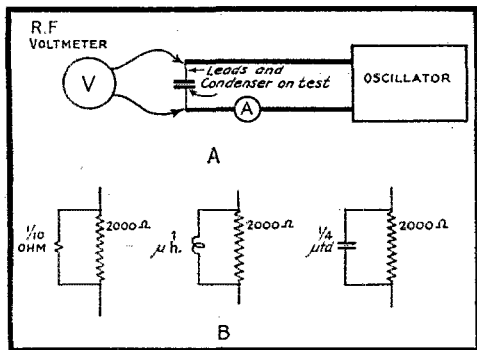


FIG. 5 — BY-PASSING

trouble by becoming series-resonant and acting as tuned circuits. This same effect takes place in the amateur bands as may be seen from the table on page 21.

A series-resonance combination like some of the above may easily account for transmitting filaments which brighten when the key is pushed, or frequency instability when working on a frequency near the one to which the by-pass or stopping condenser happens to be tuned.

The above suggests several precautions; a circuit lay-out calling for few by-passes and lightening the load on them, the avoidance of resistance in the by-pass paths and the shortening of all by-pass leads as much as possible. Where there is any doubt of the effectiveness of the by-pass it will be as well to put a resistance in the lead to be protected. In line with these suggestions it was thought best to put the voltage divider or "B-stick" into the set, rather than in the power-supply, as this construction had been found to provide a more stable set at higher frequencies. Presumably this is due to the effect suggested in Fig. 6, where A permits r.f. transfers between leads while B does not expose long leads to each other. The arrangement of A may be stabilized by putting resistors into leads 1, 2, and 3, but this adds equipment whereas B avoids it and allows the line from the power supply to be reduced to the two wires — capacity between which is harmless since one is the grounded "B"-minus.

To reduce resistance in the condensers is equivalent to asking for mica condensers since the best

of paper condensers do not look so very good at 28 megacycles. This also produces a very compact condenser which permits very short leads and thus further reduces the resistance of the by-pass path — as well as its inductance.

One may hardly hope to dodge resonance effects when working from 33,400 kc. on down to perhaps 500 kc. One must therefore expect to work through the resonance frequency of the by-passes and try to keep from getting too far into the positive reactance side of the curve on one hand (where the by-pass stops by-passing) or too far into the negative reactance side where the frequency has become too low for the size of condenser used. Largely by cut and try, a .01- μ fd. mica "postage-stamp" was found satisfactory for most of the by-passing. As seen from the table, the series-resonance frequency with ordinary lengths of wire will fall in the general neighborhood of 6000 to 8000 kc. where one would accordingly expect some signs of instability. These did not develop, nor was there frequency instability or tendency to oscillate at any frequency unless the leads of C_{10} and C_9 were made abnormally long. The lead from C_9 had originally been equipped with a 2000-ohm filtering resistance, but this was not found necessary with short wiring to ground. If the condenser C_{11} is removed the r.f. grid currents and r.f. plate currents produce drops through R_1 and cut down the gain of the stage, exactly as the removal of C_6 was seen to reduce the gain of the first audio stage. C_{11} should,

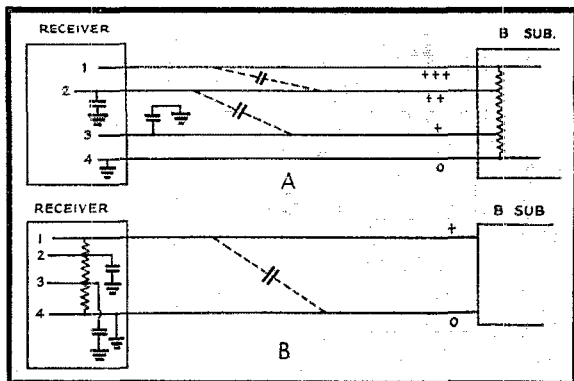


FIG. 6 — IT IS ADVANTAGEOUS TO PUT THE VOLTAGE DIVIDER IN THE RECEIVER RATHER THAN IN THE "A"-"B" UNIT

therefore, be effective through the whole frequency range. Fortunately this is easy since the resistance of R_1 is 350 ohms which is high enough so that the by-pass is effective even when working quite a long way on the high frequency side of resonance. Putting it differently, even at 30 megacycles a piece of wire is a good shunt for a 350-ohm resistor. Similarly the 0.5- μ fd. condenser

(Continued on page 90)

Navy Day—1930

How Amateurs Participated in Annual National Celebration

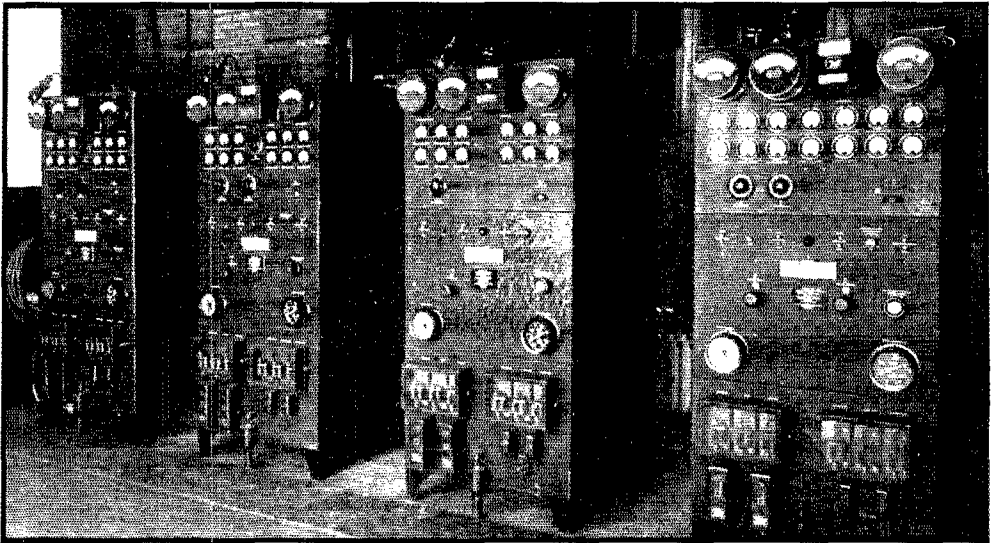
By E. L. Battey, Assistant Communications Manager

IT WAS the pleasure of the American Radio Relay League to cooperate with the Navy League of the United States in its program for the celebration of Navy Day on the seventy-second anniversary of the birth of former President Theodore Roosevelt, October 27, 1930.

For several years it has been the practice of the A.R.R.L. to conduct a receiving competition on Navy Day during which messages are broadcast to the radio amateurs of the United States from the Secretary of the Navy and the President of the American Radio Relay League. As an incentive to participants in the competition the Secretary of the Navy offers each year a letter of congratulations to the amateurs showing greatest proficiency in copying the broadcasts. The number of letters presented is governed by the number of perfect or near-perfect copies received and the

increased every year since the A.R.R.L. first cooperated in conducting a Navy Day receiving contest in 1925. More copies were turned in for 1930 than ever before. The rise in interest is apparent by comparing the number of participants in 1930 to the number who took part in previous years—*285 amateurs sent in copies in 1930; 254 in 1929; 240 in 1928; 129 in 1927; 41 in 1926; and only 40 in 1925.* The steady increase in interest is probably explained by the rapid growth of the Volunteer Naval Communication Reserve and the amateurs' keen interest in the Navy's communication activities.

The system used in classing the 1930 copies was very similar to that used in 1929 except that three stations had to be considered instead of two. The messages were transmitted from NPG (San Francisco), NAA (Arlington) and W1MK (Hartford) according to the schedule outlined in



THE FOUR HIGH-FREQUENCY TRANSMITTERS AT NAA

number of participants. Twenty-five letters were awarded to those taking part in the 1930 activity. All amateurs who copy the broadcasts are listed on a "Navy Day Honor Roll" in order of copying ability as decided by the judges. The 1930 Honor Roll appears elsewhere in this article.

Interest in the broadcasts to amateurs has

October *QST*. Each station sent its respective message simultaneously on two different frequencies, no frequency higher than 8870 kc. being used. NPG broadcast at 7:30 p.m. P.S.T. on 4385 and 8770 kc.; NAA at 7:30 p.m. E.S.T. on 4015 and 8870 kc.; and W1MK at 9:30 p.m. E.S.T. on 3575 and 7150 kc. While it was not

necessary to copy the messages from all three stations, participants who did so were given extra credit both for performance and interest shown. Likewise those who copied two stations were rated higher than those copying but one. Copies were all graded according to the number of errors made and the apparent handicaps under which each operator worked.

In view of the fact that it was a Navy Day competition it was thought appropriate to segregate the participants into Naval Districts and list them under their respective districts in the order of their accomplishments. This puts every one on more of an equal footing as a participant within any given Naval District is competing only with all other participants in the same district. For instance, if you are located in the First Naval District you are cited on the Honor Roll in accordance to your proficiency as compared to other operators in that district only. The twenty-five letters from the Secretary of the Navy have been distributed throughout the eleven Naval Districts in proportion to the number of participants in each district. The Ninth Naval District having the greatest number of participants receives the greatest number of letters, and so on. The twenty-five high men are cited on the Honor Roll in the order of their proficiency.

Except for two irregularities which were brought to light in checking over the copies, the messages sent from NPG and NAA were identical. Automatic tape transmission was used in sending the Secretary of the Navy's message from NAA and NPG. In checking the tape used at NAA and in going over the copies of NPG's broadcast it was found that one error had been made in punching the tape at each station. NAA sent "... in event of emergency or future war period our naval *communion* ...", instead of "... our naval *communication* ...". Instead of sending "... in event of emergency or future war ...", NPG sent "... in event of emergency of future war ...". Ninety-five percent or more of the operators who copied NAA failed to observe the misspelled word due probably to the practice of copying ahead. Many actually copied "*communion*" but then became wary of their own abilities and changed the word to "*communication*." In the case of NPG a better percentage noticed that the word "*or*" had been transmitted "*of*." Some operators, however, who had already copied NAA, noticed the difference in the copies and changed "*of*" so that it would correspond to NAA's "*or*." It was truly surprising to notice the number of good operators who slipped up on these two irregularities. It will be a sad lesson to some who lost a high place on the Honor Roll, but it certainly proves that we must copy what we hear and not let our imaginations run away with us. President Maxim's message from W1MK was transmitted by him, and many

favorable comments were "received on our President's fine "fist."

The usual irritating and varied forms of QRM were reported from all quarters... trolley cars, power leaks, off-frequency 'phones on W1MK's 3575 kc. frequency, a foreign commercial station with broad a.c. on NPG's 8770 kc. channel, OM QRN, inconsiderate c.w. stations riding W1MK's frequencies (one W8 in particular was reported by at least a dozen operators as sending long CQs on 3575 kc. all during the broadcast), dead storage batteries, and all the other well known evils.

And now, before presenting the Honor Roll, here are a few interesting facts. Of the 285 participants, 37 copied all three stations; 132 copied two stations, and 116 copied one station only. 243 operators copied NAA, 188 copied W1MK and 60 copied NPG. The 3500-kc. band frequencies of all three stations were found to be the best for reliable work. We regret that no credit can be given to the three participants who submitted copies but failed to give their names and addresses. NAA transmitted at about 17.6 words per minute, NPG at approximately 15 w.p.m., and W1MK at 11 w.p.m.

The texts of the two Navy Day messages are printed after the Honor Roll. These are for the information of those interested and are not for checking purposes. They are not "as transmitted", all errors having been corrected.

The twenty-five operators first listed on the Roll are those who will receive the letters from the Secretary of the Navy. Our congratulations to them! They may well be proud of their achievements.

1930 NAVY DAY HONOR ROLL

- W9FQ, W. H. Cummings, Valparaiso, Indiana (9th Naval Dist.)
- W8CEO, A. W. McAuly, Oakmont, Pa. (4th Naval Dist.)
- W7OV, D. P. Newman, Seattle, Wash. (13th Naval Dist.)
- K4KD, E. W. Mayer, Ensenada, Porto Rico (Att. to 7th Naval Dist.)
- W5AHI, Leavenworth Wheeler, Jr., Valmora, N. Mex. (11th Naval Dist.)
- W9CER, Hugo Beck, Jr., Jefferson, Wis. (9th Naval Dist.)
- W4LM, H. F. Jamison, Jr., Birmingham, Ala. (8th Naval Dist.)
- W8BKM, Wilburt C. Gross, Conneaut, Ohio (9th Naval Dist.)
- W9BDP, Robert K. B. Saxon, Falmouth, Ind. (9th Naval Dist.)
- W2CRB, Joseph Goldstein, Brooklyn, N. Y. (3rd Naval Dist.)
- W9CZC, Bert McElwain, Blencoe, Iowa (9th Naval Dist.)
- W3WO, C. E. Hedrick, Fincastle, Va. (5th Naval Dist.)

W2BEG, Bernard J. Fuld, Brooklyn, N. Y. (3rd Naval Dist.)
 W9FCW, H. E. Cremer, Kankakee, Ill. (9th Naval Dist.)
 W2AZV, Edward Lincoln Baunach, Brooklyn, N. Y. (3rd Naval Dist.)
 W1BVR, Percy C. Noble, Westfield, Mass. (1st Naval Dist.)
 W8RQ, F. R. Startzell, Hazleton, Pa. (4th Naval Dist.)
 W1AMQ, Emil F. Scholz, Milford, Conn. (3rd Naval Dist.)
 W1—, E. L. Robbins, West Concord, Mass. (1st Naval Dist.)
 W8ABX, John J. Long, Jr., Brighton, N. Y. (3rd Naval Dist.)
 W1KH, George W. Bailey, Weston, Mass. (1st Naval Dist.)
 W1BML, Curtis G. Docherty, Providence, R. I. (1st Naval Dist.)
 W3—, G. F. Hundertmark, Philadelphia, Pa. (4th Naval Dist.)
 W1WV, Miles W. Weeks, Chestnut Hill, Mass. (1st Naval Dist.)
 W6—, N. R. Cherrigan, San Francisco, Calif. (12th Naval Dist.)

The remaining 257 participants on the Honor Roll are as follows, being classified by Naval Districts and listed under their respective districts in the order of high scores:

First Naval District: W1BXB, W1CCP, W1CQN, W1CBV, W1ANV, W1COV, W1QH, W1MT, W1CHR, W1AQL, A. F. Hilferty, W1CTR, W1AJD, W1ABM, W1CNE, W1BIG, W1BEU, W1BFT, W1ATF, W1APU, W1AJC, W1CHW, W1QE, W1ALA, W1CST, W1AHX, W1BCA, W1AWU, R. B. Meader, W1BKG, W1CNJ, W1BXH, W1TA, W1ABD, W1ABH, W1BNM, W1QR, W1WU, W1CDX, W1AWR, W1BD, W1KT, W1BED, W1AFP, W1AWD, W1BAT, W1BEZ. **Third Naval District:** E. H. Gibbs (exW8AQ-W1AAC)¹, W8CIL, W2PM, W2BJA, W2AA, W1ZY-SA, W8BIF, W8DLU, W2WK-APD, W2OP, W2ACY, W2ANV, W8DME, W2ACD, W1HV, W2ACB, W2APN, W2BGO, W8DWJ, W8CVJ, W2BYC, W1BDI, P. K. Beisel, W8BHK, W2UV, W8AYM, James P. Barron (W2SC), W2BFC, W2AQJ, W2AJL, W1BVW, W2BQD, W2FF, W2AOY, W1ABI, W1AFB, W2AP, W8BFG, W8DSP, W8AYU, W8TZ, W8CSW, W2ZZD, W1ADW, W2AOJ, W2ADI, W2LB, W1TD, W1AZG, W8BRZ, W2CCD, Robert W. Ehrler. **Fourth Naval District:** W8APQ, W3MH, W3MC, W3BFJ, W8DLG, W3EB-W8DIL, W8DPI, W3AWV, W8WJ, W3BAQ, W8CMO, W8DGW, W8CDT, Charles I. Beard, W3DZ, W3CR, W3AQJ, W3AID, W3ATT, W8AJE, W3PT, W8BX, W3TF, Kenneth B. Caum, W8DRA, Robert M. Stapleton, W3CCH, W8AYH, W8AAQ. **Fifth Naval District:** W8BTV, W3AHL, W3APJ,

W4UI, W8ADI, W3ARU, L. M. Rundlett (W1ART), W8TL, W4DW, W3BWT, R. R. Hay, W3ADR, W8HD, W8CMJ, W8AYI, W3LA. **Sixth Naval District:** W4AJH, W4SS. **Seventh Naval District:** W4EZ, W4BG, W4ALH, W4OZ, W4HZ, W4GD, W4JO, W4HC, W4AIL, W4AGN, W4GQ, H. S. Harrison (NDL), W4OY, W4KY, W. A. Fuller, W4BT. **Eighth Naval District:** Francis Wm. Taylor, W4AKM, W5ASQ, W4AHP, W5ACY, W5KC, W4OI, Henry W. Fulwider. **Ninth Naval District:** W9FWG, W9AIR, W9DGS, W9GAD, John Probst, W8CXW, W8SS, W8CEI, W9GHI, W8MV, W9ESL, W9ELL, W9AUH, W8DMS, W9ERU, W9BAZ, W9CNY, W9GGB, W8DYH, W9AZY, Edward J. Brichta (W8DFE), Joseph W. Brichta (W8DFE), W9UZ, A. W. Hirsimaki, W8CMB, W9FPJ, W8DED, W9EQV, W9FO, Milton Diamond, W9CEX, W9DZU, W9AYK, W9BAC, W8ACB, W9DDB, W9ENF, W9DXY, W9CCE, W9BFD, E. H. Heppert (NDS), W9CUH, W8BDU, W. J. McGuffage, W8DYM, W8EB, W9FBJ, W9CTZ, W8CCT, W9ACU, W9EYL, W9AQL, W9FSS, W9RRB, W9BYL, W8CAT, William Lohr, Ed Atems, W9EQT, W9AHK, W9DJK, W9GFI-DMM, W9CDA. **Eleventh Naval District:** W5TV, W6DLI, W6UJ-LM, W6AOA, W6AM, W6CFL, W6ETJ, W6EC, Clinton Edward Munson, W6BZR-TE, W6BXV. **Twelfth Naval District:** W6BVY, W6DKO, W6DTM, W6BMW, W6AZH. **Thirteenth Naval District:** W7UN, W7ABN, W7VN, W. B. Wilson (WWDN), W7AAH, W7AIG, W7AFT, W7ALM.

1930 NAVY DAY BROADCASTS

From NAA and NPG:

To the Radio Amateurs of the United States:
 From the Secretary of the Navy.

It is a real pleasure to extend again this year on Navy Day the best wishes of the Navy Department to all of its good friends connected with amateur and commercial radio. Our Navy fully appreciates the great value of our civilian operators, both in the peacetime development of the science of radio communication and also in event of emergency or future war. Our Naval communication reserve is making excellent strides not only in point of increased numbers but also in organization, drilling and training in naval communication methods. I recommend that our amateurs and commercial radio operators who have not already joined, give careful consideration to the benefits to be obtained by enlistment in the Volunteer Naval Communication Reserve.

C. F. ADAMS, *Secretary of the Navy.*

¹ This operator, located in Toronto, Canada, was attached to the Third Naval District for purposes of the contest. Likewise, E. W. Mayer, K4KD, was attached to the Seventh Naval District.

From W1MK:

To the Radio Amateurs of the United States:

Every year the President of our country sets aside a day which is known as Navy Day. On this day every true American should pause in the routine of his daily affairs and give thought to that patriotic spirit that stands back of Navy Day. Radio amateurs from the beginning of radio have maintained a splendid patriotism and our government recognizes it. For many years past and again this year the President of the A.R.R.L. is invited to take part in the official exercises and to-night he again takes the telegraph key of A.R.R.L. headquarters station and transmits to the radio amateurs of the nation a message which he hopes will help keep alive the splendid spirit which radio amateurs have maintained in the past. I suggest to every amateur that he acquaint himself with the glorious history and traditions of the United States Navy. It will not only thrill him with wonder and respect but will also inspire him to do well everything that he undertakes. I firmly believe that every young American will have a better chance of making a success of his life if he will make use of what the Navy offers him. In closing this transmission let all hands remember that the Secretary of the Navy will send a letter of congratulations to those amateurs showing greatest proficiency in copying the Navy Day Broadcasts. Show him what you can do.

(Sig.) HIRAM PERCY MAXIM,
Lieut. Commander, U.S.N.R.,
President of A.R.R.L.

Strays

Hull Returns

We have pleasure in announcing that Mr. Ross A. Hull, Australian experimenter and journalist, after a sojourn of a year and a half in his native land, has rejoined the staff of *QST* in the capacity of associate editor.

Mr. Hull is already well known to our readers as a former associate technical editor of *QST*. Throughout 1928 he was the director of the League's technical development program which brought forth many well-remembered technical articles in preparation for the changing conditions of 1929. He was a co-author with Mr. Handy in writing the fourth, fifth and sixth editions of *The Radio Amateur's Handbook*. To *QST* readers of that period, nothing more need be said.

R.S.G.B. Announces 28-mc. Tests During January

From Mr. H. J. Powditch, G5VL, of the R.S.G.B. we are informed that this society is sponsoring a series of 28-mc. tests during January, 1931. The dates are: Jan. 4th, 11th, 18th and 25th. Keep these dates in mind and turn all activities to 28 mc. during these tests.

Advertisement in one of the New York papers:
"Celotex Battle Boards, 69 cents."

W1AUE says the new *Handbook* cover looks like his modulator plate!

Commercial Stations as Frequency Markers

AN AMATEUR who contemplates calibration of his frequency meter will find commercial stations useful guideposts. But there are commercials and commercials. Some of them nonchalantly vary a couple of hundred kilocycles from day to day.

The accompanying list includes only stations of proven stability, the proof being thousands of measurements made at the Riverhead, Long Island, receiving station of R.C.A. Communications, Inc. The list is partial to R.C.A. stations because these stations are frequently measured,

Kc.	Call	Kc.	Call	Kc.	Call
4015	NAA	8940	WKL	13840	WPE
4435	NSS	8950	WEL	13900	WQP
5260	WQN	9450	WES	13915	WQS
6020	W9XF	9460	WKJ	13930	WIK
6710	WER	9470	WET	14815	WQL
6725	WQO	9530	W2XAF	15340	W2XAD
6732.5	KEQ	9670	LSI	16015	WQR
6740	WEJ	9770	EAM	16030	WKW
6780	WNU	9810	DFE	17260	CMA-1
6830	CFA	10030	DIS	17520	DFB
6845	KEN	10300	KER	17880	WQI
6860	KEL	10400	KEZ	17900	WLL
6920	WEE	10410	KES	17920	WQF
6927.5	WEZ	10610	WEA	17940	WQB
6935	WEB	10620	KEI	18000	KQG
6942.5	WEV	10970	OBW	18020	KQJ
6950	WKP	11750	G6SW	18040	KQR
6957.5	WEO	11845	KDKA	18165	PPZ
6965	WIZ	12005	V1Y	18220	EAH
6985	RXC	12220	NAU	18860	WKM
7400	WEM	13420	WHR	18880	WQH
7520	KKH	13435	WKD	18900	WDS
7715	KEE	13450	WEX	18920	WQE
8005	GLK	13465	WKC	18940	WTT
8030	NAA	13480	WAJ	18960	WQD
8390	KPH	13540	GLH	19240	DFA
8590	NPJ	13690	KKZ	19940	D1H
8630	CMA	13720	KLL	20000	DGX
8870	NSS	13780	WGT	21220	WQA

and if found off frequency are corrected. When running idle they sign their call letters—a contrast with some foreign stations which may be good as frequency markers but which run high speed dots for hours without signing. Stations with such television tendencies have been excluded. Excepting marine stations, the R.C.A. uses one call on one frequency. Some calls of other stations may be used on a dozen frequencies.

The list is composed of stations usually on the air and not difficult of identification. Exclusion of a station from the roll is not condemnation, however, as numerous regularly operated and dependable stations are not included.

— A. Z. Smith, W1ABC-W2BIU,
Riverhead, N. Y.

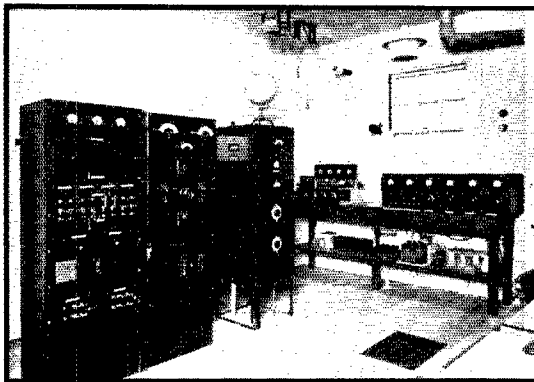
Standard Frequency Station WIXP*

The Key Station of the A.R.R.L. Standard Frequency System

By Howard Allan Chinn**

The three transmitting stations of the A.R.R.L. Standard Frequency System — WIXP, W9XAN and W6XK — perform a very special and valuable service in the realm of amateur radio: special service because the transmission of standard frequency signals for calibration purposes is sharply different from any other type of radio service; valuable service because it brings precision calibration right into the amateur station. The peculiar nature of the work calls not only for a high degree of ability on the part of the operating personnel but also an assembly of specially developed equipment as well as a particularly exact though simple technique. Howard Chinn has been identified with the development of precision frequency measuring equipment and the transmission of standard frequencies at the Massachusetts Institute of Technology for a number of years. The equipment and procedure used at WIXP have been evolved under his direction and embody the results of a long experience. The following article makes this information available in practical form; amateurs and others will find many of the features described useful and adaptable to their own purposes. — EDITOR.

THE Massachusetts Institute of Technology first undertook the transmission of standard frequency signals in the high frequency spectrum in January, 1926, and since that time has transmitted these signals under the calls of 1XM, W1XV, W1AXV and WIXP. The service was established in cooperation with the A.R.R.L. to mark definitely the limits of the bands assigned for amateur station operation and to provide amateurs and other interested parties with a means to calibrate their frequency meters at regular intervals. The original transmissions were sent from the M.I.T. Radio Society's station in Cambridge and were checked by apparatus of the Communications division of the Electrical Engineering department of the Institute. In recent years the work has been carried on by the Round Hill Research Laboratories sponsored by Colonel E. H. R. Green and under the direction of the Massachusetts Institute of Technology, at South Dartmouth, Mass. This is one of the numerous services and activities undertaken at these laboratories by members of the staff of M.I.T. The present article is a description of the standard frequency equipment at WIXP.



THE POWER CONTROL AND TRANSMITTING EQUIPMENT

The self-excited standard frequency transmitter in the corner has been succeeded by the oscillator-amplifier set shown in another photograph. The radiotelephone transmitter at its right was described in November QST.

The standard frequency transmissions that are sent by this and the other stations of the A.R.R.L. Standard Frequency System, according to the schedules regularly published in *QST*, mark the limits of the amateur c.w. and radiophone bands, and also prove intermediate points so that a complete calibration of an amateur frequency meter can be readily accomplished. The frequency standards used by the three stations have been compared with the National Standard at the U. S. Bureau of Standards at Washington. The standard frequencies transmitted are therefore based on the National Frequency Standard and their accuracy is conserva-

tively specified as within one hundredth of one percent. The current schedules are published monthly in *QST*. The transmissions are made in the 3.5-, 7- and 14-mc. bands and by choosing the schedules that are most suitable for the particular distance, the time of day, and the season of the year, these signals can be used by amateurs throughout North and South America, Africa, Europe, and even Oceania and the Far East.

The present-day requirements of frequency measurement by the amateur operator make it essential to use some form of oscillating frequency meter.¹ This type of instrument lends itself

¹ *QST*, Sept., 1930, page 21.

* Contribution from the Round Hill Research Division of the Massachusetts Institute of Technology.

** WIXP-W1AXV, Round Hill, South Dartmouth, Mass.

readily to quick and accurate calibration from standard frequency transmissions.² Considering the frequent schedules now being transmitted by the three A.R.R.L. standard frequency stations, there should be no reason for any amateur not hearing at least one transmission a month and using it to calibrate a frequency meter that will keep him operating within the legal band limits.

HOW THE STANDARD FREQUENCIES ARE TRANSMITTED

The general method of monitoring the transmitted signals against the output of the frequency standard is shown in Fig. 1. It consists of hetero-

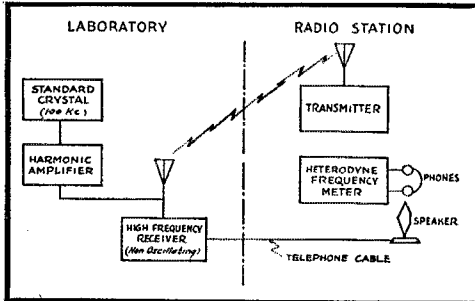


FIG. 1—THE SCHEMATIC SET-UP FOR S.F. TRANSMISSIONS

The transmitted signal is heterodyned in the monitoring receiver by the proper harmonic of the standard crystal. The resultant beat note is carried back to the transmitting station over the telephone cable and made audible by the loud speaker. The transmissions are monitored directly by the frequency standard without resort to any intermediary frequency measuring equipment. The accuracy of the transmitted frequency is therefore entirely dependent on the accuracy of the frequency standard and the precision with which the transmitter is tuned to zero beat with the standard's harmonic.

dyning the transmitted signals by a proper harmonic of the frequency standard in the non-oscillating receiver and sending the resultant beat note back to the transmitter room over a telephone line which is connected to a loud speaker. The operator adjusts the frequency of the transmitter to zero beat with the proper harmonic of the frequency standard and maintains this adjustment during the transmission of a calibration frequency. This adjustment can be made very precisely because a slight deviation of the transmitter's frequency is immediately betrayed by a growl from the loud speaker connected to the output of the monitoring receiver.

The accuracy of the transmitted frequencies is limited primarily by the accuracy of the frequency standard and secondarily by the accuracy with which the transmitted frequency is adjusted to zero beat with the standard's harmonic. The accuracy of the frequency standard used at W1XP is one ten thousandth percent (one part in a million) and the transmitter can be main-

² QST, Nov., 1929, page 9, and Oct., 1930, page 9.

tained to zero beat with the monitoring harmonic within a few cycles. The transmissions, therefore, are accurate to well within the one hundredth percent specified and accuracy to within one thousandth percent (one part in a hundred thousandth) is quite usual.

The frequency of the standard is always accurately known because its frequency is being constantly measured in terms of the standard time interval by checking the clock, which is an integral part of the frequency standard, against standard time signals. The transmitted frequency also has been compared with the National Frequency Standard at Washington, through the cooperation of the Bureau of Standards, and has been specified as accurate to within the prescribed degree. The signals are frequently checked by the Department of Commerce monitoring station at Hingham, Mass., and are also compared with the A.R.R.L. Headquarters Standard at Hartford.

The equipment utilized in the transmission of the standard frequency signals is located in two separate buildings. The transmitting apparatus is in the station proper and the frequency standard with its associated equipment is in one of the laboratories about 300 feet away. This arrangement is advantageous since it removes the frequency standard from the immediate vicinity of the transmitter which otherwise might affect the operation of the frequency determining assembly.

MAIN OPERATING ROOM EQUIPMENT

A general view of half of the main operating room of W1AXV-W1XP is shown in one of the photographs. At the extreme left is the power panel which controls and distributes the output of a 3000-volt d.c. plate supply generator, a 15-volt d.c. filament generator and a 15-volt transformer for a.c. filament supply. The meters at the top of the panel indicate the voltages supplied to the load and the total load current. Immediately below these meters are four double-pole double-throw switches which serve to distribute the high voltage supply to any one of four power outlets located in various places in the building. These switches are mounted under bakelite shields with only the knob protruding so that it is impossible for the operator to come in contact with the live parts of the switch. When a switch is thrown to the "up" position the particular bench outlet associated with this switch is connected to the d.c. generator whose output voltage is variable from 700 to 3000 volts. When thrown to the "down" position the outlet is connected to a 1000-volt d.c. generator or a rectified a.c. plate supply, depending upon the position of the switch in the lower left-hand corner of the panel. The four switches in the second row, which are not protected by shields, distribute the filament supply in a similar manner. The

upper row of jaws is connected to the d.c. filament generator and the lower row is connected to the a.c. filament supply. This switch arrangement makes it possible to obtain a d.c. plate supply at any of the four bench positions from either a 1000- or a 3000-volt generator, or from a rectifier-filter unit, and either a.c. or d.c. filament power as desired.

The second panel from the left contains the necessary field rheostats, switches, circuit breakers, etc., for the 1000-volt generator. The third panel contains the rectifier unit complete with its load circuit meters, primary rheostats, filter, etc.

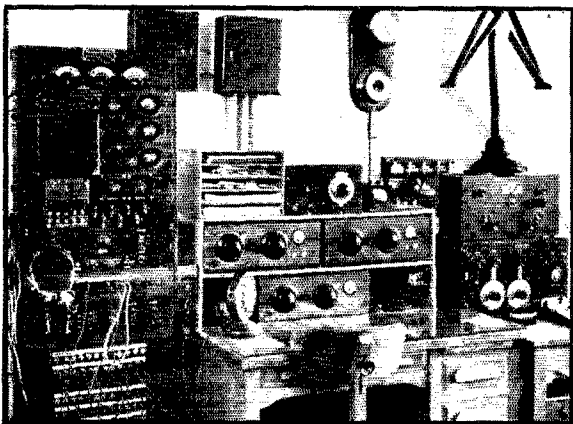
In the far corner of the table along the rear wall is a 500-watt, High-C Hartley oscillator employing two Type '04-A tubes in parallel. This transmitter was formerly used for standard frequency transmissions but is now employed for experimental transmission in the band from 2000 to 9000 kc. In order to be of value in its originally designed service the antenna and tank circuit inductors were made readily interchangeable, the coupling easily adjustable, and all tuning condensers were equipped with 12" extension shafts to minimize hand capacity effects. The right-hand half of this table is taken up by the 50-watt, high-percentage modulated telephone transmitter described in *QST*, Nov., 1930.

The other part of the operating room is shown in another photograph. At the left is a rack amplifier, the input and output of which terminate on jacks. It can therefore be placed in any desired circuit by means of patch cords. This rack also contains switches which permit the hand key to be connected to any one or more of the available transmitters for individual or simultaneous keying. It also contains jack strips on which terminate a number of multiple-pair cables which go to the various laboratory buildings. Patch cords make it possible to send the output of a receiver over these cables to any or all of the laboratories. The transmitters may be controlled from these remote points or remote pick-ups may be had, as conditions require. On the left end of the rack may be seen the tape transmitter which greatly facilitates the transmission of a standard frequency schedule by automatically keying the transmitter. Endless paper tapes suitably punched and interchangeable are drawn through by rollers and a contact rides down the center of the tape. Dozens of tapes for almost any occasion are kept at W1AXV-W1XP — but not one says "CQ"!

The desk contains three high-frequency receivers, a broadcast receiver, a long wave receiver, a heterodyne frequency meter, and a

monitor. The output circuits of all receivers terminate on jacks on the amplifier rack. A useful kink is to use a pair of 'phones with "split" receivers; that is, with each 'phone terminated on a separate cord and plug. This arrangement makes it possible to listen on two receivers at once (if two sides of a conversation are to be followed or a three-way QSO is desired) or to listen simultaneously on a receiver and the monitor when operating the station. This latter arrangement permits a continual check on the transmitter's performance.

The transmitter being used at present for the transmission of standard frequency signals in the spectrum from 3.5 to 14 mc. is shown in the third photograph. It consists of a Type '52 self-controlled oscillator, a Type '60 screen-grid buffer amplifier and a Type '61 screen-grid output amplifier which can supply 500 watts of power to the antenna. A variable frequency, self-controlled oscillator is obviously essential for this service. To adapt this equipment to crystal-control operation when desired there has been included a crystal oscillator tube and one frequency doubler which may be connected when needed before the '52 tube which then becomes either a straight amplifier or a doubler. The unit at the left contains all the equipment excepting the output amplifier which is contained in the



THE OPERATING POSITION

The amplifier rack was once part of a broadcast transmitter. Its complement of plugs and jacks makes possible centralized control of any of the various transmitters as well as the distribution of receiver output to the various laboratory buildings. The automatic tape transmitter is used for keying during standard frequency transmissions. The receivers cover practically all communication radio frequencies and are necessary adjuncts to the diversified activities of the Round Hill Research.

right-hand panel. A detailed description of this transmitter will be given in a future article in *QST*.

A typical bench outlet, previously referred to, is seen between the two panels. It consists of two double-pole single-throw switches on which

terminate the filament and plate supply cables from the power panel. In front of the switches is the keying relay which is controlled from the amplifier rack.

The radiating systems used with this and other transmitters consist of single-wire vertical or horizontal antennas with single- or two-wire voltage or current feed. In fact almost every possible arrangement, including antenna-ground combinations, is in use at various times.

THE STANDARD FREQUENCY ASSEMBLY

The frequency standard against which all transmissions from Round Hill are monitored is a 100-kc., quartz bar. From this standard are obtained, with sufficient intensity for calibration purposes, a 100-kc. fundamental and the harmonic frequencies up to at least 30,000 kc. (300th harmonic) in 100-kc. steps, a special am-

course, necessary to determine which harmonic is being used. There are innumerable ways of finding a reference point and when it has been identified other harmonics may be counted from this point. Harmonics can be identified, for instance, with any form of frequency meter whose calibration is sufficiently accurate. At WIXP a simple heterodyne frequency meter is used to make certain that the proper harmonic has been chosen for the transmission.

The complete assembly which provides the smaller steps of frequency and also a means of determining the actual frequency of the standard itself is outlined in Fig. 2. For convenience in calibration and measurement purposes a crystal having a fundamental frequency of 100 kilocycles per second is used as the standard. The piezo-electric oscillator is followed by two radio frequency amplifiers whose input circuits are connected in parallel, the output of one being used to control the subsequent frequency division apparatus and the output of the other to supply 100 kc. and attendant harmonics for calibration purposes. It is from the output of the latter amplifier that the harmonics for standard frequency transmission monitoring are obtained.

The output of the first 100-kc. amplifier controls the frequency of oscillation of a multi-vibrator adjusted to exactly one tenth of this value or 10 kc. The multi-vibrator consists essentially of an aperiodic³ circuit in which periodic current variations of irregular waveform are sustained by a triode excited by a second triode which provides the proper phase relation for maintenance of the oscillation. It also may be considered as a two-stage resistance coupled amplifier with the output circuit coupled directly back to the input. The current in the plate and grid circuits is far from sinusoidal and the harmonic components are relatively large. Since the circuit contains no appreciable inductance the frequency generated is greatly influenced by any factors which change the effective resistance and capacitance of the circuit. This frequency instability, caused largely by the absence of any inherent resonance, has restricted the use of the multi-vibrator for most purposes, although it is rich in harmonics. For the present application, however, this instability is highly desirable since the device can be made to operate at a fixed frequency by the introduction of a small voltage from a constant frequency source. The frequency of this controlling voltage can be that of the fundamental frequency of the multi-vibrator or may be that of any harmonic of the multi-vibrator frequency, even up to the 50th. The multi-vibrator is therefore useful as a frequency divider.

The 10-kc. multi-vibrator output is amplified

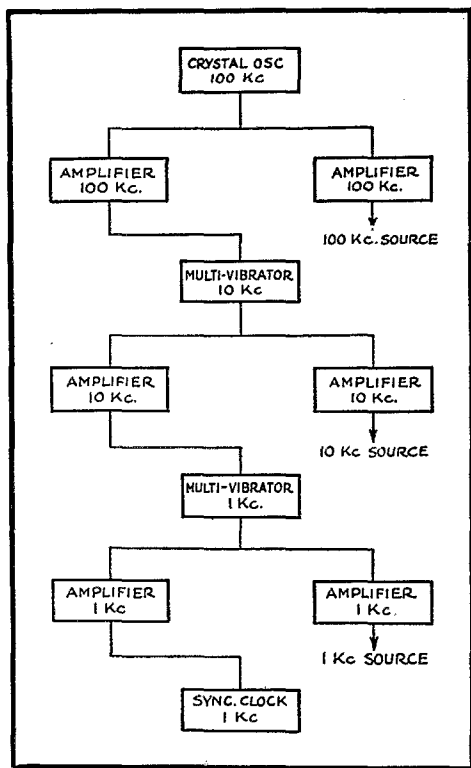


FIG. 2 — BLOCK DIAGRAM OF THE FREQUENCY STANDARD ASSEMBLY

plifier being used to emphasize the higher harmonics. Thus, when it is desired to transmit on 7000 kc., the transmitter is adjusted to zero beat with the 70th harmonic of the standard crystal; for 7100 kc. transmissions the 71st harmonic is used; and so forth. Some auxiliary means is, of

³ Strictly, the circuit exclusive of the tubes is aperiodic. Combined with the tubes, periodic variations in the output current take place. The device is more generally classified as a relaxation oscillator.

by two additional units, one of which supplies the control voltage for the second multi-vibrator and the other providing a source of harmonics of the 10-ke. fundamental frequency. From this source known points may be obtained throughout the radio-frequency spectrum at 10-ke. intervals.

The frequency is further stepped down by the second multi-vibrator adjusted to a fundamental frequency of 1 kc. and controlled by the output from the first 10-ke. amplifier just mentioned. The output of the first 1-ke. amplifier is used to drive the oscillation counter which consists of a small 1000-cycle-per-second synchronous motor geared down through a clock train to a large second hand.⁴ The synchronous impulse motor has a serrated rotor of 120 teeth, and is driven by two U-shaped magnets around which the driving coils are wound. The gearing is such that the second hand indicates true solar time when the driving current has a frequency of 1000 cycles per second. The dial reading is compared visually and electrically with standard time signals from NAA with a probable error of not over 0.01 second. Thus the mean frequency over each 24-hour interval is determined in terms of solar time as measured by the Naval Observatory, with a probable error of one part in ten million or 0.00001 per cent. By repeated observation of the travel of the clock hands during 24-hour intervals, and after applying the published corrections to the time signals, it is possible to determine the average frequency of the standard and the constancy of this quantity. Observations at Round Hill indicate that the frequency of the standard

perature. The usual method for maintaining the temperature of a body at a constant value is to employ a thermostat sensitive to small variations from a given temperature which can be made to control automatically the rate of heating

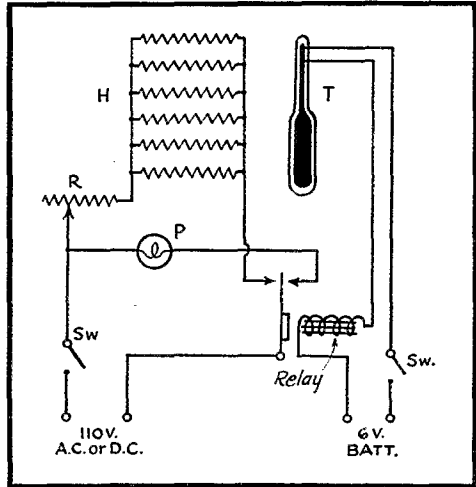


FIG. 4—SCHEMATIC CIRCUIT OF THE HEAT CONTROL FOR A CRYSTAL COMPARTMENT

- H—Six 110-volt $\frac{1}{4}$ amp. Ohmspun units connected in parallel
 - T—Mercury-column type thermostat
 - R—Heater current regulating rheostat, 15 or 20 ohms, 2 amps.
 - P—Small 110-volt pilot lamp
- The relay should be of the back-contact type such as the General Radio 507-A. The heater current flows with the relay in the back position and the pilot light is on when the heater current is off. Fixed condensers of about .25- μ f. capacity can be connected across the contacts to reduce sparking.

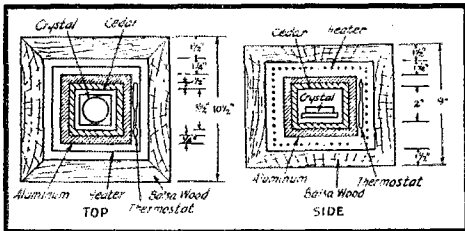


FIG. 3—DETAIL OF THE CONSTANT TEMPERATURE CRYSTAL COMPARTMENT

This would make an excellent unit for constant temperature operation of the crystal in an amateur transmitter. The heater consists of six $\frac{1}{4}$ -amp. 110-volt Ohmspun units connected in parallel, one unit being on each of the six faces of the aluminum heat distribution shell. The thermostat is mounted at an angle in the air-space between the heater and aluminum layers. A layer of sheet asbestos and a layer of ordinary wood might be used in place of the Balsa wood.

never deviates from the mean value by more than one part in one million or 0.0001 percent.

CONSTANT TEMPERATURE BOX

To maintain this high degree of constancy it is necessary to keep the crystal and its associated tube equipment substantially at a constant tem-

⁴ Cf. Frequency Standardization, *QST*, March, 1930.

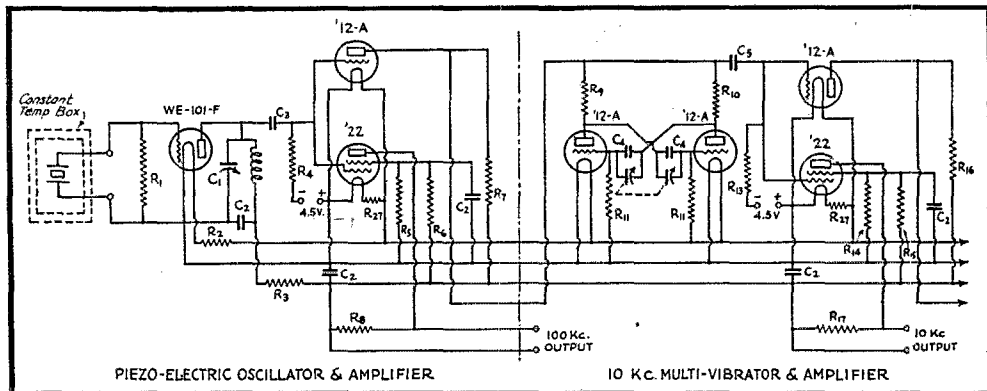
when the temperature departs from this prescribed value. It is evident that for operation of the thermostat the temperature must vary between points slightly above and below the mean operating value. If the crystal which is to be maintained at a constant temperature were placed in the same compartment with the thermostat the same temperature variations which operate the thermostat would be applied to the crystal. It is possible, however, to design the thermal system so that the variations reaching the crystal are materially reduced below those necessarily existing at the thermostat. The simplest wall which will adequately fill the needs of a constant temperature box consists of first an insulating layer, then a heating element, next a distributing layer, and finally an attenuating layer. The distributing and attenuating layers may be likened to a filter which smooths out the fluctuating heat supplied as the thermostat operates.

The construction of the temperature box containing the crystal is shown in Fig. 3. The outer shell constitutes the heat insulating layer and is

made of 1½-inch Balsa wood. The air space immediately within contains the heater coils and the thermostat. The heaters which are placed on all six faces of the box are Ohmspun resistor cards which are especially adaptable to this service.⁵ The thermostat is a six-inch mercury thermo-regulator which has a good intrinsic sensibility.⁶ The operating temperature of this instrument is adjustable in a range which is approximately that covered by ordinary mercury-in-glass thermometers and in this particular

material for this layer. When operated in a room subject to the normal temperature variations the innermost compartment does not vary more than 0.1° C. Although this degree of control is sufficient for most services it does not suffice for the present purpose.

Several expedients are available to improve the operation of this type of constant temperature box but probably the simplest is to use two stages of temperature control. By placing the temperature box containing the crystal within another



PIEZO-ELECTRIC OSCILLATOR & AMPLIFIER

10 Kc. MULTI-VIBRATOR & AMPLIFIER

- R₁ — 6 megohms
- R₂ — 2 ohms
- R₃, R₄, R₅, R₇, R₁₅, R₂₄, R₂₅ — 10,000 ohms
- R₆, R₉, R₁₁, R₁₂, R₁₄ — 50,000 ohms
- R₈, R₁₀, R₁₃ — 100,000 ohms
- R₂₀ — 0.25 megohm

FIG. 5 — THE COMPLETE CIRCUIT DIAGRAM OF R₄, R₁₅, R₂₄, R₂₅ — 0.5 megohm
All the above are Continental Carbon Co. Resistors, 2½-watt size
R₁₈ — 10,000-ohm potentiometer
R₁₆ — 0.5-megohm potentiometer
R₂₁ — 12 ohms

installation it is adjusted to 50° C. The schematic heater circuit is shown in Fig. 4.

It should be noted that the thermostat is placed in the heater compartment between the heating layer and the distributing layer. If the thermostat were placed outside the heating layer the operation of the temperature box would be handicapped materially.

Within the heating layer is the distributing layer which consists of ¼" thick aluminum sheet. This material was chosen because of its high thermal conductivity and low heat capacity. The desirability of this first property is obvious and the low heat capacity insures rapid equalization of the temperature over the entire surface and permits the thermostat to act as frequently as possible. The attenuating layer which is placed within the distributing layer is of ½" cedar. This material has a large heat capacity and low heat conductivity and is very suitable for this purpose. Sheet asbestos is also an excellent

similar box, in effect the first box is placed in a temperature controlled room. The second box is sufficiently large to include also the crystal oscillator tube and its associated plate circuit apparatus, together with the amplifiers that follow the oscillator. This insures against extreme changes in plate circuit constants — with a corresponding change in crystal frequency — that might take place were the apparatus exposed to the varying room temperature. While it was by no means necessary to place the amplifier apparatus in this box the assembly was available as a unit and was therefore included complete. The large box containing this apparatus is shown in the accompanying photographs. It is made of 1-inch Balsa wood, has heaters on all six inner surfaces and its temperature is controlled by means of another mercury thermo-regulator.

With the double constant temperature unit, the temperature of the compartment containing the crystal does not vary more than 0.01° C. regardless of the room temperature, which at Round Hill is likely to vary between 0° and 35° C.

⁵ These resistance units are made by The States Co., 19 New Park Ave., Hartford, Conn. An article describing the manufacture of ohmspun resistors appeared in QST for Sept., 1927. They are also used in the constant-temperature crystal box in WIMK's transmitter which was described in QST, Dec., 1930.

⁶ American Instrument Co., 1220 D St., N. W., Washington, D. C.

PIEZO-ELECTRIC OSCILLATOR AND R.F. AMPLIFIER

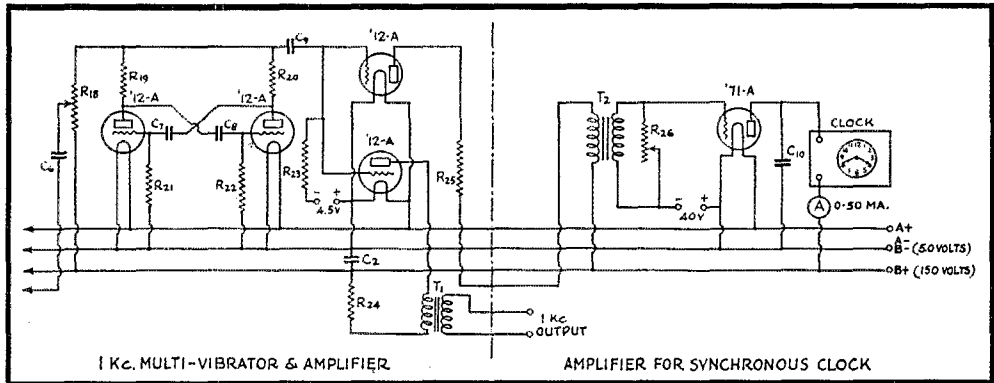
The apparatus included in this unit is that at the extreme left of the complete circuit diagram given in Fig. 5. In series with the plate supply

lead of the oscillator tube is a resistor, which provides the necessary voltage drop to permit the operation of this tube from the common plate battery of 150 volts.

Two amplifiers with their input circuits in parallel are capacity coupled to the output of the oscillator tube. The coupling capacity has been made as small as possible consistent with sufficient output from the amplifier so that any change in the load in the plate circuit of these tubes will not react on the crystal oscillator to any

divider and attendant amplifiers which supply a 10 kc. calibrating source.

The two tubes, together with the resistors and condensers which form the usual multi-vibrator circuit, are shown in Fig. 5. The frequency of this type of oscillator (which contains no appreciable inductance in its circuit) is determined entirely by the tube characteristics, the resistances in the grid and plate circuits, and the coupling capacitances. Usually the type of tube is fixed, and although various values of resistance may be



THE FREQUENCY STANDARD ASSEMBLY

- L_1 — 6 millihenry inductance
- C_1 — 500- μ fd. maximum, variable
- C_2 — 1.0- μ fd. (paper)
- C_3 — 100- μ fd. (mica)
- C_4 — 500- μ fd. fixed (mica) plus 500- μ fd. variable
- C_5 — 100- μ fd. (mica)

- C_6 — 2000- μ fd. (mica)
- C_7, C_8, C_9 — 1000- μ fd. (mica)
- C_{10} — 0.01- μ fd. (mica)
- T_1 — 4-to-1 step-down, 10,000 to 2,500 ohms (General Radio)
- T_2 — 6-to-1 step-up (Samson)

appreciable extent. This is not only generally desirable but also is a necessity if the standard is to maintain its frequency with extreme constancy. The amplifier supplies the following multi-vibrator unit with the necessary 100-kc. control voltage. The 10,000-ohm resistor in the plate circuit of this tube is in the common plate lead of the multi-vibrator tubes and the radio frequency voltage developed across this resistor is thus used to stabilize the following unit. The direct current drop across this resistor is such that the resultant plate voltage applied to this amplifier is 9 volts.

The screen-grid amplifier supplies the 100-kc. fundamental and harmonics for calibration purposes in the laboratory. The use of a screen-grid tube is considered advisable to prevent changes in the plate circuit load reflecting through to the crystal oscillator circuit. A voltage divider supplies the necessary screen-grid voltage from the common "B" battery. The output terminals are brought to the front panel and permit easy access to the source of standard frequency.

10-KC. MULTI-VIBRATOR AND AMPLIFIER

The unit immediately to the right of the large Balsa wood box seen in the photograph of the complete set-up contains the first frequency

placed in the circuit, this quantity is not conveniently continuously variable. Variation of the fundamental frequency of the oscillator therefore is accomplished by simultaneous adjustment of the capacities C_4 . In the uncontrolled state — such as would exist if the preceding 100-kc. triode amplifier tubes were removed from their sockets — a variation of these capacities produces a corresponding smooth variation of the fundamental frequency of the multi-vibrator.

When a controlling voltage of sufficient magnitude is injected into the multi-vibrator circuit — as across a common plate circuit resistor — variation of the condensers no longer produces a smooth and continuous change of the fundamental frequency of the multi-vibrator. Under this condition the frequency of the multi-vibrator changes abruptly from one value to the next, these being submultiples of the control frequency. Variation of the capacities from minimum to maximum therefore results in the production of a series of discrete fundamental frequencies each having an integral relation to the frequency of the control voltage. If f_m is the fundamental frequency of the multi-vibrator,

$$f_m = f_o/n$$

where f_o is the control frequency and n is any

integer between 1 and 50 (or higher). If the magnitude of the control voltage is increased but the circuit constants are fixed, it is found that the frequency of the device may be "drawn" in discrete steps towards the frequency of the control voltage. If a definite harmonic control order is desired the circuit constants and the value of the control voltage must be so chosen as to obtain the desired results. Analysis of the operation of the multi-vibrator for this service has been undertaken elsewhere and will not be repeated here.⁷

For the present purposes the factor n was chosen as 10 and, since the control frequency is 100 kc. the resultant fundamental frequency of the multi-vibrator is 10 kc.

Following this multi-vibrator are two more amplifiers with their input circuits connected in parallel. The output of the triode supplies the following 1-kc. multi-vibrator with the necessary control voltage while the tetrode provides a source of 10-kc. and corresponding harmonic frequencies for calibration purposes. The amplifier circuit is arranged exactly like that in the preceding crystal oscillator and amplifier unit.

1-KC. MULTI-VIBRATOR AND AMPLIFIER

The circuit arrangement for the 1-kc. unit is very similar to that just described with the exception that instead of adjusting the control order to the desired value by variation of the capacitance, advantage is taken of the fact that the same result may be obtained by variation of the magnitude of the control voltage. This is accomplished by means of an adjustable voltage divider. This arrangement eliminates the necessity for a tandem variable condenser since the capacity may be adjustable now in steps and final adjustments made with the voltage divider. This arrangement could be used in the 10-kc. unit with entirely satisfactory results and would simplify its construction. The output from one amplifier is used to supply the following unit and the 1-kc. source of standard frequency for calibration purposes is provided by the second amplifier through a transformer.

SYNCHRONOUS CLOCK

The oscillating counter is a General Radio

⁷ Secondary Frequency Standards, Proc. I. R. E., Feb., 1929.

timing unit consisting of a small synchronous motor which drives a clock movement. When supplied with 0.2 volt-amperes at exactly 1000 cycles it will keep correct time. The motor will, however, run from any constant frequency source of 500 to 2000 cycles per second providing the necessary power.

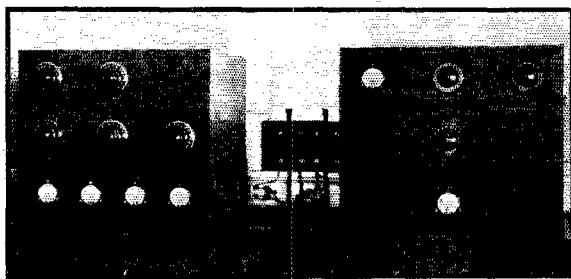
The motor is not self-starting but must be brought to synchronous speed gradually. That the motor does not start of its own accord is a decided advantage in this particular instance because if the intermediate frequency step-down apparatus should fall out of step for a moment the clock will immediately lose synchronism and come to rest. This insures against erroneous results when the oscillation counter is being observed over long time intervals.

The poles of the motor are not permanently magnetized and it is therefore necessary to have 10 or more milliamperes of direct current flowing through the field windings in addition to the alternating current. A satisfactory arrangement is to precede the clock with a Type '71-A amplifier tube and to place the clock motor directly in the plate circuit of this tube. Most stable operation of the motor is obtained by using a grid bias on the amplifier tube sufficient to block the plate current to a few milliamperes with no input signal and then to adjust the magnitude of the input voltage so that normal plate current (20 milliamperes) results. The fact that this procedure results in better running of the motor is as would be expected upon consideration of the method of operation of the synchronous motor.

POWER SUPPLY

The filament supply of 3 amperes for the entire system is obtained from a six-volt storage battery which is "floated" across the output of a Tungar charger equipped with a suitable filter to remove objectionable ripple. The plate supply of 40 milliamperes is obtained from a 150-volt storage "B" battery. This battery is also continually charged from a standard "B" substitute so that the net current drain from the battery is nil. Grid bias is obtained from small "C" batteries placed within the units with which they are associated.

The use of "floating" filament and plate batteries permits continuous operation of the system and prevents surges and interruptions on the power lines affecting the apparatus.



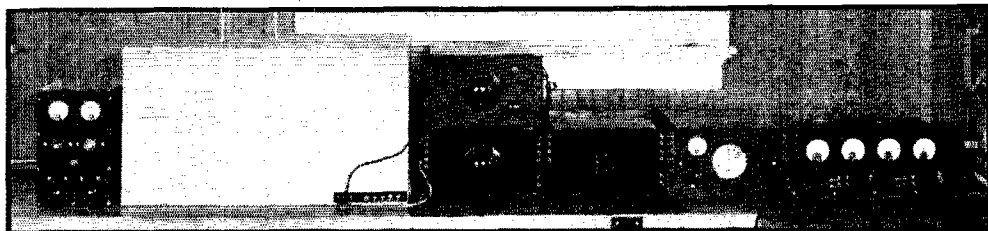
THE NEW OSCILLATOR-AMPLIFIER S.F. TRANSMITTER
This transmitter has a number of interesting features and will be completely described in a future QST article.

Changes in the line voltage cause the charging rates to vary slightly but the terminal voltages of the batteries remain practically constant.

METHOD OF CALIBRATING

To determine the average fundamental frequency of the quartz plate and also to learn something of the constancy of this quantity the number of oscillations executed over a known

varied until the contacts close just as the "nose" of the time signal is received. Thus instead of hearing the usual relatively long "second" dots that Arlington sends, only a short "chirp" is heard. During the five minutes of dots sent by Arlington this adjustment may be made several times, each time noting the position of the pointer. In this way it is possible to determine easily the position of the clock hands exactly at the begin-



THE FREQUENCY STANDARD AND ITS ASSOCIATED EQUIPMENT IS LOCATED IN A LABORATORY SOME DISTANCE FROM THE TRANSMITTING ROOM

The relays controlling the heater power are in the cabinet at the left of the large balsa-wood constant-temperature box that houses the standard crystal, oscillator and associated amplifier. The upper cabinet to the right of the constant temperature box contains the 100-kc. harmonic amplifier; beneath it is the 10-kc. multi-vibrator unit. The next unit to the right is the 1-kc. multi-vibrator coupled to the timing unit. The power panel for the complete assembly is at the extreme right.

time interval, such as 24 hours, is actually counted.⁴ This gives a means of determining the average frequency over this period of time and under the present circumstances indications are that this value can be considered the instantaneous frequency. In making this determination the time indicated by the clock is compared with the time signals from NAA (Arlington). This may be done visually by observing the position of the hour, minutes and second hands at the beginning of each minute and each half minute during the five minutes that the time signals are transmitted. By estimating tenths of a second and then averaging the ten readings thus obtained the position of the hands exactly on the hour may be determined with a probable error of 0.1 second. Other methods permit the making of this determination with greater precision and at Round Hill an aural method is used.

The synchronous clock is fitted with contacts which close once a second, when the clock is running at the proper rate, and the contact arm may be moved along an arc so that the instant of contact is adjustable and may be made to occur at any particular part of the second. That is, the contacts may be made to close when the second hand is exactly on the second or when the hand is half way between two second divisions on the clock face, or at any intermediate position. This adjustment can be made while the clock is running and the time of closing of these contacts with respect to the second hand is indicated by a pointer on a calibrated scale. These contacts are connected in series with the output of the time signal receiver and the loud speaker. During reception of time signals the adjustable arm is

ning of the time signal. This setting can be readily made to within 0.01 second — which, during a 24-hour time interval, is one part in ten million or 0.00001 per cent. By making a similar determination of the position of the clock hands at the end of the 24-hour period, the number of oscillations executed by the standard crystal can be determined.

Since it is known that the clock motor requires 1000 cycles (not cycles per second) to move the second hand one division, it is easy to calculate the number of cycles that are made by the crystal during the interval of time over which the measurement is taken. This would be equal to the number of seconds of "clock-hand" travel times 1000 (the number of cycles necessary for one "second" travel) times 100 (the step-down factor, 10×10 , of the two multi-vibrator stages). This gives the total number of cycles made by the crystal during the period. To find the average frequency, or cycles per second, it is necessary to divide by the number of seconds that actually elapsed during the period of counting. If the standard time interval is taken as one mean solar day, then the crystal frequency is

$$f_o = \frac{\text{clock travel in seconds} \times 1000 \times 10 \times 10}{86,400}$$

there being 86,400 seconds in a day. By continually operating the counting device, as is usually done at Round Hill, a daily check is had of the frequency of the standard and any tendency to diurnal variation is at once apparent. It is interesting to note that when making use of the time signals to this degree of precision it is necessary

to apply the time signal corrections which are published by the Naval Observatory, where the exact time of the final dash of each transmission is determined to within 0.001 second.

HARMONIC AMPLIFIER

In order to produce the high harmonics (14 mc. for instance) with sufficient intensity to beat

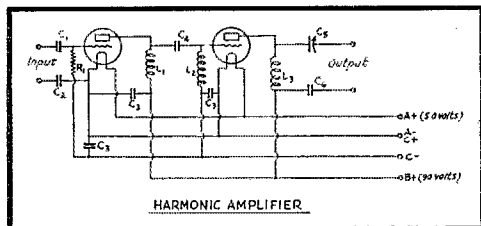


FIG. 6 — CIRCUIT OF THE AMPLIFIER USED FOR EMPHASIZING THE HIGH FREQUENCY HARMONICS OF THE FREQUENCY STANDARD

C_1, C_4 — 500- μ fd. mica
 C_2, C_5 — 0.01- μ fd. mica
 C_3 — 1.0- μ fd. paper
 C — 500- μ fd. variable
 L_1, L_2, L_3 — 85-millihenry Samson No. 85 chokes
 R_1 — 6-megohm

with the strong signal from the transmitter, an ordinary impedance-coupled r.f. amplifier is used, the circuit diagram of which is given in Fig. 6. The grid bias on the tubes is considerably above the normal for amplifier operation and consequently a distorting action is obtained which further accentuates the harmonics. The amplitude of the r.f. output is varied when conditions require by adjusting the filament temperature of the amplifier.

DETECTOR AND BEAT-FREQUENCY AMPLIFIER

The monitoring receiver used to detect the transmitted frequency and the crystal harmonic to produce a beat-frequency consists of a single stage of untuned input screen-grid amplification, detector and two stages of transformer-coupled audio amplification. This receiver is operated non-oscillating and with a low degree of regeneration. In this condition the single tuned circuit is rather broad and it has been found necessary to tune the receiver only approximately to the frequency of a transmission. This is a decided advantage in the transmission of a standard frequency schedule because the entire transmission in any one amateur band may be made without the necessity of readjusting the receiver. As the transmitter's frequency is varied strong beats are heard at 100-ke. intervals throughout the band over which the transmitter is tuned.

As has been mentioned, the frequency of the standard is constant to within 0.0001 per cent. The error involved in setting the transmitter to zero-beat, which is done by aural means at the present time, under the most unfavorable conditions cannot be greater than plus or minus 35

cycles. This is less than 0.001 per cent for all bands. The frequency drift of the transmitter is corrected for, if necessary, by continuously monitoring the signal during a transmission but manual retuning may cause a momentary change in frequency of several hundred cycles per second. Even with such variations the standard frequency signals are accurate to within 0.01 per cent of the values announced at the time of transmission. It is evident that if the swinging effect is not present the transmissions may be considerably more precise and the exact value depends upon the crystal frequency at the time of the transmission. Anyone who makes use of the schedules and wishes this very detailed data may obtain them upon request.

REPORTS DESIRED

In order to obtain some indication of the use to which this service is being put, we greatly appreciate reports of the reception or even attempted reception of the standard frequency schedules. Information regarding the signal intensity, the fading, comments on the operating procedure, whether the time of the schedules is agreeable, suggestions of means to improve the service — all are greatly desired. Each written report that reaches WJXP via A.R.R.L. Headquarters will be acknowledged with a photograph of some part of the station equipment. Perhaps we should start a contest to see who can obtain a complete set of photos!

Can You Copy FLJ?

DR. A. E. KENNELLY of Harvard University, Chairman of the Liaison Committee, United States Section, International Scientific Radio Union, asks our cooperation during the next year in determining the useful range of Issy-les-Moulineaux, FLJ, when it transmits its daily bulletins of cosmic data at 2030 Greenwich (1530 or 3:30 p.m., E.S.T.; 2:30 p.m., C.S.T.; 1:30 p.m., M.S.T.; 12:30 p.m., P.S.T.). FLJ's transmission is on 9225 kc. (32.5 meters) and the station may be picked up a half hour earlier during the transmission of time signals. The data themselves are sent in plain language (French). It is not necessary to copy this test but reports on the audibility of the station from different parts of the American continent are especially desired.

Daily observations are not necessary, but amateurs who can receive on this frequency are requested to help by listening for FLJ once each week, or at as frequent intervals as practicable. Reports of reception may be turned in to A.R.R.L. Headquarters by QSL-card. However, observers who can listen occasionally during the next several months are asked to volunteer by writing Headquarters, attention the Communications Department, and requesting the special forms for logging FLJ that are available.

— F. E. H.

Warnin' Brethren!

A Short Story

By Henry L. Kirchbaum, W8BWZ*

THERE are about fifteen thousand ardent BCL DXers in my immediate neighborhood judging from the number of urgent phone calls I get every night, all of which demand a hasty shut-down on my part. However, they all give me excellent practice in alibi formation, so I don't have the phone disconnected. The reason I need practice is what I'm going to tell you fellows about.

Due to frequent encounters with these lazy wretches who are all the time trying to break up the valuable scientific research us hams is always engaging in, by objecting to minor details such as keyclicks, etc., I've developed a line for almost everyone, whether it is a weeping nurse that says Junior missed his favorite "Ketchup" hour, or if it's some big cluck with a twenty cycle note R9 in the next room. But the variety I wanna tell your brethren about is so tricky that there aren't thirty of any other type can compare with one of this.

Last winter while I was working a jute ship off the Indian coast, getting RS QSA5 reports from him and handling some hot tfc, the kid sister says someone wants me on the pheletone. Well, that's not unusual, but what I'm doing at date of call is plenty, so I tell her to QRT and let the urgent one wait. So she hangs up.

In about four minutes, just as I finishes, the phone rings again and the same fella demands audience. So, bein' through with the ship, I ambles down and answers the phone, vy QRS; asking if I've kept him waiting and then "rpt txt." It's such a meek, soft li'l voice which answers, that I get sorta reckless and throw my invective words around pretty promiscuous which begins to get little BCL riled. Finally he hangs up, saying he's gonna call the chief and raid my shack, for he's got every kind of a selector on his set which makes the fault entirely mine. That makes no impression on me, however, for I've done more for the chief than all the BCL's in town. So the li'l silver tongue's threat is all wasted on me.

I saunters back to the transmitter and lays out a snappy CQ when the phone clatters again. I tear down threatening to burn up the inquisitor. But — "Say," a big roar demands, "who do you think you are? The RI? What's the big idea?"

"What's matter? What're you off-wave about?"

"Huh? Ya gotta 'nough nerve to steal the

*915 Caledonia Ave., East Cleveland, Ohio.

Eiffel tower, you little wart. Think you can get away with that, do you?"

"I don't give a darn about the Eiffel tower. What I wanta know is, what you want, dragging me away from important schedules at this time of night."

"Schedules! Well, lemme tell you, brother, don't CQ for five minutes straight and then not answer who comes back at you. It's not nice internationally, see?"

"Huh? CQ fer five minutes? Say-y, what kind of a watch are you usin'? Same make as yer Xmtr? Whenever you find me CQin' fer five minutes straight, you can get two 204-A's and charge 'em to me."

"Well, buddy, I wouldn't want to get tough, but any time you shove out a signal like you got for five minutes straight, just CQin', you better watch out for a bomb storm. You're right on my wave."

"Oh, yeah?" I drawls, as an idea begins to flicker in my cerebellum. "What wave are you usin'?"

"7250 kc."

"Well, buddy, it ain't up t'me then. I'm on 14 mc."

"Yeah? Well for the luvva . . ."

"Well, big boy, bye bye. Sorry you got foxed. You better practice up on code." I hangs up, feeling plenty good about having called his bluff. Just for the fun of it, though, I decides to go up with my inhaler and see if anyone is swiping my call.

Nobody using a handle anything remotely resembling mine is up there, so, mindful of twenty meter DX, down I goes.

"W8BWZ W8BWZ W8BWZ DE AC9TRC AC9TRC AC9TRC" booms in immediately. So, while the Chinaman calls me, I wax vy excited and forget all about call swipers, etc.

About two weeks later the old thunder clouds began to grumble and first thing I knew, an old whopper of an electric storm has sat right down on top my shack and vicinity. Naturally, half a dozen bolts of lightning and etc. clung onto the aerial, which was a single wire Hertz. It proved very unhealthy for when the skies moderately cleared again, all that was left of my antenna was a couple chewed up wires hanging forlornly from two shaky masts. The masts were about fifty feet high and far off from any stable objects, so I simply lay me down and tried to figure out what nearby ham would be most likely to help me get some wire back on them.

It was also at this period that the big rivalry started up in our neighborhood about DX, etc., etc. Some BCL who'd just emerged from 1500 kc. and below, breezes along with an Xmtr which, he said, could take any ever built around these parts. Of course, that raised rim with us hams. However, the RI was gettin' active, for those 1930 rules had just gone into effect and there were more a.c. notes in our midst than tricks to a Colpitts.

But I got the breaks for once — when that thunder storm came — so when I did get a spicy letter of admonishment about my note, I was able to come right back and say my transmitter had been out of order for some time, due to lack of sky wire. That didn't help much with the way this new DXer was putting it all over us hams of standing, so I got sorta sore.

But the big bitter pill was on its way. One day when I was seated over at Bob Doe's five-hundred watt outfit, while he's workin' an Aussie on phone, he leaves me to play with it while he answered the doorbell. While he's gone, there's a sudden drop in the line current and one of his fifty-watt modulators which had d.c. on it from a generator gave a sickened gasp, due to the filament drop, and goes right straight out before I could throw on the emergency filament supply. So, when Bob came up with the big shot, there I was, gazing at what used to be a perfect modulator.

Of course, he didn't get mad. It wasn't that. But the hot stuff that'd come up with him; maybe he didn't get sarcastic! That made me feel sorta bad, because, in a way, it's my fault Bob was getting razzed. However, it's the man himself that shocked me most. When he began to speak, it's none other than the soft spoken BCL of a few weeks ago! Now he's got five hundred watts and a crystal note, while I'm still strugglin' along with a pair of 210's! Worse yet, he recognized me!

While we're exchanging "friendly" greetings and looking death-rays, Bob was plugging in another fifty. He raised the Aussie again and explained. The Aussie of course thought the line drop was just another alibi, which made me feel cheaper yet.

It's only a few days after that that I got a letter from the RI tellin' me I could clear offa the air for a while until I got a decent note and stop busting up commercials. Believe me, that was sure some shock! Especially when I've got six mikes and thirty henrys in my rectifier; not to mention no antenna. After going through a lot of red tape and having a half a dozen officers look over my stuff, I was allowed back on the ether. But the old rep wasn't there any more, as is soon shown.

Several aircraft companies were in our fair city and more seem to be coming, so they're all putting in improvements as fast as they possibly could.

One of these was radio on the passenger planes. In connection with this development, they naturally needed operators. So I got all set for a commercial license. Code practice every night, listening to some fast commercials; theory diggins, out of books and from operators that were about as friendly as copperheads; and complete abandoning of ham work for a while. Believe me, I sure worked to get that license.

One fine winter day, when I was about to take the test, Bob ambled in and sinks into one of the better overstuffs. He seemed to be reflecting.

"Hank, you better watch out, y' know it?"

"Sez you," draws I good naturedly.

"And with italics. That egg that was over the other night, the one with five hundred watts and plenty where those came from, has sure got it in for you. Man, O man! An' you're tryin' t' get another license, aren't you?"

"Yeah, but what's the row about?"

"Well, seeing as he told me confidentially, I can't say, but Hank, lemme tell you, you'll be lucky to keep the one you got now!"

"Sez you. Well, thanks anyhow, Bob."

"S'all right, boy, but be careful." And he cleared out.

Well, he's right. When I went down for the exam, the RI smirks and said, "Well, glad t' see you, boy. I been waiting to talk with you fer some time, *some time*."

"Sez which?"

"Yessir. Young man, d' you know that if you weren't such a lucky li'l wretch, you'd be an amateur no longer?"

"Huh-h-h?"

"Very. If the fellow who has been doubling you hadn't pulled a boner, you'd be minus a license and much worthless transmitting equipment right now!"

"Well for the luvva —"

"S'truth. And if Mike, who is my very able assistant, hadn't happened to be listening, it would still have been just too bad. Here's what happened —"

And, condensed, this is it. My old BCL friend who just graduated, couldn't take ten words a minute. Neither did he know more than the labels about radio apparatus. So, in a dizzy fit against yours slightly, he had bought himself a "connected" transmitter and receiver, plannin' t' run me offa the air with it, usin' my call. However, he had signed his own temporary one sunny day by mistake, and Mike, the tough fellow who had called me down that first night, had heard him!

So now, hams and brethren, I want to warn you, although you shouldn't need it now, to watch it when any meek li'l BCL gets vicious; get yourselves monitors, and, above all, be kind to your long-eared hard-workin' friends — the RI's.

Standard Frequency News and Schedules

Off-Frequency Operators Being Penalized—New S.F. Service from WWV

DESPITE the general availability of standard frequency signals and of information on frequency meters and measuring methods, there are still altogether too many amateurs operating on frequencies outside the amateur bands. Word has been received that amateur licenses already have been cancelled for this and other infractions of the regulations. More suspensions will surely follow with the increased activity of the Department of Commerce monitoring stations that are policing the air for the U. S. Government. An interesting article describing the equipment and operation of the Hingham, Mass., monitoring station will be in an early *QST*. This article should be of particular interest to amateurs who do not use the standard frequency transmissions and who are not concerned with frequency measurement. When they receive the bad news from their Supervisor they will know just how they were caught.

5000-KC. S.F. SERVICE FROM WWV

Beginning January 6th a new and improved standard frequency transmission service will be sent from the Bureau of Standards Station WWV, Washington, D. C.

The transmission will be on a single frequency 5000 kilocycles, and will take place during two two-hour periods on every Tuesday except in those weeks in which the regular monthly WWV transmissions are given. The hours of transmission are from 1:30 to 3:30 and from 8:00 to 10:00 p.m., E.S.T. The dates of transmission for the next two months are January 6th, 13th, and 27th; February 3rd, 10th, and 24th. The transmission will be by c.w. telegraphy and will consist primarily of a series of long dashes. The first five minutes of each transmission will consist of the general call, "CQ de WWV," and announcement of the frequency. The frequency and call letters will be given every ten minutes thereafter. The frequency of the 5000-kc. transmission is piezo controlled and accurate to a few parts in a million. The transmitter has a power output of 150 watts, which may be increased to 1 kilowatt early in the year.

These transmissions will be particularly useful for checking the accuracy of a frequency standard or frequency meter of a fundamental frequency (as 100 or 500 kc.) that has a harmonic at 5000 kc. They can be used also to check the calibration of amateur frequency meters by heterodyning the 5000-kc. signal with a harmonic of a suitable auxiliary oscillator (such as a

500-kc. dynatron) and transferring the harmonics of the latter to the amateur band frequency meter.

The Bureau of Standards would like to have detailed information on the reception of the 5000-kc. signals and will appreciate reports from amateurs and other observers. Phenomena of particular interest are signal strength and fading (whether slow or rapid, and approximate time between peaks of signal intensity). The Bureau would also like to receive comments on whether or not the transmissions are satisfactory for purposes of frequency measurement and control. Reports on the reception of the transmissions can be addressed to Bureau of Standards, Washington, D. C., or via A.R.R.L., Hartford, Conn., from where they will be forwarded to Washington.

The schedules of regular monthly WWV transmissions will appear in February *QST*.

A.R.R.L. STANDARD FREQUENCY TRANSMISSIONS

Reports on the reception of s.f. transmissions from W1XP, W9XAN and W6XK are gradually increasing in number—but there should be a great many more. This applies particularly to W9XAN and W6XK transmissions because it is only by the reports received that the coverage of these new stations can be ascertained. Send in reports on scheduled transmissions whether you hear the signals or not. These reports furnish valuable information to the transmitting stations and serve as the basis for improvements in the service. The stations want to make their service as good as it can be made but cannot make much progress unless users of the service send in their reports.

Here are the schedules for January and February.

DATES OF TRANSMISSION

Jan. 2, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Jan. 4, Sunday	BB	W9XAN
	C	W6XK
	C	W6XK
Jan. 9, Friday	C	W1XP ₁
Jan. 11, Sunday	C	W1XP
Jan. 16, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Jan. 23, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Jan. 24, Saturday	BX	W6XK
Jan. 25, Sunday	C	W9XAN
Jan. 30, Friday	BB	W6XK
	B	W1XP
	A	W9XAN

Feb. 1, Sunday	BB	W9XAN
	C	W6XK
Feb. 6, Friday	C	W6XK
Feb. 8, Sunday	C	W1XP
Feb. 13, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Feb. 20, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Feb. 21, Saturday	BX	W6XK
Feb. 22, Sunday	C	W9XAN
Feb. 27, Friday	BB	W6XK
	B	W1XP
	A	W9XAN

interrupted by call letters and statement of frequency. Characteristic letter of W1XP is "G," of W9XAN is "D," and of W6XK is "F."

1 minute — Statement of frequency in kilocycles and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

Do not forget to QSL the transmissions. All reports should be sent to the A.R.R.L. Standard Frequency System, Hartford, Conn. A record will be made at Headquarters and the report will be then forwarded to the proper station. S. F. report blanks can be obtained from Headquarters, free and postpaid, upon request.

Don't guess. Use these transmissions and be sure.

— J. J. L.

STANDARD FREQUENCY SCHEDULES

Friday Evenings Schedule and Frequency			Friday and Sunday Afternoons Schedule and Frequency		
Time (p.m.)	A	B	Time (p.m.)	BB	C
	kc.	kc.		kc.	kc.
8:00	3500	7000	4:00	7000	14,000
8:08	3550	7100	4:08	7100	14,100
8:16	3600	7200	4:16	7200	14,200
8:24	3700	7300	4:24	7300	14,300
8:32	3800		4:32		14,400
8:40	3900				
8:48	4000				

Saturday Morning Schedule and Frequency	
Time (a.m.)	BX
	kc.
4:00	7000
4:08	7100
4:16	7200
4:24	7300

The time specified in the schedules is local standard time at the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time. Schedule BB transmitted by W1XP is intended particularly for European amateurs and starts at 2100 G.C.T. Schedule BX is transmitted especially for amateurs in Oceania and the Far East. It is transmitted starting at 1200 G.C.T. by W6XK. Reports on these special schedules are particularly desired, not only from overseas hams but from those in the Americas also.

Although the frequencies of the transmitting stations are not guaranteed as to accuracy, every effort is made to keep to within 0.01 % of the announced frequencies. The frequency standards are calibrated against the National Frequency Standard. Frequent checks on the transmissions are made by laboratories equipped with accurate frequency standards and the transmissions are also checked by the U. S. Department of Commerce monitoring stations.

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

2 minutes — QST QST QST de (station call letters).

3 minutes — Characteristic letter of station,

Mr. Terrell's Annual Report

THE annual report of the Radio Division of the Department of Commerce has just been published. Mr. W. D. Terrell, Chief of Radio Division (now known as Director of Radio), reports on the multitudinous activities of his division. We quote below the portion of his report relating to amateurs:

"After 18 months' operation under the restricted wave bands imposed by the Washington treaty of 1927, the amateurs are operating as satisfactorily as could be hoped for, considering the great number of amateur stations in these narrow bands. This is due, for the most part, to improved technical methods and apparatus devised particularly to meet the new conditions. Amateurs show increasing technical skill. Amateur voice transmission on high frequencies was given impetus by the opening of the band from 14,100 to 14,300 kilocycles for telephony as well as telegraphy. Numerous stations have effected satisfactory international telephony. Many of the better radiotelegraph stations have been in communication with upwards of 70 countries. There is an increasing interest in the investigation of the communication possibilities of the ultra-high frequencies above 28,000 kilocycles.

"Amateurs of the United States have long been noted for their excellent self-policing. In this connection it is interesting to note the establishment of an organized nation-wide standard-frequency system to make available to ama-

(Continued on page 70)

W9DAX

A Modern Station Specializing in 1750-kc. 'Phone Operation

ONE rarely hears nowadays of a "150-meter" station, yet some exist and do good work because the band is practically free from interference. Such is W9DAX, owned by Leon A. Faber, 119 North Elm Street, Sandwich, Ill. Mr. Faber, like many of us, has experienced the thrills of DX contacts on the high-frequency bands during his long experience as an amateur, but after a time one gets suited with DX chasing and turns to the "human" side of amateur radio. In his own words, "The thrills with 1750-kc. 'phone are the best of all, because many fine contacts are possible and one can make very close friends." Perhaps some of us are neglecting the possibilities of the band on which amateur radio got its start.

The station is located on the main floor of the house, with the permission of Mrs. W9DAX. The permission might not have been so readily forthcoming if the outfit were not characterized by the neatness which is apparent in the photograph. Since Mr. Faber works for the local power company, we rather imagine that explains the orderly construction — one could hardly be subjected to the influences of power station practice without absorbing some good ideas.

W9DAX consists of a crystal-controlled transmitter, using Heising modulation and a linear amplifier; power-supply equipment and other accessories; a superheterodyne receiver, and one or two other gadgets which, though not visible in the photo, are useful about the station. The transmitter is the feature of most interest, and will be taken up in some detail.

The frame houses five separate units, each of which may be removed readily for repairs or changes. These are: The radio-frequency unit; the speech amplifier and modulator; the mercury-arc rectifier, and keep-alive; the filter, and a control unit which contains the various relays for operating the set.

THE RADIO-FREQUENCY UNIT

The r.f. portion of the set occupies the top shelf in the frame, as shown in the photograph of the complete transmitter. A more detailed view of this unit alone is shown in another photograph. Fig. 1 is the wiring diagram.

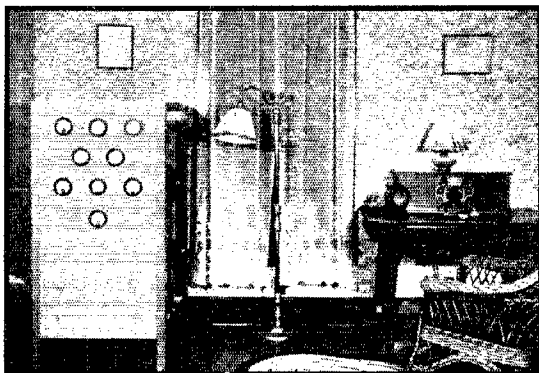
A Type '10 tube is used as a crystal oscillator, the crystal having a natural frequency of 1752 kc. Since a common plate supply is used for all tubes, a resistor in the plate circuit of the oscillator tube drops the plate voltage to the operating value, which is 250 volts. The oscillator stage is completely shielded, with a "ventilator" in the top to radiate heat. The shield is at the rear of the assembly behind the Type '52 tube.

The output of the oscillator excites a neutralized Type '10

tube which is used as a buffer amplifier. This tube also has a resistor in its plate circuit to drop the voltage to 600. The buffer stage is between the oscillator shield and the filament transformer in the photograph.

In the left foreground is the third Type '10 stage, which is the modulated amplifier. This stage operates as a Class "C" amplifier, and obtains its plate voltage through the modulation choke and a dropping resistor. Under operating conditions the actual plate voltage is 600, and the tube is biased well beyond cut-off. This tube is also neutralized, using the same system as that used with the buffer amplifier; the neutralizing condenser is connected between the plate of the tube being neutralized and a small inductance coupled to the preceding tank circuit.

The output of the modulated amplifier is fed to the grid of the linear amplifier by the arrangement shown in the diagram. With this system the excitation to the Type '52 amplifier is readily adjusted by means of the clips on the modulated amplifier tank and on the grid tank of the linear amplifier. The neutralizing connection for the Type '52 is made in much the same way as with



W9DAX

Transmitter, power supply and all control equipment are contained in the frame at the left. The receiver and microphone are at the right.

preceding stages, the neutralizing condenser being connected to the end of the grid tank opposite to that to which the grid itself is connected.

previously in *QST*. The output of the linear amplifier is fed to the antenna.

Although no shielding is used between stages,

no feedback difficulties are experienced because there is ample spacing between inductances, and further, the inductances are so oriented that coupling between them is at minimum. The inductances themselves are interesting because they are self-supporting and have practically no dielectric losses. The turns are supported by three longitudinal strips of celluloid to which the wires are cemented. The inductances for the three low-power stages are for the three low-power stages are wound with No. 14 copper wire, that for the last stage being No. 6. All are mounted on porcelain stand-off insulators.

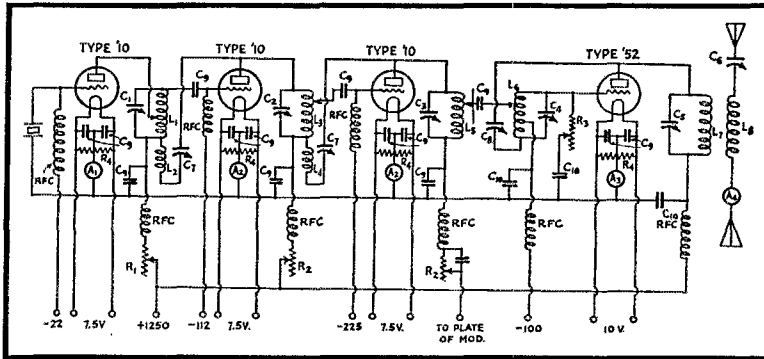


FIG. 1 — THE R.F. PORTION OF THE TRANSMITTER

- C_1, C_2, C_3 — Cardwell 350- μ fd. receiving condenser
- C_4 — .001- μ fd. receiving condenser
- C_5 — National 43-plate transmitting condenser
- C_6 — same as C_1
- C_7 — Pilot midget, double spaced; originally 23 plates
- C_8 — 5-plate double-spaced receiving condenser
- C_9 — .002 μ fd.
- C_{10} — .001- μ fd., 5000-volt Sangamo fixed condensers
- C_{11} — 1- μ fd., 1750-volt condenser
- L_1, L_2, L_3, L_4, L_5 — 20 turns of No. 14 tinned copper wire, 3" inside diameter, turns spaced with string

- L_2, L_4 — 15 turns No. 20 d.c.c. wire 2" inside diameter
- L_3, L_5 — 14 turns No. 14 tinned copper wire 3" inside diameter
- L_1 — 22 turns No. 6 copper wire 3" inside diameter, turns spaced diameter of wire
- RFC — Aero No. 349 r.f. chokes
- R_1 — 20,000-ohm variable resistor, 20-watt rating
- R_2 — 100,000-ohm Clarostat, 40-watt size
- R_3 — 100,000-ohm Clarostat, 80-watt size
- R_4 — 100-ohm resistor, center-tapped
- A_1 — 0.100 d.c. milliammeter
- A_2 — 0.250 d.c. "
- A_3 — 0.300 d.c. "
- A_4 — r.f. ammeter

The filament tap on the inductance is brought up a few turns from the end to obtain the necessary neutralizing voltage. This tap is at filament potential with respect to r.f., being connected to the filament center-tap through a by-pass condenser, but differs from the d.c. potential by the bias voltage, which is series fed.

Across the grid and filament center-tap of the linear amplifier are a resistor and condenser which serve to improve grid regulation. When the linear amplifier is being tuned up this resistor and the excitation taps are adjusted until the tube is operating as a Class "B" amplifier. The method of making this adjustment has been described

transformer has four 7.5-volt secondary windings, three of which supply current to the filaments of the three Type '10 tubes in the transmitter.

The filament

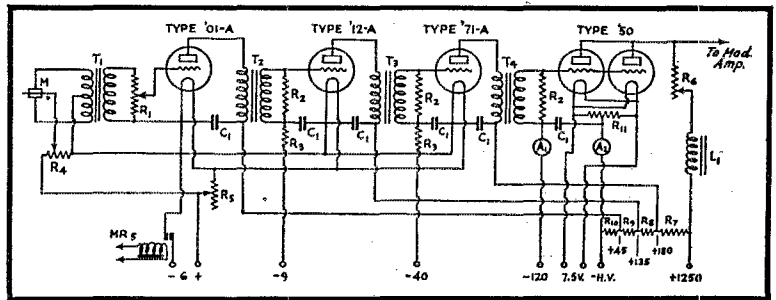


FIG. 2 — SPEECH-AMPLIFIER AND MODULATORS

- C_1 — 1- μ fd., 300-volt by-pass condenser
- L_1 — modulation choke; construction explained in text
- R_1 — 200,000-ohm potentiometer
- R_2 — 250,000-ohm grid-leak type resistor
- R_3 — 50,000-ohm grid-leak type resistor
- R_4 — 200-ohm potentiometer
- R_5 — 15-ohm rheostat
- R_6 — 100,000-ohm Clarostat, 40-watt size
- R_7 — 50,000-ohm, 50-watt resistor
- R_8, R_9 — variable resistors adjusted to give proper "B" voltages; total resistance of bank, 10,000 ohms
- R_{10} — 100-ohm resistor, center-tapped
- M — double-button microphone
- MR — magnetic relay for closing filament circuit of speech-amplifier tubes

A voltmeter is connected across the fourth winding to serve as a check on the line voltage.

All bias voltages are obtained from small "B" batteries.

The antenna system is the familiar current-fed Hertz, or "antenna-counterpoise," each half being 135 feet long; the fundamental is thus in the 1750-ke. band.

SPEECH AMPLIFIER AND MODULATOR

The modulating portion of the outfit consists of a double-button microphone, three stages of speech amplification, and two Type '50 tubes, in parallel used as modulators.

The microphone is a Western Electric 389-W public address instrument and is capable of excellent reproduction. Each of the two buttons draws approximately 30 milliamperes. The current to operate the microphone is taken from the 6-volt battery which is used to light the filaments of the tubes in the speech amplifier, through the voltage divider, R_4 , shown in Fig. 2.

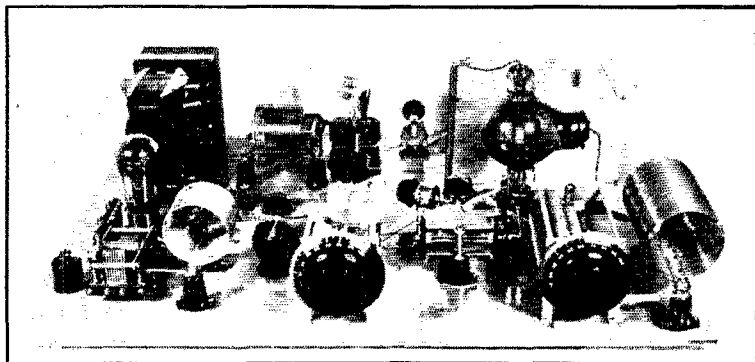
A potentiometer across the secondary of the microphone transformer regulates the output of the speech amplifier. All stages are transformer coupled, low-ratio transformers being used for the sake of quality, and as a further aid to faithful reproduction each of the transformers has a resistance across its secondary.

The first speech-amplifier tube is a Type '01-A,

tube is fed to the grids of the modulators by transformer coupling. The 50,000-ohm resistors in series with the grid bias on the second and third speech-amplifier stages are in the circuit to dissipate any r.f. that might get into the speech amplifier.

The plate voltage for the speech-amplifier tubes is obtained from the 1250-volt plate supply by means of the voltage divider shown in the diagram.

A resistor in series with the modulator plates



THE OSCILLATOR AND R.F. AMPLIFIERS

The shield can contains the crystal oscillator. Next to it is the buffer amplifier and filament transformer. The modulated amplifier and linear amplifier are in the foreground.

drops the voltage down to 800 for the Type '50's. This voltage, although seemingly rather high for these tubes, works out satisfactorily. With this plate voltage 120 volts grid bias is required. A milliammeter in series with the grids is used to indicate whether or not grid current is flowing, and thus serves as a check on overloading of the modulators. A second milliammeter in series with the high-voltage power supply indicates the plate current to the tubes.

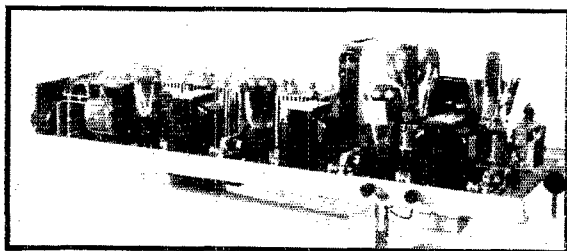
A variable resistor connected between the plates of the modulators and the plate of the modulated amplifier, R_2 in Fig. 1, is set so that the drop through it is 200 volts, thus working the modulated amplifier at 600 volts. This resistor is by-passed for audio frequencies by C_{11} , a 1- μ fd. condenser.

The mechanical layout of the speech amplifier and modulators is shown in another photograph. All apparatus is mounted on a shelf which fits in the rear of the frame below the r.f. portion of the set. The "C" batteries are com-

mon to the r.f. tubes and the speech-amplifier tubes.

POWER SUPPLY

The power supply equipment is on the bottom shelf of the transmitter frame and consists of two



THE AUDIO EQUIPMENT

Showing the arrangement of the speech amplifiers and modulator tubes.

operated with 45 volts on its plate. No grid bias is necessary with this plate voltage. The second speech amplifier is a Type '12-A, with 135 volts on the plate and 9 volts bias on the grid. The third tube is a Type '71-A, with a plate voltage of 180 and grid bias of 40 volts. The output of this

units, each of which may be removed without difficulty. One section, containing the mercury-arc rectifier, keep-alive transformer and rectifier, and the arc-tipping mechanism, is shown in a separate photograph; the other is the filter, and

an old potential transformer and has a cross-section 3" by 3", with a 6" by 4" window. Both windings are the same, 330 turns of No. 16 enamel-cotton-covered wire, one winding being center-tapped. A third winding supplying filament current for the Tungar bulbs consists of seven turns of No. 10 enamelled wire.

The keep-alive choke is also home-constructed, the core having a cross section of 2" by 2" with a 3" by 4" window. An adjustable air gap is incorporated. The winding is 400 turns of enamel-cotton-covered wire. The solenoid for tipping the arc is wound on a tin spool and the winding has 150 turns of No. 22 d.c.c. wire. The armature is a soft iron bolt. The variable resistor in the keep-alive circuit is a 15-ohm heavy-duty rheostat.

The 1- μ f.d. condensers shown in the diagram in the keep-alive circuit have been found necessary because of the "hash" set up by the arc when in operation. The correct positions for them were found by experiment, and with their use no trouble has been experienced from noise.

The filter is of the "brute-force" variety, with two sections. A total of 11 microfarads is used. The condensers are made up of low-voltage condensers connected in series-parallel, with a nominal rating of 2000 volts for the completed units. They have been tested and their performance is all that could be desired.

A two-section choke supplies the inductance for the filter. Each section is rated at 15 henrys.

The modulation choke is a home-made affair with an inductance of approximately 30 henrys. The core cross section is 2" by 4" with a 1½" by 6" window. 5000 turns of No. 28 enamelled wire constitute the winding. The air gap is adjustable, and in this particular case a gap of ⅛" has been found best.

CONTROL RELAYS

An interesting feature of the transmitter is the means of supplying power to the filaments and plates of the tubes in the proper time order. To prolong tube life the filament voltage should be applied before the plate voltage so the filaments can reach their operating temperature before

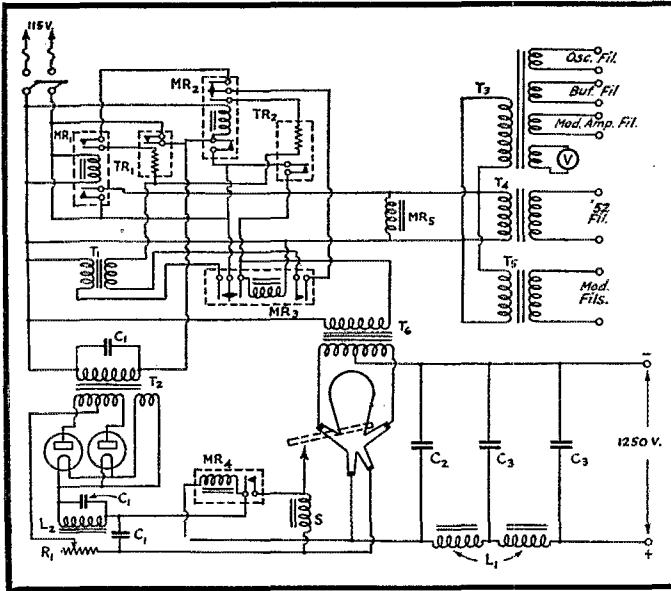


FIG. 3 — POWER SUPPLY AND CONTROL RELAYS

- MR₁, MR₂, MR₃, MR₅ — magnetic relays; operation explained in text
- MR₄ — keep-alive relay, rebuilt telegraph relay
- TR₁, TR₂ — thermal relays; operation explained in text
- T₁ — 4-volt transformer for thermal relays
- T₂ — keep-alive transformer; construction explained in text
- T₃ — filament transformer for Type '10 tubes
- T₄ — filament transformer for Type '52 tube
- T₅ — filament transformer for Type '50 tubes
- T₆ — 1-kva. power transformer; 1300 volts each side of center tap on high-tension side
- L₁ — double choke; 15 henrys each section
- L₂ — keep-alive choke; construction described in text
- C₁ — 1- μ f.d. low-voltage condenser
- C₂ — 5- μ f.d. 2000-volt condenser
- C₃ — 5- μ f.d. 2000-volt condenser
- R₁ — 15-ohm heavy-duty rheostat
- S — arc-tipping solenoid; construction described in text

part of it may be seen under the speech unit in the photograph of the transmitter. Fig. 3 is a diagram of the complete power equipment and controlling relays.

The high-voltage transformer is a 1-kilowatt General Electric affair giving 1300 volts each side of the center-tap on the high-tension side. The rectifier is a 110-volt 10-ampere mercury-arc, with a keep-alive and starting circuit of the type described in the *Handbook*. When installed in the transmitter frame the tube is immersed in an oil bath to about an inch above the lower arms to radiate heat and prevent breaking the glass.

The keep-alive transformer is home-made, 1-1 ratio, with the secondary winding tapped at the center. With the full-wave Tungar rectifier the d.c. voltage is about 40. The core was taken from

plate current begins to flow. With this transmitter this is accomplished automatically by the relay arrangement shown in Fig. 3.

On closing the line switch, filament current is supplied to all tubes in the transmitter. Ten seconds later the keep-alive circuit and arc-tipping mechanism start up, and after an additional ten-second period the high-voltage is applied to the arc rectifier.

Each of the magnetic relays, MR_1 , MR_2 , MR_3 , and MR_5 , is designed to work directly from the 115-volt line; each is in effect a double-pole double-throw switch, but only those contacts which are actually used are shown in the diagram. The thermal relays, TR_1 and TR_2 , are used to obtain the necessary time delay, and operate ten seconds after current is supplied to the heater element.

The contacts of relays MR_1 , MR_5 , TR_1 and TR_2 are open when the line switch is open, as are also the lower contacts of MR_2 . The two upper contacts of MR_2 and the left-hand and right-hand contacts of MR_3 are normally closed. When the line switch is closed both sets of contacts on MR_1 close, the lower set closing the circuit to MR_5 and turning on all three filament transformers at the same time. The arrangement of the contacts of MR_5 is shown in Fig. 2. This relay closes the 6-volt filament circuit, supplying current to the speech amplifier tubes. Closing the line switch also connects the primary of the heater transformer, T_1 , to the 115-volt line through the left contacts of MR_3 .

The upper set of contacts on MR_1 closes the circuit to the thermal element of TR_1 through the normally closed contacts of MR_2 and MR_3 . After a ten-second interval the contacts of TR_1 close, connecting relay MR_2 to the line; at the same time the lower set of contacts on MR_2 closes, connecting the keep-alive transformer to the line and also re-closing the circuit to the relay coil so that MR_2 will stay in even though the contacts of TR_1 open, as they do later. At the same time, the middle blade of the upper set of contacts on MR_2 makes contact with the lower blade, breaking the contact with the upper blade. This operation disconnects TR_1 and connects TR_2 to the heater transformer.

Ten seconds later the contacts of TR_2 close, connecting MR_3 to the line. The right-hand

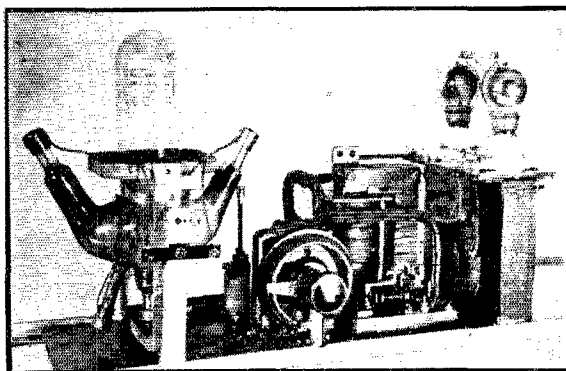
contacts of MR_3 open, disconnecting TR_2 , and the middle blade of the left-hand set of contacts breaks contact with the left blade and makes contact with the right-hand blade. This takes the primary of T_1 off the line and throws the primary of the plate transformer on the line, re-connecting the relay to the line as before. When the final operation is finished, twenty seconds after the switch is thrown, only the magnetic relays, which take about one watt each, are using power.

The heater transformer for the thermal relays is home-made and

steps the 115 volts down to about 4 volts.

RECEIVER AND MONITOR

The receiver at W9DAX is a superheterodyne, using a regenerative first detector, oscillator,



THE HIGH VOLTAGE RECTIFIER

The frame holding the arc is at the left. The tipping solenoid is visible to the rear of the rheostat. The keep-alive rectifier and transformer are at the right.



THE COMPLETE TRANSMITTER

All r.f. equipment is on the top shelf. Suspended from it at the left is the panel on which are mounted the control relays. The high-voltage rectifier and filter are on the bottom floor, with the speech amplifier and modulators on a shelf above the filter.

three stages of screen-grid intermediate-frequency amplification, second detector arranged for plate detection, and a single stage of audio-frequency amplification. The outfit is built from a factory kit made by Silver-Marshall.

For monitoring transmissions an old broadcast crystal receiver is used. No trouble is experienced in getting enough pickup on W9DAX's frequency to get a good check on the quality of modulation.

As was pointed out at the beginning of this story, W9DAX is quite content to do all his operating on 1750 kc. The station has been heard regularly over a considerable area, and has been picked up in California—an excellent record considering the fact that comparatively few amateurs listen on this band. Since broadcast receivers have been made selective, interference difficulties have dropped off—in fact, W9DAX has never had a single complaint of interference. People even call up to compliment him on his outfit when they happen to pick it up!

There are 285 perfectly good kilocycles in this band which should be a fertile field for 'phone men, especially. W9DAX says "come on up and see for yourself!"

A Four-Band "Kitchen" Transmitter

(Continued from page 16)

Having the buffer stage neutralized, connect the plate voltage through a large resistor (its own 14,000-ohm unit) and try it out. Tune for a dip in plate current. A neon lamp or flashlight and loop indicator will soon tell if it is "doing its stuff." Cut in the 7-mc. stage, plug in the grid meter and tune the preceding stages for a maximum grid current. Connect the high voltage (through its resistor) and tune the plate condenser until a sharp dip is noticed in plate current as with the previous stage. Test with the neon lamp and check this resonance point if you like. Repeat this same procedure with the remaining intermediate stages.

Now proceed to the p.a. Start with 3.5 mc. by plugging in the proper grid, plate, and antenna coils. With no plate voltage but with filaments burning, tune the grid dual condenser for a maximum grid current, setting the input condenser at about the half-way mark. Proceed to neutralize with the aforementioned thermo-galvanometer or substitute current indicating device. Both neutralizing condensers are varied together until there is no current in the plate coil. The plate tuning condenser must be varied to closely follow the changes in the neutralizing capacity. After neutralizing, tune for the dip in plate current with plate voltage on. Repeat this procedure for the other bands. There will be little if any change in the neutralizing capacity for any band. Tune the antenna and see what the note sounds like in the monitor. If not d.c., look for r.f. feedback. It is desirable, of course, to listen to the output of all the intermediate stages first.

For 'phone, the two Federal switches are thrown, filaments lighted, and speech amplifier bias adjusted. Plug in the mike and note the actions of the modulator plate milliammeter. With the gain control full on the plate current should rise abruptly when speaking. Turn the gain control down to the point where the plate milliammeter jumps only slightly when speaking normally. Connect the high voltage to the modulator, adjust the potentiometer for correct bias and listen in the monitor. When everything works according to specifications, remove the electric iron, substituting a 6-amp. fuse, and proceed to make fine adjustments in all "C" and "B" voltages. By making a note of all dial settings, a

	3.5-mc. Stage	7-mc. Stage	14-mc. Stage	28-mc. Stage	P. A. Stage	Phone* C.W.
Drop. resistor (ohms).....	14,000	10,000	8,000	8,000	4,000*	0
Plate ma.....	25	40	50	50	90	200
Grid ma.....	1	3	3	3	10	18
Plate volts.....	650	600	600	600	640	1,000
Input watts....	16	24	30	30	58	200

*Phone—single 545 modulator.

minimum of readjustment is required when changing bands.

The preceding table gives typical values obtained with the transmitter adjusted for 14.2-mc. 'phone.

With 14-mc. c.w. the voltage and current values will be a little higher. With 3.5 mc. 'phone, the inputs to the buffer stage, p.a., and modulator are all increased due to the poor regulation of the high voltage supply. By using a well-insulated choke of 10 henrys or more as an input to the filter instead of the present 1- μ f.d. condenser, the regulation should be considerably improved, especially with small loads, although the voltage would be lower.

It is expected that there will be periods of frequency drift as the crystal warms up, especially during the winter when the oven is used often! However, it usually is not comfortable to operate during periods of baking so the trouble will be a remote one.

* The modulator's negative grid bias should be 150 volts and its plate current should be 75 ma. for a modulation capability of about 90% with the Class C p.a. plate current at 90 ma. See Chap. VIII *Radio Amateur's Handbook*, Seventh Edition. — Error.

W6BAX Wins Wouff Hong Trophy

THE Modesto Amateur Radio Club announced (page XVI September 1930 *QST*) that it would, this year, resume the annual Wouff Hong Trophy award, made at the Pacific Division Conventions to the station adjudged the "best all-around amateur station in the Pacific Division entering the competition." At the Sacramento Convention Mr. S. J. Feliz, Jr., W6QA, Secre-

(Continued on page 80)

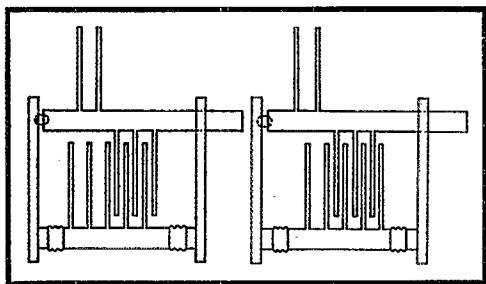
EXPERIMENTERS' SECTION

A Tuning Condenser for the Dynatron Frequency Meter

By A. E. Harrison, W6BMS-W6AYN

THE advantages of using a small amount of fixed capacity in the tuned circuit of a dynatron oscillator were pointed out in the October issue of *QST*. The condenser to be described has a fixed minimum capacity that is dependent upon the arrangement of the rotor plates. The stator plates are shielded by the frame of the condenser, eliminating one of the causes of body-capacity effects. Any condenser that has the rotor plates separated by spacers can be rebuilt.

The condenser shown in the photograph (page 48) is a "No Loss" type with a straight-line wavelength curve. The stator plates are held in slots and the spacing cannot be changed, but alternate plates should be removed. When double-



FIGS. 1 (LEFT) AND 2 (RIGHT)

spacing the condenser the rotor plates that are removed must be cut down and used as washers so that the spacing between plates on both rotor and stator is the same.

Two of the rotor plates are re-assembled on the opposite side of the shaft. Either of the arrangements in Fig. 1 and 2 may be built up by using the proper number of spacers before the first rotor plate is put on the shaft. The arrangement shown in Fig. 2 should be used when the band from 3500 to 4000 kc. is to be covered, but the plates should be arranged as shown in Fig. 1 to spread the 7000-kc. band or the 3500- to 3650-kc. band if the entire 3500-kc. band is not required.

When re-assembling the condenser everything must be screwed tight or the calibration will not be permanent. If the stator assembly is loose, paper placed between the porcelain insulators and the frame will prevent movement of the stator.

Full-Wave Self-Rectification in the Power Amplifier

One way of saving the expense of high-voltage rectifiers and filters in medium and high-power transmitters is to use the big tubes as amplifiers following a crystal-controlled oscillator, putting

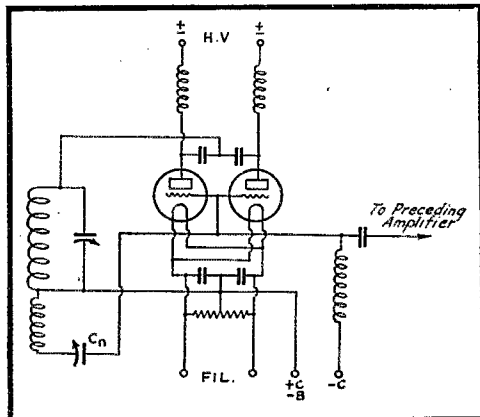


FIG. 3.—THE POWER AMPLIFIER WITH FULL-WAVE SELF-RECTIFICATION

The tubes and circuit elements should be arranged symmetrically. The two r.f. chokes in the plate leads should be exactly alike, and the plate blocking capacitors should have equal capacities. The usual values of other circuit constants apply.

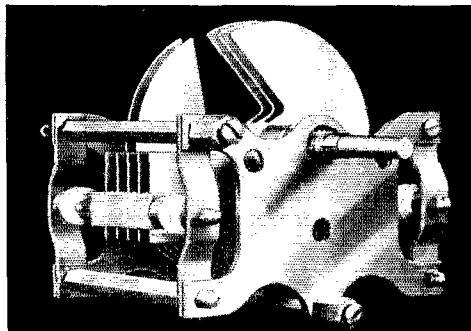
raw a.c. on the plates of the amplifiers. The oscillators and low-power amplifiers or buffers should of course have a pure d.c. plate supply.

Mr. H. B. Churchill, W2ZC, has been experimenting with amplifiers connected back-to-back for full-wave self-rectification and has been getting some excellent results. The following letter gives the information on his layout:

"We have recently been doing some experimental work at W2ZC on back-to-back amplifiers. Our attention was first called to the excellence and practicability of this amplifier by close scrutiny of W2CXL's 7000-kc. transmitter using two 250-watters as a self-rectified final amplifier for their crystal set. We constructed such an amplifier and made several refinements, resulting in obtaining an almost pure d.c. note. It was really a victory — and one we did not expect. Radio-frequency chokes had to be matched exactly and tubes put in symmetrically or the note had a high (30%) percentage of undesirable modulation. (Fig. 3 is the diagram.)

"Such an arrangement is highly economical,

requiring no expensive rectifier or filter. Using two Type '52 tubes and a 3300-volt transformer (6600 outside voltage) we get a good d.c. crystal note on 3600 kc., the self-rectified amplifier being controlled by a crystal oscillator and a buffer. A



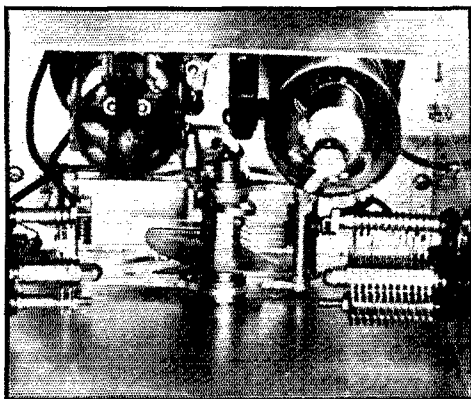
HOW THE CONDENSER LOOKS WHEN REMODELLED

good rectifier and filter for this voltage would cost at least \$65, while an extra '52 costs \$30 — a saving of \$35 or more.

"The idea is not a new one but in these days of being as economical as possible it might be a help to some of the gang to revive this much-tabooed circuit and recall that it has possibilities when in the hands of a careful operator."

Band-Spreading on the Super-Wasp

Because of the low cost and convenient construction, the battery and a.c. models of the Pilot



THE CHANGES IN THE TUNING SYSTEM TO SPREAD THE AMATEUR BANDS

The rotor of each of the large condensers is cut down to one plate. The midget condensers are mounted on the cans and are adjusted to bring the bands on the dials with each set of coils.

Super-Wasp short-wave receiver are popular with amateurs. However, the ham bands are crowded rather badly on the tuning dials, the set having

been designed as a general purpose short-wave receiver rather than as a special traffic tuner.

It is a very simple matter to revise the set slightly so that the various bands are spread comfortably over the full sweep of the scales. To do this merely remove all but one rotor plate from each of the tuning condensers, and mount a 23-plate midget on the right side of each of the shield cans. Connect these condensers in parallel with the main tuning condensers by means of short wires. The rotor connections are made automatically through the shielding. The midgets are used as loading condensers, the single plate condensers providing full band coverage. The correct setting of the midgets for the various ham bands are easily determined. The stock coils supplied with the kit are not changed in any way.

Of course this operation makes the receiver useless on the 200- to 500-meter broadcast band, but this is a small loss. Quite a number of hams who own Super-Wasps have revamped them in this way and are highly pleased with the results they obtain. The accompanying photograph shows a battery model set revised by W2BJU.

— Robert Hertzberg.

Three Band Antennas

Alva Parham, W4MR, has a suggestion which should work satisfactorily when it is possible to use fairly long feeders:

"I have noticed in *QST* several different methods used to adapt one antenna for use on the 14-, 7- and 3.5-mc. bands. Here is my suggestion concerning such antennas.

"Build a 'Zeppelin' antenna with a fundamental in the 7-mc. band with feeders of such length that parallel tuning can be used on 14 and 7 mc. The length of such feeders according to the *Handbook* would be 60 feet. When working on 3.5 mc. the dead-ended feeder could be disconnected

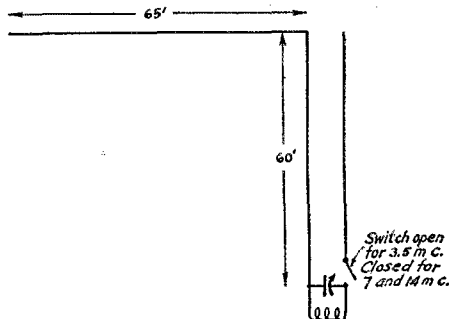


FIG. 4

and then there would be left a simple voltage-feed antenna about 135 feet long which would be fundamental for 3.5 mc.

"As I am not able to try this antenna myself I would like to hear from anyone who might have an opportunity to use it."

When working on 3500 kc. with this arrangement (shown in Fig. 4), the coupling coil and antenna condenser form a tank tuned to the transmitting frequency. It is advisable, since the antenna is being fed at a voltage loop, to make the coupling coil large and use comparatively little tuning capacity for maximum transfer of energy. On 7 and 14 mc. regular tuning methods would be employed.

Ye Ed also has an arrangement which requires even less space than the foregoing, and which has been found to work out satisfactorily. A drawing of the antenna is shown in Fig. 5. It consists of two "free" sections about 33 feet in length, with a pair of 35-foot feeders connected in the center.

For 14-mc. work there are really two voltage-fed half-wave antennas. The length of the feeders is such that parallel tuning is necessary. On 7000 kc. the system operates as a current-fed half-wave

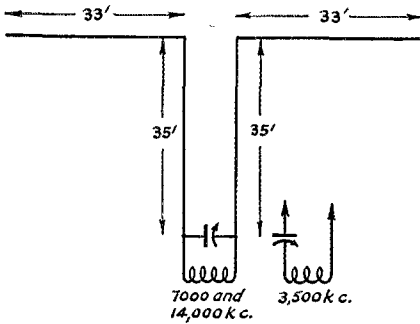


FIG. 5

antenna, the feeder length again requiring parallel tuning. On 3500 kc. the antenna is worked as a simple bent Hertz with current feed, the feeders acting as part of the antenna. The feed point is about right for this band, since the coupling is near the electrical center of the system. On 3500 kc. the tuning condenser is in series.

While this system is theoretically more efficient on the two higher-frequency bands than on 3500 kc., actual tests prove that it is a fairly effective radiator on the latter band. The use of only one series condenser throws the currents somewhat out of phase opposition in the feeders so that they, as well as the flat-top portion of the antenna, will radiate, although not so effectively as the latter.

It is interesting to note that on 14,000 kc. the two antennas are being fed out of phase, which results in a directive effect along a line perpendicular to the direction of the antenna.

With this system it is possible to feed the antenna in the center (which may be an advantage if the best antenna location is one which puts the shack somewhere near the middle of it) and it is not absolutely essential that both halves be in the same line, especially for 14-mc. operation.

Another Key Thump Eliminator

"As the curtain goes up we see a new transmitter tuned to 3660 kc. and all ready to answer a nice CQ. About 30 seconds after the key is first pushed, in gallops T.O.M. (who is a BCL) and tuning to his frequency we hear, 'If you don't stop that π^* ?;@? — noise I'll throw all of this junk out of the window.'

"Yes you've guessed it, dear readers. The whole blamed trouble was key thumps.

"The key in this case was in the filament center tap of my Hi-C Hartley. The power used was 600 volts from a pair of Type 81's and the conventional "brute force" filter. The oscillator was a 'Type '10.

"QST has published plenty of thump-elimination circuits so I thought it would be an easy matter to get rid of my thumps. I tried just about every method I could find to stop them but N.D. I was about to resign myself to quiet hours when I called W1HD and asked him to bring over some more chokes, etc., and I would have one last try before I quit. The next evening W1HD arrived with an assortment of apparatus and an idea for a thump eliminator.

"The circuit he had was found to be very effective. Every trace of a thump on the B.C. set was gone. A listen on the monitor, however,

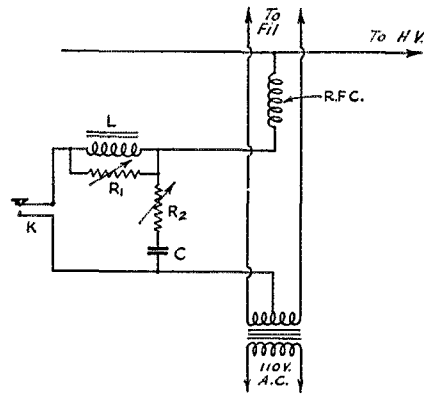


FIG. 6

- L — 30-henry choke, "quarter store" variety
- RFC — 100 turns No. 30 wire on 1" form
- R₁ — "Pilot Resistograd" 0-40 megohms
- R₂ — 200-ohm variable resistor
- C — 4 μ f. filter condenser
- K — Key

showed that the tube would block about every six or seven dashes, which wasn't so good. A small r.f. choke placed in one lead to the filter stopped the tube from blocking, but gave quite a chirp to the note. The choke was tried in the other lead and the chirp also stopped. This r.f. choke is in the correct position in the circuit diagram, Fig. 6.

"Patience will be needed to adjust this filter as the adjustment of the variable resistors is quite critical. It is helpful to have one op. adjust the

resistors and key the transmitter while another listens at the B.C. set. In this way the right adjustment may be found more easily.

"It is hoped that someone else may find this circuit just the thing to stop key clicks and permit operation during quiet hours."

— Frank Hales, W1BBU

Filament By-Pass Condensers

The squib in the October "X" Section stirred up some comment regarding the use of filament by-pass condensers. Following are extracts from some of the letters received:

"I was very much interested in comment made in October *QST* regarding the use of filament by-pass condensers.

"W3ATJ mentioned the fact that under a certain condition in his Type '10 Hi-C Hartley an apparent resonant circuit caused a heavy current to flow in the filament in excess of normal. It may be of interest to the fellows to hear that I have had the same trouble at one time, but having occurred in a totally different set-up.

"While completing and tuning up the xtal transmitter that I use for transatlantic work I nearly lost a 350-watt screen-grid tube from the same resonating effects. When the key was pressed putting this stage, an intermediate before final amplifier, on and off, the filament assumed twice normal brilliancy. At the time I was using two .002- μ f. condensers on either side of the filament. Evidently this caused a resonating circuit tuned exactly to some high-frequency harmonic. I was using high bias on this amplifier and such a harmonic would be highly pronounced. Instead of completely removing the condensers, having been reared to using filament by-pass condensers since the first c.w. days, I detuned the circuit by adding a .05- μ f. condenser directly across the filament leads at the base of the 350-watter. No sign of such resonance was then present and the amplifier works to perfection."

— H. B. Churchill, W2ZC, W1ZC, W3ZJ

Here's another one which checks W3ATJ's experience with the character of the oscillator note:

"In reading the article in the Experimenters' Section, October *QST*, I was very much interested in what Bayard Allen had to say regarding the omission of filament by-pass condensers.

"Although I hadn't noticed any heating in my tube, I purposely omitted the filament by-pass condensers in my single-tube t.p.t.g. after reading the article in June *QST* on push-pull oscillators. I had blown a filter condenser and was getting reports of r.a.c. and near d.c. After eliminating the by-pass condensers all reports were xtal steady with pure d.c. I thought perhaps it was the rearrangement of apparatus, so put the condensers back in, only to get reports of r.a.c.

"I have talked this over with several hams here and on the air, and none could enlighten me

on the cause. Several said that by-pass condensers were necessary to protect the filament transformer from r.f. current.

"I hope more of the fellows try this scheme as the condensers come in handy for receivers if nothing else. Hi."

— Tom J. Boland, W6AJP

"P. S. My filament transformer is still good, after four months without protection."

And now for a negative report:

"I wish to submit a report on one of the items listed in your section in the October, 1930, *QST*. I do not claim that this report is exhaustive in any sense of the word; it is merely the outcome of a few minutes' experimentation.

"I found that by removing the filament by-pass condensers in my fairly Hi-C Hartley transmitter that it reduced the d.c. carrier to a very poor r.a.c. tone, which was not bettered by other adjustments. The note was again d.c. when the condensers were re-inserted in the circuit."

— Dalton Atherton, W6CTP

So there we are; until more data from other experimenters is forthcoming. Let's see if some of the gang can't come across with more information on this subject. It's an easy thing to try, and it only takes a few minutes to drop a line to Headquarters and let us know what happens. Likewise some information would be appreciated on the effect of different sizes of condensers and the effect of different sizes of r.f. chokes. After our experiences with filament condensers and chokes with the push-pull outfit described in last month's issue, we have a suspicion that the better the choke the less need there is for by-pass condensers. We haven't had the time to try it here at Hq. on other circuits, so we're depending on some of the gang with a little spare time — and the experimenter's urge to investigate — to send in the dope. How about it?

Strays

The Burgess Battery Company informs us that the supply of their log books was exhausted several weeks ago, and that they do not expect to reprint them.

A clipping from the radio column of a Manila paper sent in by W5NW states that CMB, Canton, is on the air nightly with a wavelength from 400 to 450 meters. They must be transmitting television!

K4KD has been delving into some ham catalogs and *QST* advertisements and tells us that the low-power transmitter in the November issue can be built for no more than twenty bucks, everything included. Can anybody beat this? — at legitimately advertised prices, of course.

• I. A. R. U. NEWS •

Devoted to the interests and activities of the
INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, Hartford, Conn.

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New Zealand Association of Radio Transmitters
Norwegian Radio Relay League
Radio Society of Great Britain

Reseau Belge
Reseau Emetteurs Français
South African Radio Relay League
Sveriges Sandaramatorer
Union Schweiz Kurzwellen Amateure
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

WE take pleasure in announcing the addition of further concessions to those privileges possessed by amateurs in Switzerland, through recent amendments to the licensing restrictions made by the General Director of Telegraphy in Berne.

The required age for obtaining the station license for an amateur transmitter has been reduced to eighteen years. The fee for the establishment of the station has been reduced from 25 francs to ten. The yearly tax for the transmitting license, including receiving fee, has been reduced from 60 to 40 francs.

Switzerland now enjoys amateur privileges on a par with those granted in many other European countries, and should experience a pleasant increase in amateur activity under the influence of these easier regulations.

From Mr. Earnest Montu, Secretary of the A.R.I., we learn that the amateur radio situation in Italy, precarious as it is at the present time, with few if any licenses issued, is due to become very much worse. A new law which is to be approved shortly — and which may be in effect by the time this report gets in print — will forbid any transmitting by amateurs whatsoever.

Many unlicensed Italian amateurs have been prosecuted and fined, and their sets confiscated, in recent months. The amateur situation seems quite hopeless despite strenuous efforts to secure for Italy the same rights possessed by amateurs in other countries.

The A.R.I. is at present the only radio association existing in Italy, and has nearly five hundred members. Many of them are connected with BCL industrial and commercial firms. The Association dates back to January 1, 1927, and was preceded

by the Radio Club Nazionale Italiano, which was organized in 1924.

The present deplorable status of amateurs in Italy is the more to be regretted when we recall the many prominent Italians who have been instrumental in effecting the great advances of the past. It was particularly in the years of 1923 to 1925 when the immense new possibilities of the high frequency spectrum were first being plumbed, that several Italian stations were active in the work carried on. Of these such names as Ducati, Marietti, and Montu stand out strikingly.

K. S. J. Rancombe, YI6KR, R.A.F. Wireless Station at Mosul, Iraq, reports that he, together with YI1CD in the North and YI6HT in the South of Iraq, are anxious to establish contact with foreign stations on the 7- and 14-mc. bands, chiefly the latter. They will be glad to forward traffic, and QSL.

ARGENTINE REPORT

By Ernesto Rentsch, LU4DA

Owing to the fact that Morse code knowledge is not required in our radio examinations, there are only a very few code stations in our country compared with the total number of licensed stations.

Such code work as is done is accomplished primarily in the 14-mc. band, since 7-mc. is crowded with the 'phone transmissions. Bad weather during the past winter caused a great deal of QRM and even QSS, with the result that 14-mc. activities were not very great.

The local radio club (Radio Club del Argentine) is doing fine work now. The President is Mr. F. F. Delrio (LU2AZ), who possesses the true

amateur spirit. Our radio club organized a contest with Spain on the 14-mc. band, which was won by EAR98 and EAR96 for Spain, and by LU3DE and LU5DY for Argentina.

WSAQU, who operates on board the S.S. *Mumbleaver*, is actually in Buenos Aires.

We send our cordial 73 to amateurs everywhere.

----- AUSTRALIAN SECTION

By W. G. Sones, Director Fed. Publicity, W.I.A.

Interest in the Australian Section of the Union is at present centered in the Federal Convention held in Melbourne, Victoria, on the 20th of October.

It will be remembered that previous mention has been made of the organization of the section. The Wireless Institute of Australia consists of six independent divisions, widely scattered and subject to the six different company laws of the respective states of the Commonwealth, but all similarly constituted. Matters affecting all divisions, or business which extends beyond the borders of any one state is dealt with by a Federal Executive who has his policy defined by a Federal Convention of representatives from all divisions meeting periodically in one of the states. The present convention will be the Sixth Annual Convention.

The agenda paper to be submitted to the convention, in so far as it interests foreign amateurs, is extracted as follows and an explanatory note is detailed against each item. A report of the determinations will be included in the subsequent report.

(A) *Official organ and the title of "QTC."* "QTC" is our official organ and consists of a sixteen-page duplicated monthly magazine devoted to the interests of the amateur movement in accordance with the accepted principles of fellow organizations in other parts of the world.

(B) *Printing of "QTC."* The organ has a necessarily limited distribution, but, due to special subscription drives recently made by most divisions, it is being posted direct to nearly all members. Efforts are to be made to have the journal printed, for the encouragement of advertisements, which are not at present catered to.

(C) *Scientific research and location of Technical Development Section Headquarters.* The T.D. Section corresponds to the experimental section of the A.R.R.L. and the R.S.G.B., and is a comparatively new departure in Australia, although many men have of course been working independently, because of the difficulty of organizing a workable scheme to operate over a large area such as is contained in Australia.

(D) *Fellowship grade.* Membership of the Institute is divided into grades according to the technical knowledge of the member, and it is proposed to suggest an additional and higher grade for distinguished workers.

(E) *International members.* No provision yet

exists for membership in the W.I.A. other than to British-born amateurs.

(H) *Standard frequencies and standard frequency transmissions.*

(K) *Customs tariff on scientific instruments.* Australian tariff on this sort of import is prohibitive, and an attempt is requested to obtain some relief for the materials used in our radio research work.

(M) *Off-wave operation, including commercial stations.* This will probably be discussed under standard frequencies above. The number of international commercial stations operating off wave is equally as serious as amateur off-wave working.

(N) *Recording of amateur achievements, scientific or otherwise.* Refers to historical records.

(O) *Location of Federal Headquarters.* Fed. H.Q. is "located" in one division for a period of twelve months at a time. The Federal Executive, for administrative purposes, then consists of a Federal President, Federal Vice-President, and Federal Secretary elected by the convention from the members of the division in which Federal H.Q. is located. Victoria has been elected as the Federal H.Q. for the past two years.

(P) *Royal Australian Air Force Wireless Telegraph Reserve.* This is an amateur network similar to the A.R.R.L. Army-Amateur Net and Naval Reserve, but for the moment is not operating as efficiently as we would like, due to the financial stringency through which Australia is passing and a possibly unfavorable attitude by the present government of the Commonwealth.

(Q) *Regulation of 'phone on 7000 kc.* Australian amateurs are not restricted to any great extent in the use of musical modulation, but some sort of domestic control is necessary to prevent the useful DX bands being turned into experimental broadcasting bands. The object is to encourage the use of speech and genuine experimental contacts.

(W) *Retention of, and activity on the 3600-kc. band.* This band is only allotted to Australian amateurs temporarily, and representation is desired to ensure its permanent allocation for local traffic.

(X) *Telephone transmission on 1500 kc.* A domestic item referring to the concessions mentioned in last month's report, for telephone operation on the 1715- to 1200-kc. band (175 to 250 m.).

(EE) *Wave band markers.* It is proposed to allot stations which are in a position to maintain a constant frequency, to frequencies marking the extremities of the important bands.

(HH) *56- and 28-mc. transmission.* Research and investigation, and future experimental outlines.

Radio conditions during this past month for international working showed some slight improvement for a few days, but during the latter part of September were particularly bad.

(Continued on page 64)

• CALLS HEARD •

*ST6HL, ST3WT, Mr. T. Hill, 47(B) Squadron,
RAF Khartoum, Sudan*

14,000-ke. band

xau7mc cm2ss ct1aa d4wao d4wer ei2d ei2b ei8b iren ear3g
f8whg f8luf f8cs f8pz f8ex f8rex f8cf f8cdb f8wrg f8wrk f8sh
f8cb f8kwt f8co f8ru fm8eor fm8cr g20d g2nm g2vq g2lz
g2sw g5bt g5ml g5qa g5pj xg5uf g8dh g8vp g8tx g8wt g8nf
g6xn g6wt g6ta g6rb g6wl g6ut g6rm haf8c haf8c oh2nm
oh2og oh3np on2op on6jc on8au on8pf on4jj on6or pa0qf
pa0xf pa0qp pk1cx pk4aj st2c st2a st3wt au1aa sy8rs vp9sr
vq2ba vq2ty v2msn vq4msb vq4cre vq4erf vs3ab vs7ap
wlwv wzlo w1aax w2ckr w2jn w2zc w2el w2avw w2cps
w2avw w3dc w3baq w4ft w8cpc zslb zsc2 zsdm zsw5 ztlt
ztih zt6j zt5r

7000-ke. band

au7kah ap7ax d4abg eu2hs f8pr f8by f8jz g6ta g5bz on4cn
sp3ar sp3bo st3wt ti6kr ti2ft w4ft w5zk w4akh zcls

14,000-ke. band
(On River Nile)

d4aaz d4wao ei8b f8bbd f8cs f8eo f8fem f8kt f8pz f8egb
f8tas f8whg fm8eor fm8smu g2cj g2gm g2lz g5bt g5vq g6dr
g6hp g6nf g6ut g6up kalcm oh3na ok2kt on4bz ou4fa ou4pf
ou4fv pa0ku pa0xf pa0zf pk4po su8rs su8wt st2c vp9sr
v24msb vs7ap ztlt zt2b z4m ap7ax au7kah d4adb eu6ac
eu9ac f8aj f8cq f8kvt f8prx f8whg g2bt g5bt g5pj on4or
on4oj pa0pf su6sw w5act

*W6DQH, Gene Clark, 2948 Telegraph Ave.,
Oakland, Calif.*

7000-ke. band

w1blv w2afo w2ano w2aup w2bpa w2sc w3ajh w2bbb
w3cxl w3md w4abw w4aig w4ajp w4ds w4ey w4ft w4fv
w4lg w4pai w4ql w5ach w5afn w5ako w5aqe w5bah w5bcb
w5bjx w5bld w5bpu w5de w5ds w5ke w5lg w5aj w5uo
w5yw w8aav w8aid w8bos w8cdi w8chg w8ddg w8ded
w8dez w8dti w9adn w9azy w9bjn w9bqu w9brv w9bsj
w9bvn w9chr w9ciy w9cku w9ckq w9ctw w9cwx w9daf
w9doc w9dqq w9dza w9ebo w9ecs w9egu w9ehd w9ehi
w9eqe w9frw w9fnk w9fur w9fxq w9gex w9ggw w9ghy
w9gjt w9gke w9gkt w9gw w9jl w9lf w9ui w9yc k6aog k6boe
k6cmc k6cog k6dmk k6dud k6eln k6sal hclfg jldv jfxc
k7alt kalhr nn1nic ve4ek ve4hy ve4js ve4wh vk5hg x29a
x1aa z1lar z1lbn z1zac z1zbg z1zgw z1zam

*VK4GK, A. H. MacKenzie, Fire Station, Wynnum,
Queensland, Australia*

14,000-ke. band

w2qf w2zg w3fq w5aom w5ql w6diw w6dyw w6eak w6cuh
w6dvw w6ama w6czz w6eup w6sv w6dwm w6azh w6zi
w6il w6dgg w6ban w6dyn w6dio w6fy w6bsk w6vz w6gev
w6sa w6bax w6bsj w6eop w6dev w6hy w6aj w6ud w6dy
w6caj w6pu w6id w6egh w6cil w6ay w6jp w6aw w6dmk
w7be w7ty w7yq w8era w9py w9dfy w9adz w9dqj k6alm
k6erh kalcm ve5bi oa4c oa4t oa4j oa4w oa4y oa4z x9a
x5ms hclfg on4au on4fm on4bz oh3na oh3nq oz7hs ok4rm
ok2op ok2ny ok2si ct1ae vq4erf f8gdf f8hr f8whg f8pz
pk4aj pk4bo pk3bm vu2bg vu2ah d6erh jldq jldr jido
jldv j2cb

*VK3BZ, G. I. Morris, Boundary Road, Mordial-
loc, Victoria, Australia*

7000-ke. band

w1cep w1crw w1ph w2aer w2ais w2amt w2anj w2alu w2ckq
w2kv w2pjz w3amp w3cxl w3gt w4aad w4abt w4acj w4adt

w4agp w4aiv w4ly w4oi w5aea w5axx w5bet w5bic w5bjt
w5bnp w5bmn w5bob w5fn w5mh w5mx w5poi w5rg w5rr
w5uf w5uo w5zg w6amm w6abo w6aep w6aiu w6akb w6am
w6aog w6aqj w6aru w6awy w6bag w6bam w6bax w6bck
w6bco w6bcx w6bht w6bif w6bvs w6bvw w6byb w6cek
w6cie w6cog w6cpb w6cro w6csq w6cub w6czk w6dep w6dg
w6djj w6dn w6doi w6dqw w6dru w6dwi w6eak w6eb
w6eep w6ele w6ely w6emk w6eqj w6ets w6ewl w6exq
w6eyj w6fas w6ft w6gck w6hl w6nta w6gp w6sf w7afi
w7awt w7ke w7qi w7yq w8asg w8by w8dfn w8dpo w8ey
w8sy w8wk w8wo w9adn w9al w9ba w9bca w9bma w9bwt
w9cex w9ckg w9ckq w9dsc w9dti w9eip w9eke w9eqe
w9fal w9gv w9mi w9so kалан kalaw kalca kalel kalhr
kaljr kalpj kalpw kalre ka4hn ka4hw ka6bjj ka6cog
ka6eqm ka7ox ac2ac ac3gr au1szw g5by hh7c jilp jldq
jldr jldv jldy j2vw j3cc j3cq j3cr om1tb pk1cf pk3bq
ve3cz ve5eo vs2af vu2bj xo5et

14,000-ke. band

hclfg hc2jm fr8sb jldr j2bq

V. Suhoski, 26 Ford Ave., Freehold, N. J.

7000- and 14,000-ke. bands

w6aga w6ahp w6aiq w6akf w6amw w6anq w6aqj w6aup
w6aww w6am w6bcd w6bck w6beb w6bge w6bjb w6bjf
w6blp w6bms w6bqk w6byf w6by w6bvh w6bva w6bz
w6bz w6cce w6cf w6con w6cpo w6cto w6cwi w6cwx w6dov
w6djp w6dke w6dkg w6dqj w6dre w6dsi w6dtd w6dvw
w6dyn w6dzz w6dzm w6eak w6egh w6ehy w6ekn w6ell
w6epc w6ept w6eqd w6eqj w6eqw w6eri w6esb w6etu
w6ewm w6eeg w6eek w6ejf w6ej v6kt w6qy w6re w6ud
w6uf w7acq w7afo w7afr w7aij w7aok w7ek w7vq ear2 ear6
ear21 ear23 ear28 ear69 ear86 ear113 earc7 hclfg hc2ea
hc2jm fr8kr fr8ot fr8bu fr8ya fr8kp fr8cp fr8be fr8j fr8lk fr8ca
fr8jc fr8j fr8ix fr8i fr8fm fr8gm fr8ap fr8cn fr8ssw fr8ua fr8ta
fr8tn fr8sm fr8tv fr8nox fr8rn fr8vv fr8nf fr8sr fr8yb
fr8orm fr8lan fr8hp fr8brv fr8et fr8mp fr8lj fr8k fr8t
fr8r fr8jn fr8fd fr8m fr8xd fr8f fr8l fr8b fr8s fr8eo fr8wb fr8fa
fr8la fr8ln fr8lh fr8jt fr8xo fr8ie fr8fv fr8mr fr8da fr8fo fr8ca
velbr velco velap velidm velida velap velid ve2ax ve2co
ve2fo ve2al ve2ci ve2bb ve2au ve2ac ve2ca ve3fm ve3ael
ve3az ve3xq ve3pn ve3ur ve3bk ve3er ve3ea ve3of ve3wk
ve4dw ve4ea ve4aq ve4hs ve4fz ve4bt ve4du ve4al ve4hh
ve4gg ve4fx ve4bu ve4bq ve4fe ve4hp ve4fk ve4ya ve4bb
ve9aq vo3ae vo8azs vo3em vo8me vo8z vo8mr xlnq xlj
xlp xln xlg xlr xlk xlx xlaa xlaf x3y x5c x5n x9a sniaa
d4uj d4abf d4aban d4zz d4yo d4dq d4yt d4aap u0pp u0wy
u0ky u0kl oa4x oa4z oa4j hh7c pylax pyler pyljh pylia
pylam pylib pylaw pylia pylao pylaq pylal pylad pylan
pylik pylic pylbr pylar pylbv pylbk pylaf pylid pylca
py1ah pylcm py2af py2ab py2ag py2id py2iz py2as py2db
py2es py2az py2bo py2bf py2vv py2bk py2ay py3ah py6aa
py7aap on4hc on4wm on4sz on4rs on4ax on4au on4au on4bu
on4fe on4ic on4xs ya1x g2lz g2gc g2od g2nn g2bz g2dz
g5dh g5pz g5xy g5lh g5by g5ma g5ml g5kl g5bd g5yx g5yk
g5ol g5td g6og g6tk fr8fg g6hp g6bz g6ig g6dr g6wt g6yp
g6dh g6wy g6qb cn8st cn8mb cn8ags za8vx ct1ae ct1fp
ct1bk ct1ai ct1bx ct1by ct1ef ct1aa ct3aw ct3fz ct3am
ct4am ct4bc z1lx z1lat z1lac z1zbg z1zgc z1zaz z1zbe z1zas
z1zbp z1zaw z1zai z1zax z1zar z1zac z1zbn z1zdm z1zdn oz7ab
oz7ah oz7ly oz7zg vk2dy vk2bw vk2hp vk2ds vk2cm vk2xa
vk2vx vk2ay vk2dy vk2bb vk3ba vk3av vk3ag vk3fr vk3ai
vk3wm vk4bg ex2ak ex2as ex2af ex2ah cx1am cx1ed cx1bu
cx1fb lu1af lu1ba lu1lp lu1aw lu1ab lu2pa lu2ga lu2ah
lu3de lu3dh lu4dw lu4hd lu6fe lu7bb lu8de lu8cb lu8bg
lu8dp ilay ilma ildm iler ilce ildl ildp ilgw ilfp ilcs
ilgi ilea ilab ilmg ilbs ilgc ildo ilcoc im2pa ti2ea ti2aar

(Continued on page 84)

• CORRESPONDENCE •

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

A High-Power Holiday?

4915 N. Sawyer Ave., Chicago, Ill.

Editor, QST:

Mr. QST Editor, I would like very much to sit down with The Old Man, the Grand Old Man of amateur radio, and unburden myself of some thoughts — make a heart-to-heart confession as it were. I cannot afford to galavant all over the country, tagging around after him, because Heaven and you alone know where he is and neither of you will tell. About the time I thought I was close on his heels in one district he probably would be over in another. So about the best I can do is to write out my yarn and you can pass it along to him to see what he thinks of the idea — a three-year “High Power Holiday.” Well, here goes, and I hope The Old Man is comfortably seated, the pipe properly filled with plenty of tobacco and hitting on all eight, the cat peacefully sleeping and the static nil.

Ever since I first heard the magic word “wireless” there was enough mystery in it to fascinate me. I investigated it year after year and have been investigating it ever since — only to find that now we call it “radio” instead of wireless. The investigation has been a mighty expensive experience but it also has been quite a productive source of real enjoyment throughout these years, with a thrill here and another there. Of course, it all goes back to those days when radio was “in its infancy” and a spark transmitter was a nuisance, and we knew it but wouldn’t admit it. Why, if any amateur would dare to use a spark transmitter today, he would bring the wrath of the whole country upon himself. Such a transmitter would blanket two of our amateur bands and wash out all the commercial and government stations in between the bands and on both sides for quite a few kilocycles. You know, those old spark transmitters never used less than 250 watts according to the transformer rating, but no honest Old Timer will deny that a good many of them were pulling 15 to 20 amperes from the 110-volt house line. And the funny part of it was that only a few of them were able to do any real DX like we do with our c.w. tube transmitters. Five hundred miles was good DX, 800 miles was very good and when somebody clicked off 1000 or 1200 miles that was something to write to A.R.R.L. Headquarters about.

And that is what brings me to my feet and that’s what makes me think we are burning a lot of power — in fact, wasting it unnecessarily.

Not only that, but we actually boast and brag about the amount of power we use, when we ought to be ashamed of ourselves for even mentioning it. Oh, yes, I’m right in the same boat. I’ve had what might be considered high power ever since two-kilowatt transformers have been rated at one kilowatt, and I’ve been operating a c.w. transmitter that uses two 250-watt tubes. I’m not throwing bricks at anybody — I’m thinking of my own misguided efforts, too.

We talk up the fact that we United States amateurs have the cream of it all. We are allowed to use one kilowatt of power input (if we can afford it) when amateurs in another country are allowed only 10 watts. We are permitted to use any part or all of the amateur frequency assignments while amateurs in some other country get but small slices of one amateur band. Yes, and there are some who even kick about this — they want more frequency and they even get up petitions about it. Why we used to shudder at the thought of what would happen to us if we had been restricted like the Canadian amateurs were back in those days! They could use one kilowatt of power on 50 meters. A very generous allocation it would be today, but in those days it was enough to crush the spirit of any but the most persistent amateur. It was just that much more hair in the vaseline.

I value the advice of The Old Man above all others. To me, his word is the final word in amateur radio — with all due respect to A.R.R.L. officers and directors. And that’s why I’d like to see how he feels about these things. Suppose we could find out how the whole amateur fraternity feels about this three-year “High Power Holiday” and suppose the great majority was in favor of it. Then, suppose we could send a couple of A.R.R.L. officers down to Washington to ask the Federal Radio Commission to listen to our story. Suppose these officers told the Federal Radio Commission that we amateurs want to declare a “High Power Holiday” and that we request the necessary authority which would permit us to use nothing larger than a Type ‘10 tube in the output stage of our transmitters. There would be no power limit, of course. If some amateur was skillful enough to sock 100 watts into that tube and get 99 watts out — hats off to him. Suppose we asked the Federal Radio Commission to make such a regulation — what would happen? There would be set up such a yell as you never heard before — such a yell that we wouldn’t need transmitters; the yell would be heard ‘round the

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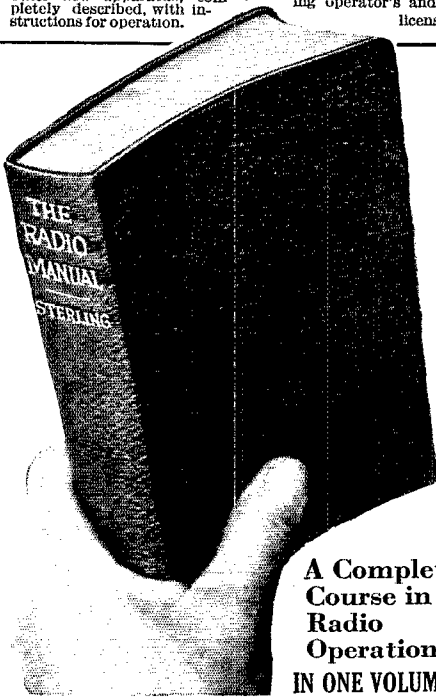
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The author, *G. E. Sterling*, is Radio Inspector and Examining Officer, Radio Division, U. S. Dept. of Commerce. The book has been edited in detail by *Robert S. Kruse*, for five years Technical Editor of *QST*, the Magazine of the American Radio Relay League, now Radio Consultant. Many other experts assisted them.

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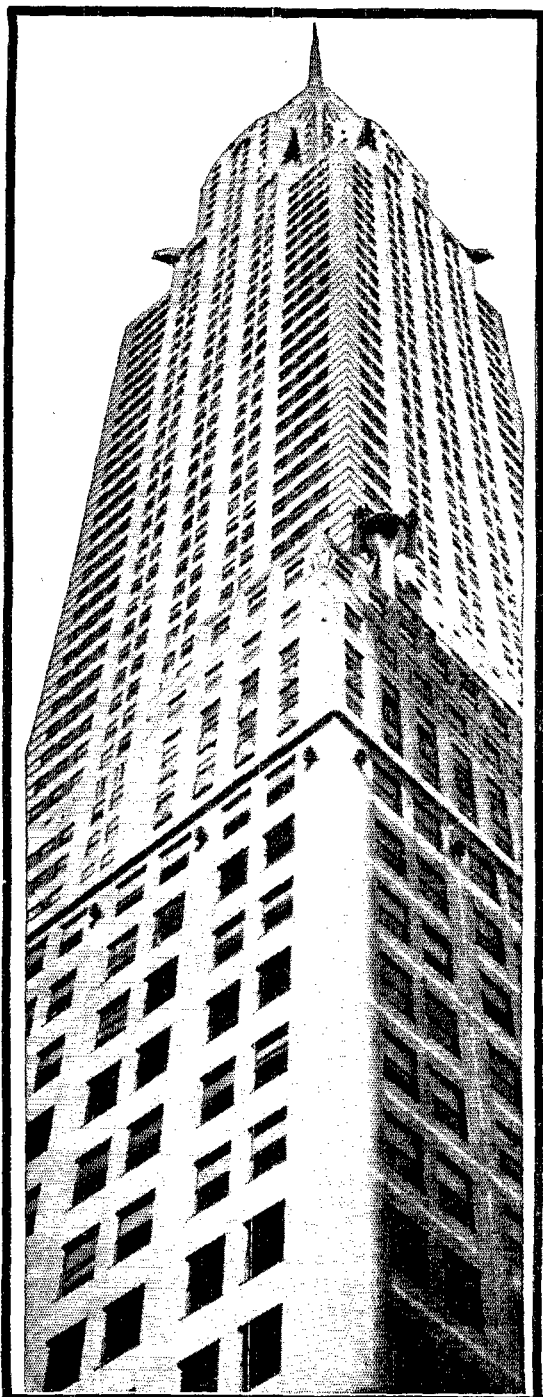
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world and petitions would grow on antennas. Yes, but if we all agreed to abide by it, what more could we do?

What would we do with all our high power apparatus? Well, what did the Navy do with the battleships when the Ten-Year Naval Holiday was declared? Scrapped them!! We wouldn't have to scrap our apparatus — we could lay it away and if the low-power idea didn't work out for the greatest good of the greatest number, then we could start right up where we left off, and undoubtedly with a lot of new ideas for greater efficiency. Any amateur who can afford to buy 250-watt tubes and burn the power for them can afford to lay them away for a time and try the low-power idea. It must be given a fair chance and no half-hearted effort is going to be worth the candle. One year would be too short a time for such a radical experiment. I think that by the time two years had gone by we would commence to appreciate what could be done with such a transmitter and by the time three years had gone by we wouldn't care a hoot about the high-power transmitter.

The "High Power Holiday" idea may be a radical one, but thoroughly reasonable and a practical one. We know that a 250-watt transmitter located in New York is capable of putting a signal into Australia. And, we know that a transmitter using but a single Type '10 tube is capable of doing the same thing. We know that amateurs in some countries use not more than 10 watts of power and yet they put good signals over to us. A 10-watt transmitter of high efficiency is much better than a 1000-watt transmitter of low efficiency, all things considered. Who is there to say that we cannot make our low power transmitters more efficient than anything we have to-day? Who will say that we cannot discover some entirely new transmitting and receiving antennas and who will say that we cannot develop more sensitive, more selective and better receivers? Who will say that we cannot do satisfactory long-distance communication with the power that can be put into a Type '10 tube? And who will say that such a scheme wouldn't give each and every amateur a better chance to display his knowledge and ingenuity and make him strive for highest efficiency? Well, who would? I believe we have enough frequency bands in which to accomplish these things and to that belief I shall stick until I have concrete evidence to prove otherwise.

Not so long ago I saw a motor-boat race in which five motor boats participated. Each boat was exactly like the others, the same size, shape and weight. The motors were alike, the rudders were alike and each one used the same quantity and the same quality of gas and oil. No changes were permitted, other than adjustment of gas and oil mixture. The race was to see which boat would travel the greatest distance in the least time. The chap who won it actually walked away from the others. Why? Because he knew how to adjust his gas and oil mixture for the greatest power and the highest speed over the greatest distance. Why not try the same idea in amateur radio?



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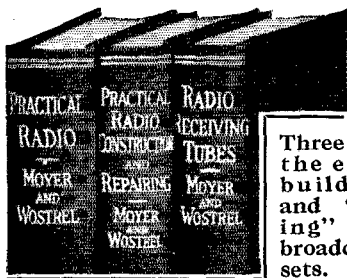
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Name

Home Address

City and State

Position

Name of Company QST-1-31

I suppose I am laying myself open to the rankest kind of criticism, but the rankest kind of criticism is of more value than no criticism at all. The amateurs who are using well-designed and carefully operated high-power transmitters will agree with me, in all probability. The ones who are using haywire and makeshift high-power transmitters and who are forever kicking about rotten results will yell the loudest. I've seen one or two of these petitions that have been going the rounds lately and the instigator of them will have another job of petitioning — but let him petish to his heart's content. Surely no sane and independent thinking amateur will swallow such rot and forsake the sound principles under which he has been operating these many years.

Remember, this is only a suggestion — it doesn't mean that we have to do it. It doesn't have to be decided to-day or to-morrow — or ever, for that matter. Let's think it over for a couple of months. Let's talk about it at our conventions and let's find out if we think we ought to try it. *QST* is the place to express ideas — I know of no better place for such expression, and *QST* doesn't have to be crammed full of technical dope each month, either. If you have any ideas, express yourself and don't wait for George to do it. George may be waiting for somebody else. Do you have a card? Would you be so extravagant and go so far as to risk one? Well, do as you see fit — after all, you are the doctor and as you go, so goes amateur radio.

— F. H. Schnell, W9UZ

S.F. and QRM

Ensenada, P. R.

Editor, *QST*:

Don't these off-frequency hounds think they are detriment enough to amateur radio as it is without putting out a "prehistoric signal" 25 kc. wide, so they can jam the Standard Frequency Transmissions on 7300 kc? Evidently they do not.

Just five minutes ago I finished covering the W9SI transmission, 7000 to 7300 kc., in an attempt to check the calibration of my monitor. Thanks to the "W" stations in general, there being too many guilty ones to specify any one station, I got not one single point that even approached accuracy. The straw that broke the camel's back was W2 — with a poorly rectified and filtered signal parked about 10 kc. out of the band, but broad enough to interfere with W9SI on 7300 kc. and prevent obtaining a decent calibration point.

It is shame enough that amateurs cannot stand by a few minutes once a week to receive the Standard Frequency transmissions, but when a bird who needs to use these transmissions as much as the station mentioned — and much more than the man he prevents from using them — covers a Standard Frequency Transmission with his off-frequency signals, then it is time to call a halt, unsheath the Wouff Hong, Old Betsy and the Rettysnitch, and start operations.

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"For strenuous power equipment applications, CeCo's type 866 tube has achieved industry-wide recognition. It takes 7,500 volts peak and delivers .6 amps. load current with only 15 volts drop in the tube. Engineers describe the 866 as a veritable power house in itself. May we send full information?"

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1. The type 866 as well as all other power tubes are tested under actual operating conditions on CeCo's own station WIXAC.
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3. CeCo Radio Tubes are licensed under the patents and applications of the Radio Corporation of America and affiliated companies.



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PROVIDENCE, R. I.**

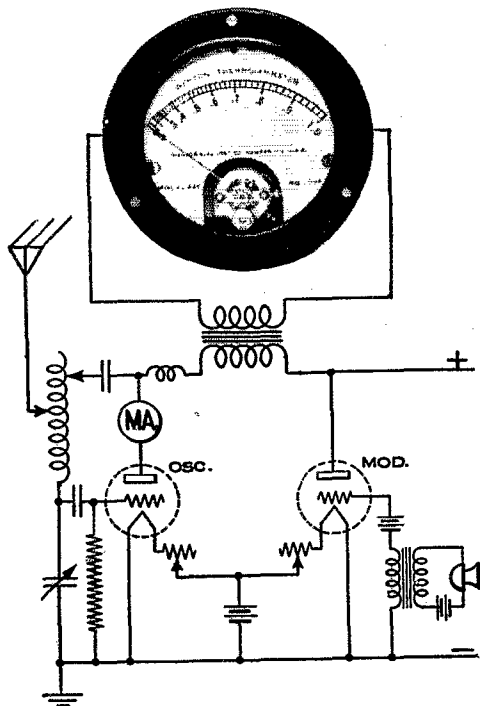


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*They're better or
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MODULATION METER

for direct reading in percent of full modulation . . .



Here is the meter that transmitting amateurs have long needed for assuring maximum efficiency from their equipment. It is a dependable means for measuring directly the percentage of modulation.

This new Modulation meter, a Model 425 Thermo-couple type Ammeter with a scale of one ampere, is used in conjunction with a special transformer, connected as shown in the diagram above.

The primary of the transformer is placed in the plate circuit of the oscillator tube on the modulator side of the r.f. choke. The meter is connected across the secondary. Reactance of the modulator tube on the oscillator can then be observed directly on the thermo-ammeter.

When ordering, specify the D.C. plate current of your oscillator tube. This value is necessary in determining the size and ratio of the transformer to be used with the Modulation meter.

Further details on request

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602 Frelinghuysen Avenue Newark, N. J.



This is closed with the secret prayer that the S.F. stations may soon send out "under cover" schedules to those who do use the transmissions, so that the birds guilty of jamming them can either be outwitted or lose 24 hours sleep in their eagerness to spoil them. I, for one, would like to calibrate a new dynatron frequency meter. The prospects at present appear to be very slim.

— E. W. Mayer, K4KD

Commercial Stations

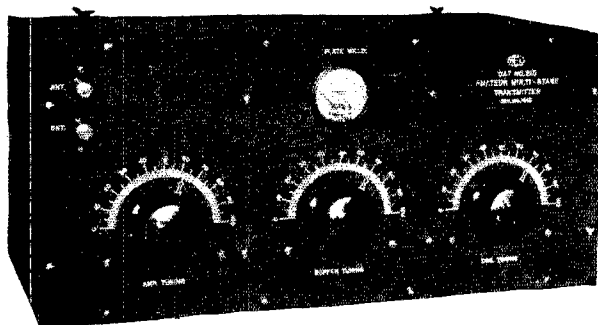
8 Old Military Road,
Saranac Lake, N. Y.

Editor, QST:

I have noticed mention made in QST now and then of instances of "rotten" commercial short-wave operation; of the poor quality of waves as compared with the better amateur waves, as well as instances of operation in amateur bands. It is true that there are many commercial stations in regular operation whose waves not only waste valuable space and cause unwarranted interference (for example: The key clicks of certain stations which extend over a part of an amateur band, even though the station producing them is outside) but would be a positive disgrace to the rankest greenhorn amateur. It is a credit to the amateur that there are many stations in his bands that cannot be surpassed in respect to excellency of emission, and that a very large number of amateur waves are of a standard far above that of an equal number of commercial stations. When one considers that in most cases these results are obtained with limited cash outlays, it is even more remarkable. There is an efficiency demonstrated in this respect that would grace any commercial engineering department.

Instances of off-wave commercial operation generally go unnoticed unless one of them wanders into an amateur band. The truth about the situation would make the amateur have considerably more self-respect. If anything can be relied upon to strengthen the amateur's status at International Conventions, it certainly would be a comparison of amateur behavior with that of some — and not a few — of the commercials. Unfortunately, commercial wanderings from the straight and narrow are quickly hushed up. One concern recently had all its licenses temporarily suspended on account of evidences of poor engineering. Another, one of the large airways systems — and one which is frequently taken as an example of this important application of short-wave radio — is assigned one of the channels in the neighborhood of 5600 kc. Its stations, both ground and plane, are regularly found at distances up to 100 kc. from the assigned channel. It has even been rumored that their plane stations are deliberately spaced at 30-kc. intervals. Whether this is true or not, the waves are far enough apart for it to be. There is not a plate supply in any of the score or so of ground stations that has enough filter to give any semblance of d.c. in the wave. At a distance of one mile the buzz from one of them blankets some 200 kc. And yet there is a continual howl over interference to and from a rival system

What Transmitter for 1931?



REL presents a super unit for C.W. transmission. 1931 Standards are tighter than ever. A clear signal will be your ticket to transmit, without it — you'll be left in the cold. This kit measures up to every specification. It is a triumph of REL's engineering and research. Look over these features and tell us if any more need be said.

1. Kit is furnished with all necessary parts including metal case, drilled engraved aluminum front panel and instruction book.
2. Extremely simple to operate.
3. Consumes minimum amount of power.
4. Employs standard broadcast receiver tubes.
5. May operate from B batteries, B eliminators or similar 300 volt DC source.
6. It is a complete low power transmitter ready to operate.
7. Employs UY-227 master oscillator tube, UY-224 screen grid buffer tube and UX-245 power amplifier tube.
8. Will deliver 10 watts to the antenna as a CW telegraph transmitter.
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10. Kit includes one set of plug-in coils for any of the three popular bands. When ordering specify for which band. Additional coils to cover other bands may be purchased for \$7.00 per set of three.

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Write for our large loose leaf handbook full of information, kept up to date by regular bulletins. Price only 50c.

Our booklet 50 describes this Modern Short Wave Transmitter together with a "bang up" Receiver.

Write for it, It's FREE!

RADIO ENGINEERING LABORATORIES, INC.

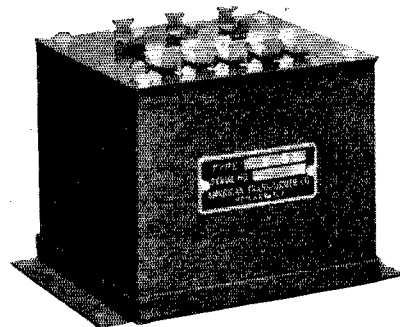
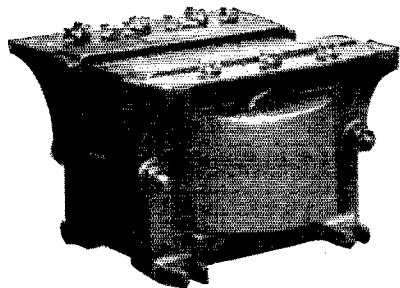
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Q. S. T. 1-31

which operates stations in the same cities, with similar waves, which wobble all over the place in the bargain. The engineers of the two concerns would cheerfully cut each other's throats. It is unfortunate that members of the same profession cannot keep in harmony — to say nothing about some of the other things which are unfortunate. The stations of these systems might have been up to date in 1923 — some of them wouldn't have been up to date in the middle ages. The Federal Radio Commission would have little to worry about in the matter of compressing channels if the commercial systems had stations as good as the better amateur stations. It seems very strange that a commercial system should have stations that are anything but equal to the best amateur stations.

If one were to be asked what the ultimate form of short-wave radio communication is likely to be, and reply, "pure waves of constant frequency," most engineers would agree; not always because they believed in it, but because they reluctantly realize that the primary consideration on short waves is conservation of space. Whims and fancied notions about modulation "because it sounds pretty" or carries better, must all be discarded in consideration for the other fellow.

And yet if one were to answer some engineers this question by "Quartz Control" or even mention quartz control, they throw up their hands in horror. The idea of quartz control on an airplane seems to be inconceivable for some reason or other, and in some cases, even for ground stations. Most of the self-excited plane sets wobble all over the place.

It is common knowledge that the radio departments of some of the airways made a black eye for radio by floundering around for months before they found out how to maintain plane communication. It is unfortunate that the officials of the companies didn't consult the A.R.R.L. as to where to obtain good radio engineers.

It doesn't seem to be generally realized how many radio engineers started as amateurs, but the A.R.R.L. certainly performs a useful work in this direction. I have also noticed that *QST* and the *Handbook* are usually in evidence around most commercial stations. I have seen an engineer poke his nose into the *Handbook* and then go and tickle up a 20-kw. tube. I wonder if it is noticed that not a few contributors to the *I.R.E. Proceedings* have "amateur radio operator" at the beginning of the outline of their careers.

I am not ashamed of the fact that I went through all the stages of an active amateur, and as a result, now rely on radio for my bread and butter.

Yours for Alma Mater A.R.R.L.

— E. G. Watts Jr.

14-Mc. 'Phone

Box 83, Savannah, Ga.

Editor, *QST*:

After reading the letters in the November "Correspondence" I am tempted to say a word or two about the one from OM W4LY.

YOU'RE WANTED *for a*

Big Pay Radio Job

Amateurs — you are just the men Radio wants for the many \$50, \$60, \$75 and \$100 a week jobs opening every year.



Why not capitalize on work that is fun to you — get in the field — get some of the good jobs that are opening regularly? My Employment Department is getting three times as many calls for graduates this year as it did last year.

Pick the job you want. I'll train you quickly to fill it

You've got a good start towards success in Radio. You are the logical man for this work — you are deeply interested in Radio — and with a little more preparation I am sure we can fit you for one of Radio's good jobs. Many amateurs have stepped into fine jobs after completing my course. Read their letters in my book "Rich Rewards in Radio."

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Principles underlying Television, constructing Television experimental apparatus, Radio's use in connection with Talking Movies, by Railroads, in Aviation, Broadcasting Stations, Shipping Companies — not one branch, but all of them are covered by my training.

Lifetime Employment Service

I not only train you quickly and inexpensively at home during your spare time, but when you graduate I help you find a job. The services of my Employment Department will be open to you as long and as often as you need its help.

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The day you enroll I will send you an agreement legal and binding upon the Institute to refund every penny of your money when you complete my course if you are not satisfied with my lessons and instruction service. You are the only judge.

Get my book at once

I couldn't begin to tell you all about the many features of my training in this small space. So send for my book. It won't cost you a cent and you won't be under the slightest obligation. Clip and mail the coupon at once.

**J. E. SMITH, President,
National Radio Institute,
Dept. 1AE2, Washington, D. C.**

	Broadcasting stations need trained men continually for jobs paying \$1,800 to \$5,000 a year.
	Operators on board ships see the world with practically no expense and make \$85 to \$200 a month besides.
	Servicing sets is paying N.R.I. men \$200 to \$1,000 a year in spare time.
	Hundreds of operators will be needed soon for commercial land stations being opened in our leading cities.
	Radio Factories employ thousands. Salaries for well-trained men range from \$1,800 to \$5,000 a year and over.

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Dear Mr. Smith: — Send me your new 64-page book "Rich Rewards in Radio."

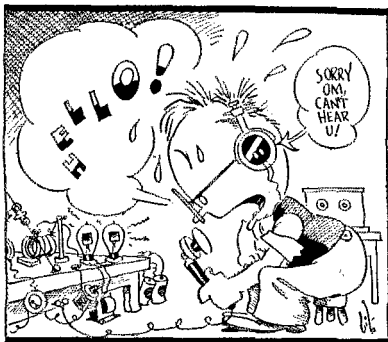
Name

Address

City State

—and for the 'Phone Man!

ONE whole chapter of the Seventh Edition of *The Radio Amateur's Handbook* is just chock full of 'phone information, much of it heretofore unpublished. From actual experience with 'phone transmitters and years of technical background, this chapter has been written especially by *QST's* Technical Editor, James J. Lamb.



Don't go through this —
profit by experience!

Do you know: What's wrong when the antenna current "modulates down"?... What tubes are the best modulators, and why?... How to adjust a linear amplifier?... When the modulator is overloaded?... The proper tube combination for 100% modulation with a desired carrier power?... How to determine the right operating conditions for any modulator tube?

These and scores of other questions gleaned from actual ham experience are answered for the first time. This chapter of the Handbook could be the basis for many a book on radiotelephony. It is up-to-the-minute and applies to all radiotelephony from watts to kilowatts — broadcast transmitters too. You cannot operate a radio-telephone intelligently until you have read this chapter of the *new* —

RADIO AMATEUR'S HANDBOOK

\$1 Postpaid
Anywhere

AMERICAN RADIO
RELAY LEAGUE
HARTFORD, CONNECTICUT

I thoroughly agree with him that the new regulations regarding plate supplies seem to have been overlooked by the boys and that all the a.c. and broad r.a.c. sigs seem to have drifted down to 14 mc. But I certainly cannot agree with his 14-mc. 'phone dope.

Now please don't anyone say that this letter is just the comeback of another 'phone man. I've always been a c.w. ham and have never in my life owned or operated an amateur 'phone.

I agree also that an amateur extra first does not mean that a man knows enough about 'phone to rate it on 20. Lots of fellows with temporary tickets have forgotten more about 'phone than some "extra firsts" including commercial extra firsts.

But here is the part that didn't "go over." I think it would be a crime to prohibit 'phone operation between 2 p.m. and 9 p.m. on 20. Don't the 'phone boys like to work DX as well as c.w. boys? When a 14-mc. 'phone works DX he has really done a piece of work that no c.w. contact could equal. Cut out his operation between 2 p.m. and 9 p.m. and how many U. S. A. contacts could he make, let alone DX?

Also, I have yet to hear a 'phone sig as broad as even the "sharp" r.a.c. sigs and I've worked about 80 percent of the 'phone boys on 14 mc. (with me using c.w. of course). As for a bum 14-mc. 'phone — well, they seem to be scarce animals. Either it's a good 'phone or the operator doesn't get out with it and therefore loses patience and improves it or goes back to c.w. I have only heard one loop-modulated 'phone since the band was opened. I know the ham who had it and he is using c.w. now.

Give the fellows their due. I can name a page full of 14-mc. 'phones that are just as fine as any B.C. station I've ever operated, and I've nursed several.

— Jas. R. Donovan, W7OC-W4WZ

I.A.R.U. News

(Continued from page 62)

28-mc. activity obtained considerable impetus from a contest arranged by the Federal Technical Director, Mr. Max Howden, VK3BQ, beginning on September 6th. It is too early to discover exactly what results have been obtained, but many interesting contacts were brought off between stations in various States and New Zealand.

It is reported unofficially that VK5RW, using 2½ watts input, established contact with AU1ZD, and VK5DN is also credited with a contact with ZS5U in South Africa.

These two contacts were made by amateurs in South Australia, but no reports have been received from members of the other divisions.

BRITISH NOTES

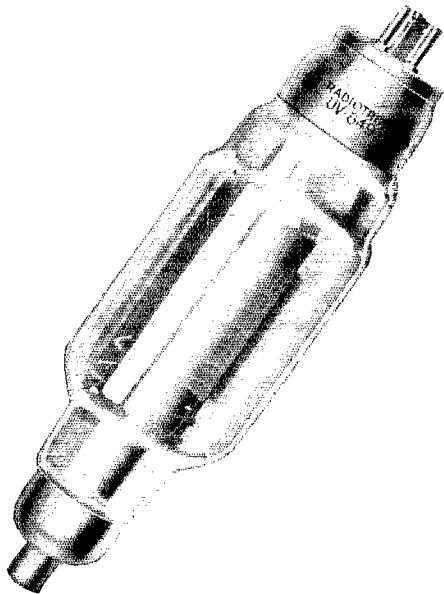
By J. Clarricoates, Hon. Sec'y R.S.G.B.

Preparations are being made for the Empire Radio Week arranged for the period 0000 GMT

(Continued on page 66)

RADIOTRON

UV-849



UV-849 Rating

Filament Volts 11 Filament Amperes 5
Amplification Factor 19

Modulator

Plate Volts	2000	3000 Max.
Grid Bias Volts	-87	-132
Plate Current (ma.)	60	100
Plate Resistance (ohms)	4000	3200
Plate Dissipation (watts)	300	Max.
Oscillator Input Watts for each		
UV-849 (Mod. Factor 0.7).	110	350

Oscillator and RF Power Amplifier

Max. Operating Plate Voltage—		
Modulated DC Plate Volts	2000	
Non-modulated DC Plate Volts	2500	
Max. DC Plate Current (ma.)	350	
Max. Plate Dissipation (watts)	400	
Power Output (watts)	350	
Net Price	\$168.00	

IT is but natural that Transmitting Radiotrons should be the unqualified choice of engineers and amateurs everywhere, for behind them are unrivalled laboratory facilities and the longest experience in commercial manufacture of power tubes.

Rated conservatively, Transmitting Radiotrons will give long service and endow your transmitter with a "real punch". All tubes sold by the RCA Victor Company are guaranteed without reservation to be free from electrical and mechanical defects.

Radiotron Type UV-849 (illustrated above) is an excellent general purpose tube as it can be used as an Oscillator, Power Amplifier or Modulator.

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Give your Radio a fresh start for 1931

New tubes give new life to your set. Install a complete set of Cunninghams throughout and enjoy modern reception.

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New York / Chicago / San Francisco
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Sunday, February 22nd, to 2400 GMT Saturday, February 28th, 1931. During this week the British stations throughout the world will concentrate upon working other Empire stations, with the object in view of fostering and increasing radio friendships. It is expected that a trophy will be presented to the station effecting the most contacts. This will be known as the "British Empire Radio Challenge Trophy" and will be competed for annually. B.E.R.U. stations will take a leading part in these tests, and all reports and claims must be forwarded to London via the B.E.R.U. official representatives. The increase in our colonial membership continues rapidly, and it is hoped the 500 mark will be reached prior to the commencement of Empire Radio Week.

The British Empire Link Stations have now been appointed, and it is anticipated that very valuable service will be rendered. Colonial E.L.S. are being appointed by the B.E.R.U. and with the agreement of the colonial national societies concerned. Overseas members desirous of receiving the appointments should approach their B.E.R.U. representative. If no member is acting in that capacity in their country they should write direct to the Society Headquarters, 53 Victoria Street, London, S. W. 1.

Many messages have already been handled by the Link stations, and it is expected that all urgent overseas traffic will eventually pass in this manner.

The 28-mc. tests which have been arranged to take place on the four Sundays during January, 1931, are likely to prove even more successful than those held during 1929 and 1930. Amateurs throughout the world are requested to cooperate and report immediately to the R.S.G.B. Contact Bureau Manager, Mr. Powditch, Porth, St. Columb Minor, Cornwall.

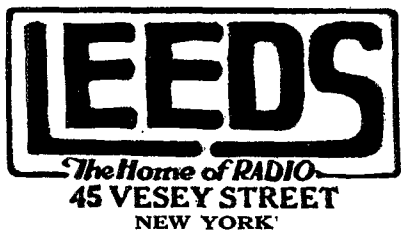
The R.S.G.B. anticipate partaking in the Schoolboys' Exhibition to be held in London during January, 1931. It is realized that the future of amateur radio lies in interesting the youth of the world, and we seriously suggest that amateur organizations attempt, whenever possible, to introduce the idea of amateur radio to Boys' Clubs, Scout Troops, etc. Publicity is our most successful method of increasing interest in the amateur cause. The R.S.G.B. realizes its importance, and trusts that other societies will leave no stone unturned to bring our common interests before those who may eventually prove to be our successors. (We concur most heartily in the statements made in this paragraph. A few practical suggestions in this regard were made in another part of the December, 1930 issue of *QST*, and more will follow from time to time.—*C. B. D.*)

It is not proposed to mention radio conditions in these notes as such information is obsolete by the time the notes appear in print. We would recommend other societies to follow our example on all occasions, except when some important achievement must be recorded.

We shall be glad to send information concerning the R.S.G.B. to any amateur anywhere in the world.

BIG JANUARY BARGAINS

- Acme 500-watt transformer, 1500-2000 volts each side of centre **\$21.00**
- Acme transformer to change 220 A.C. to 110 A.C. — 250 watt **\$10.00**
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- Acme variable ratio audio transformer..... **\$1.65**
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- General Radio audio transformer, 3 to 1 — 6 to 1..... **\$1.85**
- General Radio transformer, 600-0-600 volts; 2-7½-volt fil. windings..... **\$13.50**
- Thordarson "B" Eliminator transformer, 285-0-285..... **\$1.65**
- Thordarson 150-watt power transformer, 400 volts each side of centre, 5 volts fil. centre tapped **\$3.50**
- Radio Foundation, 2¼-volt, 10-amp. transformer for 866 tubes **\$2.45**
- Sangamo A.X. audio transformer; list \$6.00. Our price..... **\$2.45**
- Sangamo Push Pull transformer for dynamic speaker; list \$13.00. Pair..... **\$4.45**
- Emcotran Push Pull transformer; list \$10.00. Extra special per pair..... **\$2.95**
- Special 866 filament transformer, 2¼-volts, 10 amps. 10,000-volt insulation..... **\$5.45**
- Cardwell .0005 variable condenser **\$3.00**
- Cardwell No. 201E condenser; adjustable stator for short wave..... **\$2.40**
- Cardwell .00045 transmitting condenser; list \$10.00. Special..... **\$7.00**
- National new type short-wave tuning condenser; 500 mfd..... **\$2.10**
- National new type short-wave tuning condenser; 100 mfd..... **\$2.25**
- National .0005 variable condenser..... **\$3.00**
- National .001, variable condenser..... **\$3.30**
- Aerovox 8 mfd. dry electrolytic condenser self heating; 400-volt D.C..... **\$1.45**
- Aerovox 5000-volt test .002 condenser..... **\$1.45**



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 IN STOCK

- Flechtheim 2-mfd. condenser; 2000 working volts..... **\$9.00**
- Siemens 2 mfd. 2000-volt condenser; buy this on our recommendation..... **\$8.10**
- Dubilier Condenser 400-volt D.C. working voltage; type 902 — 3 mfd..... **\$1.35**
- Dubilier Condenser 400-volt D.C. working voltage; type 902 — 7 mfd..... **\$1.75**
- Thordarson double choke 18-Henry each at 250 M. 108 ohms D.C. res..... **\$6.25**
- Thordarson 30-Henry 150-mil. choke; only a few left..... **\$3.25**
- Hammerlund 85-mil. radio frequency choke..... **\$1.20**
- Silver Marshall No. 243 — 150-Henry audio choke..... **\$9.79**
- G.E. ¼-watt Neon tube..... **\$6.65**
- G.E. 2-watt Neon tube..... **\$7.75**
- Standard electric socket for above tubes..... **\$1.15**
- Bunnell spark gaps; list \$4.00. Special..... **\$1.00**
- Aluminum shield can; 5 x 6 x 9 **\$1.85**
- National, type "B" vernier dial **\$1.50**
- Marco vernier dial, 4-inch..... **\$7.75**
- No. 12 enameled copper aerial wire, per foot..... **\$0.1**
- No. 10 enameled copper aerial wire, per foot..... **\$0.1 ½**
- Magnavox microphones; special **\$6.69**
- Frost hand microphone; list \$6.00. Special..... **\$3.25**
- Mesco transmitting keys No. 101 **\$9.95**
- Murdock 2000-ohm headset; special..... **\$1.65**
- Pyrex lead in bowls, including hardware; per set..... **\$2.25**
- General Radio super het. kit, includes 3 intermediate transformers, 1 input transformer; list \$20.00. Special, **\$4.95**
- Fleron transmitting lead in insulator..... **\$8.88**
- Mesco ½" spark coil. Has many uses; reg. \$7.00. Special **\$1.50**
- Leeds listening monitor; described previous issues, **\$15.00**
- Leeds 50-watt socket..... **\$2.45**
- Leeds plug-in dustproof crystal holder; special..... **\$4.25**
- General Radio 50-ohm rheostat, type 214-A..... **\$1.50**

LEEDS RADIO LABORATORIES

Precision Custom Built Short Wave Receivers and Transmitters

This department under the supervision of the Short-Wave Specialist Jerome Gross. We design, construct and advise on any material for the "Ham" Broadcasting station or laboratory. Write Jerry Gross for advice on any of your problems.

LEEDS Short Wave Receiver

The successful operation of any Short Wave Receiver depends almost entirely upon its handling (smooth regeneration control, etc.). The LEEDS Short Wave Receiver has flawless regeneration control from 20 to 80 meters with only 2½ Vols on the detector tube.

No fringe howl is present, and absolutely no hand capacity is found to disturb tuning.

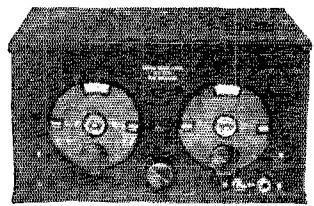
Many of these receivers have been sold to people who have tried more elaborate jobs, only to discover that a simpler well balanced receiver would be more efficient and satisfactory for their work.

Three 201-A tubes are used, one as the detector, and two audio stages.

The Universal type has a continuous range from 15 to 100 meters, using three plug-in coils.

The Amateur type incorporates a Cardwell 201-E adjustable type condenser for tuning which can be adjusted to give any spread of the bands desired. The set is supplied with 20, 40 and 80 meter coils to cover the Amateur Bands.

Universal or Amateur type Receiver completely constructed and tested, price..... **\$37.50**



Write for our circulars on our products. Quotations on special transmitters, etc., supplied upon application

New Cardwell transmitting and receiving condensers. ⅔ the size, ⅓ the weight. Rounded edges on the stator and rotar plates. A real job to use where limited space makes a more compact receiver essential. Write for full particulars and price.

PLEASE PRINT YOUR NAME AND ADDRESS PLAINLY TO AVOID DELAY

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CONSTANT IMPROVEMENTS IN TRIAD T-210 have resulted in a tube as nearly perfect as science can make it. No wonder it has become tremendously popular! Functions equally as well as a power amplifier or oscillator. Special construction eliminates grid and plate emission which is the chief cause of noisy tubes.

Yet this is but one instance of the new and sensational improvements carried out through the entire Triad

line. It will repay you to insist upon Triads — the tubes of guaranteed service!



TRIAD Tubes are fully licensed under all R.C.A. General Electric and Westinghouse Electric Mfg. Co. Patents

Triad Manufacturing Co.
Pawtucket, Rhode Island

FRENCH NOTES

By J. Denimal, DX Traffic Chief, R.E.F.

Traffic activities are once more increasing, now that the vacation months are over. Nevertheless, the problem of establishing contacts on either 7 or 14 mc. still presents certain difficulties, although some of our members have been enjoying good success with their QSO's.

Signals are received quite satisfactorily each morning on 7 mc. particularly between 0630 and 0830 GCT, with great regularity. During these hours ZL's and some W's, as well as Central American CE1AA and CE1AH, come in. The VK's also come through during this period, although the signals are very weak and difficult to hear. Some DX is also possible during the evening hours. F8EO has been QSO SFEN (S.S. *Indiane*) while on the Atlantic Ocean, about 2,000 kilometres north of Capetown. F8RJ was also QSO this vessel, which is now at the latitude of the Isle of Ascension and Kona Kry and Dakar. F8RJ has achieved WAC on 7 mc. during the past two weeks. Among other QSO's at the latitude of the Isles of Socotora in the Indian Ocean, VU4NT, XON, 5LD, and XG1JP, all Asiatic stations, were heard.

Conditions on the 14-mc. band seem to have improved toward the end of October. Some VK's and W's manage to come through on rare mornings, but very weakly and irregularly. During the day (about 1300 GCT) some W's are audible, although after 1700 some very nice contacts are possible. South Africa seems to appear again at about 1800 with ZS4M most in evidence. This can also be said for the East. QSO at F8RJ: KA1CM. At F8EJ and F8DT: VPQSO, which is the same as the former FO QSR (Rhodesia), at Becket xg5SU, throughout the breadth of the coast of Palestine. We have also to announce the activity of various of our colleagues in Martinique, and also that of V1YB (Barbados Island) with some K4 and CM. XX3BMD, a vessel now on its way to China, was heard. This vessel was off the coast of the Azores Islands on the evening of October 1st.

Summing up, the improvements in propagation conditions during the first two weeks in October have been very marked in the 14-mc. band. At the same time, it should be mentioned that this year has not been particularly favorable for DX work, not many stations being recorded. Moreover, certain stations enjoying special privileges on account of their geographical location have disturbed other low power stations in their attempts to work outside of Europe.

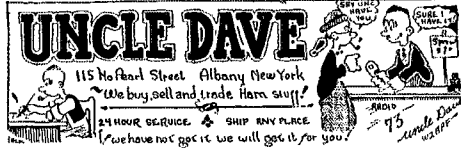
A very interesting and rapid mobilization of French stations was successfully accomplished by J. Bastide, F8JD, on Sunday, October 12th. We will have occasion to refer again to this subject, and to make preparations for later demonstrations which will undoubtedly meet with the same success.

NORWEGIAN NOTES

By G. H. Petersen, Pres. N.R.R.L.

This month's activities have centered around the forthcoming 1750-ke. Norwegian test week,

3500-4000 K.C.
Oscillating Crystals



(specify frequency
desired) **\$5.25**

SPECIAL for this MONTH

Broadcasting Station Crystals, 500 cycles plus or minus, including calibration, guaranteed.....	\$30.00
200 cycles plus or minus, including calibration.....	45.00
Manhattan full wave high voltage rectifier tube, 90 mills 470 volts. No filament type. Ideal for 210 supply. List at \$12.00, Special.....	1.50
Double button Microphone cable, 10 ft. three wire, unshielded.....	.75
Mesco telegraph keys with board, No. 101.....	.85
Mesco telegraph keys with circuit closer, No. 103.....	1.25
Tested and functioning, not guaranteed, type 210 and type 250.....	.95
Used Wheatstone bridges.....	25.00 and 45.00
10 Wire A.C. cable with Jones plug and receptacle, 6 ft.....	1.00
General Radio 1000 cycle audio oscillator, used, T213 Good sub panel four and five prong sockets. \$1.00 each, dozen.....	20.00
85 M.H. R.F. choke, unmounted, each.....	1.00
Victor 30 Henry 150 mill chokes.....	.35
U.X. or U.Y. sockets, excellent contacts.....	1.35
Power crystals, specify anywhere in the 3500 K.C. band. Guaranteed to oscillate.....	.12
Dustproof bakelite crystal holders.....	5.25
Crystal blanks, finished and oscillating.....	1.50
Crystal blanks, unfinished.....	2.75
Calibrated Monitors, built for three uses: Oscillator, Monitor and Frequency meter. These are individually calibrated and are checked against Piezo oscillators.....	1.75
With batteries and three coils for 20, 40 and 80 meter Wave Meter for 20, 40 and 80 meter band with individual charts, complete with indicator and coils.....	9.35
Dongan power transformer, 300 watt 1000 volts each side of center and with the following voltages: 3 C.T., 10 C.T., and one ten volt and one twenty volt not C.T. Fully mounted. Weight 14 lbs.....	6.25
Ward-Leonard 10,000 ohm 50 watt trans. leaks.....	5.95
5000 ohm leaks.....	.50
New Universal double button microphones, model BB net.....	.39
Model K.K. net.....	16.50
Model LL net.....	32.50
Microphone cases, special.....	48.50
New Sprague 8 mfd 430 volt electrolytic condensers.....	2.25
New Mershon 18 mfd electrolytic condensers.....	1.25
Flechtheim 2 mfd 1500 volts porc. ins. condensers.....	2.00
Flechtheim 4 mfd 1500 volts porc. ins. condensers.....	4.50
Rectobulbs mercury vapor R-81 type, just out, new, list at \$7.00 net.....	7.75
Rectobulbs mercury vapor R-3 type, net, postpaid.....	4.40
Slightly used Western Electric 212A or D tubes, guar.....	10.00
Slightly used Western Electric 50 Watters, guar.....	35.00
Slightly used R.C.A. U.V. 211 or 203A tubes, guar.....	15.00
R.C.A. U.X. 240 Hi Mu tubes.....	17.00
Slightly used R.C.A. U.V. 851 1000 Watters, guar.....	1.00
New Allen-Bradley 500 watt radiostat.....	175.00
National Var. condensers .00045, 3000 volt with velvet vernier dials.....	5.50
New CeCo 230 — 2 volt (199 type). Non Microphonic.....	9.50
New CeCo 231 — 2 volt (120 type). Non Microphonic.....	1.25
New CeCo 232 — 2 volt screen grid, D.C.....	1.25
Used U.X. 852 tubes, guaranteed.....	1.90
Sangamo .00025, .0005, .002, .001, 5000 volt condensers.....	20.00
R.F. Chokes for receiver and transmitter.....	1.12
New National A.C. Short wave five A.C. List at \$79.50. Net.....	.50
National power pack for same, list at \$34.50. Net.....	46.00
Factory wiring net \$5.75 extra.....	19.65
Above set when ordered complete with power pack and wiring, special.....	70.00
New type Patent No. 107 Master Phonovox, list \$15.00. Special.....	8.65

Stand-off insulators. Each \$1.00.....	1.00
Dozen.....	1.00
Enameled No. 12 aerial wire, 100 feet.....	.90
Two hundred feet coils.....	.90
Weston Galvanometer, new unboxed, model 375, \$5.75.....	5.75
Weston model 425. Thermo milliammeters 0-125 or 250° mills.....	7.00
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New Universal "Baby Milkes" with 25 ft. cord. Special Aluminum can assembled 5" x 9" x 6".....	4.50
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New Jewell 0-1 millimeter. New type bakelite case.....	10.85
Flechtheim 1 mfd 2000 volt trans. cond.....	6.65
Flechtheim 2 mfd 2000 volt trans. cond.....	5.00
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Microphone stands, table model, brass construction, bronze finish.....	14.75
50 watt sockets.....	4.25
250 watt sockets for 212D tubes.....	.95
204A — 250 watt sockets, set.....	3.50
U.X. 281 tested and functioning.....	1.95
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Western Electric 205D tubes, new original cartons.....	.85
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Double closed circuit jacks.....	\$.75 to 1.00
Dubilier .00025, .005, .0001, .002 mfd fixed condensers. Each.....	.14
Victor A.B.C. transformers for 245 tubes.....	.20
All types, tested audio transformers.....	2.45
201A, 199, 112A, 280, 171A, W.D. 12, 226, 227, 245. Each tested and functioning. Not guaranteed.....	.59
Tobe six volt 2 1/2 amps Dry A eliminator.....	.50
Four-volt replacement jars, Each.....	12.50
Six-volt replacement jars, Each.....	1.75
Signal Corps key, buzzer, blinker practise set.....	2.35
Thordarson 30 Henry 250 mill filter choke 104 ohms resistance mfrs. model insulated 2000 volts.....	1.75
Kelford fully mtd new fil. trans. Real job. 1-2.5 volt 8 amp., 2-1 1/2 V. 4 amp., one 5 volt 1 amp. All C.T. with extra C.T. fil. Resistances. Special.....	3.75
Kelford fully mtd power and til. trans. 2-1 1/2 volt C.T. 4 amp., 1-2.5 volt 8 amp., 1-6 volt 2 amp and high voltage. All center tapped and with extra C.T. resistances.....	3.25
R.C.A. Phonograph induction motor, list at \$50.00, new special.....	4.75
Arbophone A.C. amplifier two units power pack with Binding post strip uses one 227 ahead of two 171A push pull. Beautiful job. Ideal for speech amplifiers. For pair.....	10.75
Signal Sematic bug, Special.....	10.00
C.P. Aluminum sq. ft., 14 gauge.....	10.75
R.C.A. U.X. 250 new 10 only.....	.65
Pyrex 12" large aerial insulators.....	5.50
Marco vernier dials 2" knobs.....	1.85
New Gold Seal U.V. 227, guaranteed.....	.95
Real Spaghetti! 30" length.....	.69
Allen-Bradley three stage resis. coupled amplifiers.....	.05
Manhattan phones single with head band cord.....	3.95
Weston A.C. operated new precision type microfarad meter list \$150. Model No. 372 calibrated in .1 mfd scale reads to 1.5 mfd. Special price.....	.75
Leeds and Northrup used capacity bridge variable reads 190 mmf to 100,000 mmf cost \$350. Special.....	65.00
We carry about the most complete line of transmitting equipment as well as receiving apparatus. We are short wave specialists. Broadcast transmitting stations built to specifications.....	45.00



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This unit contains the proper chokes and high voltage condensers. All flexible wire colored leads identical to the original. Fully guaranteed. **\$4.95**
Each.....

General Replacement Transformer

Can be used as replacement in all sets using 224-245-280 and 227 tubes.

OUR PRICE \$2.75



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For sets using 226-227-245 and 280 tubes.

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Genuine Philco Power Transformer

Model 87. No. 3400.

Using 4-226, 1-227, 2-245 and 1-280 tubes.

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Victor A. B. C. Power Transformers

Used in all Victor Sets, for use with 6-226, 2-245, 1-227 and 1-280 tubes. Can also be used for any Power Amplifier using 245 tubes.

OUR PRICE \$2.75

SPECIALS

United Electric Motor and Turntable.....	\$7.95
Pacnet Phonovox.....	4.95
R.C.A. Power Transformer, Part No. 8335.....	3.95
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Zenith Power Transformer.....	3.50
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Zenith Audio Transformer.....	.95
Zenith Output Transformer.....	.90
Zenith Inter-Stage Audio Transformer.....	1.25
Freshman Replacement Transformer.....	.45
Edison Audio Transformer.....	.85
Crosley double 30 henry Chokes.....	1.50
Polymet Hi Volt, 1 mfd.....	.35
Polymet 2 mfd.....	.55
Potter 1/2 mfd. Condenser.....	.25
Crosley 1/2 mfd. Condenser.....	.25
Bal-Rad Replacement Block Majestic B Eliminator.....	2.95
Kolster Condenser Block.....	.95
Quam Magnetic Speaker.....	3.75
Westinghouse Cabinet Portable Meters.....	1.00
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For General Repair and Power-Pack Work

We guarantee these condensers for 100 per cent. free replacement. Repair man should carry a few dozen in stock.

		Each	
One Mfd.	600 Working Volts	30c	
Two Mfd.	600	40c	
Four Mfd.	600	60c	
One Mfd.	800	50c	
One-half Mfd.	300	25c	

PIGTAIL CARBON RESISTANCES

500 ohm	15000 ohm	10000 ohm	} \$1.00 Per doz.
1000 ohm	25000 ohm	20000 ohm	
4700 ohm	2 megohm	75000 ohm	

TERMS: 20% with order, balance C.O.D. 2% discount allowed for full remittance with order only.
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BALTIMORE RADIO CORP.

47-Q Murray Street, New York City
Send for our latest Bargain Bulletin

and most of our amateurs have been working around this wave to test their gear. A point of interest is noted in the statement that several of our amateurs have found this band very valuable for European contacts.

DX reports are scarce, the only known being a W3 by LA1D, and some Near East QSO's by LA1W, both on the 7-mc. band. However, several stations known to be active here have not reported. Conditions generally seem to be improving.

ROUMANIAN REPORT

By Valentin A. Calinescu, CV6AV

While amateur transmission is not authorized in Roumania at the present time, there are a number of very active amateurs operating in this country. They employ standard transmitting circuits, favoring mostly the symmetric, Mesny, and Hartley, and use low power on the order of 4 to 35 watts.

The preferred waveband is that at 7 mc., although several amateurs are working in other bands; for example, CV5MA, on 3.5 mc., and CV5AV and CV5OR on 14 mc. CV5AA has worked all continents on 3.5 mc. with 35 watts input to a Mesny circuit. Other stations who have worked considerable distances with these powers are CV5AS, CV5BL, CV5MO, in addition to those mentioned above.

Several Roumanian stations are making special efforts to work foreign stations during the 1930-31 season. They request that reports of reception and communication be forwarded via the D.A.S.D., Blumenthalstrasse 19, Berlin W. 57, Germany.

Two official stations working on high frequencies are located in Roumania. One is the Electro Technic Institute in Bucarest, on 14 mc. with .3 kw. power. The other, Polytechnic School, also in Bucarest, is on 7 mc. with .03 kw.

At the present time Roumanian amateurs are working according to the general practice of the I.A.R.U. and obeying the expressed and implied regulations despite the fact that they have no legal control. It is hoped that laws will soon come into effect giving amateurs their rights, and freeing their activity. When this does come it is certain that the numbers of the CV will increase greatly.

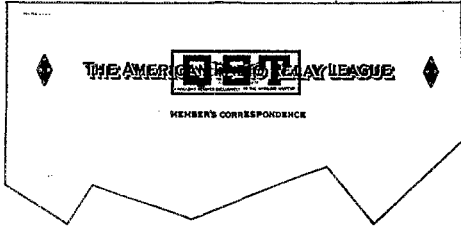
Mr. Terrell's Annual Report

(Continued from page 40)

tears, both in this country and abroad, calibration signals of known frequency, to aid amateur stations in keeping within their allotted bands. Three stations, transmitting on regular schedules, have been set up in laboratories at South Dartmouth, Mass., Elgin, Ill., and Los Angeles, Calif. The Elgin and Los Angeles installations are equipped with secondary frequency standards checked by the Bureau of Standards; the South Dartmouth installation possesses a primary standard. The American Radio Relay League states that all transmissions are accurate to more than 0.01 per cent; measurements of the South



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250 sheets	\$1.00
500 sheets	\$1.75

Postage Included

THE AMERICAN RADIO RELAY LEAGUE HEADQUARTERS: HARTFORD CONN. U. S. A. RADIOGRAM			
TO: REYN. B. SHELWAIN W9CQC	THIS MESSAGE WAS RECEIVED AT HARTFORD CONN. BY:		
BY: REYN. B. SHELWAIN W9CQC	DATE: OCT 8 1947		
RELAY CHAIN BEING ORGANIZED BY BIRDS OF ILLINOIS TO OPERATE BETWEEN THE PACIFIC COAST AND CHICAGO CALLS FOR CLOSEST COOPERATION BETWEEN IOWA AND ILLINOIS STOP SUG- GEST THAT YOU COMMUNICATE WITH WHAPT ON THE SUBJECT		LOUIS R. HUBER	
Rec'd	FROM STATION	LOCATED AT	DATE TIME OPERATOR
Sent	W9CQC	PORT MADISON IOWA	10/8/47 8:13 p RP

OFFICIAL A.R.R.L. MESSAGE BLANKS

Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size 8 1/2 x 7 1/4. Put up in pads of 100 sheets. One pad postpaid for 35c or three pads for \$1.00.

MESSAGE DELIVERY CARD FOR RADIOGRAM AMERICAN RADIO RELAY LEAGUE			
From:	Date:		
To:			
Time received:	Date:	At Radio Station:	
Address:	Phone:		

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Everything that you've wanted in a log is in the Official A. R. R. L. Log Book

New page design to take care of every operating need and fulfil the requirements of the new regulations!

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New handy operating hints and log-keeping suggestions, put where they are always convenient!

AMATEUR RADIO STATION LOG													
DATE	TIME	FREQ	MODE	CALLED	CALLED BY	STATION HEARD	STATION HEARD		MESSAGES REMARKS ETC.				
							TIME	DURATION					

THERE are 39 pages like the one above, 8 1/4" x 10 3/4", carefully designed to incorporate space for all the essential information you want and need to record about your station's operation. Thirty-nine blank pages (backs of the log pages) to be used for notes, experiments, changes of equipment, etc. Durable covers of heavy stock with space for your station call and dates over which the log entries extend. On the inside covers and first two pages are complete instructions on maintaining your log, convenient tabulations of the most-used Q signals, miscellaneous abbreviations, operating hints, amateur prefixes and signal-strength scales. The information you want, always at your finger-tips.

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"Received two promotions in four months since taking SYSTEM; am being considered for another. The ease with which I telegraph and other improvements to mention are a thousandfold." — K. M. Martin, 2033 Webster St., Oakland, Cal.

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The three CANDLER SYSTEM COURSES embody the results of 19 years Scientific Research and Experience by the author in training and developing thousands of leading Morse and Radio operators all over the world. You can "step up" to the bigger, better position through THE CANDLER SYSTEM. It eliminates all "hit-and-miss" procedure.

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"Just finished Junior Course. Send and copy much faster; have more confidence. Inspector 8th Dist. gave exam. for Amateur Licenses. Passed tests without any trouble. Could have copied twice as fast, where formerly could just about get the limit and wasn't sure of it either." — Geo. Peters, W8AWI, 230 River St., Scranton, Pa.

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- CANDLER SYSTEM Junior Course For Beginners
 - CANDLER SYSTEM Senior Course For Radio Operators
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- My present speed is: Sending wpm. Receiving wpm.
 I want to qualify in both American Morse and Continental.
 I am giving in a letter further information about myself, my ambitions, etc., to enable you to give me your personal advice.

Name Age
 Street
 City State
 (PRINT)

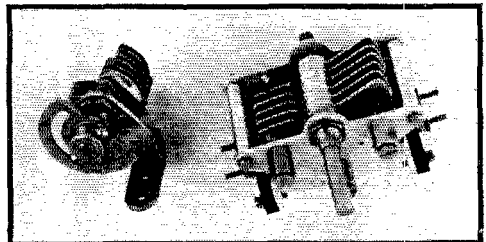
Dartmouth transmissions indicate an accuracy for that station of approximately 0.001 per cent. This standard-frequency system is part of a program instituted by the league for an increased appreciation of frequency precision and accuracy of control by amateur operators; its good effects are already apparent.

"Amateur cooperation with expeditions continued on an increased scale; there were also additional instances of cooperation with civil authorities in local storm emergencies. The pursuit of amateur radio continues to constitute a valuable training school for skilled radio personnel for industry and the art generally. The amateurs' record of public service, their spirit of cooperation, and their demonstrated national value have continued to justify the policy of this Government toward them.

"During the year there was an increase of 2165 amateur stations. This is the largest year's increase since 1922: Last year there were 16,829 licensed amateur radio stations. There are now 18,994. In 1920 there were 5719 amateur stations."

New Variable Condensers and Locking Device

TWO styles of condensers recently added to the Cardwell line are shown in the accompanying photograph. The midget condenser at the left is the double-spaced "Balancer," a condenser well suited for use as a neutralizing condenser in r.f. power amplifiers using Type '10 tubes. The condenser is made in two sizes, one

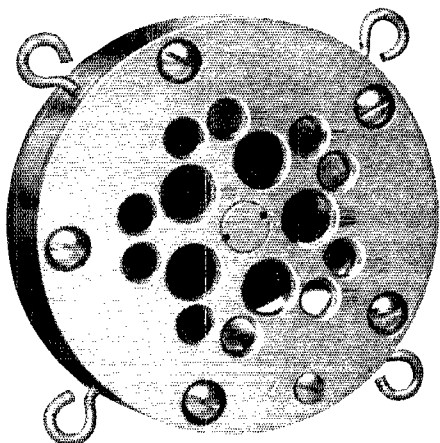


having a maximum capacity of 25 $\mu\text{fd.}$ and a minimum of 6.5 $\mu\text{fd.}$, the other a maximum of 15 $\mu\text{fd.}$ and a minimum of 5 $\mu\text{fd.}$ The breakdown voltage is approximately 2000 volts at 60 cycles. The conventional type of single-hole mounting is employed.

An interesting feature of this condenser is that it may be mounted back of the panel (if one is used) by means of the mounting bracket shown, and adjustments may be made by an insulated screwdriver fitting into the slot in the end of the shaft. The locking device may be attached to the condenser, if desired, to make the final adjustment permanent. The locking device will also fit a standard-size Cardwell condenser.

The other condenser is the "midway" type. As the name implies, it is intermediate in size between the midget and the standard condenser, and is similar in construction to the standard

Announcing an Improved DOUBLE-BUTTON MICROPHONE



*designed and priced
for the AMATEUR*

This microphone will give that **Broadcast Quality** to your station, when used with proper speech amplification.

The Gavitt Manufacturing Company has served the leading Radio Manufacturers for several years and in entering the Amateur field is offering the Ham a microphone designed primarily for voice transmission — priced right — and backed by our reputation and a money-back guarantee.

The Gavitt Microphone is of the Double Button type and has the following features:

1. Non-Metallic Diaphragm, not under tension.
2. Output level 10 to 20 D.B.'s higher than average microphone.
3. Flat output curve within voice frequencies.
4. Eliminates one stage of resistance or impedance coupled speech amplification.
5. Minimum carbon hiss due to non-metallic diaphragm.
6. Requires only 10 mills per button.
7. 200 Ohms per button impedance.
8. Solid brass construction, chromium plated.
9. Sufficient weight to damp out microphonics.
10. Diameter $3\frac{1}{4}$; $\frac{3}{4}$ thick.
11. Packed in attractive plush-lined, steel pocket carrying case. Modernistic.

Special Price \$19.50 Net *Amateurs Only*

F. O. B. Brookfield, Mass.

*Shipping Weight four pounds. Immediate delivery.
Send remittance with order and give your call letters.*

**THIS OFFER IS NOT OPEN TO
DEALERS OR JOBBERS**

Microphone Transformer matched to this Mike, \$6.00

Six foot three conductor, moisture proof shielded microphone cord.....\$2.00

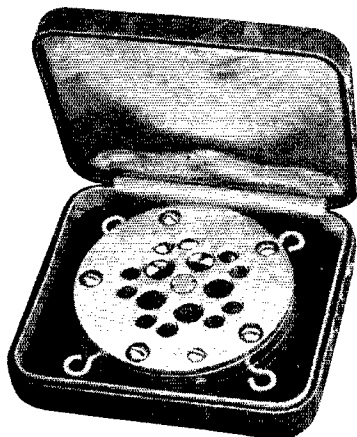
Longer cords 30c per foot.

Table Type Microphone Stand with springs, \$10.00

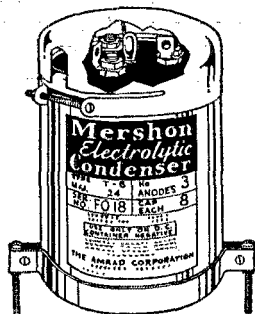
Special Offer — To those purchasing complete outfit totaling.....\$37.50

we will supply your call letters on metal plate for attaching to Microphone Stand

**Gavitt Manufacturing Co., Inc.
BROOKFIELD, MASS.**



ECONOMICAL SELF-HEALING PUNCTURE-PROOF



Merphon Electrolytic Condenser
TYPE T-8
24-MFD. CAPACITY

Thousands of servicemen and amateurs have found in the *Merphon Electrolytic Condensers* the answer to troublesome condenser problems.

Send us a drawing of your equipment showing tubes, voltages and other significant information. Our Service Department will gladly tell you how to install *Merphons* and how much they will cost.

MERPHON Electrolytic Condenser

Exclusively the product of
THE AMRAD CORPORATION
420 COLLEGE AVENUE
MEDFORD HILLSIDE, MASS.

THE AMRAD CORP.
420 COLLEGE AVE.,
MEDFORD HILLSIDE, MASS.

- Tell me how to install the *Merphon Electrolytic Condenser* in my equipment
- Send me your booklet "Puncture-proof Filter Condensers"

NAME.....

STREET.....

CITY.....

STATE.....

size. The frame is approximately 2 $\frac{3}{4}$ inches wide, as compared with 4 inches for the larger size. It is made in two breakdown-voltage ratings, approximately 3000 and 1000 volts, the spacing between plates being .070 and .031 inches respectively. Capacity ranges are from 25 to 150 μ fd., maximum, in the high-voltage size, and from 50 to 350 μ fd. in the lower-voltage rating. The plates are individually buffed. The high-voltage condensers should be excellent as neutralizing condensers in transmitters of higher power, or even as tank condensers where the maximum capacity required is not more than 150 μ fd.

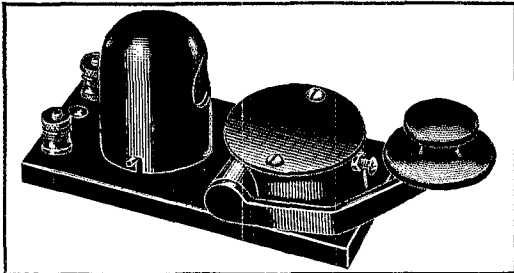
The Pacific Division Convention

A MESSAGE from China and other greetings from well-wishers at remote points who could not attend were read publicly before the assembled Eleventh Annual Pacific Division Convention held at Sacramento, California, October 17 and 18, 1930. The conventioners *did* have a "thundering good time" as anticipated in the messages, too — no mistake about that! The Sacramento Valley Amateur Radio Club was sponsor of the convention. W6EX presented his new water-cooled tube to the Sacramento Club. By unanimous acclaim the Sacramento organization awarded this big tube to "Bill" Yeaw, W6UM, its popular President and the Convention Chairman.

Friday morning was devoted to registration of delegates at the Hotel Land, but the Sacramento Club did not let it go at that. Movies showing vacuum tube repeater operation, the manufacture of lamps, and experiments with liquid air were shown in the morning also, and held the interest of an unusually large number who registered early. After lunch the convention was officially opened at the Memorial Auditorium by Director A. H. Babcock. A talk by F. E. Handy, A.R.R.L. Communications Manager followed the opening. A brief description of the League Headquarters organization preceded a discussion of possibilities and problems before amateur radio. The afternoon closed with a trip through the Southern Pacific Railroad Shops. In the evening a sail down the Sacramento River was delightful. Entertainment was provided. Several skits and contests were put on. There was an orchestra aboard. Some used the opportunity for hamfesting.

The program opened Saturday with an illustrated lecture on tube construction by Mr. McLaughlin of the National Carbon Company. Mr. R. H. Freeman of Boeing Air Transport presented a technical talk. After the official photograph and time out for lunch the gang adjourned to a "pee-wee" golf course, where an exciting tournament, or perhaps we should say *several* exciting tournaments, were held with plenty of good-natured raillery from the gallery while these were in progress. Next was a meeting at the Auditorium. The result of the election in the San Joaquin Valley Section was announced. Every section manager present was heard from during the communications or "general" meeting and

BARGAINS ARMY AND NAVY RADIO SURPLUS

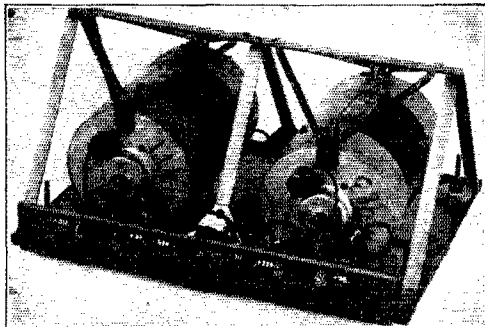


HERE'S A REAL BUY!

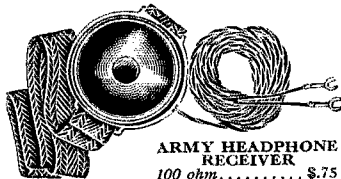
U. S. Army Signal Corps, 1/4" solid coin silver contacts, flameproof radio Trans. Key, Telltale Lamp, Bakelite base..... \$2.00



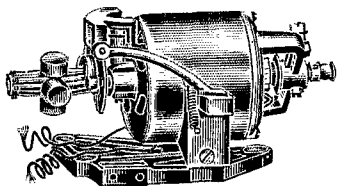
Propeller, wood, 15" long, 2" wide, 2" pitch, 9/16" bore.... \$1.00
 Prop., aluminum, auto speed regulating (Desaurliers). 20" long, 3" wide, 1" to 2 1/4" pitch, 9/16" bore..... \$4.00



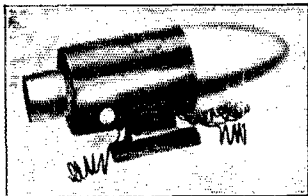
Western Electric Dynamometer System No. C.W. 927. Two 27/350 volt dynamometers in shock-proof hanger. May be used in parallel to give 160 mils at 350 volts, or in series, giving 80 mils at 700 volts. Can be used to operate transmitters up to 50 watts power from 32 volt D.C. mains. Ideal for Delco systems. Two dynamometers in hanger..... \$15.00
 Single dynamometer without hanger..... 9.00
 Western Electric Switchboard C.W. 928. Control board for Dynamometer System C.W. 927. Consists of starting switches, fuses, 0-50-500 volt voltmeter with switches for testing main lines and output. Also contains complete filter system. Very special... \$9.00



ARMY HEADPHONE RECEIVER
 100 ohm..... \$75



Edison Universal motor 1/36 h.p. with governor and regulator. Has one thousand uses. Price, each..... \$3.50

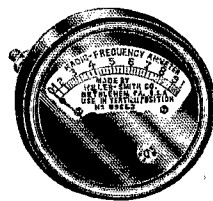


Navy Aircraft Dynamometer, Gen. Elec., new, 24/1000 volts, 1 amp., with pulley, driven by motor, or propeller, giving 24 volts output for filament, 1000 volts plate. Weight 75 lbs. Value \$250.00. Special price..... \$75.00

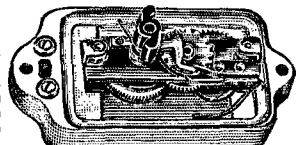


Anti-Capacity Switches, W.F. 6-8-10-12 Terminals, all with nuts, all with price, 95c each. Lots of 6..... \$5.00

- Condenser, Dubilier, mica, volts 40,000 cap. 0012-.001-.0008 or .003..... \$25.00
- Condenser, Dubilier, mica, op. volts 8500 cap. .004. 7.50
- Condenser, Dubilier and Wireless Specialty, op. volts 12,500 cap. .004..... 12.50
- Condensers, West. Elec. 21 A.A., 1 mfd, 1000 volt A.C. test..... 1.00
- Condenser, Roca RCA 600 volt No. 8333 for Radiolas 18-33 and 51. Price, each..... 1.35
- Headphones, West. Electric No. 194W same as C.W. 834, 2200 ohms, D.C. slightly used..... 5.00
- Holtzer Cabot, "Mike" Utah type, carbon granular transmitter, Special..... .95
- Western Electric Radiophone Transmitter unit, 320W. Special..... 1.50
- Dynamometer, GE Navy Airplanes 24/750 volts. Aluminum frame, unusually good for airplane test work. Specially priced, 300 mils..... 27.50
- Dynamometer, aircraft 32-275 volt, with shaft..... 5.00
- U. S. Navy head phones, excellent for practice and instruction purposes, pair..... .75
- NAVY Dynamometers, General Electric 24/1500 volt, 233 mils..... 37.50
- Coils, Retardation, West. Elec. Co. 57C, 83 ohm, 2 windings..... .75
- Ret. coil West. Elec., No. 65 A, 1800 ohm 12 henry..... 2.00
- Ret. coil West. Elec., No. 66 A, 85 ohm 1.3 henry..... 1.50
- Ret. coil West. Elec., No. 64 B, 11 ohm 1 henry..... 1.50
- Telegraph and buzzer portable sets, mahogany case, 2 tone 4 contact platinum contact high frequency buzzer, 2 telephone toggle switches, potentiometer, sending key, 4 mfd. condensers, 1 transformer and 2 choice coils receiver, \$30. value..... 5.00
- Magnets, Army mine and ringer type, 4 large magnets..... 1.00
- Sounders, Signal Corps, 120 ohms, adjustable..... 2.50
- Spark transmitter, complete, airplane type, rotary gap, transformer, mica condenser, 200 watt 500 cycle with Gen. self-sealed ball-bearing..... 25.00
- Generators, Westinghouse 110 volt, A.C. 900 cycles, 500 watts, self excited..... 15.00
- Generator 1/2 kw, 500 cycle, 300 volt, self-sealed, can be hand driven..... 25.00
- Voltmeters, D.C. portable new Weston model 45, 3 scale 0-3-15-150 guaranteed 1/2 of 1% accurate..... 40.00
- Ammeters, D.C. portable, new Weston model 45, 3 scale 0-1.5-15-150 with 3 scale external shunt and lead, 1/2 of 1% accurate..... 40.00
- Headphone, Radio School, headband, 75 ohm..... 1.50
- Keys, transmitting, Navy, back connected on bakelite base. 2 kw. 1/8-inch silver contacts..... 5.00
- Charging panel, Navy type, S.E. 809, 32 volt, Ward Leonard var. and fixed res., Weston voltmeter and ammeter. Sangamo ampere hour meter. Complete with all switches..... 30.00
- Receivers, Navy, C.V. 240, 1000-10,000 meters..... 50.00
- Receivers, S.E. 143 and I.P. 500..... 100-150
- Relay West. Elec. low voltage, 2 upper and 3 lower platinum point screws, 3 contact arms..... 5.00
- Extra platinum contact screws or arms..... .35
- Receiver, Type 122, 175-775 meters. Especially recommended for "sturdy" for coastal Broadcast stations as required by Dept. of Commerce... 50.00

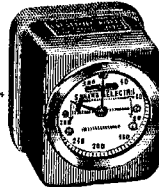


Ammeter, R.F., 0-10 amp, zero adjuster, 4 in. diameter. A real buy at..... \$4.50

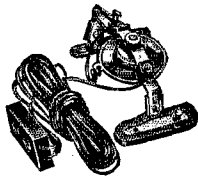


SELECTOR (Call Box)

Postal Telegraph type has variety of uses..... \$2.00



Ampere hour meter, Sangamo, battery charge and discharge, type M S 0-500 scale, capacity 15 amp. \$10.00



Magnavox anti-noise microphone, good for home broadcasting... \$1.50

Largest Radio and Electric Supply House in U. S. specializing on Army and Navy Surplus. Write us your particular requirements. Sufficient postage and deposit of 20% required on C.O.D. orders. NO C.O.D. ON CANADIAN ORDERS. DUE TO LIMITED GOVERNMENT SURPLUS WE DO NOT ISSUE CATALOGS.

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Arcturus Radio
Tube Company,
Newark, N. J.*

The Arcturus Photolytic Cell opens up a virgin field of research for radio experimenters. Advanced in design, this new cell insures more efficient operation of any photo-electric device. Perhaps you will be the one to discover a money-making new application. Write for complete information, today.



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is HOT*

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discussion. The afternoon ended all too soon, just when everyone was getting to a discussion of interference in general, and to specific proposals for bettering operating conditions.

The banquet program held at the Elks' Temple left nothing to be desired. There were addresses right to the point by Supervisor Lovejoy, H. H. Smith, also of the Radio Division, Director Babcock and others. The C.M. from Hartford had a final word for the gang. Every section manager (Bane, Davies, Frates, Quement, Ramsay, and Sandham were present) talked on various subjects. The desirability of full coöperation with the Signal Corps, with the U.S.N.R. and a plea for strict adherence to the regulations for amateur operation were mentioned by different speakers.

Last on the program came the bids for next year's convention. The San Francisco Radio Club, the Santa Clara County Amateur Radio Association, and the Oakland Radio Club all extended an invitation. The latter organization withdrew and the San Francisco Club won the vote for the 1931 convention. All agreed that a most enjoyable time had been had, so with many expressions of thanks to the Sacramento gang, and with "see you at San Francisco" the byword in parting, the delegates went their way and the convention became history.

— F. E. H.

Silent Keys

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

H. V. Flanagan, W5ATT, Corpus Christi, Texas.

W. A. McClintock, W2WI, Westfield, N. J.
A. M. Mitchell, W2AS, Maplewood, N. J.
Walter G. Read, W2CHR, Linden, N. J.

Station Descriptions Wanted!

THERE must be hundreds of low-power stations which are up to 1931 standards in every respect; furthermore a few score, at least, of the owners of those stations undoubtedly would be proud to have their stations held up in *QST* as examples of how the modern amateur station should be constructed. Hence this request for descriptions of good stations which use nothing larger than one or two Type '10 tubes to feed the antenna.

We want descriptions of neatly built low-power stations — real "1931" outfits — to help the new fellows get an idea of how a station, as contrasted with individual pieces of apparatus, should be built. Of course the equipment must be up-to-date and complete, the transmitter must be free from frequency wobble, the plate supply must meet the requirements of the present regulations, there must be some provision for continuously monitoring transmissions and for checking frequency, and the station as a whole must be neatly constructed, intelligently planned, and convenient to operate.



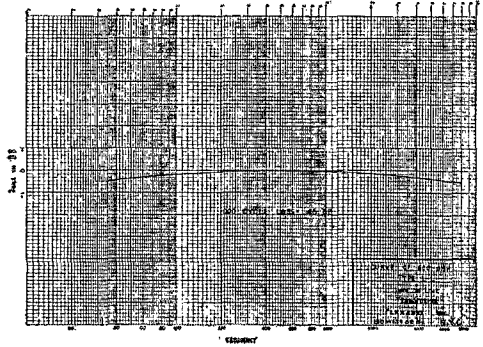
SPECIAL AUDIO and OUTPUT TRANSFORMERS

Now made in U. S. A. on 48 hours' notice

For the exacting requirements of broadcast stations, public address systems, recording devices, laboratories, speech transmission and other uses where a flat curve over a wide frequency band is necessary. They can be supplied for the following requirements, as well as many others not mentioned:

- | | |
|--------------------|-----------------|
| Microphone step up | Line to Line |
| Microphone mixing | Tube to speaker |
| Microphone to line | Line to speaker |
| Tube to line | Line to tube |

When transformer stages are cascaded the errors resulting from poor curves are multiplied. If transformers are down 3 db. at 35 cycles a three-stage amplifier using three audio and one output stage would be down at least 12 db. With three stages of coupling with our standard AF 5 audio transformers and the new precision output transformers the error or loss at 35 cycles is only about 2.5 db. if a good circuit free from regeneration and feed back is used. Further, the deviation of the curve from a straight line, between 35 and 8000 cycles, is less than 1.5 db. Circuit recommendations will be given on request.



This Curve of 600 Ohm Line to Line Transformers is typical of this newly developed series of Transformers

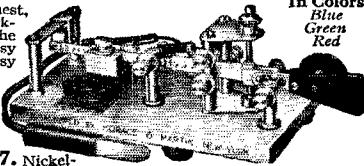
When ordering these special transformers the details of the primary and secondary operating requirements must be clearly stated. The weight of the special audio and output transformer is 2 lbs. 10 oz. Dimensions: Width 3 ins. Thickness 2 3/4 ins. Height 3 3/4 ins.

FERRANTI, INC., 130 West 42nd Street, NEW YORK, N. Y.

Sending Is EASY

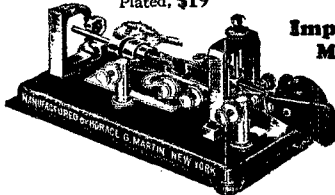
With the *Easy-Working*
Genuine Martin No. 6
New VIBROPLEX

The smoothest, easiest-working bug on the market. Easy to learn. Easy to operate. Makes sending easy.



Black or Colored, \$17. Nickel-Plated, \$19

Improved MARTIN Vibroplex

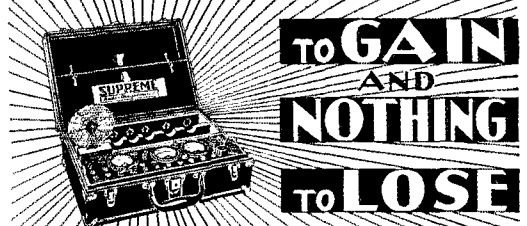


Black or Colored, \$17
Nickel-Plated, \$19

Special Martin Radio Bug — Extra large, Specially Constructed Contact Points for direct use without relay. Black or Colored, \$25

Old Vibroplex accepted as part payment
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A WARNING!

We feel it our duty to caution you against the avalanche of over-rated and misrepresented radio merchandise being offered today by un-informed or unscrupulous dealers. Condensers are rated above their actual value, or test voltages are given in an effort to confuse. Choke and transformer specifications are distorted. Tubes of second and third grades are sold as guaranteed tubes of first quality!

The Harrison Radio Co. pledges itself, in the interest of the amateur, to describe all items with accuracy and honesty, using the manufacturer's specifications when possible. The vast experience in amateur radio of our manager, Mr. W. E. Harrison (W 2 A V A), places him in a pre-eminent position to pass upon the merits and suitability for "Ham" use of apparatus before it is offered to you.

This, together with our low prices, assures you that you may, with the utmost confidence and economy, trade with the Harrison Radio Co.

Here are a few of the outstanding values in our

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WARD-LEONARD 10,000-ohm CT Grid Leaks for 210s and 50-watters, 4 x 1/2" \$.90
 RCA 5,000-ohm, 50-watt grid \$.48
 IMPORTED FRENCH PHONES, 4000 ohms 1.25

PARCON FILTER CONDENSERS

Bigger and better! More conservative ratings. And sold with a guarantee that really means something! Neat metal cases with novel stand-off insulators. The best value in condensers today!
 DC Working Voltage 1 Mfd. 2 Mfd. 4 Mfd.
 2000 Volts \$3.95 \$6.45 \$10.95
 1500 Volts 2.45 3.90 6.95
 1000 Volts 1.50 2.45 3.90
 650 Volts 1.25 1.50 2.90

PARCON .002 Mfd., 2250-volt plate blocking condenser \$1.05
 SANGAMO 5000-volt (Test) Condensers, .002, .001, .0005, .00025 Mfd. Very neat \$1.20

DUBLIER .002 Mfd., 6000 volt working \$1.75

FARADON BLOCK. Contains 1 1/2 Mfd. 1000-volt working and 2 mfd. 600 volt. d.c. working \$1.45

THORADSON CHOKES, 30 Henry, 150 MA \$2.95

Double 18 H, 250 MA — \$6.25. Double 15 H, 350 MA — \$6.95.

30 H, 100 MA — \$1.95.

HARCO 30 Henry, 120 MA mounted chokes \$1.30

85-Millihenry R. F. Chokes, Mounted \$3.35

FRESHMAN POWER TRANSFORMER, 125-Watt, Gives 7 1/2 CT, 7 1/2, and 375 volts. Complete power supply for 210 transmitter or amplifier. At this price you can use it as a separate filament transformer. Two for \$3.70. Each \$1.90

HEAVY DUTY TRANSFORMER, Gives 750 CT, 5 CT, 2 1/2 and 2 1/4 volts \$3.50

50-Watt filament transformers, 7 Volt. Easily rewound for any desired voltage. Unmounted. Two for \$1.70. Each \$1.10

MESCO SPARK COILS, Reg. \$7.00. Special \$7.75

WESTERN ELECTRIC: Hand microphones — \$3.95. Wall type — \$2.75. Regular three-wire cords — 40c. No. M4C 100 Feet rubber covered, shielded 3-wire cable \$8.75

RADIOSTAT, 500-Watt — \$5.45. E-210 \$9.75

Deposit required. Postage Extra. No orders under \$2.50

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Send for interesting data and price sheet on Transmission Condensers with working voltages up to 3000 D.C. for use with the following tubes: 203A, 204A, 210, 500W, 851, 852, 860, 865.

CORNELL ELECTRIC MFG. CO.
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And now Ellis Model 10N for Amateur Radiophone!

The Ellis Model 10N Microphone at \$25.00 list is something entirely new in microphones at this price. By means of a special gold plated corrugated metal diaphragm developed at our laboratory we have attained many of the advantages of the stretched metal diaphragm. Your jobber can secure this for you if he does not have it in stock. Write for details of mechanical and electrical characteristics.

ELLIS ELECTRICAL LABORATORY

Sole Corporation
 337 WEST MADISON ST. Chicago, Illinois

In sending in a description of your station include *all* the information and give diagrams wherever they differ from representative circuits. Call attention particularly to unusual features and "labor-saving" devices. Send us the facts, and above all, send us good photographs. Even though your station may be excellent we can't use it in *QST* unless we have large, clear photographs with plenty of detail. Don't handicap yourself by sending in fuzzy snapshots. See "Photographs for *QST*" in the March, 1929 *QST*.

Of course this does not mean that we are not going to run descriptions of good stations of higher power. Far from it. We want both kinds, so that this year's series of station descriptions will be truly representative of the best practice in amateur radio. If your station is up to the mark and you'd like to see a description of it in *QST*, send us the dope. Maybe we won't be able to use all of them, but keen competition shouldn't scare off a real ham.

The West Gulf Division Convention

THE Fourth West Gulf Division Convention brought together the most enthusiastic bunch of Hams, YLs, and XYLs that one could imagine. The convention was held in Houston, Texas, at the Rice Hotel, October 10th and 11th, sponsored by the Houston Amateur Radio Club.

Friday was a busy day, beginning with registration at 8:30 a.m. Hams from Oklahoma, Louisiana, and all over our big state of Texas began registering bright and early. License examinations began at 9:00 a.m. Others not taking the examinations saw a demonstration of the Houston Fire and Police signal system. Hamfesting was the order of the day until noon, when President Franklin said "all aboard" for Rich-



mond, Texas, to a big barbecue given by Homer Darst, W5AEE. That was the juicy-est and best barbecue. One of the interesting things at the barbecue was the car driven down from Frederick, Oklahoma. It was the original Podunk Club car — and how!

After visiting W5AEE we returned to Houston, stopping to visit KPRC en route. Friday afternoon was spent in visiting ham stations in Houston. There was a theatre party for the YLs and

QST Oscillating Crystals

"THE STANDARD OF COMPARISON"

AMATEUR BANDS:

Winter is coming, and no doubt you are going over your transmitter removing those weak links so as to get the most possible efficiency from your set.

One item of great importance is the *frequency stability* of your set. Does it *stay on one frequency*? If not, our *power crystals* will solve that problem. SCIENTIFIC RADIO SERVICE crystals are *known to be the best obtainable, having ONE single frequency and highest output.* With each crystal is furnished an accurate calibration guaranteed to *better than a tenth of 1%.* *New prices for grinding power crystals in the amateur bands are as follows:*

1715 to 2000 Kc band \$15.00 (unmounted)
3500 to 4000 Kc band \$20.00 (unmounted)
7000 to 7300 Kc band \$40.00 (unmounted)

BROADCAST BAND:

Power crystals ground in the 550-1500 Kc band accurate to plus or minus 500 cycles of your specified frequency fully mounted for \$55.00. In ordering please specify type tube, plate voltage and operating

temperature. All crystals absolutely guaranteed regards to output and frequency and delivery can be made within two days after receipt of your order.

CONSTANT TEMPERATURE HEATER UNITS:

We can supply heater units guaranteed to keep the temperature of the crystals constant to *better than a tenth of 1 degree* centigrade for \$300.00. Two matched crystals, ground to your assigned frequency in the 550-1500 Kc band with the heater unit complete \$410.00. More detailed description of this unit sent upon request.

ATTENTION AIRCRAFT AND COMMERCIAL RADIO CORPORATIONS:

We invite your inquiries regards your crystal needs for Radio use. We will be glad to quote special prices for POWER crystals in quantity lots. We have been grinding *power crystals* for over *seven years, being pioneers* in this specialized field, we feel we can be of real service to you. We can grind *power crystals* to your specified frequency accurate to plus or minus .03%. All crystals guaranteed and prompt deliveries can be made. A *trial will convince you.*

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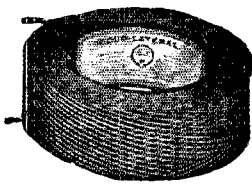
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Radio engineers and laboratories with real records of accomplishment use Pacent Duo Lateral Coils. They come in all standard turn ratios.



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1/4" Copper tubing 2 3/8" dia. Per turn 11c
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Guaranteed 8 mf. 500V peak dry electrolytic cond. Net \$1.23
3-Way microphone plugs and receptacles. Per pair \$1.39
New Thordarson T2388 — 1500-2000 each side, 500 watts. Net, \$17.64
DeForest 510-15-watt tubes, guaranteed Net, \$6.35
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Pilot plug-in coil forms Each, 65c
Flewelling short-wave adapter A.C. or D.C. complete with coils 15 to 120 meters \$4.95
Ward Leonard 10000-ohm grid leaks, 50 watt. 69c
General Electric, genuine A.C. turntables, a beautiful job \$9.85

We are jobbers for the following lines:

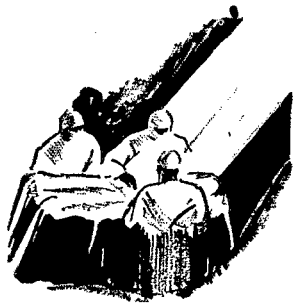
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All sizes of wire for coil winding, etc., etc.

All technical questions cheerfully answered

Special discounts on every standard item

Write for net price. Mail orders filled the same day received. Must be accompanied by 10% cash of order plus postage charges.



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The white-robed surgeon never dares to lose control. Slovenly technique may spell Death.

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CENTRAL RADIO LABORATORIES

Dept. 320 F

Keefe Avenue and Humboldt, Milwaukee, Wis.

XYLs, and at 8:00 p.m. a technical meeting at the Rice with talks on Television and Dynatron Frequency Meters by J. S. Waters, E.E., of Rice Institute, and F. E. Handy of A.R.R.L. Headquarters. Delegates were invited to pound brass at any ham stations in the city.

Saturday began with a visit to the huge power-distributing plant of the Houston Lighting and Power Company, also to KTRH and W5VA. At noon there was an address of welcome by the Mayor of Houston, Hon. Walter E. Monteith, and an address by Lieutenant White "by radio" from a plane of the Third Attack Group, Fort Crockett (Galveston, Tex.), flying over Houston and arriving at the convention. During the traffic session that followed, Lieutenant White and Sergeant Byrd, ex-KFRS, joined the group. There were talks by the Supervisor, by SCM Sherrod on "Reliability," by Lieutenant Keane of Fort Sam Houston (San Antonio), and by our Communications Manager.

Saturday afternoon we boarded the *Nicholas* for a ride down the Houston Ship Channel to Galveston Bay and back to San Jacinto Inn, where the big banquet was held. The salt breeze from the Gulf gave everyone a wonderful appetite that made them eat plenty fresh shrimp, crabs, delicious fried chicken, etc. Director Corlett acted as toastmaster, introducing Mr. F. E. Handy; Lt. S. J. Keane, U. S. Army, Fort Sam Houston, who flew over for the convention; Mr. L. J. N. DuTriel, New Orleans, Radio Inspector; Mr. M. M. Hill, Director of Delta Division, Nachatoches, La.; and Mr. H. C. Sherrod, Jr., our SCM, all of whom made short snappy talks.

Contests and drawings were held to award the many prizes so generously donated by the different manufacturers. Every ham, YL, and XYL will remember it for a long time, and surely want to attend the next convention.

— Mrs. Alice Tennant, Mrs. W5TD

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Scientifically equipped to economically export dependable receiving and transmitting radio apparatus

Book Reviews

By Jas. J. Lamb, Tech. Ed.

Discussion of the National Electrical Safety Code. (To accompany the fourth edition of the code.) Bureau of Standards Handbook No. 4. Obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., for \$1.00.

This discussion follows in general the fourth edition of the National Electrical Safety Code and bears upon radio but slightly. It amplifies and modifies some of the statements made in the Code although not to any great extent.

The use of a mechanical "fuse" or weak link installed between the attachment to the support and the antenna conductor and designed to break before either the conductor or the fastening to the support, is now prohibited unless additional means are provided to support the antenna with at least the minimum clearance to ground when such a link breaks.

We also find regarding ground switches, "For transmitting stations operating at very high frequency it may be necessary from practical considerations to use Pyrex glass for the switch base or to resort to a flexible grounding lead and substantial clamp in lieu of the double-throw switch.

PRECISION BUILT TRANSMITTING TUBES

Duovac Transmitting Tubes are custom made to a rigid standard of perfection. Every operation in construction is micromatically measured and adjusted to insure absolute peak performance. These tubes are capable of handling comparatively large overloads if used intelligently.

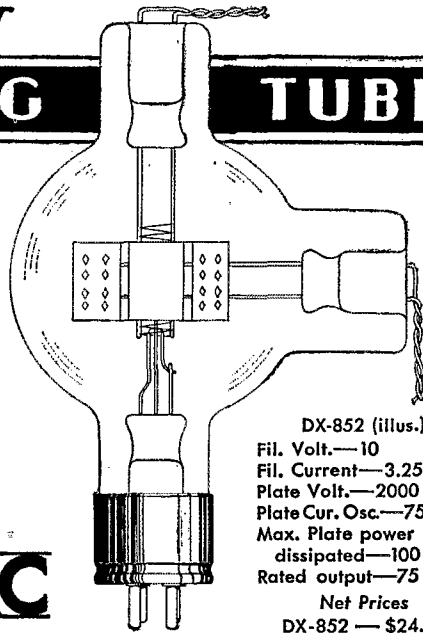
Each tube is minutely examined, thoroughly tested before shipping and is fully guaranteed as to electrical characteristics and against mechanical defects.

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Fil. Volt.—10
Fil. Current—3.25
Plate Volt.—2000
Plate Cur. Osc.—75 mills
Max. Plate power
dissipated—100 watts
Rated output—75 watts

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DV-211 — \$24.50

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Who Wants to Be an Amateur

"How to Become a Radio Amateur," a helpful booklet for beginners, describing simple apparatus and telling the whole story. Ten cents postpaid, \$1 per dozen copies.

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Build Your Own Radio Cabinet



Write for particulars about our knock down cabinets
No. 10 Mahogany (2 tube size inside 11 3/4 L. x 7 D. x 5 9/16 H.) \$1.60 F.O.B. Mill. No. 20 Walnut (3-4 tube size inside 12 L. x 8 D. x 6 3/4 H.) \$1.90 F.O.B. Mill. No. 30 Mahogany (Special size inside 25 L. x 7 D. x 5 9/16 H.) \$2.50 F.O.B. Mill. No. 40 Low Boy (Walnut). Price and details on request.

Price includes wood parts, hinges, filler and stain for finishing. All orders are cash or 25% advance on C.O.D. shipments. Height shown is net measured from top of 3/4 inch mounting board.

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International Microphone—Two button for public address, systems and transmitters. Speech or music. \$9.75

Complete Phone and CW Transmitter 15 to 30 Watts, \$39.50 including tuned plate, tuned grid oscillator with provision for crystal control. Wired for one or two UX 210 tubes. One or two UX 250's as modulators, two stages of speech amplification. Mounted in beautiful two-tone Walnut cabinet. Has ample space for AC power supply. Price includes one Stromberg-Carlson microphone.

Power Supply Unit for 15 to 30 Watt Transmitter \$19.75. Will deliver 600 volt 150 milliamperes for plate current. Has filament for 281, 210, 250, 227, and 226 tubes.

World Wide 2 Tube Short Wave Receiver. \$11.75. A two-tube receiver in a beautiful shielded metal cabinet. An ideal all around set which will give loud speaker reception on many stations. Very flexible in tuning. Complete with a set of 6 clip-in coils. Covers 14 to 550 meters. Can be used with any standard base tubes.

Tubes UX Type, 30 day replacement guarantee. No. 210, \$2.25; No. 250, \$2.35; No. 281, \$1.85; No. 280, 95c; No. 245, \$1.25; No. 224, \$1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.

Low Power Transmitter, adaptable for phone or code. With plug-in Coils. \$14.75

Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters. \$6.45

Auto Radio — Uses 3-224, 2-227 tubes and 1-245 Power tube, single dial, tremendous volume. Compact. Fits any car. We guarantee this set to perform better than sets selling up to \$150. \$20.00

Stromberg-Carlson telephone transmitter on desk stand, \$2.75

B Eliminator, Dry. 280 volts, will operate up to 10-tube set, with 280 tube, fully guaranteed. \$6.75

250 or 245 Power Condenser Blocks, 13 Mfd., 1000 volt A. C. test, tapped 2, 2, 2, 4, 1 and 1 mid., 1 mid., \$4.75

2 Mfd. Condenser Packs, 2000 volt A. C. test. \$7.90
1500 volt. \$3.80

Double Chokes, 30 henry each, 160 mils., 1500 vt. test, shielded, 130 mils. \$3.75

AC-A. B. C. Power Packs, completely assembled. \$8.75
250 V. B. also has A. C. filament for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack, 95c extra.

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Stage Shields 9" x 5" x 6" high 1.89
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Phosphor bronze drum dial cable by foot or mile.
.001 Variable Condenser, \$1.25. Please include postage.
Sponge Rubber Corn Preventers, 25c each, 3 for 65c Hi
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Tubes Repaired

Send us your burned out power tubes for repair. All work guaranteed

203 A \$15
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All orders filled promptly

CANATSEY NEON TUBE COMPANY
512-14-16 Wyandotte Street Kansas City, Mo.

If the grounding clamp is sufficiently substantial and the lead of at least as large current-carrying capacity as the grounding conductor, it may be the equivalent from a safety point of view of the grounding switch."

Static and Fading Tests.

A small pamphlet concerning some tests conducted by the Broadcasting Company of Australia in conjunction with the Wireless Institute of Australia during February and March of 1928.

These tests were made with the Melbourne broadcasting station, 310, operating at 809 kc. (371 meters) as the transmitting station with a power of 5000 watts. 300 observers, located over the Eastern part of Australia made records on a copy of the talk being delivered by the speaker indicating on their copy by means of vertical or horizontal lines the degree of fading or static encountered. Some interesting conclusions drawn are as follows:

(a) The night-time range of the majority of atmospheric impulses is not less than about 1,000 miles and often much more, although over the whole of this distance the impulse may not be strong enough to cause interference with wireless signals.

(b) There appears to be a distinct tendency for atmospherics to fade in the same manner that wireless signals fade, although the effect is less marked than in the case of wireless signals.

(c) Most of the interference from atmospherics experienced in Victoria originates in areas considerably to the north of the state.

(d) Except showing the occurrence of atmospherics with lightning flashes, the test failed to establish any relation between atmospherics or the occurrence of fading and weather conditions.

(e) The area influenced by an individual fade at a given time is always very limited, but the area over which conditions causing fading prevail is often several hundred square miles but very variable.

(f) Within Victoria the period of individual fades in the signals from 310 varies from about two to twenty seconds, but there is a tendency for this period to increase substantially at greater distances from the station.

(g) Fading which takes the form of a complete disappearance of signals occurs very seldom, and is more frequent at distances exceeding 300 miles than at shorter distances from the station.

Radio. A supplement to Vol. CXLII of the Annals of the American Academy of Political and Social Science. Edited by Irwin Stewart, Ph.D., LL.B. Obtainable from the Academy at 3622 Locust Street, West Philadelphia, Pa., for \$1.00.

There are sixteen contributors who cover many sides of the subject. Technical advances in radio and its development both at home and abroad have received a considerable amount of attention as has Federal legislation and administration concerning the broadcasting industry in particular.

The use of radio communication systems in the advancement of safety, education and weather bureau work is covered and its position in international affairs is discussed. Its adaption to army and naval operations is included.

Perhaps of most interest to the amateur is the contribution about the radio amateur by our League's president, Mr. Maxim, who in a short paper points out the reason for the amateur and his noteworthy advances which have enriched the entire world.

Unfortunately it is impossible to obtain contributions from a number of persons on the same general subject without there resulting a distinct amount of overlapping of subject matter. However, in spite of this, the book is of pleasant enough reading for one who is interested in the social and political aspects of the subject.

Transcons!

(Continued from page 10)

even sending can be copied easily and correctly and that the rate of moving traffic depends more on using this sort of sending than it does on the speed of transmission. The use of CQ should be limited to stations having traffic to dispatch



E. H. Rietzke, Director.

Make 1931 Count!

In this day of keen competition seniority doesn't mean much. It's specialized knowledge that counts! If you now have a good position some younger fellow is working for it. If you want a better position you too must be willing to prepare for it.

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HERE at Volume Control Headquarters we maintain a complete department devoted to engineering research.

This department is organized to serve you in solving any problems that may come up in connection with the fixed and variable resistors necessary to exactly meet your requirements.

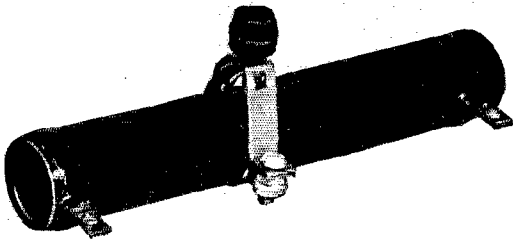
We invite you to get in touch with us concerning the application of FROST-RADIO Volume Controls to your product, or the application of other controls involving precise regulation by means of fixed or variable resistors of the several types manufactured by Herbert H. Frost, Inc.

Why not use this service, just as a considerable number of others are doing? You will find the resources of our Engineers of great value in working out your problems. You will discover, as many others have done, that this department fully understands the requirements of present-day radio manufacturing. And you will like the speed, service and cooperation that is directed toward the solution of your problems.

An inquiry on your letterhead will bring full particulars of this unique service to the radio industry.

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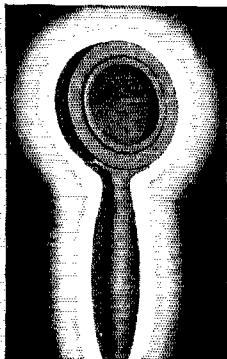


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Kellogg hand microphones are exceptionally sensitive throughout all tone values. This new instrument was originally designed for amateur broadcasting. *It is today used as the standard microphone on home-recording sets of five leading radio manufacturers.*

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This "mike" is attractively finished, compact, sturdily constructed and registers perfect response curves in tests. Sent prepaid with money order; or C. O. D., plus postage. Order today!

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and directional CQ's should save time if *only* stations that can QSP in the desired direction will answer the calling station. Listening periods will be more profitable than CQing periods if you haven't located any of the desired test messages east or west of your station. First find who has the ball, then get into the game and go after it. There is no excuse for any changes in the texts of messages during their transmission across the country — watch accuracy. For the 'phone men we suggest reference to the international radiotelephone procedure which is part of the supplementary regulations to the International Radiotelegraph Convention. Messages should be "repeated back" and OKed by the sending station to insure accuracy. (See page 191, Seventh Edition, The Radio Amateur's Handbook on "Phone Procedure.") The Western Union word list, or better, the list of names specified in the supplementary regulations should be used by 'phone operators in spelling out initials and words having phonetic similarity.

In general — Correct your timepieces so that all notations on messages check. Use your local standard time. Everybody report the day after each relay. Your reports must be in at Headquarters promptly to "make" the detailed story for QST. A copy of the messages handled by each station is necessary so that we may give the complete routing without any "gaps." All set for Sunday mornings? Mark the dates and get into the game on either side you like. Do you c.w. men accept the challenge?

— F. E. H.

Calls Heard

(Continued from page 53)

ti2ags ti2fg ny1aa k4aa k4lq k4kd k4lk k4aan cm8kp
 cm2jt cm2ac cm2iag cm2jm cm8yb cm5ay cm5ea cm5fl
 cm5ex w8ry cm5az za1oa nn3y nl1xc nn7nic hrca ce1ah
 ce2bl ce3ag ce2ab ce2ar ce4ag pa0ms pa0gd t1lag g12xd
 su2vo oh2znc oh7nd sm5uk sm5uv un7dd k6sar k6bdl
 k6def k6xyk yveke yv2xc

WSBMT, K. Neubrecht, 1216 Utah St., Toledo, Ohio

k4kd x1a x1aa ie5gf ve2be ve3ow ve3ll ve4bu ve5an w1aci
 w4ad w4aea w4ay w4ag w4agb w4aig w4aij w4ajk w4ajl
 w4akw w4an w4ag w4ei w4ft w4jd w4km w4la w4lp w4mi
 w4mu w4nz w4nb w4nf w4pai w4qe w4ql w4tp w4ty w4yb
 w4vp w4wt w4xu w4zh w4aaa w4ab w4abb w4acl w4acy
 w4ado w4ahb w4ait w4ajd w4ajs w4akm w4ala w4ani w4aox
 w4aq w4aan w4awa w4awf w4bad w4beb w4bg w4bgg w4bbq
 w4bii w4bjb w4bjx w4bky w4bno w4bob w4boo w4boe
 w4bol w4bpu w4cf w4da w4fw w4gvr w4gwr w4jd w4jg
 w4mx w4nd w4pk w4qu w4qx w4re w4sam w4uf w4un w4vq
 w4wg w4wt w4aao w4gar w4alu w4am w4awt w4axm w4bb
 w4bbk w4bjf w4bm w4bnp w4bmv w4bmv w4bnt w4btz w4bvr
 w4bvy w4byz w4cbp w4cox w4coq w4cto w4czz w4dcq
 w4der w4dix w4dmm w4dqy w4dyn w4dzl w4ebo w4eep
 w4egh w4eje w4ekj w4eop w4eot w4epz w4eru w4etj w4ewx
 w4ezf w4fag w4fas w4fbi w4fen w4re w4uij w4uae w4aax
 w4ed w4ia w4jq w4jf w4vt w4aef w4bry w4eou w4doo
 w4dti w4dun w4egd w4eve w4ewu w4eyh w4eet w4fen
 w4ffq w4ful w4fxq w4ggv w4ghy w4gkz w4pau w4aqe
 w4ej w4mm w4wv w4evf w4bht w4diq w4ell w4emk w4aab

W2BTT, Joseph Mayer, S.S. Yoro, in Caribbean Sea, 400 miles north of Panama Canal Zone
 7000-ke. band

w1abn w1agk w1by w1erw w1lg w1lz w1mk w1rp w2afo
 w2afr w2ako w2alu w2amj w2amt w2apy w2ayj w2bai
 w2bda w2blc w2bne w2bph w2bqr w2cek w2qn w2vh w2za

Two Way Radio Link Never Interrupted — Capt. Yancey's Radio Makes New Records —

Here's the Story behind These Headlines

The Yancey plane (ESCO equipped) in its non-stop flight to Bermuda maintained direct two way communication with New York. Darkness forced the plane down a little short of its goal. The plane floating on the sea remained in communication with New York.

Later, on its "Good Will" flight to South America the Yancey plane, on the ground at the Canal-Zone, maintained two way communication with New York. Zeh Bouck, Radio Operator, said—"I believe this is without doubt a record for Airplane transmission, and it shows very clearly what we could have done had we been forced down in some of the jungle over which we have flown during the last few weeks."

And on July 1, this last record was broken — the Yancey plane, on the ground at Buenos Aires, communicated uninterruptedly for more than an hour with the New York Times Station, 5838 miles away.

The Yancey plane was equipped with an "ESCO" wind driven generator to supply radio power while flying, and a battery operated "ESCO" dynamotor for ground work.

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volume controls for constant impedance lines are scientifically correct. Send us your resistor problems for quotations. Adjustable Gap. Chokes — 100 H, 80 MA, 21 lb., \$12.00, 60 H, 160 MA, 22 lb., \$12.00, 30 H, 320 MA, 27 lb., \$14.00, 20 H, 500 MA, 32 lb., \$18.00, 1/2 H, 4000 MA, 22 lb., \$12.00, 20 H, 1000 MA, 190 lb., \$48.00, 30 H, 1000 MA, 225 lb., \$58.00, 20 H, 1500 MA, 240 lb., \$63.00, 30 H, 1500 MA, 290 lb., \$78.00, 20 H, 2000 MA, 310 lb., \$98.00, 30 H, 2000 MA, 350 lb., \$120.00. Transformers, 750 watt, 1500-1850 each side, \$19.50, 500 watt, 1000-1500 each side, \$15.00, 250 watt, 500-750-1000 each side, \$10.50, 150 watt, 25-375 each side, \$9.00. Filament — any voltage, tapped primary, \$6.50. Specials to order.

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International Resistance Co.
2006 Chestnut St., Philadelphia, Pa.

w3amp w3la w4aab w4aba w4abs w4aci w4aen w4aft w4aiv
w4ft w4km w4kw w4lt w4lq w4lqo w4lqy w4tk w4tu w4wv
w5kd w5od w5ww w5aka w5ayh w5bag w5byr w5cap
w5am w5aru w5aqz w5cwn w5dgz w5dfj w5ebo w5eul w5ffo
w5flf w5flh w5fs w5ges cm2xa cm2xd ve2be wsq

G6YL, Miss B. Dunn, Felton, Northumberland,
England

7000-ke. band

w1abn w1aes w1azd w1if w2bvyy w2bxj w2cek w2cvj w2dh
w2ho w2jd w2jn w2qn w2tt w3amp w3bbh w3cxl w3ft
w3baz w3bry w3elg w3lt w3cek frear149 fm8hg fm8cr
fm8cfr fm8ih fm8le fm8p2g cm8eis cm8mp cu5or cu5ol
es3jr helfg k4aan rylms s6lil su8wy felco vk2ax vk6ag
vu4nt ar8fdy aux2fx xau7kal yllmh yl2fy y2gfm y6kr
yl2el z1aa z2gd z2zq z3ac z3aj z4bt xoh2lh xoh5au
fnhm lefh xg1jp xx3bmd xou5aa

W4AKT, Frank Higgins, Charlotte, N. C.

7000- and 14,000-ke. bands

ce1ah ce2ab cm1by cm2sh cm2zd cm5cx cm8uf ct1aa ct1ae
ct1bx ct1by ct2ac ct1ad cx2ak d4abg ear10 ear39 ear94
ear98 ear113 ear141 f8axq f8da f8eo f8ex f8lgb f8mre f8emi
f8std g2by g2kf g2nl g2nm g2vq g5bj g5by g5ml g5vm g6dh
g6gb g6rb g6wk g6wt g6wy g6xb g6xy helfg h6zjm hh7c
il0oc, jx1ba k4aan k4alk k4kd lu2ea lu3fa lu3dh lu3fk
lu9dt oa4c oa4j oa4o oa4q oa4z oa4y oa4z on4au on4ay
on4jj on4us on4wk pa0vj pa0qf py1aa py1ah py1em py2ay
py2az py2bg py2bk py2ia rx1aa su8ra ti2hv ti2ra vk2wu
vk3cx vk3pp vk4at vk5by vo8mc vo8o vo8z vq1amb z1an
z2ac z2bz zit

14,000-ke. 'phone band

w1ccz w2gg w5ql w6kt w9anz w8dno g2nm

W2CBB-W2CXZ, H. J. Conti, 15 Harbor Terrace
Drive, Rye, N. Y.

7000-ke. band

cm1by cm2jm cm2ro cm2rz cm2wa cm5fl cm8uf cm8yb
ct1bd hh7c k4kd k6aj k6av k6cd k6ff k6fr n2jpa nn1bx
nn1nic rx1aa ve1dq ve2ap ve2as ve2be ve3ag ve3ef ve3er
ve3er ve3go ve3hd ve3he ve3ll ve3rf ve3yo ve3zz ve4ou
ve4fp ve4gj ve5az ve9al ve9ap vk2ek vk3jk vk3ml vk3pp
vk5gr w6ao w6ahp w6aoe w6ass w6azy w6bbp w6beb
w6bht w6bbq w6by w6ene w6cxw w6dxx w6die w6dwh
w6dyn w6ec w6egm w6eke w6eva w6eza w6fdo w6fk w6lx
w6sf w6zzg w7aag w7aef w7aeb w7ahw w7nr w7ud w7y
wsq xobm xee xlc x9a x9b yslfm z33am z4aw

W3WG, Eugene B. Deturck, S.S. Collingsworth,
Buenos Aires, Argentine, S. A.

14,000-ke. band

w1afd w1agw w1amq w1axx w1bea w1bmc w1bpy w1bsk
w1ccz w1cmx w1cox w1dp w1ph w1su w1we w1ww w1zz
w2ab w2ahm w2ano w2aox w2beq w2bfe w2bjj w2bkt w2bon
w2bry w2buo w2bzb w2cak w2cay w2db w2gj w2mb w2qf
w2qm w2rs w2wl w2zc w2zg w2zz w3ajh w3aii w3ase w3fq
w3jr w3ac w3vb w3zb w4ae w4ag w4agx w4aik w4akt w4cs
w4kq w4lt w4ly w4um w4we w3aea w5adp w5ary w6bee
w6bii w6el w6fl w6fr w6bax w6ef w6eep w6efq w8auu
w8bai w8bbl w8bcl w8bcg w8bfo w8bkr w8brg w8btk
w8bxu w8bzt w8cfr w8cls w8cpc w8ddg w8dgv w8ddl w8dre
w8dx w8jt w8li w8mu w8rd w8sf w8uw w8aaw w9aeh w9amr
w9apd w9bdw w9bep w9bja w9bnr w9bpy w9tvh w9evq
w9dgt w9dhk w9dhm w9dku w9dyk w9dxx w9eaj w9eap
w9end w9evc w9fl w9gfv w9ghx w9lf w9ot w9pk cm2xd
cm8uf cx1pl f2iz f8axq f8ol f8pz g6wt k4alk nl8mrc oa4c
oa4j oa4bz oa4fp oa4ft oa4uh py1bf py2ab py2ak py2ar
py2au py2bf ve3cf ve3mu vlyb vo8mc ylawt nkf (w8dl
'phone)

7000-ke. band

w1abz w1aot w1aye w1bal w1bew w1bzq w1cpl w1cqn
w1cw w1fe w1ga w1mh w1vi w2alo w2alu w2ans w2apv
w2atc w2axn w2bdu w2bdx w2bke w2ble w2boe w2bpi
w2brl w2bro w2bsw w2bta w2buo w2bwd w2bxa w2bxj
w2cej w2chj w2chq w2ku w2mb w2rt w2vh w2wz w2za
w2ze w3ajh w3all w3anh w3apo w3aqz w3arp w3aws w3bdd
w3beo w3cxl w3hj w3jq w3na w3se w3sz w3ve w4ae
w4aba w4abs w4abj w4aho w4aiv w4ajs w4ald w4alg w4cg
w4ft w4kd w4mu w4nb w4nj w4oi w4pf w4qo w4sj w4vt
w4vy w5afx w5agg w5aha w5ain w5alp w5asa w5aub w5bdd
w5bmp w5boe w5bqb w5ei w5jd w5jv w5lp w5qb w5rj

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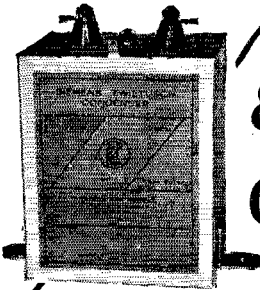
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1500	1	2 3/4 - 1 3/4 - 2 1/4	8.50
	2	4 3/4 - 2 - 6	14.50
	4	4 3/4 - 2 - 6	8.75
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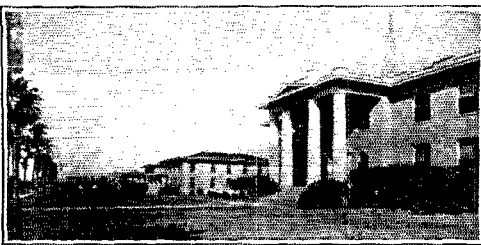
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w1ae w1ag w1afd w1bal w1bnd w1caf w1cjc w1cnx w1cpt w1crw w1ha w1rw w1zh w1zz w2ajb w2aox w2arb w2ary w2asv w2avw w2bcc w2beq w2bi w2bkt w2bok w2buo w2bxt w2cgb w2db w2dg w2hj w2jn w2mw w2ov w2qf w2qn w2rs w2vo w3aaJ w3aei w3afu w3ajh w3atj w3bdo w3buu w3odm w3fq w3hg w3hj w3mv w3nn w3oh w3ps w3sc w4agb w4fm w4vk w5ql w5yw w6doz w6djp w6dyv w8bto w8clv w8epc w8dlf w8dyk w8fz w8hx w8nb w8no w8sy w9agb w9akn w9anr w9bdu w9bbm w9bqh w9buu w9edr w9ef w9efa w9gba celai ce2ab ce3cr ce3dd ce5aa exlan ex1pl ex6fr f8fem f8lbg f8rul f8whg g2by g2kf g2ux g5vm g6hp g6wt h6lfg k4alk lu1ba lu1dy lu2ca lu3de lu3wb lu4dq lu8db lu8dj lu8en oa4j oa4t oa4v oa4z oa4fe on4fp py1aa py1aw py1ba py1cr py2ba py2fb py2bg py2je py2bk py2bo py2ih py2ik py3aw py8ia sp3ar pxb

7000-kc. band

w1hi w1mh w1mk w1rp w2aaf w2afz w2agt w2alu w2amt w2atc w2atz w2avq w2aya w2baw w2bxj w2byw w2cek w2cec w2civ w2hs w2kt w2rd w2up w2vh w2wz w3apn w3awa w3bet w3cxl w3zk w4abi w4ft w4nj w4ty w5abk w7qf w8akw w8auz w8ayh w8bgy w8daq w8dnr w8wo w9abu w9bdv w9dgz w9dt w9dti w9elk w9fxo w9lf w9lm w9sq ct1cw k4aak wlm wsq

WSSC, H. M. Merrill, 212 William St., Boonton, N. J.

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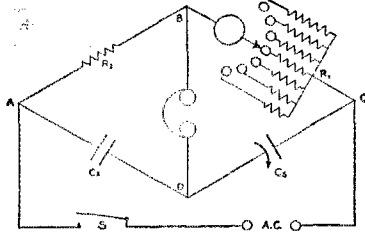
celah celai celal ce2ab ce3ab ce3ch ce3er ce5aa emlby em2bo em2jm em2jt em2sh em2xd cm8uf cm8yb ct1aa ct1ae ct1bx ct1cw ct2aa ct2ac ct2an ct4ad cx1af cx1an cx1fb cx1pl cx2ak cx2bt d4abg d4go d4wao ear37 ear39 ear52 ear65 ear113 ear116 ear149 f8aap f8aly f8axq f8esc f8et f8dmf f8eo f8ex f8fem f8fr f8fw f8gi f8gw f8kwt f8ks f8lbg f8mrc f8nkt f8ol f8ami f8whg f8wrg fm8asu fm8mst fm8paz inhm fq8bpg g2by g2cj g2gm g2kf g2ls g2ma g2nm g2od g2uq g2vq g5bv g5bj g5by g5hv g5ml g5qa g5vb g5vm g5yk g6gc g6gz g6hp g6qb g6rb g6rg g6vp g6wn g6wt g6wy haf3c hclfg he2jc he2jm k4alk k4akv k4kd k4kf k4sa kfr6 kfr7 kfu5 lu1ba lu2ca lu2dj lu3de lu3dh lu3fa lu3fk lu3wb lu4dj lu4bi lu4dw lu5ac lu6fj lu8dj lu8dy lu9dt nj2pa oa4j oa4q oa4t oa4z on4aa on4au on4fe on4fp on4ft on4gn on4wa oulem ozlj pxbe pxmg pa0fp pa0gg pa0wr pa0xg py1ah py1as py1aw py1ax py1ba py1cm py1er py1id py2ab py2ag py2ak py2al py2ay py2az py2ba py2fb py2bg py2bj py2bk py2bm py2bi py2ih py2ik py2jk py2la py2ba py8ia py9hc py9ps rx1aa slaa su8rs sx5m ti2ea ti2hv ve5ao ve8ae vo8aw vo8mc vo8z vq3msn vq4cr w8bl w8ul x1aa x3a x9a xee xg1xc xoq xpa0jv xx3bmd yl2ra yslx zp2ab zt1t

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The new issue of the government call book, "Amateur Radio Stations of the United States," as revised to June 30, 1930, is now available. It can be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., for twenty-five cents in currency or money-order — stamps not accepted under any circumstances.

The edition is in general a duplicate of previous ones, but is somewhat larger. As before, technical, training school, experimental, and visual and relay broadcasting stations are listed alphabetically as well as by states and cities. This latter feature alone with regard to the listing of amateur stations makes the book almost indispensable to any amateur.

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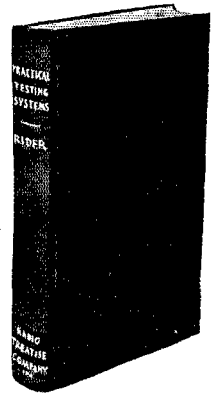
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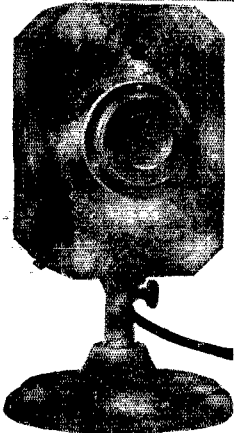
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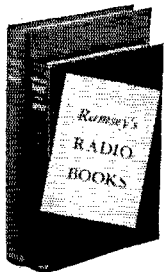
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*Special attention to Broadcast
Stations*

NATIONAL RADIO TUBE CO.

3420 18th Street

San Francisco, Calif.

W6BAX Wins Wouff Hong Trophy

(Continued from page 46)

tary-Treasurer of the M.A.R.C., extended the time for receiving entries one week from the close of the convention in order that more amateurs might get their entries in order.

The award was determined by an examination of the entries describing stations with consideration of the following points: DX (miles per watt, maximum) 35%, amount of traffic handled 25%, operating ability 20%, percentage home-made apparatus 20%. Custody of the Wouff Hong Trophy (see photo, p. 27, January, 1925, QST), which is patterned after the original wielded by T.O.M. himself, is a most appropriate honor to go to the operator of the outstanding Pacific Division station. This donation was fashioned from the plates and grids of many hundreds of burned-out transmitting tubes collected from the whole amateur fraternity.

It is pleasing to announce that the M.A.R.C. award goes to W6BAX, Mr. O. P. Taylor, Box 366, Sunnyvale, California. Here are some of the outstanding facts and records accredited to W6BAX. DX — Winner in the Third International Relay Competition (1930) with 100 watts input. Made W.A.C. in ten hours and forty minutes on January 1, 1930. (How to start the New Year right. Hi!) About 50 different European QSO's to date. Transmitters — 28 mc. experimental, m.o.p.a. 210 oscillator and 852 amplifier with 200 watts input on either 7 or 14 mc. Home-made equipment: Filament transformers, relays, bug key, coils, tank condensers, antenna lead-in insulators and rods, frequency meter, operating table, receiver and shack. It would make any ham envious just to take a look at the log of this station. Congrats are in order. FB W6BAX! — F. E. H.

Revising Amateur Tuner Design

(Continued from page 22)

C_8 is made effective at radio frequency by the fact that the only alternative path lies through the high resistance R_8 . It is necessary that C_8 have a capacity above that of the mica condensers because it must handle audio-frequency voltages also. C_5 and C_7 simply fulfill the usual requirements, the former being big enough to pass audio-frequency voltages and the latter just small enough to avoid passing much of them.

Some filtering which does not appear in the diagram, and is not normal in radio receivers, takes place at the power supply. Noises in the 110-volt lighting line, when arriving at the power transformer, encounter an electrostatic shield between the primary and the other windings of the transformer. Those disturbances which pass through this barrier or which are generated by the rectifier tube, are attenuated by r.f. filtering additional to the ordinary audio filtering. Such an r.f. filter may take several forms, as an r.f. choke between the rectifier filament and the positive side of the main filter, a .01- μ f. mica condenser shunted to ground, or simple combinations of the two.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraphs (1), (2), (3) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance. For quietness, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872 rectifier, complete plate power units. Rectifier Engineering Service, 4837 Rockwood Road, Cleveland, Ohio.

THE finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone CW transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ennsall Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

WHOLESALE discounts. Approved parts. \$50,000.00 stock. Over four pounds, catalog, circuits, data — 50c, prepaid (Outside U. S. — \$1.00). Weekly (new items, test reports) bulletins — 20 weeks — \$1.00. Experimenters 56 page house organ — 25c, prepaid. Kladag Radio Laboratories (Established 1920 — over 4,000 radiowave customers), Kent, Ohio.

LEARN Wireless (Radio) Morse telegraph. School, oldest and largest; endorsed by telegraph, radio, railway and government officials. Expenses low — can earn part. Catalog free. Dodge's Institute, 7 Wood St., Valparaiso, Ind.

CRYSTALS: I grind, test and calibrate each plate myself, and guarantee complete satisfaction. 7000-kc. \$15. 3500-kc. \$12. W9DRD, Herbert Hollister, Edwardsville, Kansas.

CRYSTAL holders \$3.50, ovens \$25. Build receivers, transmitters or power supplies. Smith, W2BRQ, 65 Glenwood Rd., Montclair, N. J.

G.E. 1000-watt transformers, 1100-2200-4400 each side center tap. Used by Cornell, Navy and 300 hams. Guaranteed unconditionally, \$12. F.O.B. Write for other sizes and voltages. Detroit, Fred G. Dawson, 5740 Woodward, Detroit, Mich.

A.R.R.L. sweater emblems should be worn by all League members. They are yellow and black 5" x 8" diamond, felt letters and embroidered symbol. Only \$1.00. Money order or currency only accepted. Eric Robinson, 135 Jefferson Road, Webster Groves, Mo.

FOR sale — Silver Marshall a.c. shortwave bearcat. Factory wires, tubes, speaker, coils, including broadcast, only \$65. Used one month. W9FKW, 234 Littleton, Lafayette, Ind.

ESCO m.g. 32-10-500 volt, 200 watt, two units, four bearings, complete with starter. Perfect condition. Sell for \$45. W1ANS, Milford, N. H., R. F. D. 2.

RECTOBULBS prepaid R3 \$10, R81 \$5.25; 85 or 170 meter Power Xtals ground to specified wave \$12; Sangamo A. F. transformers 45% off; any other new apparatus at maximum discounts. — Henry's Radio Shop, Butler, Mo.

GUARANTEED Marathon 210 and 250 tubes while they last, \$1.85. Other supplies for sale. Write for list. L. W. Robson, W9CKU.

JEWELL 199 set analyzer, 210 tube tester, 210 tube tester, list General Electric airplane receiver with shockproof case \$15.00. Airplane generator 13 volts 33 amperes propeller \$8.00. Gordon Brown, 192 South Goodman, Rochester, New York.

JEWELL 54 voltmeters 0-2000 with external resistors, 1000 ohms per volt, \$14. Leitch Park Drive, W. Orange, N. J.

SELL — Cooper Hewitt 22 inch mercury arc complete with holder, choke and resistance for 110 volts d.c. \$20 cash. William Mayer, 58 West 40th St., New York City.

POWER supply 550 v. and filaments, complete cabinet and rectifier tubes, \$15. 7½ watt transmitter, cabinet with meters, \$15. Both \$25. W1AOR.

SELL or trade Eveready Raytheon foto-electric cell type 3 GC. W9ECT.

BEST, lowest price, Cardwell transmitting variable condensers. Get list. High voltage. Hatry & Young, Hartford.

SELL — Esco 500 volt two bearing motor generator like new, \$20. Half kw. 500 cycle Navy generator, new \$10. W6BVY, Newman, Calif.

COMPACT m.g. — 1000 volt — 250 watt — 250 mil — 3450 RPM — 110 volt AC ¼ horse motor. Bronze bearings — wick oiling. Almost new — unconditionally guaranteed. "Baby needs shoes!" 55 bucks! Bargain! W2US, Hannah, Riverhead, N. Y.

SELLING two complete 7½-15 watt outfits also miscellaneous equipment. Write for list. Hurley, W6CKS, San Fernando, Calif.

W6CUX wishes his many friends and customers a Happy New Year.

RADIO, television, photographic and blue print supplies. Special attention given to "green" experimenters. Write for our circular. Geo. F. Meyer, 3604 Waldo Ave., New York.

MAGNAFORMER coils wanted. W. E. Schwenzer, 3619 Peach, Erie, Pa.

COIL forms, UY base, Silver Marshall design, threaded or plain; selected seconds, 25c, prepaid. Type 250 tubes, \$1.50. Stecher, 605 Wenonah, Oak Park, Ill.

POWER crystals — precision .1%, 1750 band \$8, 3500 \$10, plug-in holders, \$3. Oscillating blanks \$4. Crystal calibrated dynatron oscillators, \$30. Monitors, \$15. W9EPX, 1316 Anthony, Columbia, Mo.

HAVE a C.W.-I.C.W. and Fone Trans. Heising modulation, built for 150 to 175 meters. Worked 2000 C.W. stations and over 200 fone stations on fone in three years on 10 Watts. DX was both coasts and Florida. Log books go with set to prove this, or ask any veteran fone ham about this Canadian 3GG fone. They have all worked this station. Needs tubes and from 300 to 500 volts of "B" to put her back on the air. Easy changed to work on the 80 band. Will trade for anything or reasonable cash offer. Want movie camera, field glasses, binoculars, musical instruments, microscope, rectifier tubes, A.B.C. Eliminator, trans. chokes, etc. List your stuff and make offer. VE3GG, Hydro, Ontario, Canada.

CRYSTALS — .1% precision, guaranteed strong oscillators, 3500-kc. \$4; 7000-kc. \$7.50, one millimeter blanks, \$1.25. W1WH, 4 Sargent St., Hanover, New Hampshire.

SELL or trade: WE21D, 212D; RCA 210, 281, 852, 204-A; Powel Xtals: 24-1500 V. dynamotor; 500 V. MG; 1500 D.C. voltmeter; Acme 1500 V. transformer; other apparatus. W9ARA, Butler, Mo.

HAMS: Get our samples and prices on printed call cards made to order as you want them. W9APY, Hinds, 19 S. Wells St., Chicago, Ill.

BARGAINS — first time 10c, HY-7 constructional article. Leading shortwave superhet, parts, prices. Hatry & Young, Hartford.

QSLs, 90c per 100. W9DGH, 1816 5th Ave., N., Minneapolis, Minn.

CRYSTALS for sale or trade, guaranteed excellent oscillators, precision .1%. 3500-Kc. \$7.50, 1715-Kc. \$6. One inch tested blanks thickness .055 \$2.50. W9CVT, 6320 Main St., Kansas City, Mo.

SELL slightly used UX852 guaranteed \$18 or trade for good wrist watch. Sell new 2000V Tobe 1 mfd. \$4. Trade power crystals for wrist watches, kodaks, etc. W6EBV.

FOR sale — complete 'phone mopa transmitter. Write W9ESB, Quincy, Ill.

FOR sale — Robbins and Meyers motor generator set with rheostat, 1250 volts at .333 amperes, half horse power motor for 110 or 220 \$65. Kellogg broadcast mike \$35. Crystal for 180 meter fone band with holder \$10. Also Acme plate and filament transformers and W. E. speech amplifier with coupling transformers. W9CHS, R. No. 1, Box 265, Kenosha, Wis.

SELLING out — write for list. W1AAM, Groton, Conn.

QSLs by W2AEY, Prices, samples furnished, 338 Elmora, Elizabeth, N. J.

SILVER Marshall 735 a.c., 16-600 meters. Extra choke and output transformer. K. C. Murch, 81 Grove St., Fitchburg, Mass.

SELL General Electric 24/1500 volt dynamotor, \$18. W1CDT, Meredith, N. H.

TRANSFORMER rewinding, \$4 to \$8. Guaranteed. Clark Brothers, Albia, Iowa.

SEE it in QST? Order it. We have it — or get it. Try us. Hatry & Young, Hartford.

QSLs, 100 two color, \$1. Samples, W9CKA, Corwith, Iowa.

EXCHANGE \$105 Conn. trumpet for 75 watt transmitter complete. Chas. Bell, 385 Central Ave., Bridgeport, Conn.

SELL Aero automatic tuner, \$15. W8CUX, Millington, Michigan.

TUBES — selected seconds, 222-224s, 90c. 245-280-227s 70c. 112A-171A-226, 60c. W8CXW, Trenton, Ohio.

TRADE — Will trade half kilowatt 500 cycle Navy generator new for UP1016. W6BVY, Newman, Calif.

FOR immediate sale, slightly used; REL type "A" wavemeter, \$7.50; Aero monitor complete, \$9. W7KQ.

CRYSTALS: Guaranteed power plates, blanks, \$3, 7000-kc. \$15, 3500-kc. \$10. Write for dope on random frequency plates. Big saving. W2FM, 4606 Clarendon Road, Brooklyn.

BARGAIN: complete transmitter and receiver, \$25. Dope, write A. Newton, 306 Woodstock Ave., Kenilworth, Ill.

POTTER Condensers: 2-mfd. 1000-test voltage \$2.50; 1-mfd. 2000-test \$2.50; 1-mfd. 2500-test \$3.25; 2-mfd. 2000-test \$4.00. 5-Dial Omnigraph \$12.50. Aluminum square-foot 85c; Lead 85c. "Ham-List" 2c. Curtis, 1109 Eighth Avenue, Fort Worth, Texas.

SELL: WE387W double button mikes nearly new \$25. W9ARA, Butler, Mo.

TRANSFORMERS, 1500-1000-c-1000-1500 2.5 V filament, 110-220 primary. Encased. Transformers and chokes to specifications. Modulation chokes. Lambricht and Cook, Box 1509, El Paso, Texas.

QSLs, message blanks, wall cards, stationery, etc. Hillcrest, Craneseville, Pa.

TRADE — 700-kc. xtal for Vibroplex or 866s. W7KQ.

EIGHTY meter power-type crystals, \$5.50. Sell or trade good parts. W9DOQ, Route 1, Duluth, Minn.

TRADE or sell; double button mike-transmitter-receiver-UV203A, etc. Want 250 watt tube, equipment. List for stamp. W2CE.

UX210, UX281, UX250s, \$1.35; 2½ mfd. 1000 working volt filter condensers, 80c; 0-10 a.c. panel voltmeters, \$2; 0-100 panel milliammeters, \$1. Hanifan Sales Co., Waterville, Ohio.

SHORTCUTS, code reading speed, 5 to 25 quick, easy. Reports many hams on request. Dodge, Box 100, Mamaroneck, N. Y.

CRYSTALS for sale or trade. Guaranteed power type. W9DLL, 222 W. 73rd Street Terrace, Kansas City, Mo.

TYPE 866 mercury tubes, firsts \$6. each. Thirty day replacement guarantee. These are much improved over our product of two years ago. E. Ewing, Jr., 29 S. LaSalle St., Chicago, Ill.

SALE — ½ k.w. xmtr with UV204A. A bargain at \$125. Or trade for what? Write for details A. H. Whitney, Hemet, Calif.

FOR sale — transmitting equipment or trade for tubes and meters. What have you and what do you need? Lowell Ecker, Sedan, Kansas.

QSL cards, two colors, \$1. per hundred. Free samples. W8DTY, 257 Parker Ave., Buffalo, N. Y.

TRANSFORMERS — 200 watt, 3 filament windings for 2-250's, 2-281's, one 2.5 volt. Plate winding 1500 CT. 3000 volt insulation. Weight 19 pounds, include shipping charges. Price \$3.50. 30 henry 170 mill chokes, unconditionally guaranteed \$2.00. Filament transformers for 2-210's, center tapped, \$1.00 each. Faradon 1500 volt .1-1 filament by-pass condensers 55c each. 0-100 milliammeters \$1.25 each. Anything sent COD. Hufnagel 879 So. 18 St., Newark, N. J.

WANTED — SE1420 or IP501 receivers. Paul Trautwein, 38 Park Place, New York.

NAVY standard receivers, Dubilier 12500 volt condensers, spark gap units, Esco 220 a.c. motor, 1600 volt generator with 16 volts filament. Mariners Radio Service, 38 Park Place, New York.

CONDENSERS — 1.79 mfd. General Electric oil filled, 2800 volts a.c. excellent for ham transmitter up to 4000 volts. Only \$15. each. Guaranteed. Howard W. Chapin, Box 26, Ypsilanti, Mich.

POWER crystals: Guaranteed excellent oscillators ground to your approximate frequency. Calibrated to .1%. 3500 kc. bann, \$7.50. 7000 kc. \$10.00. Plug-in mounting, \$3.00. Precision Piezo Service, 427 Asia St., Baton Rouge, La.

TRANSMITTERS, November QST style power supply key antenna, \$25. Omar Hilton, Lexington, North Carolina.

TRADE — 30-40 calibre rifle and 303 calibre rifle for xmting equipment or shortwave receiver. Box 21, Seaford, N. Y.

QSL photos, stamp size, hundred for \$1. postpaid. Send remittance with photo (negative preferred). Friedman, 1269 Boston Road, New York. (W2FX)

W8CXW selling out. What can you use?

SACRIFICE — two new WE fifty watters, \$10 each. REL sockets, \$1 each, two new rectotubes used about two hours, \$7 each. RCA 104-210 amplifier, 251 power pack and dynamic speaker including five tubes, \$30. Two Flechtheim 2 mfd. 1500 volt condensers, \$3 each. First money order wins. R. Stimpson, Radio W1KL.

WANTED: Kennedy 110, Grebe CR-7 or SE1420, SE143. Schindler, 116 Rebecca, Scranton, Penna.

TRADE Navy Radio Receiver 1000-10,000 meters for Short-Wave Receiver — Sell Grebe CR-8 150-1000 meters Receiver \$4. 50-Marconi-Victor Six Double-Faced phonograph Code instruction records and manual \$3. 50-Underwood No. 5 typewriter A1 condition \$25. Will sell for \$20 or trade for radio apparatus twenty volume complete set "Book of Knowledge" Children's Encyclopedia list \$60. A1 Condition Excellent Gift New Year. What am I offered. All letters answered. Joseph C. Owen, 1219 55th Street, Brooklyn, New York.

SELL, 50 watt transmitter with arc rectifier, complete with transformers and tubes. Also receivers, miscellaneous parts. Write for full information. W9BHZ, Janesville, Minn.

WANTED — heavy glass jars, 1" x 6" outside diameter, W9CKA, Corwith, Iowa.

SPEAKER rewinding, \$2 to \$2.75. Guaranteed. Clark Brothers, Alvia, Iowa.

1 Tobe 2 mfd. 3000 volt condenser, \$4, 3 Parvot 2 mfd. 1500 volt condensers, \$4.50 each, 2-110 powerstats, \$1. each. C.O.D. V. Jones, 1312½ Lagoon St., Wilmington, Calif.

SELL or trade: 24-1500 volt dynamotor; band box super; Underwood typewriter; 1200 volt 866 power supply, \$30; 2 button mike, stretched diaphragm, \$18; 212D tube, \$20; 3 Weston milliammeters; electric victrola with recording attachment; crystals, \$5 up. Want 16 m.m. movie outfit. Earl E. Hampshire, Elgin, Kansas.

CRYSTALS ground to your frequency, 3500-kc. \$5. 1" oscillating blanks, \$2. W8AKW, R. L. Tedford, 1804 Waltham Ave., College Hill, Cincinnati, Ohio.

COMMERCIAL design new 50 watt short wave transmitters, low price. Ask for bulletin on standard ham equipment. Pontiac Engineering Co., 1100 Avenue I, Brooklyn, N. Y.

ESCO dynamotor, 32 to 500 volts, 3 amp, \$20. 110 volt d.c. converter 1 amp. \$15. C. & W generators, 25-275, will give 400 volts 100 watts new \$8. Used \$5. Write your requirements. R. Wood, 46-20 102nd St., Corona, N. Y.

GET started — parts for QST November transmitter. Real beginners outfit. Made up also. Write Hatry & Young, Hartford.

REMOTE control relays in steel cabinets. Low voltage push-button circuit can be open-wired anywhere. Two pole, ten ampere, adaptable to either 110 or 220 volts, 60 cycles. No-arc contacts, \$6.50, postpaid. Satisfaction guaranteed. Robert Gettelman, 605 Hi Mount, Milwaukee, Wis.

DELUX 550 volts power supply for 210 transmitter uses 281 rectifier, \$8; with rectifier \$10. Several unused Baldwin speaker units 30c each. ABC supply for 245s, push-pull \$7.50. Brass key, \$1, pair Pilot push-pull transformers, \$4. Surplus list on request. Charles Bailey, 233 Exeter St., Brooklyn, N. Y.

100 Kc. Standard frequency bars to be used in any type of approved low frequency circuit. These bars are guaranteed to oscillate at exactly 100,000 cycles when the crystal circuit is properly adjusted. \$9.00 each with complete instructions. Guaranteed high quality quartz crystals 1 to 4 Mc. calibrated to within .1% of your stated frequency, \$9.00. Collman & Biley, 34 West 8th St., Erie, Penna. W8GU.

FOR sale or trade — for shot gun. Phone and c.w. transmitter, with Jewell meters, \$29.50. F. W. Steffen, Hartley, Iowa.

OMNIGRAPHS, Teleplexes, Wasps, 50 watters, transformers, transmitters, receivers, Vibroplexes, Rectotubes, crystals, sockets, meters, bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

SELL — Pilot a.c. super wasp with Pilot power pack and Pilotrons, \$42. Slightly used RCA 852 \$20. W9ADS.

WESTON meters, new, one model 301, 0-50 milliammeter, one model 517, 0-10 a.c. voltmeter, one model 506, 3 and 200 volts, \$5 each. W7IL, Hermiston, Oregon.

Q R A SECTION

50 c. straight with copy in following address form only:

W1BIC — Ernest E. McAviney, 105 Central Ave., Hamden, Conn.

W1FL — G. Donald Meserve, Box 252, Noroton Heights, Conn.

W1MG — St. George's School Radio Club, Thomas W. Brown, 4th Opr., Newport, R. I.

W4ADY — R. L. Miller, Jr., P. O. Box 744, Durham, N. C.

W9BIK — Lawrence A. King, 1701 Crilly Ct., Chicago, Ill.

WIMK, A.R.R.L. Headquarters
R. B. Parmenter, Chief Op. "rp"

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Bethesda crystal blanks are tested for maximum power and output, and are unconditionally guaranteed to be free from any and all defects.

Price of zero angle or x cut blanks ground to within 1/1000 of an inch in thickness of the

- 50 to 500 meter band \$4.25 per section
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- 20 meter band \$7.00 per section

Blanks on the V or 30° angle plane to within 1/1000 of an inch in thickness of the 80 or 160 meter bands, \$4.25 per section. — Prices include postage and are C.O.D. or cash with order. — Special quotations to Dealers, and on orders of 5 or more blanks. Crystal sections on hand, or cut to order in any shape, size, or plane, for Laboratory or Basic science research work for Universities. A trial order will convince you of the high standard of our product. Special attention given every order.

BETHESDA CRYSTAL LABORATORY

P. O. Box 43 Bethesda, Md.

STUYVESANT ELECTRIC CO., INC.
53 Walker St New York
FREE CATALOGUE
LATEST RADIO BUYS AT BIG SAVINGS
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Scientifically Prepared for Maximum Power and Unconditionally Guaranteed 1 in. square sections (close to your specified frequency), supplied promptly at the following prices:

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- 75-100 meters.....12.50
- 100-200 meters.....9.00
- 200-600 meters.....15.00
- 1 in. Tested blanks, 200-400, 400-600 meters.....4.00
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(A Calibration furnished with each crystal)

Sections of any practicable dimensions made to order

(Charges for grinding to exact frequencies given on request)

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"A pioneer crystal grinder"

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Radio operators are officers aboard ships. Well paid, pleasant work, travel. You can qualify in a short time in our well-equipped school under expert instructors.

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DONGAN 250-watt transformers with line ballast resistors. Insures absolutely steady voltage regulation. Completely mounted and shielded. Terminal lugs on top. Resistors furnished free. Secondary high voltage output is 1500 volts, centre-tapped at 750 volts. Filament output is 15, 7½, 7½ centre-tapped and 2½ centre-tapped. Get your order in fast as there are very few left. Price complete.....\$5.95

KNIGHT 150-watt transformers. Ideal for 210 power supply using half-wave rectification. High voltage is 600 volts. Filaments are two 7½ centre-tapped windings, 2½, and 1½ volts. \$2.75

RCA-VICTOR power transformers. 150 watts. Just the thing for that 245 transmitter (Nov. QST). Supplies 650 volts centre-tapped, and 2½, 2½, 1½, 1½ and 5 volts for the filaments. Shielded in a metal case. Special.....\$2.75

COLUMBIA 30-henry, 200-mill chokes. A real rugged choke for heavy duty power filter supply.....\$2.50

THORDARSON 30-henry, 150-mill chokes.....\$3.25

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COLUMBIA 30-henry, 120-mill chokes, mounted.....\$1.30

GRID-LEAKS Wire wound and enamel coated. For all tubes up to 250 watts, 10,000 ohms, \$.95; 5,000 ohms, \$.65.

TUBES of high quality. Made to stand the gaff. FREE 30-day replacement. Type X281, \$1.60; X250, \$2.15; X210, \$2.05; Y224, \$1.20; X171A, \$.70; X280, \$.90; X245, \$1.20.

COLUMBIA TRANSMITTING FILTER CONDENSERS. Newer and better. Extra heavy duty and with a REAL replacement guarantee.

Capacity	Working Voltages		
	1000 d.c.	1500 d.c.	2000 d.c.
1 mid	\$1.50	\$3.10	\$3.95
2 mid	\$2.40	\$4.60	\$6.95
4 mid	\$3.90	\$8.95	\$11.50

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The Time-Tested Resistor
For Your Power Pack

"IT'S ADJUSTABLE"

You can adjust TRUVOLTS to any desired value within their entire range — easily, quickly, accurately; can add taps and take them off. This convenience, exclusive with air-cooled TRUVOLTS, — coupled with superior performance — explains their great popularity among engineers, experimenters and fans.

Write Dept. Q-1 for TRUVOLT Circular and details of the Electrad-Loftin-White Direct Coupled Amplifiers for all power requirements.

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WOULDN'T you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below — clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership

AMERICAN RADIO RELAY LEAGUE
Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose \$2.50 (\$3 in foreign countries) in payment of one year's dues, \$1.25 of which is for a subscription to *QST* for the same period. Please begin my subscription with the issue. Mail my Certificate of Membership and send *QST* to the following name and address.

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Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST*?

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Thanks

For Your Convenience


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 THORDARSON 250 watts—1200 v. center tapped, two 7.5 and one 3 v. windings.....	\$5.75	\$4.75
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THORDARSON 100 watts—same as above but for 25 cycle use.....	4.25	3.25
AMERICAN 2.5 v. filament for 866 tubes. Two windings at 11 and 3 amps.....	3.75	2.75
AMERICAN step-down, gives 110 from 220 volts — 60 cycle.....	4.25	3.50

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 THORDARSON Filter Choke, 30 henri — 150 mils.....	\$3.25	\$2.75
GENERAL ELECTRIC Filter Choke, 22 henri — 300 mils.....	6.00	3.75
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 THORDARSON Filter Choke, Double type, contains two 18 henri — 250 mil windings.....	6.25	4.75

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	Old	New
GENUINE R.C.A. UV-213 Rectifying Tubes, full wave, same voltages as 280..	\$.95	\$.65
GENUINE R.C.A. 216-B Rectifying Tubes, 7.5 volt filament, 550 plate volts	2.35	1.95
KENOTRON Rectifying Tubes, filament voltage 8 to 10, plate 550 volts.....	.50	.35
WESTERN ELECTRIC VT-2 — 5 watt tubes — standard base.....	2.50	
GENUINE DE FOREST Transmitting Tubes shipped you direct from factory:		
503-A, \$30.00; 511, \$30.00; 545, \$33.75 (50 watt oscillators, modulators, etc.)		
552, \$24.25 (75 watt oscillator and R.F. amplifier, low internal capacity.)		
566, \$9.00 (half wave mercury arc rectifier, filament 2.5 — plate 7500 volts.)		

We also handle the products of the following nationally known companies and will be pleased to supply catalogs and prices on request: VIBROPLEX, AMERTRAN, THORDARSON, GENERAL INDUSTRIES MICROPHONES AND PUBLIC ADDRESS EQUIPMENT, ELECTRAD, JEWELL METERS, R.E.L., FLECHTHEIM TRANSMITTING CONDENSERS, DE FOREST TRANSMITTING TUBES, UNIVERSAL MICROPHONES, PILOT, ESCO GENERATORS, SAMSON "PAM", AMPLIFIERS, NEW HAVEN ELECTRIC CLOCKS, AEROVOX TRANSMITTING AND RECEIVING CONDENSERS, CARDWELL TRANSMITTING VARIABLE CONDENSERS, NATIONAL COMPANY EQUIPMENT and MERSHON CONDENSERS.


To the Transmitting Amateur, Short Wave Experimenter and Serviceman

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4 mfd.....	8.70	
2000 volts — 1 mfd.....	6.00	
2 mfd.....	9.00	
4 mfd.....	15.60	

Write for special prices on 3000 volt condensers and type HS & HV.

DUBILIER 1 3/4 mfd. 1000 D.C. working voltage.....	\$1.75	\$1.15
DUBILIER 7 mfd. 600 D.C. working voltage.....	2.50	2.00
DUBILIER 4 mfd. 600 D.C. working voltage.....	1.80	1.25
 DUBILIER Plate Stopping Condenser, .000125 mfd. at 1000, volts.....	.50	.35
AEROVOX 7 mfd. Block, 2 mfd. at 1000, 2 at 800 and 3 at 400 v. D.C. working volts.....	3.00	2.50

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	Old	New
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David W. J. Jones, *Brisbane, Australia* says: "I have received on my Super-Wasp all the test transmissions between W2XAF (Schenectady, U. S. A.) and VK2ME (Sydney NSW), and PCJ Holland, G5SW England and Sydney—London phone service."

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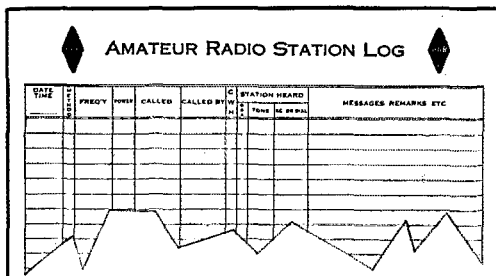
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Designed by F. E. HANDY
A. R. R. L. Communications Manager



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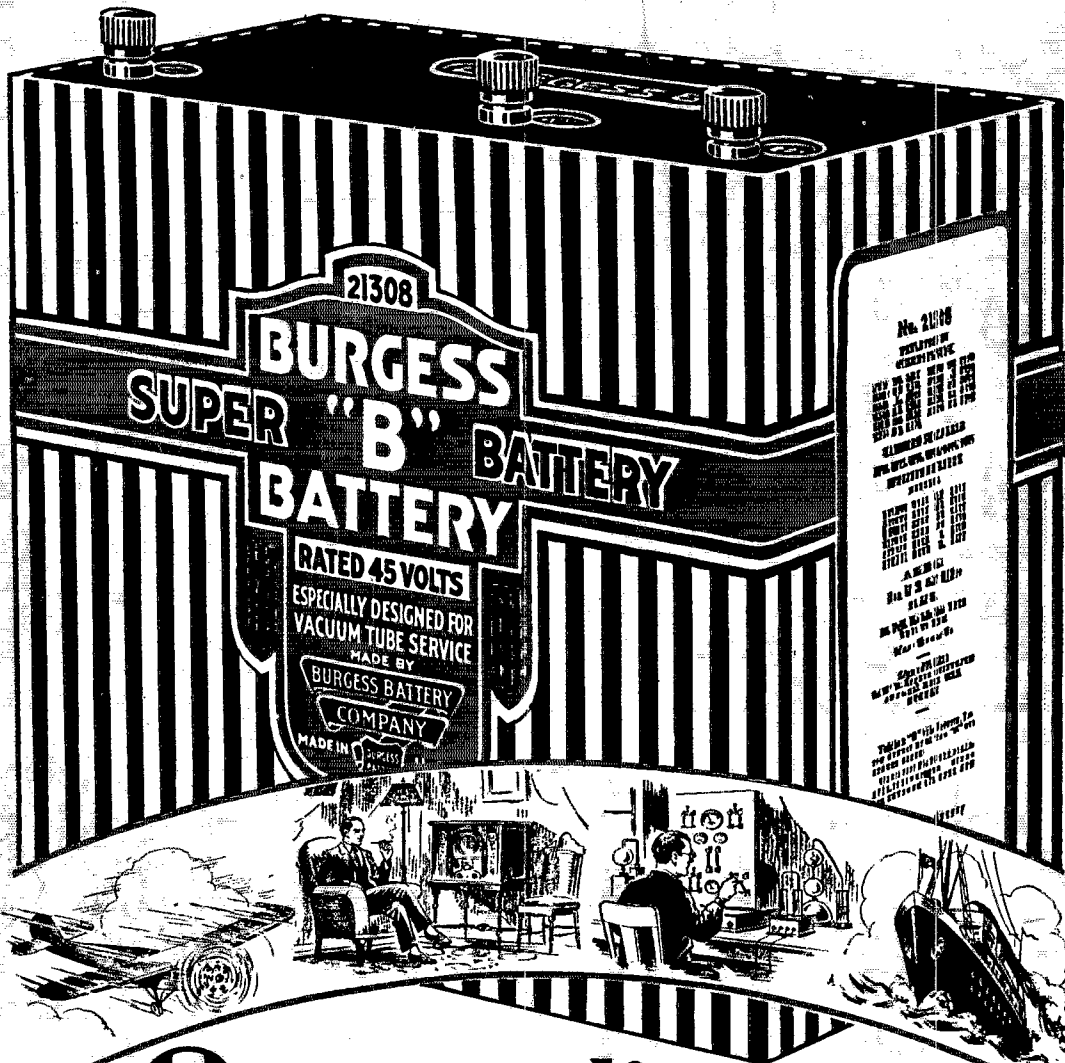
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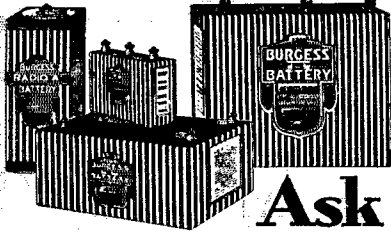
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THE COMMUNICATIONS DEPARTMENT

F. E. Handy, Communications Manager

E. L. Battey, Asst. Coms. Manager

1711 Park Street, Hartford, Connecticut

Off-Frequency Report

THE number of complaints and protests against amateur interference on the channels of other radio services is increasing and reaching rather serious proportions. It is not uncommon for an A.R.R.L. official observer to identify and send friendly warnings to as many as ten stations operating above the high-frequency end of the 14-mc. band at a single week-end sitting.

A survey of conditions shows the greatest interference on GBW (14,440 kc.) Sundays from about 11 a.m. to 3 p.m. E.S.T. by stations in the south and extreme west. WNC, 14,470 kc., is received in London and comes in for a share of the interference from U.S. amateurs. Off-frequency stations have been logged as far out-of-band as 14,760 kc.!! Every evening between 7 and 11 p.m. E.S.T. some hams run amuck on GBS, 8905 kc., nearly 100 kc. out of the 7-mc. amateur band. At the same time a disgracefully large amount of off-frequency amateur operation has been going on between 7300 and 7400 kc. — QRming reception of the newly opened Netherland's station, PDT, 7350 kc. in this country. Amateurs have even been identified at irregular intervals on 9790 kc., another channel assigned GBW!!!

Examining the operators caught off-band and queried by long distance telephone brings to light the information that in nearly every case the operators in question have neglected regular checking of frequency before going on the air. In many cases these men had no suitable frequency measuring devices at all and were accustomed to "borrow a meter from the ham down the street" — a "reason," but not so good or suitable an expedient to use in defence of the position of the off-frequency operator. The situation should improve, however. Careless and haphazard operators are becoming aware (to their sorrow) that the Radio Division policing or monitoring stations are on the job and "making examples," too, for infractions of the regulations. Such operators can get no comfort from A.R.R.L., whose Board agreed that examples should be made — not to risk the operating rights of the many on account of a few careless hasty amateurs who refuse to accept their responsibilities in keeping their frequencies within the bands.

Check frequency regularly BEFORE going on the air. Also before changing frequency bands. Be sure your frequency is within the band. Use standard frequency transmissions sent every Friday and Sunday to calibrate. A regular practice of checking frequency "before" . . . will pay big dividends! Make the first sentence above the slogan of your station.

Check frequency daily. Check frequency daily. Check frequency daily.

Suggested — A New Year's Resolution: I will check my station frequency regularly every time before operating, and I will adjust frequency to a point sufficiently inside the band limits so that there is no possible chance of my accidentally "drifting" off frequency.

Old-Timers' Week

TO "start the new year right" we are setting aside the first week in the New Year, January 1 to 7 inclusive, as "Old-Timers' Week." It is not an activity in the nature of a contest, but just one grand invitation and opportunity for every "old-timer" to get together on the air and renew old friendships "on the air." Perhaps we ought to define an "old-timer" as an operator who has been on the air over a year. Ed Glaser, W2BRB, suggests that it would be fitting to have a special kind of CQ for the partic-

ipants indicating the date a station went on the air, or the date of the operator's first license.

There is no limit to the choice of frequency bands. You may hunt around for "old pals" any time during the week that the fancy strikes you — Saturday night and Sunday would be a good time for a lot of fellows we imagine. Keep track of how many OT's you hook, or let us know who it was you got together with — just a postal to the Communications Department to let us know how you made out and whether you would enjoy another such get together sometime.

Glaser suggests that some of the old-timers who can do so "hoof it up" and have some of the snappy three and four way get togethers that used to be so popular. Of course this will depend on conditions and the convenience of the operators somewhat. The suggested form for inaugurating a get together with someone who got on the air about the time you did: CQ CQ CQ OT de W9— W9— W9— 1925 AR. Remember the dates, from the time we ring in the New Year until midnight January 7.

Coming — Second Annual Sweepstakes (All-Section) Contest, February 15-28 inclusive. See full announcement next issue!!

Coming — The Fourth International Relay Competition, March 8 to 21 inclusive. Full announcement later. Details substantially as in late years. Foreign stations, please get ready for opportunity to make an unprecedented number of U. S. A.-Canadian contacts — thereby winning out for your own country perhaps in addition?

Coming — ?????????????? April.

28-mc. Tests

ALSO all A.R.R.L. members are invited to try 28-mc. work during January and to send full reports of results to A.R.R.L. Headquarters. The R.S.G.B. has announced a general QSO contest for the dates of January 4, 11, 18 and 25, 1931, so these times will be most excellent to work on 28 mc., since there will be observers in many parts of the world. If possible contacts during the whole 24 hours are desired to bring out the characteristics of this communication frequency. Our brother hams across the water are far from admitting that the possibilities of night work are hopeless. Special cooperation is expected from numerous keen experimenters in Australia and New Zealand also, and owners of 28-mc. stations who can do so are urged to try reflectors, not so much for directional purposes as to control the angle of radiation and get most of the radiated energy on the most favorable transmission angle. Note the material on beam antennas which appeared on page 17 of April, 1930, *QST* in this connection.

If you are equipped to send or receive (or both) on 28 mc., send us a QSL card and say so, in order that you may be in line to receive any late information on 28-mc. tests. Photographs of equipment are also welcomed.

56-mc. Tests

COMING in February — each Sunday — February 1, 8, 15, and 22 — tests between 5-meter experimenters. See September, 1930, *QST* (page 13), for a descrip-

tion of successful 56-mc. apparatus. Plenty of time to get busy and ready for tests. If commercial organizations can make good use of the adjacent frequencies, it is high time amateurs showed some use of this territory. Let's go, everybody. Don't forget that everything we said about QSL's and photos applies to the 56-mc. group, too. Send your card to A.R.R.L., Attention Communications Department, and state on what frequencies you can receive—or have a full station in operation for any future tests.

G2DT, G6LK, G6XN, G6TW, G2OL, OH2OP and G2BY are ready to make five-meter observations across the water, as well as a large number of B.R.S. (licensed receiving experimenters).

North Dakota Emergency Work

RADIO amateurs of North Dakota proved their usefulness when called upon to handle emergency traffic during the sleet storm of November 20th when all telegraph and telephone lines were broken between Jamestown and Fargo.

Activity at Jamestown centered at W9CBM where, with the assistance of W9DGS, a constant watch was kept from noon until 5:30 p.m. November 20th. During this time much important traffic was handled for the Northern Pacific Railroad, the telephone companies and the local papers. The Northern Pacific used amateur radio to keep their trains running between Fargo and Jamestown. During the evening W9BVF and W9DGS tried to establish communication on 3500 kc. without success as Fargo had no 3500-kc. transmitter.

Contact was reestablished at 9:00 a.m. the next day (November 21st). But little traffic of real importance was handled on the 21st, as it was taken care of by WDAY at Fargo and KFYZ at Bismarck, being transmitted over land wire between Bismarck and Jamestown. W9BVF and W9DFG handled some traffic for Minot and other points to the northwest.

W9AOX was the amateur station at the Fargo end and the operator deserves much credit for efficiently handling the situation there. So far as we know W9AOX was the only operator at Fargo although W9FWO's transmitter was used at W9AOX on the second day.

Other stations which assisted were W9AFM at Minot, W9BPM at Grand Forks, W9EOZ at Dilworth, Minn., and W9BN at Minneapolis.

— W9DGS and W9CBM.

1750-Kc. 'Phone Bridges the Gap

ON the night of November 19th a very severe sleet storm followed by a blizzard hit Nebraska bringing down all wires between Sutherland and North Platte. On the 20th W9BBS of North Platte was called upon by the Union Pacific Railroad to try to get west by radio. It was about 9:00 p.m. before the power lines had been repaired sufficiently to enable him to get on the air. He had tried to get his portable outfit going with "B" batteries but with his antenna down and a high wind blowing he was unable to get through. Very shortly after getting on the air W9BBS raised W9EXP at Sutherland on 1750-kc. 'phone. The distance between North Platte and Sutherland is only 20 miles so 1750 kc. was used. Traffic was handled for the Union Pacific for about 22 hours until they got their wires up again; 100 messages were handled totalling over 3100 words. Some messages had checks as high as 200 words. The officials of the railroad were high in their praise of the quick and accurate way in which the traffic was put through.

The lines east of North Platte were also down for a while, and the Postal Telegraph Co. had a rush message for Omaha. W9BBS raised W5GG, Cleveland, Miss. (also on 1750-kc. 'phone) and gave him the message to put on the wire at Cleveland.

W9BBS says: "I believe more stations should be equipped to use 1750 kc. as it is the best band we have to handle traffic on by 'phone. I have been on the air about seven years and use C.W. on the 14-, 7- and 3.5-mc. bands, but for 100% service for full 24-hour periods over distances up to 150 miles, give me 1750 kc. every time."

With the 'Phones

W2COJ has been making a great many recordings (on the new Victor records) of various 'phones received at his station. W1BCR is using a pair of 852's as linear push-pull amplifiers. The Providence Radio Club expects to obtain the use of an oscillograph to make pictures of wave forms and modulation. Better improve your modulation, fellows! W1AEB is modulating a final 203-A with a 212-D. W8AKU uses a 203-A oscillator and 845 modulator and sure makes a noise here in the East. VE3GM uses a 203-A final amplifier modulator with two 211-D N.E. tubes.

On November 9, 1930 twenty 'phone men met at the Providence Radio Club and discussed the formation of an Eastern Amateur Radiophone League. The E.A.R.L. was formed that the 'phone men as an organized group might progress more rapidly than individually; that the fellows might meet one another at regular get-togethers held in different sections; to provide information for improving 'phones; to arrange 'phone traffic routes of service to the community and country in time of emergency, arranging tests or contests to stimulate interest; to help, if possible, the QRM situation; to obtain, if possible, a wider band for 'phone. Temporary officers: President, C. N. Kraus, W1BCR; Treasurer, J. M. Wade, W1QT; Secretary, A. T. Turner, W1AEB. Control stations appointed in the various sections: W1BCR, 3544 kc., Master Control and Rhode Island; W1AEB, 3539 kc., Massachusetts; W1AMQ, 3525 kc., Connecticut; W1AUY, 3540 kc., New Hampshire; W2COJ, 3550 kc., New Jersey; VE3GM, 3550 kc., Canadian Third District. A Boston section meeting will be held soon and W2APF, W2COJ, and W2BXO are planning a New York section meeting. At this writing the new 'phone organization has upward of one hundred members.

A Change in W1MK Operation

A.R.R.L. Headquarters Station W1MK now operates on a frequency of 14,300 kc. in addition to 3575 kc. and 7150 kc.

At the request of West Coast amateurs a broadcasting schedule has been added on the 14,000 kc. (20-meter) band. Also, we are inaugurating some "general" operating periods so that more west coast A.R.R.L. members may contact Headquarters. Since the operating hours of the station are limited it is not possible to give up much time to 14 mc. operation now, but if this operation works out favorably some further changes in schedules may make it possible to expand it further. The new transmitter described in December, QST will be used on 14,300 kc.

OFFICIAL AND SPECIAL BROADCASTS are transmitted on the following schedule: (All hours are given in Eastern Standard time.)

Simultaneously on 14,300 kc. and 3575 kc. at the following times:

8:00 p.m.: Monday and Friday.

10:00 p.m.: Monday and Friday.

Simultaneously on 3575 kc. and 7150 kc. at the following times:

8:00 p.m.: Sunday, Tuesday and Thursday.

12:00 p.m. (midnight): Sunday, Tuesday and Thursday.

GENERAL OPERATION periods have been arranged to allow everyone a chance to communicate with A.R.R.L. Headquarters. These general periods have been arranged so that they usually follow an official broadcast. They are listed under the three headings of 3500 kc., 7000 kc. and 14,000 kc. to indicate whether the watch is devoted to listening on the 80-meter, 40-meter or 20-meter band. W1MK's frequency in each band is given in parenthesis.

3500 kc. (3575 kc.)

8:15 p.m. to 9:00 p.m. on Sunday, Tuesday and Thursday

10:00 p.m. to 11:00 p.m. on Tuesday and Thursday (No OBC sent before these periods)

12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning)

7000 kc. (7150 kc.)

10:15 p.m. to 11:00 p.m. on Sunday, Monday and Friday

12:00 p.m. to 1:00 a.m. on the following nights (actually on the morning of the day following): Mon., Tues., Thurs. and Friday. (Only on Tuesday and Thursday does the OBC precede these periods.)

14,000 kc. (14,300 kc.)

7:30 p.m. to 8:00 p.m. on Monday and Friday

8:15 p.m. to 10:00 p.m. on Monday and Friday

SCHEDULES are kept with the following stations through any of which traffic will travel expediently to A.R.R.L. Headquarters, on 3500 kc.: WIACH, WIBXB, WICTI, W1ZB, W2JF, W3AVI, W3BWT, W3CXM, W8CKC, W8CUG, W8DLG, W9OX, VE9AL; on 7000 kc.: W4AGR, W6OJ and W9ECS.

QSL CARDS for W1MK should be addressed in care of A.R.R.L., 1711 Park Street, Hartford, Conn. A complete log of every transmission is made and W1MK is always glad to send any station worked a card, but frequently cards are lost when sent direct to the station at Brainerd Field. W1MK always QSLs upon receipt of card from station worked.

OFFICIAL BROADCASTING STATIONS

Changes and Additions
(Local Standard Time)

W7FL (14,285.6 kc.) (CW) Tues., Fri., Sun., 2:00 p.m.
W7FL (7142.8 kc.) (CW) Mon., Thurs., 7:00 p.m.
W7FL (3950 kc.) (CW) Mon., Thurs., 8:00 p.m.
W7FL (3500 kc.) (Phone) Every night 12:00 Midnight.
W8AKA (7215 kc.) Fri., 9:00 p.m., 10:00 p.m.
W8BAH (3875 kc.) Mon., 7:00 p.m.
W9SO (7120 kc.) Mon., Wed., Fri., 1:00 p.m.

Traffic Summaries

(OCTOBER-NOVEMBER)

Central led by Illinois	11,273
Pacific led by Los Angeles	7772
Atlantic led by Eastern Pennsylvania	4607
West Gulf led by Oklahoma	3904
New England led by Eastern Massachusetts	3568
Midwest led by Missouri	2984
Hudson led by New York City and Long Island	1560
Roanoke led by Virginia	1496
Northwestern led by Oregon	1460
Southeastern led by Ga.-S. C.-Cuba-Isle of Pines-P. R.-V. I.	1154
Delta led by Louisiana	1068
Rocky Mountain led by Colorado	1064
Dakota led by Southern Minnesota	857
Ontario	586
Vanalta led by Alberta	404
Prairie led by Saskatchewan	252
Quebec	150

875 stations originated 11,284; delivered 7839; relayed 25,036; total 44,159 (69.1%).



All Hail Illinois and the Central Division!! They came, they saw, they conquered! After Los Angeles leading the other Sections in traffic for seven consecutive months, and the Pacific Division leading the country for well over a year, Illinois comes forward with a total of 4787 and Michigan with 2927, ably

backed by the rest of the Central Division for a grand total of 11,273, and take the honors away from the west coast. The Banner goes to Illinois, and with it goes our hope for continued competition among the various sections throughout the country.

The Central Division has the upper hand now. Will the Pacific Division make a "come back?"

A traffic summary showing the standing of the various divisions for the past month is printed above. What place does yours take?

Traffic Briefs

JANUARY 1 is the time to start a new series of numbers for your originated traffic. It is necessary to have some sort of a system in numbering your originated messages to avoid duplication and help keep your records straight. Start a number sheet of originated messages as explained in the chapter on "Operating A Station" in the Handbook.

W1MK will not operate on New Year's Day — January 1. On that day "RP" will be busy making New Year's resolutions.

Among messages to other dignitaries, W2ZC has handled messages to Mussolini and King George. FB!

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W9AYD	663	197	368	1228
W9DZM	207	211	484	902
KAIHR	217	139	366	862
W8DYH	44	70	584	698
W5AHI	8	11	650	669
W5VQ	27	37	523	587
W6QP	136	108	286	528
W6CXL	41	83	392	516
W3BWT	140	165	501	501
W3ZF	77	136	224	437
W8DED	49	25	348	422
OMITB	150	90	177	417
W6HM	108	272	9	387
W9BMA	66	59	256	381
W6YG	183	32	146	361
W1MK	82	73	204	359
W1IP	16	31	298	345
W6AXV	306	7	20	333
W6TAL	50	100	178	328
W6AAD	121	8	198	327
W5BAH	280	10	32	322
W3ARU	207	65	35	307
W9DBB	7	20	273	300
W7ZD	22	60	212	294
W6CDZ	36	18	238	290
W8CMB	37	19	194	246
W5BKE	57	56	248	289
W6AQ	276	—	—	276
W9ESA	5	242	28	275
W9GBA	146	55	72	273
W5ZG	4	35	220	259
W6ALL	21	65	172	258
W2SC	62	79	110	251
W3CXM	21	52	175	248
W8CUG	14	19	214	247
W1LQ	31	43	172	246
W5GKX	15	20	203	238
W8QL	23	17	196	236
W3AKB	8	27	198	233
WYE-8SL	95	4	132	231
W9EJQ	21	24	185	230
W8DPJ	47	22	160	229
W2WO	22	—	190	229
W9DGZ	219	10	—	229
W8CZ	19	30	172	221
W4JD	97	25	98	220
W9APY	211	18	—	219
W8BIA	57	38	115	210
W6AOA	10	9	190	209
W6BIP	13	28	166	207
W9ZZE	51	18	133	202
W8ERU	18	30	152	200
W84ET	8	10	182	200
W1WV	34	92	92	178
W6WA	80	54	27	161
W9GFL	31	59	62	152
W9DNP	28	60	21	109
W9BIR	11	55	42	108
W1NS	16	53	38	107
W2JF	12	52	20	84
W9CFL	11	55	16	82

All these stations appearing in the Brass Pounders' League are noted for their consistent schedule-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations in the order listed responsible for over 200 hundred deliveries in the message month: W6TFM, W9ESA, W9DZM, W9AYD, KAIHR, W3ZF, W3BWT, W6QP, W6TAL.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more deliveries will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also?

BEGINNERS, ATTENTION!

The November (1930) issue of QST contained a list of 1750-kc. amateur stations that are sending code practice for beginners. The December number contained a supplement to this list. This month we are pleased to announce that W5TG, Houston, Texas, has added his services to the 1750-kc. volunteers. W5TG will transmit code instruction on 1725 kc. every Tuesday and Wednesday from 7:00 p.m. to 8:00 p.m. C.S.T. W8CSW, Montour Falls, N. Y., may also be heard on 1750 kc. from time to time. If you receive the transmissions from these or any other of the "volunteer stations," we suggest that you write to them and let them know how they are coming through, and what help you are deriving from their efforts. A complete list of the stations sending code practice on 1750 kc. will be gladly sent you, if you will drop us a line.

The Radio Amateur's Handbook contains useful suggestions for learning the code and much other information that you would find helpful. We invite requests for any information you may need. Just write to the Communications Department and we shall do our best to help you.

Articles Wanted—Communications Department

AGAIN a call for suitable material for these columns is in order. We want to print at least one interesting or educational article in this section each month. If we get enough good material we can make room for more than one article.

To make it worth your while to take time from your operating to set down ideas which you believe interesting or beneficial to other amateurs we are going to offer the particular writer whose material is used in the leading position in the C.D. each month his choice of (1) a copy of *The Radio Amateur's Handbook* bound in leather cloth, (2) six pads of message blanks, or (3) six of the new type A.R.R.L. log books. This offer is good for the entire year of 1931. Manuscripts are not limited in length. They should be clearly written, marked to identify the writer, and to show that the material is submitted for consideration in connection with this offer. We reserve the right to use all material submitted but failing to make the prize position, with the usual credit to the author.

We wish to make this section of *QST* bigger and better and truly representative of all classes of "communicating" amateurs. New ideas and viewpoints, criticisms of present conditions, suggested remedies for those conditions, suggestions for interesting two-way communication work, using c.w. or phone to report football or baseball games, to conduct contests between remote points, to maintain communication with others while on hikes or touring the country—all these subjects offer possibilities. Interesting material on unusual communication work, on exceptional traffic handling feats, hints on DX work, articles on the place of radiophones in present-day amateur radio work, all such will be welcomed and given full consideration. Expedition work will receive consideration, too, but remember that the contribution must be of article calibre and not a routine report such as we normally use as part of an expedition article, or as a "Traffic Brief." In short we shall welcome contributions from any individual not a member of the Headquarters staff on any and all phases of amateur communication. Photographs and diagrams may be submitted and can sometimes be used to good advantage in presenting articles. Please bear in mind that station descriptions and technical articles are not included in this offer, however. Such material is welcomed but should be presented to the *QST* Editorial Department. Also bear in mind that we are not interested in stories or fiction unless they can be shown to bear on timely amateur practices and unless they have either "reading interest" or material helpful in bettering our operating conditions or increasing amateur enjoyment and fun in two-way communication work. What are you doing that is new, better, different, or unusual in the line of "communication"? What amateur operating practices do you note that need improving to increase the utility and efficacy of amateur radio stations? What is the most intelligent way to go about making DX contacts or handling worthwhile traffic? What unusual communication is worthy of record, taking place on 28 mc. or 1750 kc. or other special bands? What suggestions do you wish to make regarding rag-chewing and amateur friendships? What local work have you done in club organization or solving interference problems of long standing resulting from amateur communication? Send in your contributions AT ONCE!

— F. E. H.

AMATEURS STAND BY FOR HURRICANE EMERGENCY

Had the West Indian hurricane last September reached the shores of the United States radio amateurs would have been found prepared and ready to handle emergency traffic. On September 1 K4AAN, St. Thomas, Virgin Islands, was heard sending QRR (emergency call). W3CAB, Washington, D. C., called and worked him at 11:14 p.m. A message reading as follows was received: "Gale hurricane force reported approaching St. Thomas. Arrival next ten hours. Please listen reports from this station even hours GMT night 2nd and 3rd starting 2200 stop Relying city power. sig. K4AAN." W3CAB got in touch with the U. S. Weather Bureau and was informed that the tropical disturbance was not expected to strike land for many hours. On September 2 amateur stations in Washington arranged to stand by for the emergency, and a watch was kept on K4AAN. At 9:00 p.m.

W3CAB again worked K4AAN and received the following message: "Gale passed 100 miles south St. Thomas headed WNW this a.m. Danger passed this section. sig. K4AAN." Watch was then discontinued on K4AAN. On September 3 a hurricane was reported approaching Santo Domingo. Watch was immediately resumed at W3CAB and other Washington stations for emergency and distress signals. Watches were also kept on September 4 and 5. The following Washington amateurs are known to have cooperated in standing emergency watches and handling traffic pertinent to same: W3BWT, W3AI, W3ALN, W3CDQ, W3JQ, W3LA and W3CAB. The Fourth Corps Area Army-Amateur System also stood by to assist in case of emergency. Considerable valuable information regarding the storm's progress was furnished by Louisiana Net Control Station W5ZK and A-A station W4AAY, which were in touch with CM2XD at Havana, Cuba. Although the need did not arise for any actual emergency work, the amateurs were prepared. It is good to know that we were ready. Well done, OMs.

Traffic Briefs

On November 9th eight amateur 'phones, four in Texas and four in Oklahoma, held a very interesting "round table QSO" or "phone-feat." The stations participating were W5PP, W5APW, W5LM, W5EJ, W5KJ, W5BIE, W5ABO and W5ARU. The event was given a good write-up in the *Caddo* (Oklahoma) *Herald*.

We have received from W8DEN the following suggested penalties as suitable punishment for those amateurs who deliberately violate any of the amateur regulations, particularly those regulations referring to frequency observance. Minimum penalty—To receive ten lashes with No. 10 B. & S. gauge wire, the blows to be delivered by the holder of an Extra First Amateur Ticket and in the presence of four other prominent, law-abiding hams. Maximum penalty—To dance to a popular ham tune such as "Vibroplex Twirl," "Radiation Blues," "Straight-Key Shuffle," or "Antenna Swing"; to dance this barefooted on newly broken, burned out type '01As in the presence of at least ten "real amateurs." These penalties may sound a bit bloodthirsty at first, but think them over—perhaps the amateur-law-breakers deserve just such "gory" punishment. Hi.

W9COS has the spirit! Boy, oh, boy, how traffic would move, if all hams could catch his viewpoint. In a letter concerning his duties as Route Manager he says, "If the gang will just dish out the dope on what they have that is of the color of permanency, we can lay out a pattern of traffic veins that will make Newcomb Carlton turn in his swivel chair and give us the 'OO'." (Newcomb Carlton is President of Western Union M.I.M.) Come on, gang, let's hop to it. Cooperate with your Route Manager in lining up reliable traffic nets. If you don't happen to know who the RM for your Section is, write him care of the SCM. Get in touch with the Route Manager for schedules and dope on how you can help in bringing about more efficient traffic handling.

AC8WB is now located in San Francisco and is signing W6HN.

Have you ever heard an exceptionally well-operated station and had the desire to tell the operator just how you enjoyed his "fist." Yes, and haven't you even wanted to tell the whole world about his operating? A well-operated station certainly deserves suitable mention, and it is for this reason that we are again soliciting lists of stations for our "Well-Operated Stations" column. Don't report any stations unless you feel the operation is in line with the best operating procedure. Send your lists along to the SCM when you send him your High Quality Signals list.

W6CPD tells of the practical value that amateur radio has been to the Pasadena-San Gabriel Valley Council Boy Scouts of America. Their summer camp is located at Cherry Valley Harbor on the north end of Catalina Island, 24 miles off the coast of California, and is two miles by water from the nearest telephone, which is located at the Isthmus. The Council installed a 7.5-watt transmitter at the camp using "B" batteries for power and operated under the call

W6BSA. The camp was quarantined for Infantile Paralysis during the Scouts' stay there and for two weeks orders were "strict confinement to camp." Mail was nearly blocked and telephoning impossible so that about 100 Scouts depended on amateur radio for communication with the mainland and home. Medical supplies, food and instructions were all ordered and handled over W6BSA, as well as messages of good cheer and assurances of good health to the parents of the Scouts. W6DOZ and W6CLX of Pasadena and W6CUH of Hermosa Beach gave splendid cooperation in handling the traffic.

Here's a traffic brief that is "brief." VE3AD took a message for Toronto from VE3DW, signed off with "DW" and within three minutes worked VE3DT in Toronto, who took the message and phoned it to the addressee. FB!

On October 5, 1930, station W3AWS at the U. S. Marine Barracks, Quantico, Virginia, was completely destroyed in a \$100,000 fire which swept the Radio School and Signal Battalion storerooms. W3AWS will be off the air until such time as the station can be rebuilt.

Out in Dodge City, Kansas, a group of active amateurs have organized a "ham" club, which they call "The Kansas Association of Static Stompers." A mighty appropriate name!

W2RU was the call of the amateur station installed at the seventh Annual Radio World's Fair at Madison Square Garden, New York City, September 22 to 27, 1930. The transmitter, a T.P.T.G. circuit using a type '52 tube and type '66 rectifiers, was set up in the basement of the Garden and was operated by members of the Radio Club of Brooklyn and the Bronx Radio Club. Over 300 messages were handled during the period of the fair. The following amateurs participated in the installation and operation of W2RU: W2FF, W2APV, W2AZV, W2AYI, W2A00, W2AMJ and W2FZ.

W9DZW informs us that the Chicago and Northwestern Railroad Co. has been asking for data on stations which might assist them in time of emergency. How quickly could you get on the air in case transmission lines were down? Write W9DZW full particulars regarding the availability of your station in time of emergency.

With the holiday season comes a suggestion from W3HY that you can get "Holiday Greetings" message blanks from almost any W. U. office "for the asking." A different form is used every year and almost invariably the W. U. offices have a surplus on hand. These blanks make good copying paper for traffic, as well as for taking general notes.

For the last couple of years old-timer C. B. Diehl, W9BYG, has kept an informal schedule (every two weeks) with VK3HL, A. T. Hutchings, "Bryn Avon," Callawadda, Victoria, Australia. The schedules usually work out best at 3 a.m. C.S.T. (sixteen hours time difference from Australia). On a recent schedule Mrs. Diehl and Mrs. Hutchings had a fine visit discussing the technical problems in connection with "cooking practice" on opposite sides of the earth, swapping cooking recipes on favorite dishes, etc. What next?

An idea for the schedule keeper --- W3AAJ sets his alarm clock for the hour of his next schedule, and finds it to be a "fool proof" reminder. That method should work out well. Try it, gang.

W9BGA worked VK3WL on 14 mc. at 2:14 p.m. C.S.T., November 3. The QSO lasted for twenty-eight minutes and ended when QRM stamped out VK3WL's signals, which were QSA3, d.c. This QSO is rather phenomenal, as VK signals do not usually come through at that time of day.

Here's something to shoot at, gang. In thirteen consecutive months in the BPL, W9COS's report totals as follows: Originated 1194, Delivered 2299, Relayed 2512, Total 6005, an average of approximately 462 per month! FB, W9COS.

One of our SCMs, W7AAT, recently joined the ranks of the benedicts. It happened on the fifth day of October, 1930. Congratulations, OM!

Q S T FOR JANUARY, 1931

W7KQ ground a couple of crystals recently and upon checking them found that the frequency of the two happened to match perfectly. Later he ground a crystal for W7ACS and in measuring the frequency of this one found that it matched the other two. Now W7KQ has three perfectly-matched crystals, which he doesn't know what to do with. Send 'em to us, OM. We'll find a use for them. Hi.

ENDURANCE RECORD BROKEN

In November ('30) QST, page XVI, we announced a QSO Endurance Contest with W2AMT and W4ABS holding the record for maintaining continuous contact for three hours and forty-two minutes.

We have just received logs from W8DEH and W8DTK on the strength of which we hereby proclaim them to be the new "record-holders." Perfect contact was maintained from 7:30 p.m., November 16, until 2:40 a.m., November 17, a total of seven hours and ten minutes. W8DEH says: "We challenge any one to break this record, and if done, we will just take it back again."

More contestants are invited to send in logs. The only requirement is that you abide by the rules set forth in November QST.

W1AMQ reports some "endurance" work, which, although not breaking the present record, deserves mention. On October 4 W1AMQ took traffic from W3ATC through bad QRM for five hours, from 5:30 p.m. until 10:30 p.m. A total of 93 messages was received. Those who have copied traffic through QRM for any length of time will realize that that was "endurance" in the true sense of the word. FB, W1AMQ and W3ATC!

Routing traffic demands some knowledge of geography. Often too little thought is given to this and traffic is given to stations south when traffic is going north. We must not forget the underlying principle in handling traffic that you are working to get your traffic to destination as soon as possible. Sending it in the wrong direction only slows things down. This is one reason why we have schedules. We must pass along our traffic in the right direction. It is permissible to violate this rule when we are sure time can be saved. Sometimes we can give traffic to a station in the wrong direction if we know they have a schedule with a station at the destination of the message, but even then we can very often do better to stick to the rule. The value of a message is lost when it becomes a week or more old, and, worse than that, it gives the recipient a wrong impression of A.R.R.L. When you get a message, the destination of which is reasonably close, deliver it *at once*. Don't hold it on the very slight chance you may work some station closer.

— W1WV

ELECTION NOTICES

To all A.R.R.L. Members residing in the Sections listed below: (The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present incumbent and the date of expiration of his term of office.) This notice supersedes previous notices.

In cases where no valid nominating petitions have been received from A.R.R.L. members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from Members of a Section, the present incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filing of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in Hartford on or before noon of the dates specified, all of which are 1931.

Section	Closing Date	Present SCM	Present Term of Office Ends
Alaska	Jan. 15, 1931	W. B. Wilson	Mar. 28, 1931
Utah-Wyoming	Jan. 15, 1931	P. N. James (resigned)
Mississippi	Jan. 15, 1931	J. W. Gullett	July 28, 1931
Michigan	Jan. 15, 1931	Ken Conroy (resigned)
Los Angeles	Jan. 15, 1931	B. E. Sandham (resigned)
Ga.-S.C.-Cuba- Isle of Pines- Porto Rico- Virgin Islands	Jan. 15, 1931	M. S. Alexander (resigned)
Oklahoma	Feb. 15, 1931	W. J. Gentry	Mar. 30, 1931

Due to the resignations in the Utah-Wyoming, Michigan, Los Angeles, and Ga.-S.C.-Cuba-Isle of Pines-Porto Rico-Virgin Islands Sections, nominating petitions are hereby solicited for the office of Section Communications Manager in these Sections and the closing date for receipt of nominations at A.R.R.L.

Headquarters is herewith specified as noon, January 15, 1931. Reports from ORS in these sections should be sent to the Acting SCMs listed on page 5 of QST.

To all A.R.R.L. Members residing in the Sections Listed:

1. You are hereby notified that an election for an A.R.R.L. Section Communications Manager, for the next two-year term of office is about to be held in each of these Sections in accordance with the provisions of By-Laws, 5, 6, 7, and 8.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Section concerned.

3. Nominating petitions from the Sections named are hereby solicited. Five or more A.R.R.L. members residing in any Section have the privilege of nominating any member of the League who holds an O.R.S. appointment in their Section as candidate for Section Manager. The following form for nomination is suggested:

Communications Manager, A.R.R.L.
1711 Park St., Hartford, Conn.

(Place and date)

We, the undersigned members of the A.R.R.L. residing in the Section of the Division hereby nominate, as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Five or more signatures of A.R.R.L. members are required.)

The candidate and five or more signers must be League members in good standing or the petition will be thrown out as invalid. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in Hartford, Conn. by noon of the closing date given for receipt of nominating petitions. There is no limit on the number of petitions that may

be filed, but no member shall sign more than one such petition. Members are urged to take initiative immediately, filing petitions for the officials for each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

— F. E. Handy, Communications Manager.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating petitions, this candidate shall be declared elected. Accordingly, election certificates have been mailed to the following officials, the term of office starting on the date given.

San Joaquin Valley	E. J. Beall, W6BVY	Oct. 15, 1930
Northern Minnesota	Raymond Welhe, W9CTW	Nov. 15, 1930
Vermont	Clayton A. Faudette, W1IT	Nov. 15, 1930
Arkansas	Henry E. Vette, W8ABT	Nov. 15, 1930
San Francisco	Clayton F. Bane, W6WB	Dec. 20, 1930
Maritime	A. M. Crowell, VE1DQ	Nov. 15, 1930

In the Colorado Section of the Rocky Mountain Division, Edward C. Stockman, W9E8A and Willard C. Wright, W9BQO were nominated. Mr. Stockman received 24 votes and Mr. Wright 14 votes. Mr. Stockman's term of office began November 5.

In the Ontario Section of the Ontario Division, C. D. Lloyd, VE3CB and E. C. Thompson, VE3FC were nominated. Mr. Lloyd received 49 votes and Mr. Thompson 43 votes. Mr. Lloyd's term of office began December 1.

In the Rhode Island Section of the New England Division, N. H. Miller, W1AWJ and C. N. Kraus, W1ECC were nominated. Mr. Miller received 22 votes and Mr. Kraus 11 votes. Mr. Miller's term of office began December 1.

DIVISIONAL REPORTS

ATLANTIC DIVISION

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Forrest Calhoun, W3BBW—Let's get together and get that Traffic Banner. Get those new fellows you know to report. Maryland: W3AFF leads our state in traffic. W3AIL is his 2nd op. W3LA made his report short. W3BBW is still pounding away. W3ZK is putting in C.C. W3AOO reports trouble with BC.Ls. Delaware: W3HC reports some activity in his state. W3ARM, W3BBP, and W3BCV are all new stations. W3ALQ has been QRL work. District of Columbia: W3CXL and W3BWT sure ran a close race this time. W3CAB reports a new one, W3BFV. W3OZ sent in a few. W3PM is rebuilding again. W3AKR built an MOPA and gets xtal reports. Happy New Year to all.

Traffic: W3CXL 516, W3BWT 501, W3AFF 160, W3LA 61, W3HC 24, W3BBW 22, W3ZK 16, W3CAB 12, W3OZ 8, W3ALQ 4, W3AOO 3, W3PM 3, W3AKR 1.

SOUTHERN NEW JERSEY—SCM, Bayard Allen, W3ATJ—W3BEX, ex-W9FJA, is the high man this month. W3BEX, W3JL, W3ANP, W3ABG, and several others have formed the Morris County Radio Club. W3ASG says that since Sept. 15th he has had 54 QSO's with VK stations. W3ZI has the bug as bad as ever and requests an ORS. W3AOV is the call of the 112th Field Artillery at Trenton. W3ATF handled a few via A.A. work. W3BEI, our OO, has been observing on 3500 kc. and says the boys are pretty well behaved. W2BPN and W2BUB are operating W3ZX and W3BAO, respectively. W3BAQ is having success with fone. W3EM's power supply evaporated via the smoke route. W3BAQ, W3EM and W3AWV attended the Bloomfield Radio Banquet. W3BWF and W3AFH are new fone stations in Trenton. All the Trenton Boys want ORS. That's fine. Let's have your applications. W3AWL has become a 3500 kc. convert. W3OH is still working everything he hears on 14 mc. W3ATJ has been helping him keep that band in use. W3BAN at last has his power supply and is getting that thrill of working his first few stations.

Traffic: W3BEX 42, W3ASG 41, W3ATF 24, W3JL 8, W3ATJ 8, W3BEI 12, W3ANP 5, W3AWL 6, W3ZI 2, W3ABG 2.

EASTERN PENNSYLVANIA—SCM, Don Lusk, W3ZF—The new certificates have been mailed out and several stations, W8EU, W3AQQ, W3UH and W3AVI are recent appointments. W3ZF is going back into the "500 message" class again. W8EU, our recent newlywed, will be pounding brass very soon. Introducing one of our new appointees, Route Manager Jack Waggeneller, W3GS and W3BF, who is well known and ready to start work with our other RM, W3NF. Let's work with them. Several new appointments are to be made to those who can qualify for Official Observer and Official Broadcasting Station. Please

state in your next report if you can handle either or both of these jobs. W3NF wired in his report. W3VD says the Army schedules are helping his totals. W3MC sends in his usual list of off-wave stations. W8AWO comes forward with information on an automatic code transmitter which will operate on approximately 3660 kc. He will send code practice Sunday evenings at 7:30 p.m. EST. W3CFI will be operated by W9EWW-W8CVG, W3AKJ-W8CMT, W3UL and W3AUK, who attend Bucknell Univ. W3EV sent in a nice report. W3AVI reports continued activity at the Frankford Radio Club. W3DZ telephoned his report. W3AKB is still handling radio show traffic. So is W3UX. W8AWO expects to install crystal this month. W3OP reports activity up Allentown way. W3UH reports. The old 20th Century Route is perking again with W9AIN, W9DXZ, W8EU and W3ZF pounding them off as of old. Western traffic to be "Expressed" should be sent via any one of these stations.

Traffic: W3ZF 437, W3AKB 233, W3UX 119, W8VD 106, W3UH 77, W3NF 117, W3MC 60, W3GS 33, W3DZ 33, W8CWO 28, W3AVI 28, W3EV 25, W8CFI 24, W3AQQ 20, W3OP 15, W8AWO 12.

WESTERN PENNSYLVANIA—SCM, R. M. Lloyd, W8CFR—Nearly all the old ORS have applied for and received their new certificates. W8CUG leads again this month. W8DLG keeps some good schedules. W8GU is busy contacting off-frequency stations and telling them to move. W8CMP reports four schedules. W8DUT has a permanent crystal transmitter and a Hartley for test. W8AAG is active in the Naval Reserve. W8AGO has a schedule with W8CMP. W8AJE is taking up aviation. W8BJC is on the air. W8DKS is building a new receiver. W8BRM is doing good work on 14 mc. W8AVY is working on an AC receiver. W8ARC made a trip to Cleveland. W8AJU is building another short wave super-het. W8BGW has an MOPA. W8CEO is putting the finishing touches on his new 14 mc. transmitter. W8YA is still having trouble with its license. W8KD is doing fine work with his crystal transmitter. W8BNU, W8AT, and W8CCR are active in Erie. W8APQ says he is "worked to death, but still broke!" W8AAQ has a new power supply. W8DRA and W8BRC are on the air. W8DYL is building a new push-pull transmitter. W8DGW applies for an ORS. W8AYH has a Canadian schedule. W8BK is working on all bands. W8ASE has a new Oscillator for his MOPA. W8BXG is coaching some beginners. The ATA held its November Banquet, and a good time was had by all. W8CFR promises to be on the air longer and oftener.

Traffic: W8CUG 247, W8DLG 63, W8GU 51, W8CMP 20, W8DUT 18, W8AAJ 11, W8AGO 11, W8AJE 10, W8CFR 10, W8DKS 5, W8AVY 4, W8ARC 2, W8AJU 1, W8KD 131, W8APQ 90, W8DYL 16, W8AAQ 15, W8DGW 9, W8AYH 7, W8BK 7, W8BNU 1.

WESTERN NEW YORK — SCM, J. R. Blum, W8CKC — W8QL makes the BPL and is also a new R.M. in this district. W8CRF has plenty of power leak trouble. W8DSA passed his amateur first. W8BMJ put in crystal control. W8CVJ is rebuilding. W8BLK is doing FB work as O.O. W8AKC is on 14 mc's. W8DME handles plenty of Navy traffic. W8BFG has a new remote control outfit. W8CPC handled important traffic from Cuba. W8AWM was off the air all month. W8AMV is on 14 mgs. phone, crystal controlled. W8B8L has moved to Rochester. W8BIF is using his new Zepp to good advantage. Wedding bells are jingling near W8BGN. W8BJO reports bear hunting about as good as the 56 mc. hand. W8CSW was married this month. Congratulations. W8AB had the misfortune to burn out his m.g. W8AJ has a new 250 watter, crystal controlled. W8BXO is very active in communication work in Rochester. W8ABQ has a new a.c. screen grid receiver. W8NW is busy on 7 mc's. W8BOM is now VE2CPC. W8KS had his seventh birthday this month. W8IY has a new crystal net on 3500 kc. W8CMW is on with a new phone outfit. W8IH has installed a couple of new 800's. W8AFM is rebuilding his 7 mc. rig. W8CHG has his push-pull xtal-controlled 860 rig going very nicely. W8BYD, the R.M. in Jamestown, wants schedules and plenty of them. If you want schedules for any section of the state see W8QL, W8DSA, W8AAZ or W8DME. W8DEJ, our only Y. L. operator, has her first-class ticket and also an O.R.S. appointment. W8CYG wants schedules with 9's, 5's and 6's. W8DSP is now an Official Observer.

Traffic: W8QL 236, W8BMJ 76, W8CKC 75, W8DSA 68, W8BHK 54, W8AI 54, W8CPC 47, W8TZ 44, W8BYD 37, W8CRF 32, W8BYO 30, W8DME 26, W8DII 21, W8BJO 17, W8AYM 9, W8BUT 9, W8AAC 5, W8AFM 5, W8DEJ 10, W8BIF 4, W8ABQ 3, W8BFG 8, W8CMN 1, W8CIL 1, W8CYG 74, W8DSP 86.

CENTRAL DIVISION

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — I. G. Watkins of W9JL announces the gift of an 852 to the Kentucky station handling the largest grand total of traffic Jan. 15th to June 15th. Let's see you fellows go after that prize! W9ZZE came home and showed up the whole gang! W9BAZ finally persuaded a 203 to push and a 203-A to pull. W9BGD cuts loose in "big league" style. W9AZY says to look for him on 3800-ke. at 6 p.m. daily. W9AIN and W9CBT are trying close harmony — they live side by side. W9ALR increased power and results. W9ARU is off to a flying start. W9OX will be on regularly as soon as his drops off. W9BEW, W9CDA, and W9EDQ are in line for ORS. W9AUH is building new receiver, W9GGB says new ORS tags leave more room for QSL cards. W9BAN has a CQ machine. W9CEE says BCL's and key-clicks won't mix. W9AXU and W9BWJ have new receivers. W9ELL is doing extensive rebuilding on a 1750-ke. fone. How about you other fones reporting? W9ENR and W9FQN lose ORS for failure to report regularly. W9EYW was badly out while working (?) in his cellar. W9BXX and W9CNE report. This month was fine, now let's make the New Year better, and Kentucky the best!

Traffic: W9ZZE 202, W9BAZ 126, W9BGD 119, W9AZY 93, W9AIN 71, W9ALR 69, W9JL 60, W9ARU 26, W9OX 17, W9EDQ 11, W9BEW 9, W9AUH 8, W9CDA 8, W9GGB 8, W9BAN 5, W9CEE 4, W9ELL 2, W9AXU 1, W9EYW 2, W9BXX 20, W9CNE 17.

INDIANA — SCM, George Graue, W9BKJ — W9DDB leads in traffic with a grand total of 160. W9DHJ wants reliable schedules with Chicago and Indianapolis. W9CVX has been appointed RM for N.E. Indiana. W9GGJ can't refrain from making changes to his set. W9AXH is a new ORS. W9AIP has a variety of transmitters ranging from type '99 to 204A's. W9AKJ is changing QRA. W9GJS is the new RM for S.E. Indiana. W9CIC is working U.S.N.E. skeds. W9EMV is a new ham at Brownstown. W9AET has changed over to crystal control W9FYB and W9FTT are trying their luck at fone. W9CYQ is heard occasionally. W9DOD is having BCL QRM. W9FSG took fifty messages without a break from the Chicago Radio show. W9FCX has applied for ORS. W9AMI knocks out lots of tfe. The Mishawaka High School station, W9CZU, affords a rendezvous for hamfests this winter. W9BDE is a new member on fone. W9CUZ wants schedules with other High School stations. W9DUZ expects to have his station going very soon. W9CKG has his hat in the ring for an ORS appointment. W9FPQ likes the ham game very much. W9AEB wants schedules. W9ETH expects to be on the 3.5 mc. band for the

winter. W9DDB reports a new club at Lafayette with 35 members.

Traffic: W9DDB 160, W9BEJ 65, W9DHJ 63, W9CVX 55, W9GGJ 64, W9AXH 36, W9AIP 28, W9AKJ 20, W9GJS 18, W9CYQ 14, W9FYB 13, W9AET 6, W9FSG 137, W9AMI 84, W9FCX 71, W9CKG 8, W9ETH 15, W9FPQ 24.

MICHIGAN — SCM, K. F. Conroy, W8DYH — Once again Michigan stacks up a new record in traffic. FB. W8MV finally discovers 3.5 mc. gang is OK. Lightning made a mess of W8CFQ's heap. W8PP handles his on week-ends. W8CJZ talks big — 204a! W8CUC, judging from his printing, thinks other ham-printers have QRT. W8GO is on the "GO" for traffic. W8DSF accepts Sunday traffic for Pontiac — via auto. W8PG fell for the T.N.T. circuit. W8BTJ was too bashful to report but W8BTK convinced him. W8BTK has a sideswiper that actually sends Continental! W8AJC nosed this one: Ann Arbor, Mich., new YL — no call yet, Miss Alma Seeley — the RI gave her 88. (NO! NO! Mrs. Brown, — 88%) Miss W8JH will operate the Normal Collitch station. W9AXE claims ND up-state. W8DLX has a new antenna and CC. To arms! To arms! O'Haley, Correl and O'Perry of WYE-W8SL go BPLING! W8AUT says W8AYO is doing FB with 2 type '01A's. W8XJ works 3.5 and 7 mc. bands. W8FX plans on settling down soon. W8CVU gets R7 from West Coast! W9EQV wants more locals on 3.5 mc. W8RPS service work is snowing him under. W8CM is now at WRDE. W8DED says he is gonna QRT if phones don't let him be. W8DUA starts when KIDT QRTs. W8BJ will try to schedule WIZ to increase his traffic total! W9HK has a monopoly on Canadian traffic schedules! W8AE will soon be PP CC 50, W8CU will not be responsible for burnt out "cans" when he opens up. W8DE, the Grand Rapids Radio Club station, will be perking soon. W8PQ broke his last alarm. The two amps in W9GJX's antenna turns out to be two-tenths! W8CYX is willing to trade 2 "NG" type '10s for a good monitor. W8ARR is an "Announcer" at WCK. W8CAT has at last conquered his CC. W8CKZ ordered his winter supply of message blanks. Any one having slightly used cigars — please QSP to W8DEN. W8BUH says his new set is FB. W9CE finds traffic on the inline. W8DJQ finds "things" picking up. W8DMS says 73. W8BRO is young and foolish — he and 1YL become incorporated Xmas. Collitch may be duty, but W8SS' heart is with ham radio. W8BRS is up and "attem." W8BQG rebuilds after every CQ! W8BTC tried 1500 on a type '10. W8DFE operates schedule A Mess N'Andy. W8DDO is starting a radio club at school. W8BMG says, "If you want dirt why don't you sweep up your shack?" W8DNT is putting code practise on 1750 kc. W8CUP is going to try 1750 also. W9EGF wants fast traffic. W8BIG challenges every one to a "key-sitting" contest! W8DEH and W8BTK set a new endurance mark — QSO 7:30 p.m. to 2:40 a.m. — 7 hours and 10 minutes. Send future reports to W8DMS, R. J. Stephenson, 8840 Monica Ave., Detroit. W8DYH wishes to thank you for the cooperation and sure wishes conditions would permit continuing as SCM bur ND. Very 73 and TU again.

Traffic: W8DYH 698, W8DED 422, WYE-SSL 231, W8BTK 148, W8DDO 145, W9HK 110, W9CE 104, W8BJ 98, W8CAT 80, W8DMS 73, W8MV 70, W8BMG 67, W8DFE 66, W8DEH 64, W8AJC 51, W8CVU 51, W8BTJ 48, W9EQV 47, W8PQ 42, W8BRS 28, W8ARR 27, W8GO 26, W9AXE 26, W9GJX 25, W8DJQ 24, W8CYX 22, W8RP 20, W8BUH 18, W8DLX 18, W8DSF 18, W8XJ 13, W8CKZ 10, W8SGP 9, W8PP 7, W8SS 7, W8CUP 4, W8CFQ 3, W9EGF 3, W8AUT 2, W8CJZ 2.

ILLINOIS — SCM, F. J. Hinds, W9APY — The traffic this month is wonderful — keep it up fellows. W9DKF has changed to Push-Pull TPTG as per Nov. QST. We congratulate W9DOX on being promoted to a Lieutenantancy in the Signal Corps Radio Division. The eight stations in the BPL this month are W9AYD, W9DZM, W9ENH, W9DDB, W9DGCZ, W9APY, W9ERU and W9BIR in order of totals. W9ERU is installing a crystal. W9BNO uses a white rat for a neon tube. Hi. W9FFQ has 281 rectobulbs in a fine MOPA. W9DSS is parked on 3500. W9DBE has completed his rebuilding. W9AYD uses Push-Pull TPTG on 7000 and 14,000 kc. W9ANQ is on the air week-ends only, due to school QRM. W9FGD is doing some nice DX work on 14,000 kc. A dandy crystal is going at W9EIP. The set at W9AD is also a crystal. W9MI has BCL interference. W9EAL removed the case and bolted the transformer down to avoid the shaking spells. Hi. W9DZG, the newly elected president of the Egyptian Radio Club, has stirred up a

great deal of activity in his section and reports are coming in fine. W9DWB has a nice station going at North Central College, Naperville, with the call W9CUX. Ex-W8AEL is now W9GFU of Oak Park. Traffic is picking up at W9BSR. W9EAS and W9DPC are again on the air. W9GV has an 860 in a Hartley working 4 schedules with Australia. W9DZG is building a 250-watt fone outfit. W9ADN (Ex50M) is on at Lockport and has schedules with Guam, "OMITB," and Australia. W9GJJ has an 860 and crystal. W9GIV don't singe his fingers any more — he has a relay. W9AFN is still looking for Asia. W9ACU installed an Edison 32-volt light plant so now uses a Westinghouse dynamotor. W9CUH is coaching new hams. W9CZL is credited with a new ham in Olney. W9CNY did good work on Navy Day. W9RDW is rebuilding with 866's. W9DZM is going to do some extensive experimenting. W9FVO has added a third Xmitter which will be used on 14 mc. W9BIR reports poor Wx. Same report from W9FTX. W9FCW copied both Navy Day and Armistice messages. W9DBB says Chicago Hams should go down to the U. S. Naval Reserve Armory for code practise every first and third Thursday evenings at 8:00 p.m. (Randolph St. at Lake front). W9FUL and W4FT call joint CQ's on the same wave and each sends every other letter.

Traffic: W9AYD 1228, W9DZM 902, W9ENH 322, W9DBB 300, W9DZG 229, W9APY 219, W9ERU 200, W9BIR 108, W9AHK 102, W9AMO 103, W9FCW 101, W9BZO 82, W9CUH 75, W9DZG 63, W9ACU 61, W9EIP 56, W9DKF 54, W9GFD 45, W9DDE 44, W9FUL 42, W9ANQ 31, W9EBX 31, W9DZU 30, W9DZG 28, W9BLL 26, W9DOX 26, W9BDW 24, W9END 23, W9MI 23, W9GV 20, W9AIU 19, W9CZL 19, W9QI 17, W9CUX 15, W9APX 13, W9BSR 12, W9ADZ 10, W9GIV 10, W9BRY 9, W9GJJ 8, W9AFN 8, W9FTX 7, W9GFU 7, W9AD 5, W9EYN 4, W9FPN 4, W9ACR 3, W9CNY 3, W9GIF 3, W9BVP 2, W9CMC 2, W9FO 2, W9EMN 2, W9GBO 2, W9AWL 1, W9FVO 1.

OHIO — SCM, Harry A. Tummonds, W8BAH — Ohio placed third in the Division last month. The BPLs for this month are W8GZ, W8BGX and W8CMB with W8DPE lacking seven of the required total. W9BDU received his commercial ticket. W8ADS received an R7 report from a patrol boat on the Gulf. W8CWA will have CW crystal reground to 3675 kc. W8APC is building a new MOPA. W8CNM has a schedule 5 days a week with W9FGD. W8DPF is still working out of town. W8BAH has schedules with W8BGX and W8BKM. W8GZ reports regular AA schedules. W8CK wants traffic for Findlay. W8RN is now a land lubber and back in Bedford. W8BCF reports some good DX records along with his traffic. W8DBK reports the DARA has Club rooms at Main and Forest Sts., Dayton. W8CMR, on air with 'phone and CW, reports that W8DHJ is also active in Dayton. W8BAC is still experimenting with Windom's single wire feed. W8QO wants skeds. W8TK wants a schedule with Cleveland. Write to W8AXY, OM. W8DU is having trouble getting the "bugs" out of his transmitter. W8NP is now holding five schedules. W8BGX, a new ORS, reports 238 this month. W8LI got his total during the last week. W8CX is doing some fine DX work. W8BKM has about seven regular schedules. W8EJ claims to be the sleepless wonder. W8BBH reports still rebuilding. W8CIY, W8CHA and W8DAX were out after the bunnies. W8BZL is helping to rebuild W8BSR using an 852. W8DRX has made application for ORS. W8DDQ reports 15 members in the Norwalk Club. Ex8AXE is now W8ANO in Vermillion. W8BEA reports four FB schedules. W8DIH has been busy with Radio service work. W8AWS reports for first time. W8MH is also reporting for first time. W8AKA reports QSOs with 95 stations last month. W8BAX is still rebuilding. W8DMX finally got traffic into Cleveland by working your SCM. W8CMB made the BPL again. W8AXV reports 31 for first report. W8AXV works nights. W8CSS has just rebuilt. The SCM was very glad to meet the following fellows personally on their visits to Cleveland last month: W8BGX, W8AJD, W8DFL and W8DMI. Don't forget to use the (new) ORS numbers on your Certificates.

Traffic: W8CMB 290, W8BGX 238, W8GZ 221, W8BKM 78, W8DPF 75, W8MH 64, W8NP 57, W8DU 43, W8APC 36, W8TK 35, W8DBK 34, W8DMX 32, W8AXV 31, W8BAH 24, W8OQ 23, W8DRX 20, W8BA 18, W8ADS 15, W8CCS 14, W8BDU 14, W8CNM 14, W8CWA 13, W8BCF 13, W8LI 12, W8BZL 11, W8AKA 10, W8AWS 8, W8EJ 6, W8CX 6, W8DIH 4, W8BEA 2, W8CIY 1, W8DDQ 1.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9GFL

is Wisconsin's new Route Manager and most active station. W9DTK had a U.S.N.R. gathering at Green Bay on Nov. 2nd and enlisted seven members. W9FSS has schedules with W9GFL and W9DBB. W9FAW is operating on morning schedule, 5:00 to 7:00 a.m. on 3500 kc. W9DIT sends first report for this season. W9SO will have five operators on the job this winter. W9FHU has combined with W9FGX at Wausau. W9FHU signs "HNK" and W9FGX signs "CR." W9VD is using new doublet receiving antenna with flat top sections 33 feet long and lead-ins twisted 44 feet long. W9BIB is still among the missing. W9EBO is building an MOPA using two 862's.

Traffic: W9GFL 152, W9FSS 39, W9FAW 30, W9DIT 10, W9SO 8, W9FHU 7, W9FGX 4, W9VD 9, W9EBO 78.

DAKOTA DIVISION

NORTHERN MINNESOTA — SCM, Raymond Weihe, W9CTW — Hello, gang, and thanks. I am sure glad to take over the duties of SCM of your section. I will do my best to do as well as our good friend, W9BVH. W9BBL, W9FNJ and W9ARE reported very fine totals. W9BBL wants reliable sked west. W9FNJ has a transmitter as per Nov. QST. W9ARE has his xtal gg FB and was down to visit W9BVH. W9BCT is finally perking on 3500 kc. W9EHI is active. W9EGU was hunting deer with no luck. W9BHH Qaed New Zealand. W9GQQ sends his report in via radio. W9CTW and W9BVH were up to Duluth for the ARA meeting held at W9DOQ's shack. W9BVH, the ex-SCM, now has a good sked with W8TM. Remember that ALL ORS were automatically cancelled on the 15th of Nov. Send in your request for new appointment, if you have not already done so. See you all on the air, fellows.

Traffic: W9EGU 7, W9BHH 3, W9EHI 25, W9BCT 2, W9BVH 54, W9CTW 52, W9GQQ 36, W9ARE 44, W9FNJ 14, W9BBL 53.

SOUTH DAKOTA — SCM, Howard T. Cashman, W9DNS — Two stations reporting from Huron this month! FB, Oms. W9DGR reports trouble with Mr. Heaviside. W9CFU clocks off a nice total. W9DKL handles a mean pack of skeds. W9DB was on the job as usual during the sleet storm. He has a nice new fone set on 1800 kc. W9DRB is rubbing his eyes and will be on 7000 kc. soon. W9DNS is under QRM of heavy schedule at KSOO. Let's hear from some of the rest of you fellows.

Traffic: W9DKL 32, W9DB 21, W9CFU 16, W9DNS 3, W9DGR 2.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — North Dakota had a lot of unexpected traffic this month. Several towns on the main line were cut off from the outside world by a storm and amateur radio had a chance to do something. We have a new ORS this month, W9CRL at Maddock. W9DM is building a screen grid receiver. The Navy Day Broadcast and the Armistice Day message were both copied by W9DGS. W9BVF has been keeping AARS schedules.

Traffic: W9BVF 102, W9DM 43, W9DGS 37, W9CRL 19.

SOUTHERN MINNESOTA — SCM, J. C. Pehoushek, W9EFK — W9COS has resumed his Oriental Schedule, this time with W6QP at the Western end. W9DRG is back on the air with a crystal controlled outfit. W9BNN is a new ORS. W9CKU has been handling lots of traffic. W9BN handled a large amount of emergency traffic when a sleet storm isolated Grand Forks, Fargo, Minot, Bismarck and Sioux Falls. W9YC is busy with broadcast station. W9AIR attended a hamfest at W9DB. W9BXE has a new hundred watt push pull T.P.T.G. W9ABK has turned BCL with a new receiver. W9FDG is in Iowa. W9AKN blew plate and filament transformer. W9EYL has rebuilt. W9EJR is rebuilding. W9FLE has a number of new schedules. W9DMA is building a new monitor. W9DSH is building a semi-portable fifty watt crystal control job. W9DBC is operating a 1750 kc. 'phone set. W9EFK has a new 30' galvanized pipe antenna on top of his house. W9EAT has moved to 1750 kc. W9EFK worked W6LL, ex W9LL, who sent his 73 to his friends in the section. W9ELA-W9BTW have been busy at school. W9AAN-W9IK, W9EGU, W9COS and W9CKU were visitors in the Twin Cities recently. The Official Observers are complaining of more and more off-frequency stations as the season progresses. Be careful fellows. Don't let the RI's axe fall on you.

Traffic: W9COS 76, W9DRG 50, W9YC 24, W9BNN 50, W9NBN 49, W9AIR 13, W9CKU 15, W9BXE 6, W9EFK 5, W9AKN 2, W9EYL 2.

DELTA DIVISION

ARKANSAS—SCM, Henry E. Vette, W5ABI—We have the largest traffic total this month that we have had in a long time. FB. Our BANNER STATION this month is W5BKB. W5AAJ reported by radio. W5DD will be on 3500 kc. soon with a xtal controlled transmitter. W5SI also reported by radio. W5IQ has been appointed ORS. W5BMI has also been appointed ORS. W5BRI is getting out well in the 14 mc. band. W5HN has about completed his fone set. W5AUU is back on the air. W5ASG at Widener is a new reporting station. W5ABI has been experimenting with fone on 3500 kc. Come on, gang, let's hear from you ALL.

Traffic: W5BKB 81, W5AAJ 60, W5SI 48, W5ABI 26, W5ASG 19, W5HN 10, W5IQ 7, W5BMI 7, W5BRI 7, W5AUU 7.

LOUISIANA—SCM, Frank Watts, Jr., W5WF—Cool weather is here and with it comes an increase in traffic totals. W5YW is still pounding out from L.S.U. in Baton Rouge. W5BRI is a new ham in Shreveport. W5BPL is on 2500 kc. phone in New Orleans. W5ACY reports his best traffic total in his seven years on the air. W5BKL is a "ham what am." W5MH works on 7 mc., 14 mc. and 3.5 mc. W5WG is using xtal on 7 mc. band. W5ANA had QSO with "KA" while using 180 volts on a type '10. W5BHV is still on 7 mc. W5RR was QSO with England on 14 mc. W5BDJ and W5BHV were in Shreveport to see him. W5BJA handled 34 messages for College Station during the Centenary-Texas A. & M. football game. W5KC is using 100 watt xtal transmitter on 7 mc. W5BDJ is still perking and operating KMLB. W5WF is now open for traffic. Let's make the BPL a Louisiana affair next month. We can and should. W5AXS, W5WG, W5BDJ and W5AXU all have crystal control transmitters perking. W5ANQ, W5BFP and W5AXD have push-pull TPTG rigs. W5NS has to listen to the OW and doesn't have time for radio. W5AEN has aeroplane fever. We had a FB time at the little get together held in Monroe November 15 and 16th. Those present were W5WW, W5BLN, W5ZL, W5WG, W5BRI, W5BHV, W5BDJ, W5BKL and WS and WJ of W5WF. W5EB has transmitter on all bands. Send in your reports next month for the BPL party.

Traffic: W5WF 131, W5ACY 75, W5RR 42, W5BHV 42, W5BJA 36, W5KC 24, W5MH 6, W5BDJ 8, W5WG 2, W5ANA 1, W5BKL 131, W5YW 6.

TENNESSEE—SCM, James B. Witt, W4SP—This is the best month we have had in Tenn. for a long time. W4AFS sends in the best report. W4AFK is rebuilding to Xtal control for 14 mc. He is also working sked on fone with W4AGV. W4ACT is a new ham at Elizabethton. W4PR is on after being off all summer. W4RP has finished rebuilding. W4FX will be on soon with a new MOPA rig. The SCM spent the last week-end in Nashville with W4AFS.

Traffic: W4AFS 92, W4AFK 53, W4CW 37, W4RP 31, W4SJ 15, W4FR 17, W4AGW 16, W4AFM 14, W4SP 7, W4DG 4, W4FX 3, W4ACT 3.

Hudson Division

NEW YORK CITY AND LONG ISLAND—SCM, V. T. Kenney, W2BGO—The Eastern N. Y. Section beat us last month, so it's up to the gang to get busy and step out. The largest city in the world and we don't hold a candle to some of the other sections throughout the country in traffic work. With the issuance of the new certificates a complete reorganization of our official stations has taken place; we now have three route managers, six official observers, seven official broadcasting stations, and twenty-seven official relay stations. Whether you have been active or not you are required to report on the 16th of every month, if you want to hold the official appointments. Manhattan: W28C makes the BPL both ways. W2BXW is using a.c. tubes in the receiver. W2BDJ has changed his QRA. W2BNL just got over another sick spell. W2BCB now has a.c. and is getting ready for the change from d.c. W2AYK is back on 7 mc. again. W2OV is with us again. Bronx: W2BGO leads this boro. W2BPQ, Army NCS for Southern N. Y. State Net and RM for Bronx, is back in line again. Ed, the second op at W2CYX, is keeping the station in operation while Marty travels. W2AQQ QS0x ZL and VK regularly. W2AFO continues to find quite a few off-frequency stations. W2AII is still with us. W2FF has his Dynatron Oscillator in operation and offers to give anyone his correct frequency for the asking. W2VG has forsaken 7 mc. for 3.5 mc. W2AET is QRL school work. W2LW is a future ORS.

W2APV continues that famous sked with NJ2PA. Brooklyn: W2CCD leads Brooklyn in traffic. W2PF now signs "Captain." W2BEV got most of his traffic from the Pittsfield, Mass. radio show. W2AZV has built a dynatron oscillator. W2LB schedules NDF on Tuesday and Friday evenings. W2BIV, RM for Brooklyn, is prepared to do his share to aid in lining up skeds and routes for any desiring the service. W2BO suggests a list of marker stations in the Hudson Division to help the gang calibrate their monitors. W2APK says his outfit will be heard often from now on. W2BJF says the 50-watter went west. W2BRD has finished the article for the columns of this magazine. Long Island: W2AYP is now equipped with a Xtal. W2BVL, station of the Nassau Radio Club, with W2ASS as chief op, sends in a report. Skeds are desired for Monday, Tuesday, Thursday, and Saturday evenings at this station. W2ASS is using a CC '10 MOPA outfit. W2AZ claims lots of DX on 14-mc. fone. W2DL is rebuilding.

Traffic: Manhattan—W2SC 251, W2BXW 65, W2BDJ 8, W2BNL 6, W2BCB 4, W2AVK 2, Bronx—W2BGO 49, W2BPQ 36, W2CYX 26, W2AQQ 23, W2AFO 22, W2AII 17, W2FF 10, W2VG 6, W2AET 4, W2LW 4, Brooklyn—W2CCD 32, W2PF 26, W2BEV 19, W2AZV 13, W2LB 8, W2BIV 6, W2BO 2, W2APK 1, W2BJF 1, Long Island—W2AYP 50, W2BVL 25.

NORTHERN NEW JERSEY—SCM, A. G. Wester, Jr., W2WR—New ORS certificates have gone out to every active ORS. The dead wood has been abolished and our new motto is "Fewer and Better ORS" or "Quality and not Quantity." W2JF resigned as RM. W2AOS handled all his traffic on Army and Navy skeds. W2CFQ says conditions are returning to normal. W2CWK reports fine QS0's on 3500 kc. W2JF again goes into the BPL. W2AGX QS0D eight Europeans over one week end. W2BPY is experimenting. W2CJX has been on the sick list but his health is now back to normal. W2CHZ is a new reporter using an MOPA with type '10s. W2BHW worked VK4AB at 7:30 p.m. E.S.T. on 14 mc. W2BPQ is all tied up with school work. Will W2CEX please send me his QRA??? W2DV has applied for an ORS. W2AUP sends in a fine report. W2MQ has also applied for an ORS. W2BJZ has some nice message deliveries. W2AMR has a new power supply using 866's. W2CDQ visited W1MK.

Traffic: W2WR 1, W2JF 84, W2AOS 55, W2CFQ 15, W2CWK 9, W2AGX 2, W2BPQ 16, W2CJX 8, W2CHZ 2, W2BHW 8, W2BPG 1, W2CEX 21, W2DV 26, W2AUP 10, W2MQ 37, W2BJZ 3, W2CDQ 17, W2AMR 12.

EASTERN NEW YORK—SCM, H. Rosenthal, W2QU—The Pioneer Radio Club now has two transmitters on the air allowing instantaneous changeover from 3.5 to 7 mc. The Schenectady Amateur Radio Association is still growing and has W2BSH of the club running for Director of the Hudson Division. W2LU still heads the traffic pounders. W2ACD kept all his Army skeds. W2QP has installed a break-in system. W2CJP has become an ORS. W2AYK is busy keeping the only 3500 kc. watch in New Rochelle. W2BAI is keeping a Panamanian Freshman at Union College in touch with his relatives at home through RX1AA. W2ATA has applied for an ORS appointment. W2ANV is pushing Army-Amateur traffic. W2ACB is building an AC receiver. W2BSH has left for Buffalo where he will be for about a month. W2CBB has received an ORS appointment. W2BJA made a trip to New York to get his First Grade Amateur License. W2BER reports 800 QS0s in the past year with a bootleg 210. W2CRL is now operating entirely on 14 mc. W2BKL is looking for 14 mc. schedules and has applied for an ORS appointment. W2BIQ is off the air temporarily while a new power supply is being built. W2BKN reports DX coming in now. Uniforms are being issued to the members of the Naval Reserve of the Pioneer Radio Club and a dress parade will soon be held.

Traffic: W2LU 177, W2ACD 102, W2OP 37, W2CJP 36, W2AYK 28, W2BAI 24, W2ATA 24, W2ANV 21, W2ACB 19, W2BSH 14, W2CBB 14, W2BJA 9, W2BER 8, W2CRL 5, W2BKL 2, W2BIQ 1, W2BKN 1.

MIDWEST DIVISION

NEBRASKA—S. C. Wallace, W9FAM—W9FAM heads the list with total of 190. W9DFF, a new ORS, handled a good total. W9BOQ has started the old hay-maker again. W9DI is busy schooling. W9BQR is very busy with Army work now. W9EHW wants schedules from 11:30 a.m. to noon, 1 to 2 p.m., 5:30 p.m. to 6 p.m. and 10:30 to 11:30 p.m., 7100 kc. during day, 3650 kc. after supper. W9CPJ is the R.M. and working hard on a traffic

system. W9BHN is working 7140 kc. W9DTH reports. W9CHB is the Official Observer. W9FUW is keeping schedule with W6BUZ Readley, Calif. W9BLW is very busy with school. W9BYG is unable to get his transmitter to perk. W9EEW has been placed on inactive list on account of too much dispatching on CB&Q. W9DFR has ground his xtal to 1780 K., making his freq. 3560 kc. W9BEX is on leave for the winter in Chicago. W9BBS is getting started and handled 12.

Traffic: W9FAM 190, W9DFE 83, W9BOQ 13, W9DI 5, W9BQR 4, W9EHW 4, W9CPJ 4, W9BHN 4, W9DTH 2, W9FUW 19, W9BBS 12, W9DFR 9, W9BEX 42 (Sept-Oct.).

IOWA — SCM, H. W. Kerr, W9DZW — Our RM tops the list and has schedules working FB. If you want schedules, QSO him on 3690 kc. any morning before 8:15. W9EFH follows up with a nice total. W9FLK rolls up 142. W9ACL gets his ORS. W9FFD was reflected Pres. of TSARC. W9EEH is putting an MOPA on the air. Thanks to W9BFL, Des Moines comes in. W9CKQ says HC1FG best DX for month. W9BCA is keeping USNR schedule with W9ND. W9FWG copied the Navy and Army messages. W9EIV has two TNT transmitters. W9FZO says as "OO" he notices no improvement —?? W9BPG reports. W9AWY is now working both hands. W9EOP is back at college — says W9EMM is also there. W9AEX has our thanks for report. Army work fills the air Monday nights and results are improving — a live op at W9BNT. ORS, send in your old certificates for new ones. W9CNP puts Whiting on the map on 7000 kc. W9DPL sends his 73 from Valpo. W9AFQ sends a Bull. of the Mississippi Valley Ass'n entitled "Q.R.N." W9DTI, Campus Radio Club, reports club increased from 15 to 25. W9EJQ says his crystal falls in a bad BCL harmonic. W9GFB gives a promise of more Des Moines traffic. W9CPI is a Postal Press op. W9AED on 7000 kc. has a FB signal. W9DNZ is rebuilding. W9CZC and his Pa put up a new mast. The gang's sympathy to W9DFK in the loss of his mother. Thanks to W9ACL, W9CS, W9POF and W9GKL — always glad to get news. Happy New Year, gang!

Traffic: W9EJQ 230, W9EFH 157, W9FLK 142, W9DZW 139, W9ACL 95, W9FFD 93, W9EEH 64, W9BFL 45, W9CKQ 44, W9BCA 46, W9FWG 24, W9EIV 22, W9FZO 13, W9BPG 12, W9AWY 8, W9EOP 4, W9AEX 3.

MISSOURI — SCM, L. B. Laiture, W9RR — St. Louis: W9ECI led, closely followed by W9ZK-W9AAU. W9BEU is active in A-A Net. W9ECI is after more skeds. W9ZK-AAU is on the air on 7 mc. and 3.5 mc. W9DUD is QRL at KGPC. St. Louis Police Radio. W9FTA reported by radio. W9GHG increased power on 14 mc. Absentees reporting: W9BMU, from U.S. dredge Ft. Chartres; W9DZN, from the P. J. Hurley. W9BEU is QRM'd by QSL and Christmas card business. Reports at large: W9GBA led in this division with 273. W9GAR second and W9BJA third. W9BGN helped a new station get on the air. W9ASV reported direct to Headquarters. Ex-9CCQ of Braymer is back again as W9FJV. W9CJB likes the new ORS certificates. W9FBF is now in M.U. at Columbia. W9BJA is now holding five traffic schedules plus A-A net on Mondays. Ex-W9BYU is reported coming on again soon. W9DHN asks for schedules. W9FAL is on 3.5 mc. for A-A work. A new station is reported at Moberly. W9ENF is handling traffic regularly. W9GJF is putting up a Zepp. W9EPX is still shut down after moving. W9GAR joined the A-A net. Kansas City: W9BMA is again in the BFL with 381. W9CFL made BPL on deliveries. W9AKZ was on most of the time. W9PW is proud papa of 10-lb. junior opr. W9CRM and W9CDU report direct to Hq. The new ORS are the only valid ones; likewise Official Observer appointments. OBS were unchanged. RM tickets are available; the office is now vacant. ORS were reduced from 39 to 25 on Nov. 15th.

Traffic: W9BMA 381, W9GBA 273, W9GAR 148, W9BJA 137, W9ECI 79, W9AOG 60, W9ENF 41, W9FTA 36, W9FJB 32, W9BGN 31, W9AKZ 19, W9RR 18, W9DUD 8, W9CFL 82, W9PW 15, W9CRM 48, W9CDU 49, W9ASV 24, W9CJB 1, W9BEU 12.

KANSAS — SCM, J. H. Amis, W9CET — W9CFN reports improved activity in western Kansas. W9GHI installed rectobulbs. W9ELL has two daily schedules. Manhattan: The following report was sent in by W9BTG-5ZZR. K.S.A.C. is planning a ham station for the college. W9GHR has a new crystal rig. W9GAU has a new portable receiver. W9CHEX is using type '10s in the last stage. The 852 at W9BTG-5ZZR is perking FB. The following hams are attending K.S.A.C.: W9DOG, W9GDV, W9GHQ, W9GKY, and W9ERR. W9CKV is going strong. W9ESL is

building a new CW crystal rig for 3500. W9DVG is advertising for traffic in his local paper. Topeka: W9EV1 is on 3500 kc. W9FLG is busy with the AARS. W9DEB promises some U.S.N.R. activity. W9BHR is building a new ac receiver. W9FRC is building low powered transmitters. W9CET has a new zepp antenna. The KVRC meets the second and fourth Friday, 8 p.m., Topeka Chamber of Commerce. W9EBF reports W9FIG on 14 mc.

Traffic: W9CFN 46, W9GHI 22, W9ELL 18, W9BTG 14, W9CKV 11, W9FLG 9, W9ESL 11, W9CET 51. (These totals too late to be included in Traffic Summary.)

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Fred A. Ellis, Jr., W1CTI — The contest is on and W1WV won the first Handbook! Let's have some competition! W1TD is back with us again. W1AFB reports. W1NE is working nice DX on 3500 kc. W1AMG is working at CosCob. W1BOD reports renewed activity. W1BWM has mounted the transmitter in a BC console. W1BQH-W1BI will have two 50-watters in a push pull T.P.T.G. soon. W1HD tells us of a new station in Waterbury, W1ABI. W1ZL is waiting for a "break" in 28 mc. weather. W1RP says QRL other things besides radio! W1BWW has been appointed District N.C.S. and alternate state N.C.S. in Army Amateur Radio System. W1HQ is all set for traffic. W1AMG has been spending most of his time on fone. W1MK has added some new schedules to his list. W1BBU is on the air again with low power. W1AVB sends in a nice letter. W1CH says some one is using his call and is staying off the air until he can find out who is doing it. W1AZP reports a new ham in Bridgeport, W1CHS. W1BEO sends in his first report. W1AKI has been on the sick list. W1AGZ, our OO, has moved out of the state and resigned his position. Any one who would like to take up his work, please get in touch with the SCM at once. The following report by radio: W1UE, W1CJ and W1AZG. W1AKI reported direct to Hqs. Ex-W1PE is back on the air with W1AVV as his new call. W1CTI has three daily schedules and four others twice a week. Remember CTNITE on the 15th. Note Eastern Mass. total of 1185 against ours of 819. Get busy and give them a real race.

Traffic: W1MK 359, W1UE 86, W1CTI 84, W1CJD 55, W1AFB 33, W1AMG 28, W1AKI 27, W1HD 22, W1AZP 21, W1BEO 14, W1BWW 13, W1BWM 9, W1NE 9, W1RP 8, W1TD 7, W1BOD 7, W1AMG 5, W1AZG 3, W1HQ 2, W1AKI 27.

EASTERN MASSACHUSETTS — SCM, Miles W. Weeks, W1WV — The issue of the new ORS certificates has resulted in a general housecleaning, and the following have been reappointed: W1ASI, W1ABG, W1CCP, W1WU, W1ADK, W1LQ, W1KH, W1WV, W1BXXB, W1AZE, W1AAT, W1BZQ, W1LW, and W1ACH. The appointments of W1BTT and W1CMZ have lapsed owing to their failure to continue their ARRL membership. W1CRA has resigned his ORS due to college QRM. W1ACA and W1BOB have also resigned due to lack of time for traffic activities. W1KY will soon have her reappointment. W1ASI is QRL at WNAC. W1ABG attended the Hamfest at Nashua, N. H. W1CCP is using fone for local contacts. W1WU reports that a new Radio Club, known as the New Bedford Transmitting Association, has been organized with 25 charter members. W1AED is Secretary, W1ADR, Treasurer, and W1CQ, President. W1ADK wants more skeds on 3500. W1LQ is top traffic station this month and makes BPL with a good total. W1KH has a 7000-kc. schedule with Florida. W1WV is keeping 30 schedules with 10 stations four days a week. W1BXXB is looking for reliable schedules in Maine, N. H. and Vt. W1AAT is keeping midnight schedules on 3500. W1BZQ continues his midnight work on 7000. W1AZE reports 14,000 kc. DX conditions very poor. W1LW handled more traffic this month. W1ACH has been very busy with Naval Reserve work. W1ATX has a new 132 ft. antenna. W1AFP is planning to try 3500. W1CQN worked his share of DX and traffic on all three bands. W1TL has given up his station due to college work and W1AGN and W1CHR have divided most of his junk between them. W1CAW is using fone occasionally on 3500. W1ABM blew his '81s and is using two 39-cent 210s temporarily for rectifiers. The Eastern Mass. Amateur Radio Association held its annual Hamfest in Cambridge on Nov. 12th. Over 60 attended and plenty of prizes and interesting speakers made it a most enjoyable occasion. We were interested to learn that W1FL is again on the air in Conn. In the Eastern Mass.-Conn. Message Delivery Contest your SCM, W1WV, seems to have won the first Handbook for the greatest number of

deliveries, namely 52, made during the month by a station of these two sections. Next month it will have to be some one else, so be sure another Eastern Mass. station gets it, gang.

Traffic: W1LQ 246, W1WV 178, W1LM 85, W1ABG 85, W1KH 75, W1ACH 69, W1BXB 67, W1AMB 61, W1BZQ 50, W1CCP 42, W1AAT 38, W1AFP 34, W1ATX 34, W1CAW 26, W1CHR 19, W1CQN 19, W1ASI 19, W1WU 17, W1AZE 16, W1ADK 5.

MAINE — SCM, G. C. Brown, W1AQL — The Queen City boys were pleased to have W1ACV present at one of the club meetings recently. The SCM is just waiting for you to send in for one of the new ORS, RM and OO tickets. All appointments became void on Nov. 15th. We are very glad to hear W1ANH on again after a brief illness. W1ATO is high man. W1BLI comes second. W1ACW is with us again using a fifty watt bottle. W1CDX wants one of those new ORS and RM tickets. W1KQ is on with a new MOPA. W1QH spent part of the month on the 14-mc. band. W1BFZ is having his troubles with power line and blooming receiver. QRM. W1BEU sends in his first report. FB, OM, W1BGZ is in line for one of those new ORS certificates. W1APU has reconditioned his shack and it looks FB. W1FQ was in Portland recently attending telephone repeater school. W1AHY says that the Maine stations are not coming in over his way.

Traffic: W1ATO 68, W1BLI 53, W1ANH 37, W1AQL 21, W1ACW 18, W1CDX 18, W1KQ 12, W1APU 10, W1BEU 10, W1BFZ 7, W1QH 7, W1FQ 5, W1BGZ 2.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — The gang in Nashua put on a Hamfest Nov. 12th with the following present: W1ARW, MS, IP, CMB, VII, ABG, BEF, CTC, BJA, AKE, BJF, AUU, ANS, BHJ, TA, BMC, AFD, ex-BOH, C. M. Arnold and B. Marcy. Every one voted the meeting a success. W1CCM is keeping a bunch of schedules. W1HG is having trouble with his transmitter. W1AVG is a new station in Concord. W1BCP is same in Dover. W1AUY says his new Zepp works better than his old antenna. W1CAF is working good DX on 14 mc. W1BBF is a new man in Exeter. W1AVL is tuning up his old 50 on 7 and 14 mc. W1NZ is using a 112-A on 7 mc. W1BFT is working on 7 and 14 mc. W1AEF has finally got his set working to his satisfaction. W1IP crashes the BPL again and says things are FB. W1APK hooked up with 7 stations in a fone chain. W1BJF is pounding out well. W1BAC is a new ORS. W1AUE is using a 210 on 3500-ke. fone band.

Traffic: W1IP 345, W1BJF 104, W1BAC 66, W1APK 56, W1CCM 30, W1CAF 7, W1NZ 6, W1BFT 4, W1AEF 1.

WESTERN MASSACHUSETTS — SCM, Leo R. Pelouquin, W1JV — Traffic handling stations in this section are invited to write the SCM for details on ORS appointment. W1BZ spent a week in Washington, D. C. W1NS — W1AJN, W1CTF, and W1BZJ have just organized the Blackstone Valley Radio Assn., with a club house on the shores of Lake Nipmuc, Mendon, Mass., where they meet every Sunday at 2 p.m. W1ALL is a new ham in Springfield. Welcome! W1CPG continues to handle his share of traffic. W1WJ is on 3710 kc. with a brand new crystal outfit. W1ATK has been appointed ORS. W1BVR is District control station for Western Mass. All stations west of the Conn. River interested in Army-Amateur work are invited to write him. W1AFU reports. W1BSJ has been appointed traffic manager at W1BWY. W1APL is looking for schedules. W1AJD is working nights. W1BNL is kept busy with U.S.N.R. Drills. W1ASU is on regularly. W1BIV is back on the air and has schedule with W1BVR. W1UUM recently had the pleasure of entertaining W3BQ. W1BWY has lined up several operators who will keep regular schedules. W1DB is back on the air. Welcome! W1ASY, our new Route Manager, is doing a good job lining up a network of traffic stations.

Traffic: W1BZ 63, W1NS 107, W1AJN 92, W1ASY 65, W1CPG 33, W1WJ 21, W1ATK 20, W1BVR 16, W1AFU 16, W1BSJ 15, W1APL 14, W1AJD 13, W1BNL 12, W1ASU 6, W1BIV 6, W1UUM 4, W1BWY 2, W1BZ 48 (Sept.-Oct.).

VERMONT — SCM, C. A. Paulette, W1IT — Let me introduce W1AOA, Richard Sterling, 16 Vine Street, Montpelier, who turns in a fine report and is after an ORS. W1CGX has joined the Army-Amateur net. He is also your Route Manager. W1ATF is high traffic man this month. W1BJP reports a new aerial of the Zepp variety. W1BD is our new SCS Army-Amateur Station and he reports that W1ATF is Alternate SCS. W1BJP and W1IT had a FB trip to Brattleboro and visited the following stations: W1AOA, W1BDX, (tried W1BD), W1CGX, and W1AEW, who is old W1AD of Bellows Falls. All old ORS previous to

Nov. 1, 1930 are now void, so if you wish a new appointment, write me and I will take it up with you direct. We have an entirely new form of ORS certificate which has to be sent in for renewal each year. W1BD is also Route Manager and an Official Observer. Continue with the reports, gang, and I will try and do my part by giving you all the news as I get them.

Traffic: W1ATF 51, W1AOA 25, W1CGX 25, W1BD 42, W1BJP 8, W1IT 7.

RHODE ISLAND — SCM, C. N. Kraus, W1BCR — W1MO and W1AWE reports direct to Headquarters. W1MO worked G6VP and CT1AA. W1AWE has a new receiver.

Traffic: W1MO 12, W1AWE 2.

NORTHWESTERN DIVISION

IDAHO — SCM, Oscar E. Johnson, W7AKZ — W7QD has moved to 14 mc. W7CG gets on with his portable W7AMH now and then. W7ALC, W7ALW and W7A00 are holding down 3.5 mc. W7ANA is jr. op at W7ACP. W7AT missed out on some schedules because his grid leak went "blooey." W7IY is building a new AC receiver. W7AIH is working on his new xtal rig. W7AIV and W7AJJ have fifty watters in action. W7AFT made 267 "SK" schedules his first year on the air. W7AFN pounds brass at W7AHG. W7ACP says traffic and DX are picking up. W7ALY and W7ATN are shedding "weeps" because their power transformers failed them. W7ACN will soon be on with a 75 watt 'phone on 3.5. W7ALW is new OBS for Idaho. We have three new hams with us: W7ATR in Weiser, W7AUB in Boise, and W7AUR in Sandpoint. W7ACD is busy. The RI from Portland visited Boise and as a result some of the gang lost their licenses.

Traffic: W7AT 9, W7ACP 22, W7QD 5, W7AFT 31, W7IY 17, W7ALW 4, W7ACD 7.

OREGON — SCM, W. S. Claypool, W7UN — W7ZD, our newest ORS, is doing splendid work with six schedules. W7ALM has five schedules. W7AMF reports traffic OK. W7ACH is going out after ORS. W7LI reports via radio. W7AHJ and W7AJX report. W7PE got called on the jury this month. W7QY is getting on 3.5 mc. for USNR drills. W7AHX threw his fifty watter in ash can to use a 210. Two weeks was spent in Calif. by W7WL. W7AIG thinks weather is picking up. It seems that 281's don't last long for W7APE. W7IE is looking for traffic schedules. W7WR is still having difficulties with power leaks. W7AMQ's crystal is still forthcoming. W7MV is on quite regularly. W7IF is taking good advantage of BCL rush season. W7AHZ puts his call letters out in front of his garage and gets lots of visitors. W7EO likes to sneak up on the SCM's frequency while he is QSO with some one and make it three way. How would a contest between Oregon and Washington suit the gang? The SCM is all for it but can't figure how the prizes will be obtained.

Traffic: W7ZD 294, W7ALM 89, W7AMF 26, W7ACH 18, W7LI 17, W7AHJ 16, W7PE 15, W7QV 14, W7AJX 13, W7AHX 13, W7WL 13, W7AIG 11, W7APE 11, W7IE 11, W7WR 10, W7AMQ 7, W7MV 7, W7IF 6, W7AHZ 5, W7EO 2, W7UN 136.

WASHINGTON — SCM, Eugene A. Piety, W7ACS — Our Route Manager jumps into first place this month. W7ABN takes second place. W7AJY reports for the first time. W7AJS keeps Centralia on the air. W7KQ is busy grinding crystals. W7APR gets out well with a type '01A. W7QI reports that he is on a transcontinental route. The YLs keep W7BB and W7ACY busy. W7AG-W7SL is on the 'phone. W7BZ has a fine 'phone job going. W7AM sends in his first report for a long time. W7BR installed an 852. A push-pull crystal job seems to be just the thing at W7KO. The Alaskan skeds have fallen through at W7TK. W7RT sends in a very newsy letter. Some of it — W7APT new ham, W7AUD outstanding ham in Seattle. W7TS and W7CN are 'phone sharks on 3.5 mc. W7VK is President of Broadway High Radio Club. In Spokane, W7AHO seems to be the only real active ham on the air. W7QF wants ORS. In Olympia, W7KZ leads and is a new ORS. W7AIT is on occasionally. W7AMO is on. W7GP is working KOL in Seattle. W7WY reports from Vancouver. W7ACQ rebuilt into a MOPA. W7TK wants an ORS. W7ACS worked KA1CE using 300 volts on a 50 watter in a xtal job. W7IT is handling quite a bit of traffic. W7AHQ says that W7ARQ is on at Anacortes. At Kirkland, a new ORS, W7FJ, is using a new receiver on AC. W7ATV handles a few now and then. W7OJ is getting more time on the air. W7AFX got his commercial. W7AAE is an officer in the Sea Scouts. W7ACE came back from the Orient.

W7AAX keeps working DX. W7ALM visited the SCM. W7BG found that his tube has gone soft from disuse.

Traffic: W7OV 136, W7ABN 56, W7Q1 47, W7KZ 46, W7RT 39, W7AM 39, W7AHO 30, W7OJ 24, W7ACS 24, W7TX 20, W7BB 19, W7TK 19, W7AFX 17, W7AAE 16, W7AJY 14, W7AIT 14, W7ATV 11, W7BR 10, W7AG 10, W7AJS 8, W7KO 7, W7EJ 6, W7APR 4, W7KQ 2, W7WY 1.

ALASKA — SCM, W. B. Wilson, WWDN — We are indebted to A. E. Cresa, K7AOP, for the following reports: K7ABS is busy working on power house installations for City of Petersburg. K7ANM has a daily schedule with W7TX. K7ARL is having trouble with his antenna. K7ANG, Miss Lily Osterback, is heard on the air with a good d.c. signal. We would like to know the call of the new station at NPB.

MONTANA — SCM, O. W. Views, W7AAT-7QT — W7ASQ reports direct to Headquarters. A new station in Helena is ready to go on the air as soon as license is received.

Traffic: W7ASQ 12.

PACIFIC DIVISION

HAWAII — SCM, L. A. Walworth, K6CIB — Hawaii is still on a toboggan in traffic totals as a result of continued activity in rebuilding. K6CFQ wrote a long letter from Washington stating he hoped to pass through Honolulu soon enroute around the world. K6AJA writes that the code class at the High School is going strong and a new crop of hams is inevitable. K6ERO worked Japan with a 210 on low power in October. The SCM has had a touch of Flu and has been ND this month. Wah Chan Chock an old timer of King Spark days, has applied for license renewal. McKinley High School has several girls in its code class.

Traffic: K6COG 130, K6AJA 28, K6DYC 25, K6ACR 20, K6ERH 16, K6BJJ 12, K6BOE 8, K6ERO 1.

PHILIPPINES — Acting SCM, John R. Schultz, KA1JR — KA1HR's 500-watt MOPA is under test. KA1CE has four skeds daily. KA1PW is hamming nightly. KA1HW is again on the air. KA1DJ has closed down. KA1XA has sked with KA8AA. KA1EL works on 7- and 14-mc. bands. KA1SU is FB station. KA1RC keeps sked with KA1CE daily. KA1ZA is on the air. KA1ZC is back again. KA1JR puts more time on his radio fone.

Traffic: KA1HR 862, KA1CE 152, KA1JR 34, OMITB 417.

SAN JOAQUIN VALLEY — SCM, E. J. Beall, W6BVY — This is the first report from our new section and from all indications we will give the rest of the Sections in this Division a good run for traffic and activities. Our first section meeting was held at Merced November first. The SCM presided with Mr. Babeock, our Director, as the principal speaker. W6BYH handled the arrangements taking the initiative to start the section off with a bang. W6QA of Modesto is chief Route Manager for the section. W6SF of Stockton, W6BYH of Merced and W6AHO of Fresno are his assistants. W6QA has schedules with W6BYH, W6AHO and W7APE. W6AV, an old timer, is active with an MOPA xtal. W6EBH relayed requests for selections from KROW via W6ALX. W6EBH passed his ops exams at the Pacific Division Convention. W6CUL blew his fifty and is rebuilding around a 75-watter. W6CNM is on again after rebuilding. W6APJ is on again to assist the new section with traffic. W6KU, another old timer promises cooperation. W6CLP finds working east a snap on 3500 kc. W6EKH with a lone 210 and a 216 is getting out FB. W6ADB is with the Pacific Tel. and Tel. Co. as repeaterman. Prof. Martin of Modesto Junior College is instructor at the Modesto Radio Club. W6BVY is commander of Volunteer Communication Reserve Section No. 3. He has maintained a schedule with KA1AU, Manila, P. I., since March 1926, with UX210. W6QA is op at the Dept. of Agriculture Station. W6AME is learning to be a commercial op in San Francisco. W6BYH, W6ADB, W6CLL, W6EKH, W6CRC, W6DIY, W6QA and W6BVY are all members of the U.S.N.R. W6FED is a new op on 3500 kc. W6BUZ sent in nice report. W6BYH schedules W6DWV and W6QA. Have you a little schedule in your home? If not, communicate with W6QA, the Chief RM.

Traffic: W6CLP 23, W6KU 25, W6QA 9, W6BVY 46, W6DCG 3, W6AV 35, W6AHO 33, W6BYH 19, W6BUZ 20, W6CXT 9.

SANTA CLARA VALLEY — SCM, F. J. Quemant, W6NX — The message total went over 1,000 which is the highest mark reached for many a month. With W6HM back handling his transpacific schedules and W6YG running wild with traffic, prospects do look good. W6YU was reported R9

in New Zealand on 3500 kc. W6ALW visited the SCM during the month. W6BMW copied the Navy Day broadcast. W6DCP wants schedule with Fresno. W6FBV is a new ham breaking into the traffic handling game. The following stations were mailed ORS Certificates (new): W6BHY, W6YL, W6YAO, W6DCP, W6ALW, W6BMW, W6YU, W6NX, W6AMM, W6EEC, W6BYY, W6ESW, W6YG. W6BET is new ORS and W6BYY is new RM. Other active stations desiring ORS appointment should communicate with the SCM. W6BHY is reliable traffic station, as is W6YAO. The SCM's crystal set is at last ready to go on the air. The SCCARA held a ninth anniversary reunion November 14th. A large crowd of amateurs heard Jim Warner describe his transpacific flight aboard the Southern Cross. Nine years is quite a long life for a radio club. Let's all get behind the key and handle some real traffic. There's no reason why 2000 messages a month could not be handled. Do your share, and drop your card to the SCM on the 15th!

Traffic: W6HM 387, W6YG 361, W6YU 117, W6ALW 108, W6BMW 72, W6DCP 22, W6FBV 3, W6NX 12, W6YL 50.

SAN FRANCISCO — SCM, C. F. Bane, W6WB — Nearly every reporter this month mentions that he is rebuilding for xtal control. W6BIP leads all competitors again due mainly to the fact that he is willing to make and maintain skeds. W6DFR is the old stand-by of this section. W6ERK is cutting big holes in the air with a quarter KW. W6ABB again reports and says that the S.F.A. station, W6FBO, is nearly completed. W6AMZ has been badly bitten by the Xtal bug. Speaking of Xtals we understand that W6ATI is about to give his latest gift to radio a try on the air. W6CAL sends in another of his inimitable reports. W6AC tells us that he has a fine new baby out his way. Congratulations, OBI! They tell us that W6FK finds his talents wasted on radio and is expressing himself via the media of the pen. W6DPF and W6SC are working in the chain gang and are on the air with a portable rig signing W6DJX. A new man joins us this month, namely W6DXW. W6PW and W6WB are all excited about amplifiers and "PW" beats all comers by running his Xtal at 700 volts.

Traffic: W6BIP 207, W6DFR 66, W6ERK 42, W6ABB 22, W6CAL 18, W6AMZ 10, W6WN 9, W6AC 3, W6ATI 2, W6WB 2, W6DXW 2.

LOS ANGELES — SCM, B. E. Sandham, W6EQF — It is with deep regret that I submit my resignation to Hartford as Section Communications Manager of this section. Much correspondence and time has to be lent to keep the section active all the time. It is this factor that has prompted my action for I no longer have the requisite amount of time. It has indeed been a pleasure to work for fellows who work for you in return and this has always been my experience in the Los Angeles section. I trust my successor will experience the same high degree of good fellowship and assistance in return for his efforts as I have enjoyed from the members here, and to whom I herewith extend my unalterable and sincere appreciation. W6QP again heads the traffic men and has taken W6AD's schedule with W6COS. W6AOA is the runner-up. W6WA sends in Naval Reserve report from Bakersfield. W6ETJ has ruined his rectobulbs. W6ABR worked LU3FA. W6AGR had to drop his PI schedule due to QRM at that end. W6EGH has rebuilt. W6LN has new CC going. W6CWT is constructing dynatron per QST. W6CZZ reports for first time. W6WO is busy blowing filters and fighting power leaks. W6BCK is using TPTG cc now. W6OJ says W9EXU and W9AV, brother and sister, are here for the winter and on the air. W6CXW is now using 852 in final stage of cc. W6ZBJ has radio club going at Santa Barbara. W6DAK works LU, CX, CE, NJ and X. W6EFP has schedule with W4EY. W6AVJ has new National receiver for 'phone reception. W6AM is using 506 foot antenna working PI single at 9 am. W6ERL has schedules with "6th" and "7th" districts. W6DLL is rebuilding. W6UJ is preparing to be on the air regularly. W6AWY says conditions just rotten. W6EAU is ready for fall DX and schedules. W6CZT has USNR schedules. W6ESA has new National receiver. His father and W6EKE have left for the Philippines taking along four receivers and a high power C.C. job. W6FAA and W6EZF have X29A with them. They keep skeds with his home at Hermosillo, Mexico. W6EXK arises for work at 4 am. W6ID is putting in rectobulbs. W6BGF says new club starting in Puente. W6ACL is putting in c.c. and new receiver. W6EZZ reports from San Gabriel. W6BVZ has bad power leak. W6AEL reports conditions poor. W6AEO gets R6 from "J" and "OM." W6CYA is installing c.c. W6DOZ is busy at school. W6DZI states

that W6BJX is back in our midst. W6ON QSOd VK, ZL, K6 and K7. W6AZL has commercial ticket now. W6BFB is having trouble with transmitter. W6HT has low traffic again but holds hopes. W6EQD has 3.5 mc. c.c. p.p. fone. W6CUX has new 4-deck transmitter. W6EBS is now c.c. W6AKD just returned from trip. W6EPH is busy at school but his dad, W6EPI, is on the air lots. W6ASM comes to club with more badges and buttons on than a GAR veteran. W6MK has new QRA and is rebuilding. W6AKW is leaving for 3 weeks trip and reports early. W6EQF rebuilt and has 852 now. All of the clubs are active and much enthusiasm is being shown. The SCM's calls are being switched, W6EQF will become portable call and W6VO the permanent station call. Warning to all whose licenses are near expiration — send them in six weeks ahead of time to the RI at SF or LA. The convention at Sacramento was very FB even if the hams did swipe the fire axes and ships bell off of the stern-wheeler which took the gang down the Sacramento River for a night ride. W6QP, W6AOA and W6WA make the BPL.

Traffic: W6QP 528, W6AOA 209, W6WA 161, W6ETJ 149, W6ABR 96, W6AGR 86, W6EGH 75, W6LW 10, W6CWT 52, W6CZJ 56, W6WO 49, W6BCK 48, W6OJ 47, W6CXW 42, W6BZZ 42, W6DAK 39, W6EEP 38, W6AVJ 36, W6AM 32, W6ERL 27, W6DLI 27, W6UJ 26, W6AWY 23, W6EAU 19, W6CZT 18, W6ESA 16, W6FAA 11, W6EXK 11, W6ID 8, W6BGF 7, W6ACL 7, W6EZQ 6, W6BVZ 6, W6AEI 6, W6AEO 6, W6DOZ 6, W6DZI 6, W6ON 5, W6AZL 4, W6BFB 4, W6ET 4, W6EQD 4, W6EBS 3, W6AKD 2, W6EPH 1.

EAST BAY — SCM, J. Walter Frates, W6CZR — Under the new policy adopted at Hartford all ORS have been cancelled. If you plan to frame one of the new pieces of wall-paper, send in an ORS application to the SCM. With the aid of members of the Oakland Radio Club W6AQ installed a transmitter at the recent Pacific Slope Dairy Show and gathered in a lot of traffic for the section. W6ZX ran up the next highest total by relaying messages from the show. W6RJ has been working Aussies with a type '10 this month. W6CGM still swears by the old type '10s and has been working trans-Pacific regularly. He was host to W6TM and other hams recently. W6EDO promises to report regularly for a change now that winter has come. W6AQO was among the leaders in traffic this month. W6BBJ has changed his xmitter from one 203A with UV845 modulator to two 203A's with 212D modulator. W6CPB is another of the men who handled considerable traffic. W6ASJ ran up a good total in spite of being prexy of the ORC, putting in a power plant at Livermore, and running a night class for the Oakland public schools. W6BYS is still clicking away. W6CZN will be on soon with an AC receiver. W6CIG more than made his required total for an ORS this month. W6CDA says there are no changes at his station at present. W6DQH reports traffic again for the second time. FB. W6BZU at Concord wants his old ORS back. W6AUT is on and off the air as his operating hours are limited and irregular. W6BUX has been using a 7.5 watt xtal but is building a 50 watt xtal job. A YL op, W6ETS, has three schedules a week. W6BI announces that he sent the Navy Day BC from his station on 7100 kc, and that W6NM sent it on 3750 kc. W6ZM, the CRM's portable station, has suffered in traffic a little because of the work at the Dairy Show. W6BIW says that he is going to reform and hop after traffic. W6BMS has a new dynatron frequency meter nearly finished. W6GQ kept the natives and other interested persons here in touch with the planes searching for the lost P.A.T. night air liner at Lebec. The Oakland Radio Club held a smoker for its members, invited guests, and other hams of the San Francisco Bay region recently, and it was a great success. W6BDU, who won the prize as the strong man at the Sacramento Convention, was the guest of honor. W6BSB reported from New York that he is back from Greenland with the Second Roumanian Arctic Expedition and that he heard W6BJW's signals while there.

Traffic: W6AQ 276, W6ZX 107, W6RJ 98, W6CGM 74, W6EDO 69, W6AQO 69, W6BBJ 43, W6CPB 40, W6ASJ 34, W6BYS 36, W6CIG 28, W6CDA 23, W6DQH 17, W6BZU 15, W6AUT 13, W6BUX 10, W6BI 9, W6ZM 8, W6BIW 6, W6BMS 5.

NEVADA — SCM, Keston L. Ramsey, W6EAD — W6CDZ is the banner station this month. The Nevada Amateur Radio Assn. put on an exhibit at the University of Nevada Homecoming Day and it went over with a bang. The station using the call W6YAR accepted 192 messages and relayed 3. W6UO has a new mast. Nevada has a new Route Manager this month in the person of W6CDZ. The

N.A.R.A. had two meetings this month with lectures on amateur equipment. W6EAD is planning a new antenna for winter DX. W6CRF has a new location. All stations wanting schedules thru Nevada get in touch with W6CDZ or W6EAD.

Traffic: W6CDZ 292, W6YAR 192, W6UO 22, W6EAD 45. SACRAMENTO VALLEY — SCM, Everett Davies, W6DON — Things are beginning to show signs of life in the Sacramento Valley Section. W6UM was presented a water-cooled 250 watt tube at the convention. W6TM is now back on as the Section's star traffic man. W6CGJ says that his type '10 is still kicking out on 14, 7 and 3.5 mc. W6AIM thinks a doublet antenna is the only thing in the world. W6BDX says he and the rest of the Redding gang are rebuilding. W6BYB is building his new 1-kw. set. W6EOU sold his UV204 to W6AXM and is now using a type '10. W6AXM says Tony's old 204 works well. About five of the fellows here lost their temporary tickets when the R.I. gave examinations during the Convention. W6DQG and W6BSN are still trying to work "Hellenback" on 14 mc. W6DYF now has a YL and has forgotten radio and Latin. W6ER is selling Fords. W6AYI traded his 50-watter for a Ford. W6DON has been using W6CAO's set. Your SCM is offering a prize consisting of radio parts of at least five dollars value to the best traffic report in his Section every month beginning with the December report.

Traffic: W6TM 328, W6CGJ 48, W6AIM 19, W6EOU 9, W6DON 18.

ARIZONA — SCM, H. R. Shortman, Jr., W6BWS — W6ALU leads the state in traffic this month. W6AWD is operating on 7100 kc. W6EFC is still servicing Copeland refrigerators. W6VV-W6BWS, chief op at KGSI, reports the call changed to KGUP. W6EOF is leaving for Tucson to operate for American Airways. W6EEB-W6ECW is pounding away as second op at KGUP. W6DQW gets AC reports when using half wave rectification with eight mikes. W6CDU has a new job, and W6DWP stepped into the old job that CDU vacated. W6CWI has a new Master oscillator. W6BJF is working 3500 kc. W6DJH has a new set for 3500 kc. 'phone. W6DRE is still operating BC station KOY. W6DGY is operating BC KTAR.

Traffic: W6ALU 258, W6AWD 11.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6AXY again leads the section in traffic. W6ACJ has four schedules now. W6CTP says DX has begun to come in on 14 mc. W6AEP says 'phone is FB. W6BAM says the new ORS tickets are sure neat. W6AYK is a new ham in La Mesa. W6CNK says he is not working or going to school now. W6CTR is heard on the 3500-ke. band with 'phone. W6BFE reports lots of QRM. W6EOS is very QRL college. W6EOP is on 'phone once in a while. The following stations in the San Diego Section were mailed their new ORS tickets: W6AXV, W6BGL, W6BAS, W6EPF, W6CTP, W6BFE, W6CNK, W6EOP, W6ADC, W6AEP, W6BAM, W6ACJ, W6EOS, W6CTR and W6BKK. There is more room for several good stations so please get in touch with the SCM and get lined up for an ORS ticket. W6BGL blew a filter condenser. W6AJM has moved. W6HY is studying up on speech amplifiers. W6DNW works till midnight and then goes on 'phone. W6DNS is making midget BCL sets. W6BFB traded his 250 watter for a Fifty and a motor generator. W6DNL is now on 7 mc. W6DAL says 'phone is FB. W6EOL is building a Fifty watt transmitter. W6QY has his set all ready to go on the 14-mc. band. W6DGW is building a new 50-watt set with crystal control. W6DOB is on with crystal control 'phone. W6EMA and W6EPZ have applied for ORS tickets.

Traffic: W6AXV 333, W6ACJ 34, W6BGL 17, W6CTP 11, W6AEP 10, W6EOP 10, W6BAM 1, W6AYK 1.

ROANOKE DIVISION

WEST VIRGINIA — SCM, D. B. Morris, W8JM — W8DPO again stands out as the most active ham. W8HD is again taking up the duties of OBS. W8OK resigned as RM of W. Va. The SCM will appreciate hearing from all interested in this position. W8TI and W8AYI are putting on a new station at W. VU. W8BOK is receiving some real results from his 1930 phone station. W8DNN has "skeds" with W9AZY and VE2CA. W8DRL and W8BOK both operate on the same frequency and take turns QSOing a station. Ex-W8ARK of spark days is getting the fever again. W8CBV is working real DX. Reports are still appreciated on the 16th of each month.

Traffic: W8DPO 38, W8ND 11, W8DNN 5, W8CBV 3, W8BOK 2.

VIRGINIA — SCM, J. F. Wohlford, W3CA — R. N. Eubank, W3AAJ, 2817 Montrose Ave., Richmond, Va., has been appointed RAI for this State and has already worked up good routes. Those wanting schedules see Bob about them. W3CXM broadcast the Armistice Day message from Chief Signal Officer. W3AWS reports that the Signal Battalion had a disastrous fire and that W3AWS is a total loss. W3WO handled message to New York City and got an answer back in ten minutes. W3FE is building a new TNT circuit. W3TJ is back with us. W3CFL handled his traffic on 7000 kc. W3FJ has rebuilt MOPA outfit. W3ASA and W3IB are rebuilding station. W3BCI is using a type '10 in TNT circuit. Ex-3LT is rebuilding at new location where he will sign W3BFS. Ex W4AFV is now working at WRVA and has ham call W3BFQ. W3AHV is on air with MOPA. W3AEW has 1/4-kw. T.P.T.G. outfit. W3BCI and this station are consolidating. W3AMB is using 1500 volt on aluminum wire chemical rectifier and gets PDC. W3ZU got German 30-watter as prize at convention. W3HY handled several death messages. We are sorry to report that W3BZ has been confined to his bed for nearly a month. He is improving however and we expect him out real soon. Speedy recovery, OM. W3ARU remodeled the outfit and operating room. W3AHW has trouble with his crystal. W3SZ worked a Switzerland station. This station and W3QE are combining. A new radio club has been organized at Danville Military Institute by W3HY with six members and three hopefuls. The Richmond Short Wave Club extends an invitation to all hams in and around Richmond to join the club. W3ZA is still perking with that phone outfit and has a double button mike doing extra duty. W3BGS and W3KG are remodelling the station. W3BDZ has finished his outfit. W3BDW says BCLs run him "nutty."

Traffic: W3CXM 248, W3ARU 307, W3WO 229, W3AAJ 75, W3CFL 50, W3FJ 46, W3AEW 30, W3SZ 27, W3HY 20, W3AMB 7.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — W4FP has gone to California to spend the winter. New ORS certificates have gone out to the following: W4JR, W4NG, W4AA, W4ZB, and W4AEW. All others have been cancelled. Will be glad to receive requests for application blanks for new appointments. W4LY worked over a dozen VKs, ZLs, and LUs between the 6th and 13th of October. W4GW, W4SX, W4NJ, and W4TO are also on the air "in the Land of the Sky." W4EJ is having trouble with a very strong back wave in his new crystal transmitter. W4MZ and W4OU are the force at WYNC now. W4YT is heard with his 852 occasionally. W4QJ was an operator in the World War. W4TS, our former SCM, is still busy trying to make a living. W4AEW is on the air with his new crystal transmitter. W4OC has just completed a 100-watt T.P.T.G. push-pull job for 14 mc. W4ZB is building a remote control, crystal control transmitter. W4EEL reports working a couple of VKs. We are glad to have a first report from W4AGO. W4TR writes in for ORS application blanks. W4AHS reported. W4JR is working regular schedules. W4TU recently got some messages through to his mother in Buffalo and got answers in less than fifteen minutes. And here comes another new station with a creditable report — W4AKC. W4DQ forgot the expiration date of his license, so he was off the air the greater part of the month. W1BHT, a student at State College, gets a great kick out of working some of the amateurs in his home town from W4EG. W4NG reports the completion of a 75-watt crystal control job for W4ZE. W4ABC has gone to South Carolina. W4AA is increasing power to 250 watts. In February of this year there were only five amateurs in Greensboro and at present there are about twenty-five active "hams" in the Greensboro Radio Amateur Club. There is about the same number in the R. J. Reynolds High School Radio Club in Winston-Salem. W4IF is one of the licensed operators in that club. W4EG is taking a radio correspondence course and also attending a radio class at night at State College. So is W4QS. W4EG stepped down to Costa Rica for his best DX this month. W4UB, W4TJ, W3SZ and W1BHT are enrolled students at State College.

Traffic: W4NG 104, W4ZB 74, W4JR 43, W4TR 39, W4AA 33, W4AHS 28, W4DW 22, W4AKC 17, W4TU 17, W4AGO 13, W4EEL 7, W4DQ 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, E. C. Stockman, W9ESA — W1QV and W8CEA are now located in this section. W9AOD has new high powered crystal rig. W9DNP is installing new power supply. W9FQJ and W9FQK are

kept busy at KFKA. W9CDE advocates Amateur support for Army-Amateur Net. W9CXG has dismantled and moved to Bovina. W9FYY is working in 14,000 kc. W9FXQ has been on the air a short time. W9FXP is temporarily out of town. W9BJN moved a lot of show traffic. W9AUJ is rebuilding his receiver. W9CWX is still going strong with DX. W9BCW wants an ORS. W9AAB and W9GBQ want the new ORS certificates. Let us have more requests for these tickets, fellows. W9ESA is kept busy with several reliable skeds. W9CSR reports.

Traffic: W9AOD 20, W9DNP 109, W9FQJ 6, W9FQK 16, W9CDE 2, W9FYY 2, W9BJN 137, W9AUJ 3, W9BCW 4, W9CWX 27, W9AAB 25, W9GBQ 15, W9ESA 275.

UTAH-WYOMING — Acting SCM, C. R. Miller, W6DPJ-W6ZZZ — All ORS appointments automatically became void on Nov. 15th. Several ORS will not be re-appointed, due to inactivity and failure to report. All stations eligible for ORS appointment are urged to apply. W6BTX keeps three schedules. W7AAH is still on 3.5 mc. band. W7ALI reports for the first time. W7AAG is leaving the section. Sorry to lose you, OM. W6DPJ makes the BPL.

Traffic: W6DPJ 229, W6BTX 91, W7AAG 65, W7ALI 38.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Robert Troy, Jr., W4AHP — W4KP leads the state in traffic again. W4LM is getting out well. We are indebted to W4ADL, secretary of the Birmingham Radio Club for the following dope on the Birmingham stations. W4LG is rebuilding. W4DD is doing good work on 7000 kc. W4PAI has put in a 204A. W4AGI has installed crystal. W4JF is pushing a 210. W4VC is on with an MOPA. W4FU has a portable transmitter. W4AHA is on now and then. W4ADL will soon be on with a 50 watter crystal controlled. Montgomery is waking up. W4AN is working fine now. Same for W4AEZ. W4AJR is becoming more active. W4AAQ is busy at WSFA. W4AHP has built a dynatron frequency meter. W4GX is trying to get started in his new location. W4AKB is dormant. W4AP is on some with fone. W4CX promises to be on soon. W4AJB is in Montgomery now. Troy woke up in the person of W4VY. In Selma W4TI and W4OH are having trouble with key clicks. W4DS is working everything with his 210. W4IA has his new fone outfit going. W4QJ did a nice bit of relaying for two ships.

Traffic: W4KP 139, W4AJW 15, W4LM 75, W4AAQ 6, W4AKM 4, W4ADL 45, W4VY 4, W4AHP 5.

FLORIDA — SCM, Harvey Chafin, W4II — I congratulate each and every one of you for the splendid work that you have done during the past year, 1930. W4QL sends in the highest total this month. W4MM is next highest man. W4AKA is now working at WFLA-WSUN. W4AGN has been appointed an ORS. W4ACM was control station for Section one, U.S.N.R. for the month of November. There are two ops at W4AFT, W4IH is a member of the U.S.N.R. W4KM has bought a new transformer. W4SK is keeping a schedule with W1KH at 6:45 a.m. W4QF has built a new M.O.P.A. set. The 'phone men of Florida are going to have a party on 3500 kc. some night real soon. I would like to see you fellows on the air every Friday night at 7:30 p.m. E.S.T. W4PAW will act as control station. The following stations will be called every Friday night: W4UH, W4WS, W4DU, W4QF, W4ABF, W4AC, W4BN (4PAP), W4SQ and W4AKJ. If there are any more amateur 'phone stations in Florida, please get in touch with me so we can put your call on our list. W4AIO has been putting in quite a bit of studying for the radio exam. W4AEM was sick in bed and could not pound brass. W4TK is still on the air when not at WJAX playing phonograph records. W4JO says he copied the Navy Day and Armistice Day broadcasts. W4PAZ keeps the Miami Naval reserve on the air. W4FM says all schedules are with YLs. W4HY reports. Capt. W. A. Fuller at Cocoa tells me that there are 238 Florida amateur stations listed in the new Government call book against 207 listed in the old book. Well, W4QN says "the more the merrier." W4AFN has been getting out very good lately with 300 volts on his type '10. W4ABK is getting on the air with a fifty. W4OK is up at Dodge's radio school. W4CK has just finished a new five tube receiver. W4DC is using a fifty watter. W4WS sends in his report for the first time.

Traffic: W4QI 111, W4MM 36, W4AGN 32, W4ACM 30, W4AFT 29, W4DC 28, W4IH 21, W4AEM 18, W4KAL 13, W4SK 12, W4QF 12, W4AIO 8, W4AKB 8, W4TK 7, W4AII 7, W4PAW 6, W4JO 6, W4FM 3, W4HY 3, W4WS 2.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, M. S. Alexander, W4RZ — W4DN is a new station in Tifton, Ga. W4JD makes the BPL. FB! W4ABP uses two type 12A tubes with about 300 volts in Hi-C Hartley. K4ACF expects to be going again soon. K4KD is now a member of the WBE club as well as WAC. W4AFQ visited the fellows in Augusta, Ga. W4DV has two crystal transmitters, one for 7 mc., the other for 3.5 mc. W4AJH is back from a trip to Denver. W4GT is having lot of school QRM. W4AAV is spending a month in Atlanta. W4OQ, a new ham, is pounding brass when the YLs will let him. W4VH, also a new ham, is sick in hospital at Pottstown, Pa. Sorry, Om. W4OQ does lot of hunting and fishing. W4SS wants schedules in Florida and Alabama. ExW9BSV is chief operator at WRDW.

Traffic: W4SS 116, W4DV 23, W4AJH 17, W4GT 14, K4KD 5, W4ABP 54, W4JD 220, W4DN 10.

WEST GULF DIVISION

O KLAHOMA — SCM, Wm. J. Gentry, W5GF — W5GF is building a portable station. W5VQ still has plenty of schedules. W5CB is getting lots of traffic from the Okla. School for Deaf. W5AUV has resigned as ORS. W5OJ handled a radiogram for air craft parts. Glad to see you back with us again, W5BMU, OM. W5ASQ has a Xtal about ready to go. W5AMC worked NNINIC. W5PL makes his first report. W5PL used to be 6CMD. W5BOE makes his first report too. W5AHH is now at Holdenville, Okla. W5BHW is busy with school work.

Traffic: W5VQ 587, W5CB 188, W5AUV 168, W5OJ 70, W5BMU 40, W5AMC 33, W5GF 20, W5PL 25, W5ASQ 8, W5AAV 2, W5BOE 2.

SOUTHERN TEXAS — SCM, H. C. Sherrod, Jr., W5VY-W5ZG — The SCM is now a budding Houstonian. As a result W5ZG-W5VY will be off the air for an indefinite period. Similarly W5ZL has changed his address from Houston to Center. Bryan: W5AQY, the station at A. & M. College is back with us. Rosenberg: W5PU is getting "rite regular" with those reports. Port Arthur: W5YH, the Port Arthur Business College, is the sole representative of this city. Galveston: W5BQJ has the sole transmitter to an MOPA with a fifty watter as the final amplifier. W5AUX is rapidly completing the crystal controlled job. Warriner is expecting his license momentarily. Scharpwinkle is in the same fix. W5AVC has recently completed a very nice 100 watt T.P.T.G. rig to be used in a plane. His buddy, Al Granger, is better remembered as W6AXW of Luke Field, Honolulu, Hawaii. Kennedy, an old timer who operated at "GV" back in the Marconi days is coming on with a transmitter soon. Flatonia: Neersta, W5AJD, came mighty close to the BPL this month with a total of 192. Kerrville: McKnight is now operating under W5ZB. He is keeping schedules with Corpus Christi, Houston, and Nacogdoches. W5BKE sends in a very nice report and makes the BPL. Another stunt put over by that Kerrville Gang was W5BKZ's recent QSO with France. Corpus Christi: W5AB is leaving Corpus to go to New Orleans. He will be heard operating W5GR at that city shortly. W5MS is using all of his spare time to build new equipment. W5ATY is using a new power supply. W5AAA is a new ham in Corpus. W5TO is doing some fine work after changing from his old power supply to a couple of '66 rectifiers. W5AQK and W5BKG will be relocated in Corpus very shortly. W5BRY is a newcomer to the game at Corpus, and another from Taft. will have his license shortly. The Corpus Christi Radio Club is now functioning and the gang is attending its meetings regularly. W5ZX is going strong after going into the third stage of hamdom! W5ZN of the Western Union Office is doing fine work with pure d.c. and a lonesome five-watter. W5AHZ is QRL with the talkies. San Antonio: W5AHH is on 7116 kc. with crystal control and is keeping schedules with W5AJD. W5BPT of Dodd Field is a new ORS. He was formerly W9BSH of Rantoul, Illinois, and transferred his ORS appointment from the Illinois Section. Welcome, old man. Baytown: W5DS is on the air with a new MOPA rig using two type '04-A tubes. He reports that ex-W5NW is now PK5NW and is on the air at Sumatra, Borneo. QSOs should be attempted with him between 5:30 a.m. and 7:30 a.m. CST as he is anxious to hook up with some of his old W5 friends. Houston: W5VA is having trouble with his new PA rig. W5ZL has moved to Center. W5IU is using 3500 kc. 'phone. W5TG is coming on the air with a 1650-ke. fone. W5BKW is building a 50 watt xtal job and also a 3500-ke. 'phone. W5EI is using a fifty-watter on 7000 kc. FLASH! W5PK takes the big jump. We

now have another benedict in our midst, he having taken unto himself a better half on the eighth of November in the city of New Braunfels. Congrats, OM! W5AZR is on occasionally. W5BOC is rebuilding. W5PO is also rebuilding. W5BHO is rebuilding a 3500-ke. 'phone. W5TD has moved to 1419 Marconi Street. He will be on shortly on 7130 kes. W5ASAM is off the air rebuilding. Ernest Ross, the second op at W5PK, is now the mainstay of W5PK. W5KI is a new-comer in Houston, W5EW is on with a single type '10. W5LB is using a remote controlled job and is QSO VK and ZL. W5BBV is doing most of his DX from the mike at KTLC. W5LP requests cancellation of his ORS appointment. The SCM may be addressed for the present care of Radio Station KXYZ The Texas State Hotel, Houston Texas.

Traffic: W5TD 6, W5DS 37, W5AHH 31, W5AB 106, W5BKE 289, W5ZB 48, W5AJD 192, W5BHO 7, W5PK 19, W5ZG 259.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — W5TV now has another type '10 on 7 and 3.5 mc. W5AJR wants more traffic. W5AUV likewise. W5EF is on as often as his railroad work will permit. W5AJL has been rebuilding his whole shack again. W5BQE is now alternate State Net Control of the A.A. net. He and a new man W5BRV visited the SCM a short time ago. Our QSO Party hasn't been too successful to date. The QRM on 7 mc. has been pretty bad every Sunday and so many of you fellows are apparently more interested in working out of the Section. And when you call CQNM don't answer every "9" or "6" or "5" that calls you — this is supposed to be a strictly New Mexico affair. Perhaps we would be better off on the 3.5-mc. band. Comments and suggestions are solicited.

Traffic: W5AHI 669, W5TV 36, W5AJR 29, W5AUV 19, W5EF 19, W5AJL 14, W5BQE 13.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — W5BAD took first place this month with a whale of a total. FB, OM. W5HY is keeping skeds with W5BOL, K6CDD, K5RH and W9BMA. W5CF broke through with a fine total and wants schedules East and South. W5BND is building a 50 watt 'phone job for 3.5 and 1.75 mc. W5AUL, a new ORS, is starting off in fine style. W5RH has a schedule with W5ZB daily. W5BMP is asking for traffic schedules on 14 mc. W5RJ is playing with 1750 and 3500-ke. 'phone. W5ARK also working on 'phone and says there is lots of traffic. W5BAM is chasing down plenty of QRM over at Dallas. W5AZP is going to give 'phone a try-out with a 50 watt modulator. W5GZ is going on 'phone with his 250 watter. W5ARV is a student at TCU, W5JV is using a pair of type '10 in a mesny circuit. W5ALA promises a very attractive hand painted QSL card made by his OW to the hams that are QSO with him; also has a station photo for all foreigners reporting his signals. W5DF is at A. & M. College. W5DX, an old timer at Dallas, is on the air on 7000 and 14,000 kc. W5LY will soon be ready to handle traffic again. W5AAO formerly of Abilene is our newest ham in Ft. Worth. W5GI — DV is a recent Benedict. W5BAT has sold out to W5RJ as has W5GI. W5KL is one of the operators at WBAP. W5AGQ and W5ASV have pooled their interests and consolidated. W5BNN has been off on account of the family as well as himself being on the sick. W5BNO, another WBAP man, is going well with a pair of type '10s. W5BGW is back again with another power transformer. W5MW is trying to get going with a type '10. W5ASP reports a new ham, W5BOI, in Wichita Falls. W500 of Glenrose is a new ham in our section. Welcome, OM. W5ACL will soon be tearing up the air with a push-pull 852 job. W5BG has a 250 watter going. All ORS appointments prior to Nov. 1, 1930, have been cancelled as per QST. If you desire reappointment, please apply at once.

Traffic: W5BAD 327, W5HY 125, W5CF 80, W5BND 75, W5AUL 58, W5RH 51, W5BMP 44, W5RJ 40, W5ARK 40, W5AZP 23, W5BAM 27, W5GZ 18, W5ARV 10, W5JV 7, W5ALA 5, W5ASP 38.

W8CAT, W8JD and W8DMS, all of Detroit, work near the same frequency in order to minimize local interference and assure them all an equal chance of working outside stations. They have agreed to operate within a certain bunch of kilocycles leaving the entire remainder of the band open for them to work outside stations without causing each other QRM. W8DMS operates on 3754 kc., W8CAT a bit higher and W8JD a bit higher than W8CAT. This plan should work out well in cities where the amateur population is large.

CANADA

I have again to urge all members to do their best to get on the air each Wednesday night as much traffic for the east has still to be diverted through the USA. Ontario stations in particular are looking for eastern schedules. Come on, gang, let's all pull together and put the all Canadian Route on a firm and reliable basis.

VE3GT, VE3HA and VE4EI, between them, turn in a total of over 600 messages. With these fine totals added to the others we have a grand total of 1392, the best showing in traffic handling Canada ever had. Keep up the good work.

A Happy New Year to all and best of luck for 1931.

CANADIAN GENERAL MANAGER
ALEX REID, VE2BE

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — We are indebted to VE1DR for the report of activity in the eastern part of this section. VE1AB is now using "B" battery plate. VE1DR needs one more continent for the W.A.C. Some of the gang visited VE1BR during the month. VE1DA remarks that there is no DX. VE1AS has been experimenting with tubes. VE1AX is still getting good reports on his 3.5-mc. 'phone. VE1CC is still raving about his new MOPA. VE1DQ has been very busy with new job. VE1DM has a type '10 going on 7 mc. Ex-VE4AF has applied for the call VE1AF. VE1AZ burnt out his grid leak.

NEWFOUNDLAND — Acting SCM, E. V. Jerrett, VO8Z — VO8WG of North West River Labrador will be off the air all winter owing to a breakdown in Power supply at a time when it was too late to order new parts before the close of Navigation. VO8AW has finished his new Hi C transmitter. VO8MC is an Empire link station for the BERU. VO8AE has just returned from up North. VO8AN and VO8C have both been silent for a long while. 8AZS, the OP at the wireless station Battle Hr., Labrador, has a 204-a going on about 7890 kc. (38 meters.) VO8Z will be going on 3500 kcs ere this is in print. A Happy and Prosperous New Year, OMs.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — VE3GT is our headline this month. VE3AD be- moans the lack of DX. VE3FO and VE3CT are active at Hamilton. VE9AL turns in a nice total. VE3AL, the portable station operated at the Toronto Radio Show for one week, originated a flock of traffic. VE3GK will be crystal-controlled soon. Mrs. "GK" is looking for another "Lady of the Key" to QSO. VE3BC's signals are beginning to get out. VE3DW reports a good month's activity. Mrs. "DW" gets a lot of enjoyment from traffic handling. VE3DA has the C.C. transmitter on 7015 kc. going fine now. VE3CE changed to TP-TG push-pull. VE3BC is QRL at school. VE3HE has gone back to his first love — the 'phone. VE3GM uses phone to very good advantage working good DX. VE3FC is preparing to use crystal-controlled with low power. Southern District: C. D. Lloyd, VE3CB, Asst. SCM — VE3HB has been overhauling his station. VE3FD is back on the air again after four months of silence. VE3CB hopes to be on the air soon. Northern District: G. V. Lawrence, VE3ET, Asst. SCM — VE3HA kicks with the best total that has been reported in this district for many a moon. VE3BD is keeping some schedules. VE3GX was badly QRM'd laying up DF sets. VE3ET takes the booby prize. VE3HA handled messages for VE3AR for his sister in Port Arthur. VE3AR reports VE3BH's traffic. VE3HU had tough luck with his new 852. VE3AG plans beaucoup activity for the coming season. VE3HD reports VE3HL on at the Soo. VE3DM and VE3HD handled about fifty between them but neglected to list them as originated, relayed and delivered so our district cannot be credited with them. VE3HA, VE3FW, VE3BD and VE3HD are hard at work on the Trans-Canada Chain. VE3ET is leaving amateur radio for the present. Send your reports direct to the SCM until otherwise advised.

Traffic: VE3GT 172, VE3AD 46, VE3AL 39, VE3GK 15, VE9AL 30, VE3DW 13, VE3DA 7, VE3CE 1, VE3HA 210, VE3BD 17, VE3GX 7, VE3AG 5, VE3ET 2, VE3FD 5, VE3BH 17.

XVI

QUEBEC DIVISION

QUEBEC — SCM, Alphy L. Blais, VE2AC — The season opened with a hamfest at Newman's. VE2CL, prepared by 2CL with 2CA, the XYL at 2CA and 2CL's mother acting as cooks. VE2AP was away all month. VE2CP, McGill University station, has 15 members. VE2BO is on 14 mc. VE2AQ is back at McGill. VE2CO uses a type '10. VE2BJ is a new amateur in Murray Bay. VE2BB does some fine traffic work. VE2BZ has started the season with a punch also. Sunday phone work at 11 a.m. on 3.5-mc. band is here at last with over ten stations taking part. VE2AC worked many DX stations. No applications have been received yet for ORS appointment. Remember that all ORS were cancelled Nov. 15th by orders of A.R.R.L. Headquarters. Our CGM, VE2BE, has been very busy all month organizing for winter activities. Happy New Year, gang. Let's make 1931 an even more active one than 1930.

Traffic: VE2BB 8, VE2BZ 8, VE2CA 6, VE2AC 7, VE2CL 3, VE2AP 20, VE2BE 47.

VALNTE DIVISION

ALBERTA — SCM, G. F. Barron, VE4EC — VE4EI makes the BPL this month. VE3DT and VE4HM report with traffic. VE3GD arose in the wee small hours to work some DX and enroute to the transmitter, tumbled down the stairs. VE4GM's 'li' gossip on pepper resulted in the blowing up of a condenser in his power pack. VE4GT has his 79-ft. antenna mast erected. The SCM had a visit from Corporal Wild of the C.N.W.M.P. who has just returned from Bernard Harbor, near Tree River, in the Arctic. Corporal Wild informs us that the Police Patrol boat is equipped with a transmitter using the call VGSR. Watch for him, gang, on 7000 kc. and 14,000 kc. VE4EI is the first to report contact with VGSR. VE4EA is busy calibrating his dynatron. VE4EC blew his type '10. Snap into it, you fellows who don't report. Surely you can at least write me one letter each month. The SCM wishes you all a Prosperous New Year.

Traffic: VE4EI 200, VE4DT 11, VE4HM 11, VE4EC 12, VE4EA 1.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — VE5AN had a wonderful time at the Sacramento Convention. VE9AJ is push-pulling on a tuned plate. VE5AG has been losing sleep trying to keep schedules. VE5AC is able to get the odd message. VE5BP is doing nicely with low power. VE5AL is handling traffic on 7000 and 14,000 kc. VE5BI is on with a nice little heap. VE5CW is busy these days. VE5DR is putting his heap in shape. VE5CF has tried the new key click filter and says it's perfect. VE5DD has made himself a new receiver. In Victoria. VE5CO is shielding the entire house trying to cut down QRM. VE5EC is troubled with key clicks. VE5AD and VE5CB hope to be on again soon. VE5HP wants to know how to keep a motor generator perking. VE5HR is trying to make a type '22 detect. VE5CJ has his portable in action. VE5DQ is using low power on 3500 kc. VE5BR at Savary is on 3500 kc. with his old schedules. VE5DX seems to be the most active station in the north.

Traffic: VE5EC 53, VE5AG 55, VE5AL 43, VE5AN 14, VE5HP 1, VE5DU 1, VE5BP 2.

PRAIRIE DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4DK heads the list with a good total. VE4FP turned in his first report. VE4GQ has made a welcome reappearance. VE4JB has his outfit going at a better location. VE2AP of Montreal was on hand to assist in erecting a Zepp antenna. VE4BQ is still working DX on 14 mc. Arrangements are being made to entice some Saskatchewan stations up on the 3500-ke. band with a view to linking up with Manitoba for the purpose of handling Canadian traffic.

Traffic: VE4DK 49, VE4BQ 23, VE4DJ 12, VE4HR 11, VE4BU 9, VE4FP 7, VE4JB 6.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — VE2BE tops in traffic this time. VE4CV wants schedules on 3.5 mcs. VE4BB says conditions on 7 mcs. are approaching normal. VE4CN, VE4ID, VE4FK and VE4IE will all be on soon. VE4IH expects to be on daily for the next six months. VE4HY and VE4HO are going fine. Our XYL, VE4AV, turns in her first traffic report. VE4CQ QSO'd several stations on Armistice Day. Season's greetings, Gang.

Traffic: VE4BE 41, VE4CV 31, VE4BB 23, VE4IH 22, VE4AV 2, VE4HY 16.

QST FOR JANUARY, 1931