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amateur radio

december
1933
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1933

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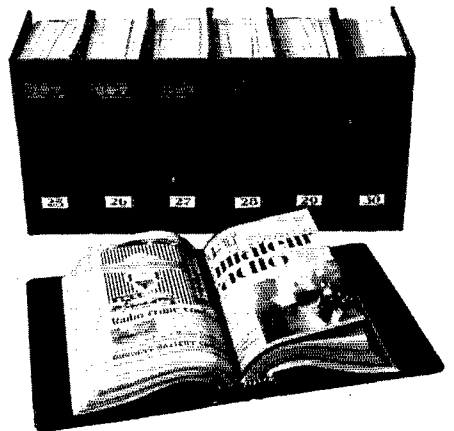
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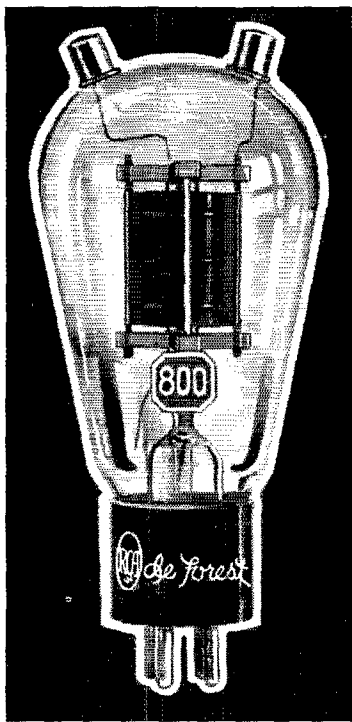
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West Hartford, Connecticut



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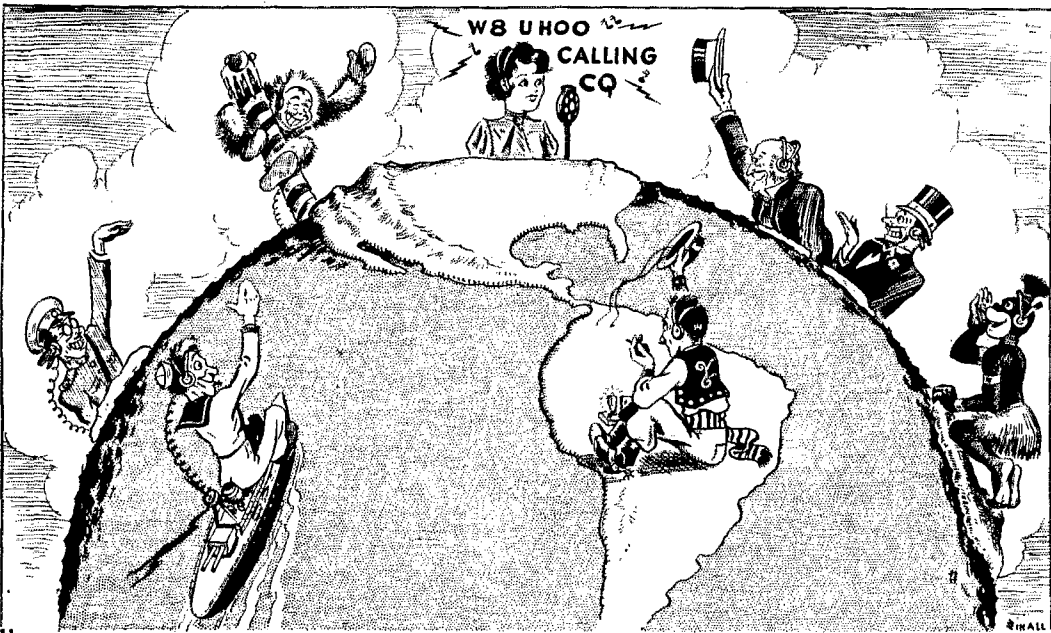
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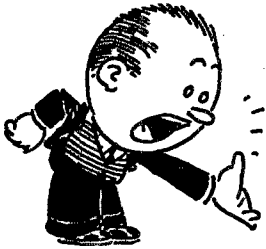


QST

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devoted entirely to

AMATEUR RADIO



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DECEMBER
1933

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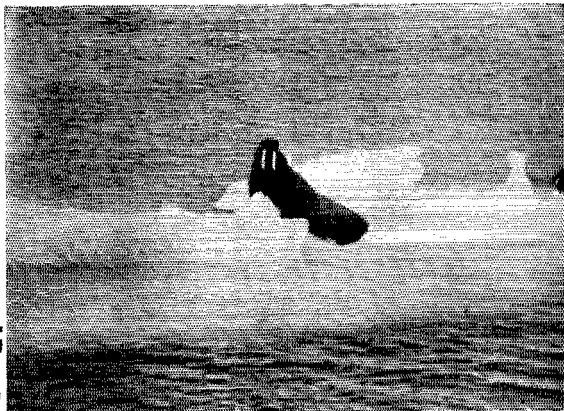
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... from the
**ARCTIC
WASTES**



NIRAM PERCY MAXIM, PRESIDENT
CHAS. H. STEWART, VICE-PRESIDENT

CON

THE AMERICAN RADIO RELAY LEAGUE

HEADQUARTERS: WEST HARTFORD, CONN., U. S. A.



RADIOGRAM

CITY OF ORIGIN Schooner "MORRISSEY"	STATION OF ORIGIN VOQH	NUMBER 5	DATE 9/30/33	CHECK
--	---------------------------	-------------	-----------------	-------

TO Mr. Winner
% Hammarlund Co.
(STREET AND NUMBER, OR PHONE)
438 West 33rd St. N.Y.C.
(PLACE)

THIS MESSAGE WAS RECEIVED AT
AMATEUR RADIO STATION W2KJ
OWNER J. & S.A. Ross
STREET ADDRESS 1066-83rd ST PHONE SH5-1642
CITY AND STATE Brooklyn

Please accept my belated but nevertheless sincere appreciation for your fine co-operation and help x Hammarlund Comet "Pro" receiver has worked like a charm and has been a great comfort to all members of Norcross Bartlett Expedition x

NORCROSS

SENDER'S ADDRESS AND PHONE NUMBER FOR REFERENCE:

Rec'd	FROM STATION VOQH	LOCATED AT	DATE 9/30/33	TIME 7:45AM	OPERATOR SAR
	TO STATION				



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... to torrid Africa; from New York to humidity-drenched Singapore—thousands of Comet "PRO'S" are working "like a charm," delivering invariable consistency of high-frequency performance. You, too, should have a "PRO" for your specialized needs. Write Dept. Q-12 for details.

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The American Radio Relay League



• **T**HE AMERICAN RADIO RELAY LEAGUE, INC., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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

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

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

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Address all general correspondence to the executive headquarters at West Hartford, Connecticut



THE EDITOR'S MILL

TEN YEARS ago this month there was a grave crisis at the QST Factory: we ran completely out of exclamation points! For many months our supply had been getting lower and lower under the necessity for reporting in every issue yet more startling accomplishments in amateur transmission. We amateurs were beginning to get the real hang of c.w. transmission. But the grandest and most inspiring event of that whole dramatic period, the one which reduced our inventory of exclamation points to zero and caused us to throw the office cat at the stenographer and crown the mail-boy with a waste-basket, was the first accomplishment of amateur two-way transoceanic communication! It happened just ten years ago.

Ten years is a long time in the life of amateur radio, an even more important part of the individual amateur's pursuit of this art. Many of you fellows have become old-timers in the brief space of three seasons. We have no idea that ten percent of the amateurs of to-day were in the game ten years ago. The amateur now entering his second season is a bit of a veteran, regarded with awe by the chaps just starting out, and when you encounter a ham who has been at it five years you have, figuratively a bearded patriarch whose whiskers drag the ground. You fellows who can do everything there is to do to-day and get scarcely a thrill from it: you ought to have been at it ten years ago. So severe were the thrills in that glamorous period that every amateur needed a king-truss on his spine, for those were "the days when".

Impossible as it to-day seems, there once was a time when we could not work across the ocean. In 1921 the A.R.R.L. and a British radio magazine ran the first transatlantic tests, in which twenty-five American amateurs transmitted while two hundred and fifty British amateurs listened. Those were the days of 200-meter spark signals, with an occasional early c.w. bird. Although some of the British amateurs used amplifiers of up to ten stages, or perhaps because of that fact, no signals were heard. Late that year the second tests were held and A.R.R.L. sent to Scotland the crack amateur receiving expert of those days, Paul F. Godley, who set up his gear and listened for ten days while American amateurs pounded brass. The outcome is one of the classic accomplishments of amateur radio. Even to-day we cannot read *QST's* account of "Paragon Paul's" expedition without feeling anew the tremendous kick that first surged through us at that history-making event. For we got across on schedule, and Godley copied half a dozen spark stations and twenty c.w. stations, the first amateur transoceanic reception at a land station! In the winter of 1922 the third A.R.R.L. transatlantic tests were held with profoundly inspiring results. Literally hundreds of American amateurs were heard in Europe, mostly in England and France, and we ourselves succeeded in hearing a few English and French amateurs for the first time. But still no one could work two-way, for the abilities to copy these extremely weak signals and to build a transmitter that would get across were not yet combined in one individual on each side of the water.

As we roam back through the *QST's* of ten years ago it is apparent that during 1923 there was a determination to do something about this situation. Our signals were getting out all right, not only were eastern amateurs often heard in Europe but west-coast amateurs were copied frequently in New Zealand and Australia, a much greater distance. But it wasn't reliable, the signals weren't good enough, and two-way work was still an impossibility. What to do? It is apparent from *QST* that there was the dawning conviction that perhaps the answer lay in this new business of using a shorter wavelength. Some of the pioneer fellows had been experimenting for a couple of years with the idea of making the wavelengths shorter and shorter and they found that the signals went right on up as this was done. Stronger signals were precisely what was needed for transoceanic work. So A.R.R.L. went at this 1923 job with great determination. The fourth A.R.R.L. transatlantic tests were organized for that winter, to commence on December 22nd in collaboration with the Radio Society of Great Britain and the French societies of those days. These were to be listening tests for us, not sending, for we knew we could get over. For twenty nights the French and British amateurs were to alternate in transmitting to us and then, from January 11th on, we were to attempt two-way communication with them.

How these plans were anticipated by private enterprise is now another of the real classic tales of amateur radio. It happens that during the summer of 1923 there came to this country the leading French amateur, partly to visit our second national convention but more expressly to prepare himself to become the first European amateur to engage in two-way communication with America. Yes, León Deloy, F8AB—do you remember him and his 25-cycle flutter? He was an old friend of our then traffic manager, Fred Schnell. They determined to attempt to work each other, and for advice they called upon that world-famous experimenter, John Reinartz, who had a new trick circuit that would go all the way down to 100 meters. Deloy returned home with enthusiasm and a Grebe receiver and many transmitting parts, and both he and Schnell prepared their transmitters according to the Reinartz dope. Deloy got ready first and cabled that he would transmit on November 25th. I was at Schnell's station that night. The most goshawfullooking haywire receiver you ever saw had hurriedly been assembled and set at 110 meters per wavemeter. At the appointed hour there Deloy was, right from the first dot, readable all over the house. Wow, did this short-wave stuff work! Another day and Schnell's transmitter was ready, and a cable to Deloy arranged a two-way try for the night of November 27th. The throaty gargle of F8AB came in on schedule. A long call, and then the invitation to Schnell to GA. Four 50-watters started doing their stuff as he replied. Can you fellows imagine what it was like that first time? Were our American signals getting over? Would amateurs at last click across the Big Drink? He switches over, we hold our breaths. Deloy replies! But maybe it is only happenstance; perhaps he is just accidentally calling again at that time to say ND. Will the fellow never end his call and say something! Aha, he breaks! And then, my lads, came the first transocean *R, R, R* in all amateur history! Oh boy, oh boy, was *that* a thrill? Two-way transatlantic: Reinartz was on the air too, and at his first chance, within the hour, he also was in contact with F8AB. (Note, by the way, that all three of these first stations used that same Reinartz transmitting circuit. John must still find a lot of pride in that thought.)

With these transmissions international amateur radio was born, and by these astounding events the fourth A.R.R.L. transatlantic tests were completely scooped. Naturally these happenings created the greatest commotion in amateur ranks. How was it done? What must a fellow do to duplicate it? What was the circuit? Like wildfire (whatever that is) the word flew 'round, and amateur after amateur discovered that by reducing wavelength and working the old antenna well below its natural wavelength (as we said in those days) the deed could be done. For it must be remembered that that was before the time of low one-wire Hertz antennas. An antenna in those days was a real affair, a six-wire cage or flat-top say 75 feet high and 100 feet long, with a counterpoise under it preferably covering a half an acre. Kruse analyzed the results in 1924 and apparently granted no part of the improved performance to the change in frequency itself but rather attributed it to immensely increased radiation resistance by working the antenna well above its fundamental frequency. At any rate, the word spread on how to do it and in an incredibly short while a dozen hams had worked F8AB. In Europe the word similarly spread and on December 8th the first Anglo-American QSO occurred, between G2KF and Your Announcer. December 27th 2AGB worked the first Dutchman, PCII, and on the following day Canada and the motherland were first united between C1BQ and G5BV.

And that, OM's, is how it all started. We read in *QST* that a month later there was a fellow who had worked no less than six different foreign amateurs in three different countries. Another month and we reported with pride that there were as many as thirteen European amateurs who had been in communication with this continent, while we had record of as many as seventeen Americans who had been in transocean QSO. But that was ten years ago, and ten years is a long time. Things change. Last year's thrills are this year's tears. Not the least thing that ten years will change is point of view. Last week we had a letter from a Young Squirt who in three months had worked sixty-six countries with a pair of 7½-watters and wondered what he could do next. Brother, can you spare a thrill?

K. B. W.

THE M. I. T. AIRPLANE TESTS

Bearing all the earmarks of a highly successful project, the M. I. T. 56-mc. tests are well under way as we go to press (Nov. 6). During the first five flights, the plane has pushed signals into and received signals from all New England states and has established a reliable "QSA5" range of at least 100 miles.

The complete story of the tests is planned for January *QST*. In it we hope to include a full list of stations heard in the plane.

We offer our thanks to the amateurs who are coöperating. We make a plea, however, for that particular brand of coöperation involved in sending logs of all reception to Headquarters. It must be remembered that the tests are made possible only by a large expenditure of time, effort and money. Only by the collection of massive data can this expenditure be justified. Send in your logs, gang!

Pre-Selection and Image Rejection in Short-Wave Superhets

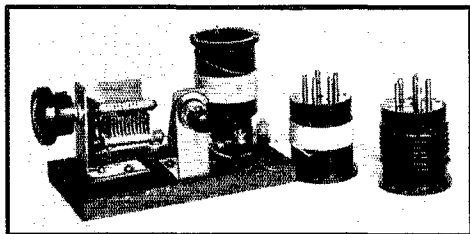
Practical Methods Applied to Amateur-Band Receivers

By James J. Lamb and F. E. Handy

IMAGE-FREQUENCY interference, caused by the beating of the high-frequency oscillator with signals twice intermediate frequency removed from the desired signal, has become a problem of general concern with the popular adoption by amateurs of the economical type of short-wave superheterodyne receiver in which there is but one tuned circuit between the antenna input and the first detector. Usually the oscillator in these receivers operates intermediate-frequency higher than the desired-signal frequency, commonly 465 or 500 kc. above, so that the image signals are some 930 or 1000 kc. higher than the frequency to which the receiver ostensibly is tuned. This frequency difference is seemingly quite large, and almost any kind of tuned circuit might be thought adequate to discriminate against the image. On the lower-frequency bands, 1750-kc. and 3500-kc., this is generally so. But on the higher-frequency bands, 7- and 14-mc., the arithmetical ("absolute kilocycle") selectivity becoming progressively less, the image trouble is experienced—especially on 14 mc.

The "close-up" selectivity and sensitivity of these receivers (QST S.S. Five, Hammarlund Comet Pro, National FB7A, etc.) being adequate, there is no special need for additional selectivity to discriminate against neighboring signals or for

further amplification. Therefore, first consideration can be given to means for reducing image response, with but secondary consideration for



A SIMPLE WAVETRAPP PROVIDES EFFECTIVE IMAGE REJECTION

It can be arranged for connection external to the receiver cabinet and equipped with plug-in coils, as shown above; or it can be built into the receiver and equipped with switching of a tapped coil, as shown in Fig. 1 B.

the additional "hop" and "close-up" selectivity that may be realized in the process. Of course, pre-selection also will reduce pick-up of intermediate-frequency noise (static) and of low-frequency signals that, sometimes, get through the first detector into the r.f. circuits by stray coupling.

Several general methods of attack suggest themselves. The simpler and more direct is particular rejection of the image. Another is additional selection of the desired signal, which also reduces pick-up of i.f. noise and low-frequency signals through the first detector. Reduction of stray capacity coupling, by a Faraday shield, also helps. All of these methods have their particular merits. The following practical applications, adapted to typical receivers, tell the story.

WAVETRAPP IMAGE REJECTORS

One simple and inexpensive method of suppressing images that is fairly effective and entirely practical is a wavetrapped circuit placed in the antenna circuit, introducing high impedance right at the unwanted (image) frequency. It is easy to install, as shown in Fig. 1. For the usual i.f. of approximately 500 kc. the images are about 1000 kc. higher than the desired-signal frequency. Thus a trap circuit resonating 1000 kc. above the signal frequency can be used, introducing only low values of impedance at the amateur-band frequency. Such a trap is broad enough so that it

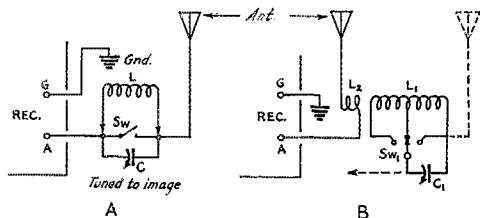


FIG. 1—CIRCUITS FOR TWO TYPES OF WAVETRAPP IMAGE REJECTORS

Type A is fitted with plug-in coils and is intended for use external to the receiver. The coils, L , are wound on 1½-inch diameter plug-in forms, 30 turns for the 3.5-mc. range, 14 turns for 7-mc., 7 turns for 14-mc. The tuning condenser C is a 140- or 150- μ fd. midget, SW is a single-pole single-throw shorting switch.

Type B is more adaptable to mounting within the receiver, coupled inductively to the antenna lead as shown or directly in series with the lead. It should be shielded from the receiver input. For rejection of images in the 7- and 14-mc. ranges, where image trouble is likely to be most pronounced, the coil L_1 should have 14 turns on a 1½-inch diameter form, with a tap at the sixth turn from the "set" end. A single-section three-position tap-switch SW_1 selects all or part of the coil, or shorts the trap. C_1 is a 150- μ fd. midget condenser.

seldom requires adjustment if once set at the center of the frequency range it is desired to eliminate. It can be tuned easily for maximum suppression of any particular frequency, however. It produces an improvement of at least several times in the signal-to-image ratio.

"Low loss" construction should be employed to make the resonance curve as sharp as possible. Properly working, the desired signal should not drop appreciably when the undesired signal is reduced some 80% in strength. The wavetrap can be coupled into a turn or two in the antenna lead as shown in Fig. 1-B, to improve sharpness of tuning, but it is usually sufficiently satisfactory connected right in the antenna lead with a shorting switch to cut it out when not in use. When

a pre-selector stage. A trap circuit can, at best, only improve the wanted to undesired signal ratio, introducing some loss at the desired-signal frequency—although suitable precautions to sharpen trap tuning will make this loss small. A pre-selector amplifier stage has the positive advantage that no signal strength need be lost—some gain may be added at the signal frequency—and, at the same time, images are substantially reduced in strength. The objective should be not so much to add gain but rather to hold the gain constant, and to use loose coupling and sharp tuning in the pre-selector so that its full benefit can be realized.

Pre-selectors can take a number of different forms. The one illustrated, simply a tuned r.f.

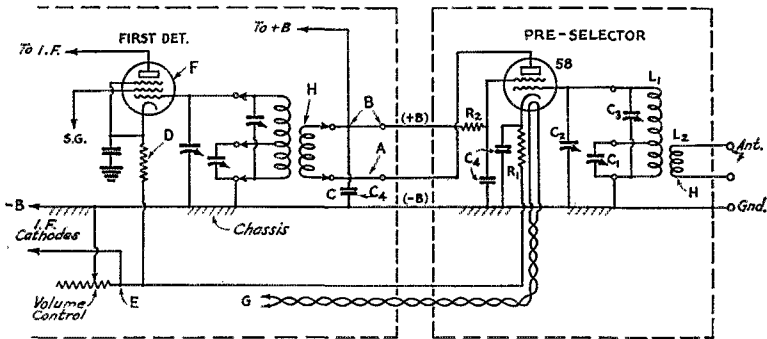


FIG. 2—CIRCUIT OF THE ONE-STAGE PRE-SELECTOR AMPLIFIER

Changes in the receiver circuit are indicated by the alphabetical designations and are described in the text. Circuit specifications for the addition are as follows:

- L₁—Grid winding of standard National plug-in coil.
- L₂—Antenna winding of standard coil, modified as described in text.
- C₁—100- μ fd. midget condenser (on panel).
- C₂—100- μ fd. auxiliary trimmer (external to coil shield and set once for all bands).
- C₃—Trimmer condenser mounted in coil form.
- C₄—0.01- to 0.1- μ fd. r.f. by-pass condensers.
- R₁—300-ohm 1-watt cathode resistor.
- R₂—50,000-ohm 1-watt screen-grid voltage dropping resistor.

placed in the same compartment with other components additional shielding of the trap circuit may be necessary to prevent undesired stray couplings. Where the receiver is well shielded it may be simplest to apply the trap externally, as suggested in the illustration.

The design shown in Fig. 1-B is suggested for eliminating the bother of changing coils. There is room for a small tapped coil and a midget condenser near the antenna post inside most manufactured supers. A 3-point switch, 150- μ fd. midget condenser and a 1½-inch tube with 14-turn coil tapped at 6 turns are suggested for the built-in trap, covering 7- and 14-mc. requirements. The trap may be coupled to a two-turn antenna coil wound on the same form about ¼-inch from the wavetrap coil, or the trap itself may be wired between the antenna post and first detector, as the builder prefers.

A PRE-SELECTOR AMPLIFIER

The second suggestion for image elimination is

stage, was built integral with the receiver since a single receiving unit is more convenient to handle than a collection of boxes and gadgets. A 6" × 12" × 8" crackle-finish box matches the dimensions and finish of the FBXA receiver. This is also large enough so that a wavetrap may be built in the rear section, with control switch on the right side of the box.

Using standard parts, the construction is simplicity itself. Additional standard National detector coil assemblies were obtained, one for each amateur band. A 2-inch hole in the lower center of the box is cut to mount the Type XC coil shield; the 100- μ fd. tuning condenser is mounted just above; then the socket and shield for the 58 are bolted, on pillar bushings, to the bottom of the box behind the coil. Two binding posts for the antenna coil and one for ground connection are mounted on the right side, and three ¾-inch holes are drilled on the left side so that output and A-B-power wires can be pulled through to the

receiver proper when the pre-selector box is bolted in place and we are ready for final connections. In assembling, the coil mounting is fixed in place first. The coil socket is taken out of its can from the rear and the five wires soldered and brought out at the points provided in the back cover of the shield-can. The circuit of the r.f. stage is given in Fig. 2, connections of detector coils in Fig. 3.

ADAPTING THE RECEIVER CIRCUIT

A few changes in the receiver wiring make it ready to attach the pre-selector unit. In addition to providing the necessary "B" and filament supplies for the added circuit, these changes include provision for gain control on the pre-r.f. tube and first detector, with substitution of a 58 first detector for the regular 57. This tube change is recommended for the reason that cross-modulation is considerably reduced with the 58 first detector. The drop in conversion gain or sensitivity with the 58, as compared to the 57, is compensated by the additional gain of the r.f. stage, so that the net result is a real improvement. The essential changes are designated by the letters in the diagram of Fig. 2, and are as follows:

A—Remove the 100- μ fd. antenna series condenser and connect antenna post direct to one side of antenna coil. This is necessary for series feed to the pre-selector plate through the receiver's antenna coil.

B—Disconnect ground post from chassis and connect to positive plate supply in receiver, picking up the "plus B" on the load side of the "B" switch.

C—Connect the 0.01- μ fd. r.f. bypass condenser from ground post to chassis (-B).

D—Remove 20,000-ohm detector cathode resistor and replace with one of 2500 ohms. This improves weak-signal sensitivity of the first detector.

E—Connect the "ground" end of the detector

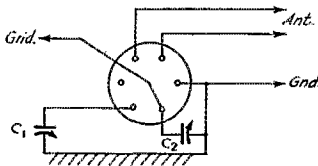


FIG. 3—DETECTOR COIL CONNECTIONS, AS VIEWED FROM TOP OF COIL OR BASE

C_1 is the tuning condenser, C_2 the trimmer.

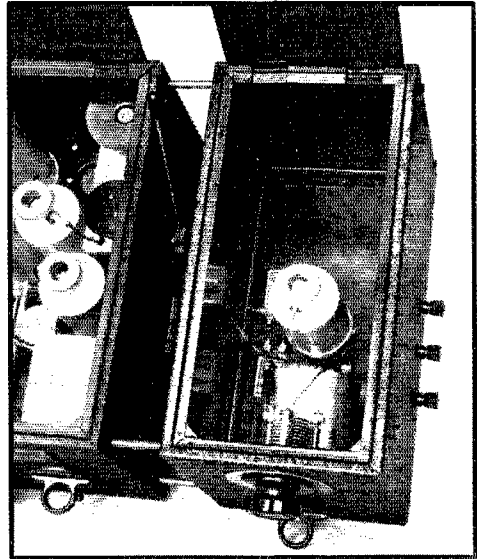
cathode resistor to the cathode terminal of the volume control, along with lead to i.f. cathodes and to cathode resistor of pre-selector tube. This applies variable-bias (volume) control to all stages preceding the second detector and makes possible the complete elimination of blocking effects on strong signals.

F—Replace Type 57 first detector with a 58.

G—Connect twisted-pair filament leads for the

pre-selector stage across receiver filament circuit wherever most convenient.

H—Modify primary windings of plug-in coils



A PRE-SELECTOR AMPLIFIER ADDED TO A STANDARD RECEIVER

It is simply a tuned r.f. stage having a tuned circuit identical with that of the first detector. Ganging of its tuning condenser or a vernier dial are not necessary because its tuning is non-critical. The construction is described in the text.

to reduce coupling, thus sharpening selectivity and improving gain. The operation is quite simple and can be performed without opening up the coils. Pull off the black bakelite coil protection of the National form. A twist will loosen the cement. Next, two $\frac{1}{8}$ -inch holes should be drilled in the slot, opposite the respective antenna socket pins of the base. (See Fig. 3 for identification.) Now cut the primary coil at the top turn, close to where it disappears inside the form. Then, with a hook made of a short piece of No. 26 wire, the leads may be "fished" out through the $\frac{1}{8}$ -inch holes, the wire re-wound in the slot and soldered to the leads, without the necessity of getting at the base pins or of taking off the top of the coil form. The number of turns is 2 for the 14-mc. coils, 3 for the 7-mc. coils and 5 for the 3.5-mc. coils. The objective is, of course, to reduce the coupling, especially the capacity coupling, between primary and secondary. As the coils are built there is probably as much capacitive as magnetic coupling, especially at 7 and 14 mc. This distributed coupling tends to reduce the selectivity. Although it makes for high gain, it has the undesirable effect of aggravating image response on the high-frequency bands.

To make the i.f. filter controls accessible, a $1\frac{1}{2}$ -inch space should be allowed between the two

cabinets, to permit one to reach the crystal filter switch knob; or this knob can be drilled and tapped, and a 4-inch brass rod added as an extension handle. The $\frac{3}{16}$ -inch holes drilled low in the right side of the receiver proper permit pulling all wires from the p.s. unit right under the chassis, after the unit has been bolted in place. The receiver cabinet has holes drilled in the rear which will take 6-32 bolts. When wiring of the p.s. unit in accordance with the diagram shown has been completed, drill two similar holes $\frac{1}{2}$ -inch in from the front and at the same height as the two holes at the back of the cabinets. Then complete the bolting and pull the wires through.

ALIGNMENT OF THE CIRCUITS

We are now ready to give the p.s. a tryout. A slight adjustment of the padding condenser in parallel with the first detector tuning condenser, inside the set, and a touching up of the padding

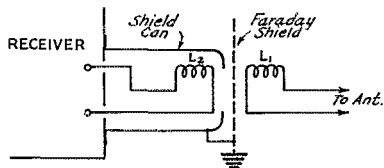


FIG. 4—A SUGGESTED ARRANGEMENT FOR BALANCED INPUT COUPLING WITH A FARADAY SHIELD TO MINIMIZE CAPACITY EFFECTS

L₁ and L₂ each may be 4 turns or so on a tube-base form. The coil sizes and degree of coupling are not especially critical, one combination being satisfactory for all bands.

across the individual first-detector coils, too, may be necessary to compensate for slight changes in circuit values.

It is important that the operator go about making these adjustments, or any other adjustments of the receiver, with understanding of what he is trying to accomplish. *First, study carefully the instructions that came with the receiver. Do this before starting, not after the circuits have been gotten all out of whack.* More "defective" receivers result from blind tinkering with circuit-adjusting set-screws than ever come from the factory that way. This applies especially to the i.f. adjustments, on top of the i.f. transformers. Leave them alone until you know what you are about.

For circuit alignment, all the way through the receiver, it is best to use some kind of visual indicating instrument to show "peaking." With the FB7-series of receivers, a 0-1 d.c. milliammeter connected in series with the 'phones is as good as anything. With a steady signal from a local unmodulated oscillator tuned in, the meter will indicate maximum upward deflection at peak tuning. The maximum current should be kept below 0.5 ma., by adjustment of the volume control, to avoid detector overload and to give most precise indication. Lacking a meter, the less

accurate listening test can be used. For this it is preferable to tune for peak receiver noise ("rush"), at low volume level, rather than for peak audio (sound) with a signal. The ear is less able to detect the actual peak setting on a signal.

No changes should be necessary in the oscillator coils of the receiver, and these coils should not be touched except when necessary to center the band range on the main tuning scale. For adjusting the pre-selector coils, set the receiver tuning for center-of-band reception; tune the p.s. knob to half scale. Set the 100- μ fd. p.s. padding condenser to about $\frac{2}{3}$ full capacity and adjust the individual coil padding condenser for peak output. With this adjustment completed the pre-selector should track nicely over the amateur bands. It is not essential to use the p.s. knob continually in tuning, but only at an auxiliary and final adjustment in bringing any signal to peak strength.

A FURTHER AID

The capacity coupling to the antenna, previously mentioned as a prime means of image input to the receiver, also can be reduced by proper electrostatic shielding between the antenna input coil and the receiver input circuit. This is especially effective for coupling transmission-line feeders to the receiver, to give "balanced" input. Note that this shield must be *electrostatic*, not *electromagnetic*—which means that it must be of a type free from eddy-current (short-circuited-turn) effects. A solid sheet of copper, or even a copper-mesh screen, will not do. This shield, of the type sometimes called a "Faraday screen," must be in the form of a grid of parallel wires, *insulated from each other except for inter-connection at one point on each wire.* This common connection is grounded.

Convenient material for making up this type of screen is the Hammarlund self-supporting space-wound coiling popularly used in short-wave receivers some years ago, before the tube-base era. To make the screen, a piece of the coil is cut length-wise and flattened out into a rectangle. The wire ends along one edge are then scraped bare and all soldered to a lead for ground connection. Two types of this coil material that were tried showed no noticeable difference in shielding effect, one consisting of No. 37 wire wound 137 turns per inch and the other No. 24 wound 30 turns per inch. The larger-wire screen is preferable, however, because of its greater mechanical rigidity. If necessary, screening of this type can be made up by space winding No. 24 d.c.c. or d.s.c. wire on a cylinder of celluloid, temporarily supported on a 3-inch cardboard form, and then "doping" the winding heavily with clear Duco or collodion. The cardboard form is removed when the winding is thoroughly dry and the operation is completed as described above.

(Continued on page 76)

An Efficient C.W. and 'Phone Transmitter Using the New Tubes and Circuits

Multi-Band Operation—Tri-Tet Crystal Control—100- to 150-watt Output
With Type 800 Tubes

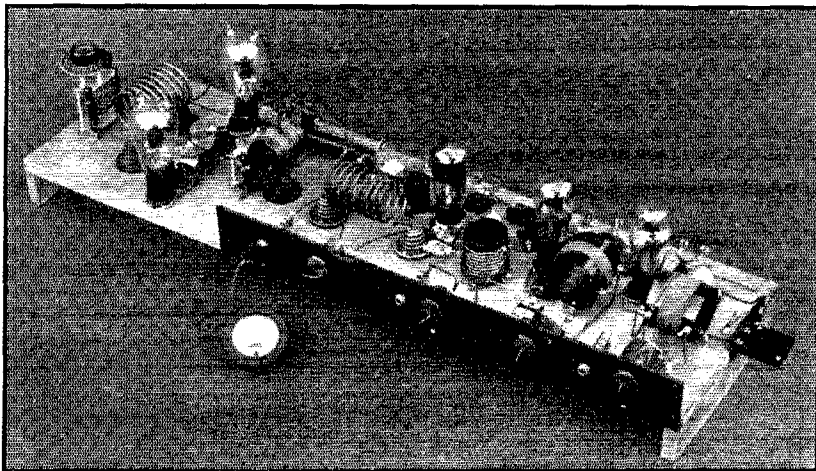
In Two Parts—Part I*

By L. C. Waller, W2BRO**

EVEN a casual glance at the article in last month's *QST* on the new Type 800 must have convinced most amateurs that this tube has remarkable possibilities.¹ As much as 65 watts r.f. output per tube and, especially attractive to anyone interested in 'phone, 100 watts of audio with a pair of relatively small tubes in Class B—here *was* something worth investigating.

Since tinkering with 851's, 203-A's, 860's, and

ously in use at W2BRO (employing a UV-851) modulated but little more than 200 watts input to the Class-C stage, there would be no come-down in power; but there would be a nice economizing in size, weight and cost of the equipment used to obtain that power. Rebuilding was in order, especially for 14-megacycle 'phone, which had never quite lost its appeal despite occasional none-too-good radio conditions in that band. The r.f. portion of the transmitter



COMPLETE R.F. SECTION OF THE TRANSMITTER

From right to left, the stages are: 59 tri-tet crystal oscillator; 46 doubler; 841 driver; and push-pull 800 power amplifier. Details of the assembly are given in the text.

2500-volt power supplies had become rather tiresome (to say nothing of expensive, when the man came to read the meter), it was decided to build a simple bread-board type transmitter using the new Type 800 tubes both in the Class-C radio-frequency amplifier and in the Class-B modulator. Inasmuch as the Class-A modulator unit previ-

that resulted will be described first; the modulator will be covered later.

WHAT TUBES FOR THE LOW-POWER STAGES?

The problem immediately arises of what and how many tubes to use in the low-power stages. Because the choice of the power amplifier determines chiefly what is necessary in the low-power stages, it is better to begin figuring at the high-power end and work backwards. Further, in the case of a 'phone transmitter, the operating conditions of the r.f. power amplifier are very

* Part II, describing the a.f. end of this transmitter will appear in a following issue of *QST*.

** RCA Radiotron Co., Inc., Harrison, N. J.

¹ Reinarts, "Putting the Type 800 Transmitting Tube To Work," *QST*, Nov., 1933.

definitely controlled by the power output of the modulator unit. Since two 800's as Class-B modulators will deliver approximately 100 watts of audio power, we might expect to have an input of 200 watts to the Class-C stage. However, the power output rating is from the *tube viewpoint only*, and does not take into consideration the efficiency of the output transformer or of the circuit. The modulator output transformer has a known peak power efficiency of 90 percent; therefore, 90 watts of useful audio will be available.

As explained several times before in *QST* and in the *Handbook*, the mean power input to the r.f. amplifier at 100 percent modulation should be just twice the audio power delivered by the modulator. Therefore, an input (d.c.) of 180 watts to the Class-C stage appears feasible. However, an inspection of the data on the 800 as a plate-modulated r.f. amplifier shows that the maximum rated conditions of 1000 volts at 80 ma. per tube will give an input of 160 watts for two tubes in push-pull. Good enough — that leaves a reserve of about 10 watts of audio. It is better, from the standpoint of quality with high percentage modulation, to have a modulator that is slightly under-worked rather than one overloaded.

Next, what tube to drive push-pull 800's?

Looking over the list, the 10, 841 and 800 all seem to have possibilities. The 800 was not used because it was more powerful than necessary; besides, it is enough to dodge 1000-volt potentials in the power amplifier without having to do it in the buffer stage as well. The 841 was finally chosen, because it delivers somewhat more output than the 10 with the same exciting source. The 10 will give comparable results, however, and can be used if it is desired to keep cost at a minimum. Because a number of amateurs have already asked, "How about the 46 to drive push-pull 800's?", it should be noted that this type is not suitable for this service. Two 46's in push-pull operating at 400 volts and 50 ma. per tube might prove fairly satisfactory, but a single 841 or 10 is much to be preferred.

A 59 serves as a tri-tet oscillator (see article by J. J. Lamb, in October, 1933, *QST*) with a 3550-kc. crystal; the plate tank of the 59, tuned to the second harmonic of the crystal frequency (7 mc.) drives a type 46 as a 14-mc. doubler. A 46 won preference for this position over a 59 simply because the latter requires several extra parts, such as a screen-circuit resistor and another by-pass condenser. The "Universal Exciter Unit" described in October *QST* should be very satisfactory as a driver for the 841. For

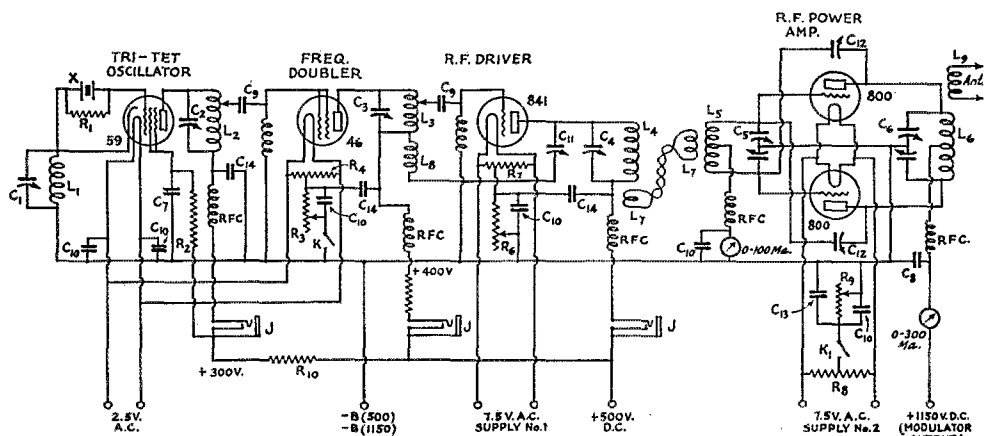


FIG. 1 — CIRCUIT OF THE 100- TO 150-WATT R.F. UNIT

- L_1 to L_4 — See "Coil Data" table.
- L_5 — Antenna coupling coil (see text).
- C_1 — 260- μ fd. midget variable (Hammarlund Type MC-250M).
- C_2, C_3 , and C_4 — 100- μ fd. midget variables (Hammarlund Type MC-100M).
- C_5 — 182- μ fd. per section (Cardwell Special Split-Stator Type 407-B).
- C_6 — 210- μ fd. per section (Cardwell Type 157-B with Mycalex insulation).
- C_7 — 0.05- μ fd. fixed mica (600-volt).
- C_8 — 0.002- μ fd. fixed mica (5000-volts working voltage).
- C_9 — 500- μ fd. fixed mica (600-volt).
- C_{10} — 0.01- μ fd. fixed mica (400-volt).
- C_{11} — 35- μ fd. midget variable (Hammarlund Type MC-35M).
- C_{12} — Neutralizing condensers (see text).
- C_{13} — 25- μ fd. electrolytic (audio-bypass for modulated service only), 500-volt rating.

- C_{14} — 0.002- μ fd. fixed mica (600-volt).
- R_1 — 100,000-ohm 1-watt resistor.
- R_2 — 40,000-ohm 2-watt resistor.
- R_3 — 1000-ohm 5-watt adjustable resistor (wire-wound).
- R_4 — 30-ohm center-tapped resistor.
- R_5 — 1500-ohm 10-watt resistor (wire-wound).
- R_6 — 1000-ohm 10-watt adjustable resistor (wire-bound).
- R_7 — 50-ohm center-tapped resistor.
- R_8 — 50-ohm 5-watt center-tapped resistor.
- R_9 — 2000-ohm 75-watt variable resistor (wire-wound).
- R_{10} — 12,000-ohm 10-watt resistor (wire-wound).
- RFC — 8-millihenry General Radio transmitting type r.f. chokes.
- J — Single-closed-circuit jacks.
- X — 3550-kc. quartz crystal with plug-in holder.
- K — Key or push-switch for 'phone break-in.
- K_1 — Key for C.W.

operation to include the 10-meter band it would be more desirable, in fact, than the arrangement shown in Fig. 1, because of the increased output of the 59 as a regenerative doubler.

The type of coupling to be used between stages was next considered. Because of its simplicity and ease of adjustment, conventional capacitive coupling is used between the 59 and the 46, and between the 46 and 841. But inductive coupling with a low-impedance line (link coupling) was the logical choice for transferring the excitation from the single-ended 841 to the push-pull 800's. This arrangement is both convenient and efficient, and is finding increasing favor as more amateurs learn of its advantages.

THE BIAS PROBLEM

The matter of obtaining grid bias for each stage was also given careful consideration. There are in general three ways of biasing an r.f. amplifier tube. These are: (1) grid leak; (2) a separate source, such as a battery or bias rectifier; (3) self-biasing resistor between the filament center-tap (or cathode) and minus B.

Grid-leak bias appears simple but has one serious disadvantage. With this method, grid bias is derived from the rectified r.f. excitation voltage, which causes a direct current to flow through the leak. The voltage drop across the leak biases the grid negatively. But if the crystal pops out of oscillation or if the excitation is removed from the grid-leak-biased tube for any other reason, the tube is left with zero bias — and the plate current of the tube hits an altitude determined chiefly by the plate supply voltage and the plate resistance of the tube. Naturally, such plate-current excursions are not conducive to long tube life.

Battery bias is satisfactory at low power, where grid current is small, but is somewhat expensive over a period of time. A combination of battery and grid-leak bias is also usable.

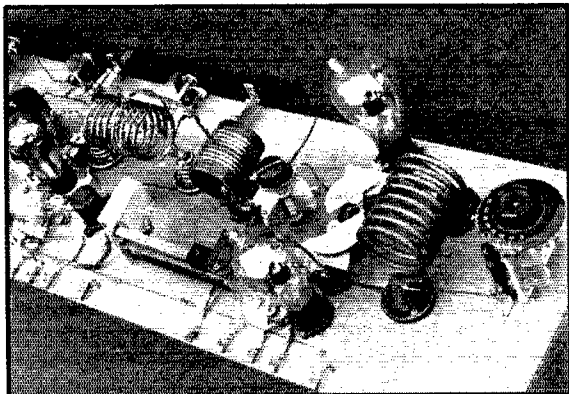
Automatic self-bias is attractive from the viewpoint of longer tube life, ease of adjustment and consistently stable performance. It has the disadvantage of requiring a comparatively high-wattage resistor for the plate-return circuit in addition to a separate filament-supply winding for each self-biased filament-type tube. Against these drawbacks is the fact that the plate current of the tube is safe-guarded from "running away," because the bias automatically increases and the effective plate voltage decreases proportionally as the plate current rises. For coated-cathode tubes such as the 46, 47 and 59 (except as crystal oscillators), self-bias is almost a necessity in order to prevent the plate current from increasing until the tube is destroyed. This is always likely when the tuning adjustments are incorrect. When these tubes have their safe plate and screen dis-

sipation exceeded, primary grid emission begins and the fireworks really start!

Since the cathode of the 59, as in most heater-cathode types, is electrically insulated from its heater, the same 2½-volt supply can be used for both the 59 and the 46. The only extra filament supply necessitated by this biasing arrangement is the 7.5-volt winding for the 841. Self-bias was found to be no better than grid-leak bias for the crystal oscillator; therefore, the leak method is used because of the fewer parts required.

THE LAYOUT

The photographs show the layout of the vari-



THE POWER-AMPLIFIER STAGE USES TWO 800'S

Since this photograph was taken, split-stator grid and plate tank condensers have replaced the single-section type shown, as explained in the text.

ous parts of each stage. The base-board is a piece of dry white pine of ¾-inch stock measuring 12 by 40 inches. The hard-rubber panel on which are mounted the plate-circuit meter jacks and the midget tuning condensers measured 3 by 26 inches. This could also be of dry wood.

It should be noted that the first three coils, from the crystal-oscillator end, are all placed at right angles to each other to minimize stray inductive coupling between stages. This positioning is less important with each coil operating at a different frequency, as in this transmitter, than it would be if the second, third, and fourth coils were all operating at the same frequency. The grid and plate coils of the final amplifier are placed with their axes parallel to obtain mechanical and electrical symmetry for the connections to the push-pull 800's. With the 800's properly neutralized, not the slightest trouble was experienced with self-oscillation in the final stage. Furthermore, when the 800's are modulated or keyed no undesirable reaction on any of the preceding stages is apparent.

The self-biasing resistors for the 46, 841, and 800's, may be seen in the photograph. Each is adjustable, the one for the 800's being fitted

with a sliding contact. This is an especially useful feature in adjusting the power amplifier.

The neutralizing condensers (C_{12}) for the 800's are homemade. Their construction is shown in the photograph. Consisting of four small stand-off insulators and four plates from an old variable condenser, they are inexpensive. This type of construction is advisable because of the extremely low grid-plate capacitance of the 800 tube. The plates of each condenser are spaced $\frac{1}{4}$ -inch

amplifier some distance away from the exciting stage, it is only necessary to increase the length of the twisted pair between the 2-turn coupling coils. Ordinary twisted lamp cord should prove satisfactory for this purpose. The coupling coil at the 841-end is placed in between two of the turns of the tank coil near the low r.f. potential end. The coupling is about 60 percent and is not extremely critical.

For 14 mc. the neutralizing coil for the 841 stage is composed of four turns of No. 18 d.c.c. wire, bunched around the "cold" end of the 46 plate coil. This neutralizing arrangement works perfectly, is exceptionally easy to adjust, and leaves the plate coil of the 841 stage free of all neutralizing connection.

Both the grid and plate tuning condensers in the 800 stage should be preferably of the split-stator type, in order to balance the capacity from each tube plate to ground and between each grid to ground. Although the condensers shown in the photograph (Cardwell types 410-B and 411-B) are not of the split-stator type, after the photograph was taken the split-stator condensers specified in Fig. 1 were installed. The

TUNED CIRCUIT COMBINATIONS FOR FIVE BANDS					
Output Band L_1C_1 and L_2C_2	Crystal Frequency	L_1C_1	L_2C_2	L_3C_3	L_4C_4
1750 kc.	1750 kc.	Shorted	1750 kc.	1750 kc.	1750 kc.
3900 kc.	1950 kc. 3900 kc.	1950 kc. Shorted	3900 kc. 3900 kc.	3900 kc. 3900 kc.	3900 kc. 3900 kc.
7000 kc.	1750 kc. 3500 kc.	1750 kc. 3500 kc.	3500 kc. 7000 kc.	7000 kc. 7000 kc.	7000 kc. 7000 kc.
14,200 kc.	3550 kc. 4733 kc. 7100 kc.	3500 kc. 4773 kc. 7100 kc.	7100 kc. 14,200 kc. 14,200 kc.	14,200 kc. 14,200 kc. 14,200 kc.	14,200 kc. 14,200 kc. 14,200 kc.
28,000 kc.	3500 kc. 4667 kc. 7000 kc.	3500 kc. 4667 kc. 7000 kc.	14,000 kc. 14,000 kc. 14,000 kc.	28,000 kc. 28,000 kc. 28,000 kc.	28,000 kc. 28,000 kc. 28,000 kc.

Note. — Where L_2C_2 is at the same frequency as L_3C_3 , the 46 will also have to be neutralized.

apart; the adjustable top plate is, in this setup, placed at about 40 percent of full capacity.

An r.f. choke will be necessary for the crystal stage if grid-leak-across-crystal bias is not used for the 59. This method was found to be entirely satisfactory at the low plate and screen voltage

Type 411-B, which worked satisfactorily for c.w. operation, was replaced by the 157-B, the latter type having a voltage breakdown rating more suitable for modulated service.

The coil specifications given in the "Coil Data" table are for 20-meter operation only.

For operation in other bands, additional coil data may be obtained from back issues of *QST* and from the table on page 100, *The Radio Amateur's Handbook* (tenth edition). For operation in the 10-, 20-, 40- and 80-meter bands, all tank coils except the 59-cathode coil should be of interchangeable type. The frequencies at which the various circuits may be operated for output on bands

other than 14 mc. are given in the "Tuned Circuit Combinations" table.

THE POWER SUPPLIES

While power supplies are more or less cut-and-dried affairs, and while most amateurs probably have one or more already constructed and in use, the proper operation of this transmitter is so dependent on the correlation of the plate supplies with the various stages that a brief discussion of the subject is justified.

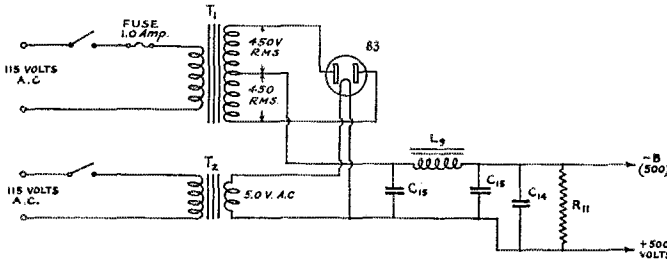


FIG. 2 — THE LOW-VOLTAGE POWER SUPPLY

- T_1 — Plate power transformer, 200-watt.
- T_2 — Rectifier filament transformer, insulated for 1500 volts; 3.0-amp. secondary.
- L_3 — 30 henrys at 120 ma. d.c., 300 ohms.
- R_{11} — 50,000-ohm 10-watt bleeder resistor.
- C_{14} — 0.002- μ fd. fixed mica (600-volt).
- C_{15} — 4.0- μ fd. (600-volt).

used, the crystal r.f. current being of the order of only 20 to 25 milliamperes.

The link coupling between the 841 tank and the grid coil of the 800's is clearly illustrated. If it is desired in some set-ups to place the power

For c.w. work the crystal oscillator may be operated through a dropping resistor from the same 500-volt supply which furnishes power to the 46 and 841, as long as the keying is done in the final stage. If the 46 or 841 stage is keyed, a separate 250- to 300-volt supply should be used for the 59, to prevent the note from being chirpy. For 'phone operation, the 500-volt supply may be used as shown in Fig. 1. The circuit constants of this rectifier are shown in Fig. 2.

The same 1150-volt power supply may be used for both the Class-B modulator tubes and the r.f. power amplifier, provided the supply has a sufficient volt-ampere rating and exceedingly good voltage regulation (10% or better). The plate transformer should have a rating of at least 500 watts; a choke-input filter employing a "swinging" choke of low d.c. resistance should be used. Mercury-vapor rectifiers Type '66 will be satisfactory for the purpose. The circuit constants for this supply are given in Fig. 3. If it is not convenient to build a power supply the equivalent of the one described, it will be advisable to use separate high-voltage supplies for the modulator and the r.f. power amplifier.

TUNING UP FOR 14 MC.

After the transmitter has been constructed, it is usually a good plan to connect up all filament supplies and the negative B leads, but to leave the positive B leads disconnected. The positive 300-volt supply lead should then be connected to the crystal oscillator, with the plate milliammeter plugged in the 59 plate jack. If the crystal oscillates properly, the plate current will drop from 50 or 60 ma. to about 12 ma. when oscillation starts.

With this indication that the crystal stage is operating properly, the positive 400-volt lead to the 46 should be connected, first making sure that the self-biasing resistor of the 46 is adjusted to about 400 ohms. The plate current meter, which is shifted to the 46 plate jack for this adjustment, should read practically zero when the crystal is not oscillating. With the crystal oscillating and the plate tank of the 59 tuned to resonance at 7 mc. (approximately), the plate current of the 46 rises sharply, indicating excitation. The 46 plate tank is next tuned to resonance (14 mc.), the plate current dipping about 30 ma. on this adjustment. The 14-mc.

output from the 46 should light brightly a sensitive neon bulb touched to the plate side of the circuit.

The 841-stage should now be neutralized in the usual manner, using a sensitive neon bulb or, better, a thermo-galvanometer. After each adjustment of the neutralizing condenser C_{11} , both the 46 and the 841 tank circuits should be

COIL DATA FOR 14-MC. OPERATION						
Coil	Aprox. Freq. kc.	No. Turns	Wire Size	Spacing Between Turns *	Length of Winding	Inside Diam.
L ₁	3500	14	18 d.c.c.	None	1¼"	2¾"
L ₂	7000	10	18 d.c.c.	None	¾"	2¾"
L ₃	14,000	7	14 enam.	⅛"	1½"	2½"
L ₄	14,000	8	¾" c.t.	¼"	3¾"	2½"
L ₅	14,000	8	14 enam.	⅛"	1½"	2½"
L ₆	14,000	8	¼" c.t.	¼"	4½"	2½"
L ₇	.....	2	18 d.c.c.	None	¼"	2½"
L ₈	.....	4	18 d.c.c.	None	Bunch-wound	2½"

* Spacing turn-to-turn, not between centers.

re-tuned, and C_{11} then readjusted. When this has been gone through three or four times, the neutralization should be satisfactory.

The positive 500-volt lead should now be connected to the 841. With the 46 tuned for maximum output, the plate current of the 841 should rise to something over 60 ma. until its plate tank is tuned to resonance, when it should dip to

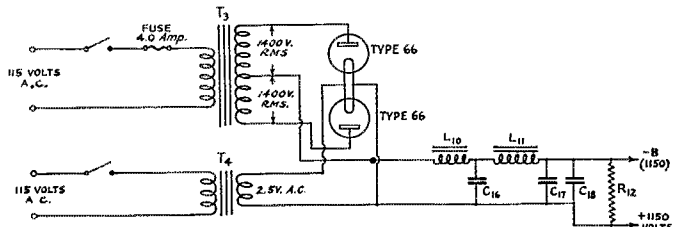


FIG. 3 — THE HIGH-VOLTAGE POWER SUPPLY

- T₃ — Plate power transformer, 500-watt (see text).
- T₄ — Rectifier filament transformer, insulated for 4000 volts, 10.0 amp. secondary.
- L₁₀ — 20 henrys at 150 ma., 250 ohms ("swinging" choke).
- L₁₁ — 20 henrys at 250 ma., 250 ohms.
- C₁₆ — 2.0- μ fd. 2000 volts (working voltage).
- C₁₇ — 4.0- μ fd. 2000 volts (working voltage).
- C₁₈ — 0.002- μ fd. fixed mica, 2000 volts (working voltage).
- R₁₂ — 100,000-ohm 50-watt bleeder resistor.

about 30 or 35 ma. As another indication of correct neutralization, the plate current of the 841 should rise to approximately the same value when C_4 is detuned on either side of resonance. The 46 and the 841 biasing resistors should now be adjusted until the plate current of each is 50

(Continued on page 74)

The Overmodulation Racket

A Plea for Restoration of the Wasted Kilocycles

By James J. Lamb, Technical Editor

I BELIEVE that I can qualify as an old-timer in amateur 'phone operation. The beginning was an introduction by Dr. A. H. Taylor at old 9XN-9YN, University of North Dakota, back before the war, when modulation of his long-wave arc transmitter was just so much Einstein to a knee-trousered ham from a nearby small town. Through loop modulation in '21, the workings of a Heising in '22, the achievement of a real double-button mike in '23, "like broadcast quality" in '26, 100 percent with crystal-control in '29, Class-B modulation in '31—yes, I'm probably eligible as an old-timer. And, as such, I cannot help but have genuine interest in amateur 'phone; an interest that makes me want to have 'phone as good as it can be, not only so that I can get the maximum of enjoyment from it for myself in the limited operating periods available to me but, perhaps even more, so that I can feel satisfaction in knowing that amateur 'phone as such is making full use of the technical developments it has available and of the practical information concerning them which consistently has been presented first in *QST*.

There is no denying that all is not aces with amateur 'phone today. It's too crowded. We all know the pat panacea that is most often proposed as the measure of relief. But above the not altogether harmonious chorus for more kilocycles, chanted as the solution of existing congestion, we hear arising an occasional voice not quite so certain that further frequency assignments hold the only answer; nay, even venturing the suggestion that most of the crowding and jamming may, possibly, be the result of something haywire with the 'phones themselves and not with the width of the bands. And these occasional voices are right. There is every justification for complaint against the wholesale and needless slaughter of perfectly good kilocycles that goes on day and night, in which crime the vast majority of 'phone's citizenry are not only the hapless victims but are, at the same time, the cheerful perpetrators. It's a kind of suicide. Its name, broadly speaking, is overmodulation.

Now it cannot be said that warning against this particular crime has not been given, both in *QST* and in the *Handbook*. It has been stated repeatedly that overmodulation generates spurious side bands and, hence, causes serious interference; that modulation must be symmetrical; that there must be no carrier shift; that there should be no variation in the Class-C amplifier

plate current—all of which, despite the superior ability we assume to characterize 'phone operation, seems to have gone in one eye and out the other. Perhaps these statements should have been run in Gargantuan red letters, not simply given as straightforward technical suggestions with the assumption that their face-value importance was sufficient to make them register. If the evidence has any meaning at all, those for whom the information was intended seem, almost unanimously, to be suggestion-proof. Over 90 percent of the 'phones are over-modulating anywhere between 50 and several hundred percent and, in consequence, are taking up as much as 10 times more space per 'phone than there is any sane reason for their occupying. It can be said, without violating conservatism, that at this time overmodulation alone reduces the effective width of the 3900-kc. 'phone band to less than half of what it could and should be with proper modulation in every transmitter.

Now this is not high-flung theory evolved from abstract mathematics and put forth for academic argument. It is woefully real. The spurious frequencies resulting from improper modulation actually exist, and exist to an extent and with an importance far beyond what theoretical speculation would lead us to suspect. Here are a few bits of actual evidence, based on unbiased measurement, that happen to be at hand:

Exhibit A: Of 13 'phones checked in the A.R.R.L. laboratory during a single noon-hour period, using a superhet receiver with a linear second detector, 12 were overmodulated from 50 to 200 percent, as indicated by increase in average plate current of the detector. The one properly modulated 'phone, which caused no variation in the detector plate current, not only had the highest quality but also effectively occupied a band of but 4 kilocycles on the s.s. receiver. The 12 overmodulated 'phones had harmonic distortion ranging from noticeable to terrible and occupied from 6 to 50 kilocycles apiece on the same receiver, being worse on both counts in proportion to the extent of their overmodulation. One, the worst, was so badly distorted as to be practically unintelligible. Summary: Bad and improperly operated 'phones, 92.3%; good and intelligently operated 'phones, 7.7%.

Exhibit B: Quoting from a report received from W. H. M. Watson, W5NT, who, with W5AOT, has checked a number of 'phones with equipment including a cathode-ray oscillograph, and indi-

cating and recording volume-level indicators:

"So far we have found 1% of the stations on 75-meter 'phone modulating up to 100%, none modulating less than 100% and 99% modulating over 100%. On 20 meters the average 'phone is modulated close to 200%, while on 75 meters the average 'phone is modulated close to 250%. These figures may seem high but that's how they turn out. We actually logged a W6 the other night who was modulating 375% on phonograph records and so much more on voice that we were unable to take readings. We also find, by their indications, that on 20 meters less than 1% of the transmitters have r.f. in the audio systems while on 75 meters about 15% have r.f. in them.

"As for ourselves (W5NT and W5AOT), we find that when modulating up to exactly 90% we cause one another no interference, while 100% modulation causes a very slight amount of interference. We are located 2 miles apart. We also found that we were modulating somewhere in the neighborhood of 200% on an average (with severe interference) before making corrections."

* * *

What's to be done about it? Technically, the cure lies in really simple things. In the first place, let no 'phone be operated with the slightest variation in average plate current to any stage handling modulated r.f. Watch the plate milliammeter of the modulated amplifier stage. It's the most important meter in the 'phone transmitter. Never mind what the antenna current meters are doing; and do not rely on the much-touted current-squared galvanometer. These meters are heat-operated r.m.s. gadgets, are too sluggish for use as operating indicators. They indicate 100% modulation, by the 22-odd percent current increase, only when the modulating signal is purely sinusoidal and is of sufficient duration to give steady-state conditions. But we do not voice sine waves, nor do we talk at a fixed output level. Speech is a conglomeration of transients. It is neither pure in frequency composition nor anything like constant in amplitude. It's the transient peaks in speech that we have to worry about.

The maximum modulation capability of the transmitter, which is the thing meant when the label "100-percent modulation" is attached, must be reserved for use only on these peaks. The idea that a transmitter should be run at full 100-percent modulation with average speech level is as ridiculous as would be the idea that a 120-horse-

power motor car should be run always with the motor developing its full rated output—which would certainly land its operator either in the morgue or in the lock-up. But that is just the kind of thing 'phone operators do when they keep the audio input jacked up to the point where an r.f. meter "hits a hunnert percent" on average speech. Full 100% modulation should occur only on the occasional peaks, which endure but a fraction of a second. Sluggish r.f. meters cannot show them. As a matter of plain fact, the r.f. current meters should barely show variation with normal speech modulation. Watch the r.f. meters in any good b.c. station.

D.c. meters measuring average current value really show something—by not showing anything. That is, the average values concerned should be absolutely constant. It goes like this: When a wave is properly modulated its average amplitude is constant. The average amplitude should be unchanging between zero and 100% modulation. With constant d.c. plate supply voltage the average amplitude of the radiated wave is directly proportional to the average current input to the plate of the modulated stage. The plate d.c. milliammeter indicates the average value of the plate current. Therefore, there should be no variation in the current indicated by this meter: Q.E.D.

The constant average requirement applies equally to the plate current of Class-B linear r.f. stages following the modulated stage. It also applies equally with all systems of modulation—grid-bias, Class-A plate, Class-B plate—or what have you. Any system for normal modulation that will not permit constant average input (and output) is not permissible. Like Joe Cook's corn flakes without milk, it's just no good. It is in failing to meet this constant average requirement that various trick systems fall down, among them being absorption (loop) modulation, plate modulation with only audio power and without the necessary steady d.c., non-linear grid-bias (grid-leak) modulation, and so on.

Of course the rightness or wrongness of a modulation system is not all in its type and the kind of circuit diagram used to hook it up. It must have properly coordinated tubes, the right audio coupling devices, proper voltages here and there, and, above all, intelligent adjustment. Transmitters sponsored by QST are of sound and tried

(Continued on page 78)

... "It can be said, without violating conservatism, that at this time overmodulation alone reduces the effective width of the 3900-kc. 'phone band to less than half of what it could and should be with proper modulation in every transmitter" . . .

* * *

... "Let no 'phone be operated with the slightest variation in average plate current to any stage handling modulated r.f. Watch the plate milliammeter of the modulated amplifier stage. It's the most important meter in the transmitter" . . .

* * *

... "The rightness or wrongness of a modulation system is not all in its type and in the kind of circuit diagram used to hook it up. It must have properly coordinated tubes, the right audio coupling devices, proper voltages here and there, and, above all, intelligent adjustment" . . .

CX7 Hangs Up New Record

WITHOUT pomp or ceremony the National Guard of Kansas has for the past few years been going about the business of building up an amateur radio net during its summer field training period. This year's encampment brought the climax—the enviable total of 7275 messages handled during the month from July 27th to August 26th! Worthwhile traffic, too, with 100% deliveries all along the line. Such a record is not made without complete preparation; long before the camp opened the groundwork of lining up reliable schedules with amateur stations in principal Kansas cities and towns had been laid. And this year things went off like clockwork (literally, too, as will be seen later) to the tune of an all-time record for messages handled by an amateur station in the space of one month.

CX7 is the call used at Camp Whiteside, Fort Riley, Kansas. The station equipment is housed by the building shown in one of the photographs. Alongside it is the tower which supports one end of the transmitting antenna; this tower is 68 feet high and is made from 2×2 's braced with 1×2 's. The transmitter, a view of which is given in another photograph, is built up in two units, each of which can be used as an independent transmitter in case something should go wrong with the other. The frame at the left contains a shielded crystal oscillator using a 47 tube, a buffer stage having a pair of 46's in push-pull, and a push-pull amplifier with a pair of 211's. These three stages normally run with inputs of 3, 15, and 135 watts, respectively. The power supplies for all three are contained in the lower compartment of the frame. While the output of the 211 stage is normally used to excite the amplifier at the right, this stage can readily be coupled to the antenna should a failure occur in the high-power stage.

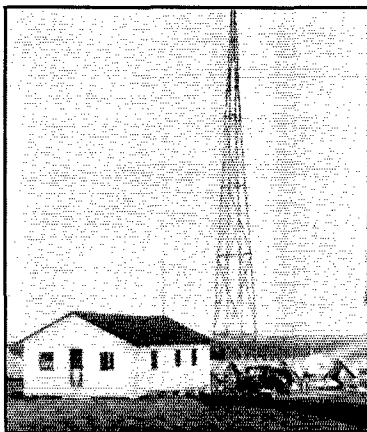
The right-hand frame contains a pair of 204-A's in push-pull, complete with power supply and so arranged that the stage can be used either as an amplifier or as a self-excited oscillator. Normal input to this stage is slightly over 600 watts. There were no failures of sufficient consequence in either unit to make it necessary to use the other alone, however, despite the fact that the transmitter was in continuous operation for 21 hours a day, every day of the month's encampment. The operating frequency used was

3620 kc. A half-wave Zepp was the antenna decided upon, after field-strength measurements had been made of the performance of several different types of antennas.

As is often the case with National Guard training periods, there were two camps, each of two weeks duration. During the second camp it was found necessary to locate the receivers and control point about 1000 feet from the station building to avoid interference from electrical appliances attached to the camp

power-supply system. A keying line (weatherproof) was run to the remote-control station, which was set up in a tent, and although no relays were used the system functioned perfectly. Keying was in the center-tap of the 211 stage.

Four receivers were available, two a.c.-operated and two battery-operated. One of the a.c. receivers was set on 1810 kc. to monitor the transmitter; the other, a superheterodyne, was used to copy traffic when the interference level was low. Both these sets were installed in the station building. The two d.c. sets were similarly used at the remote-control point, one as a monitor, and the other for

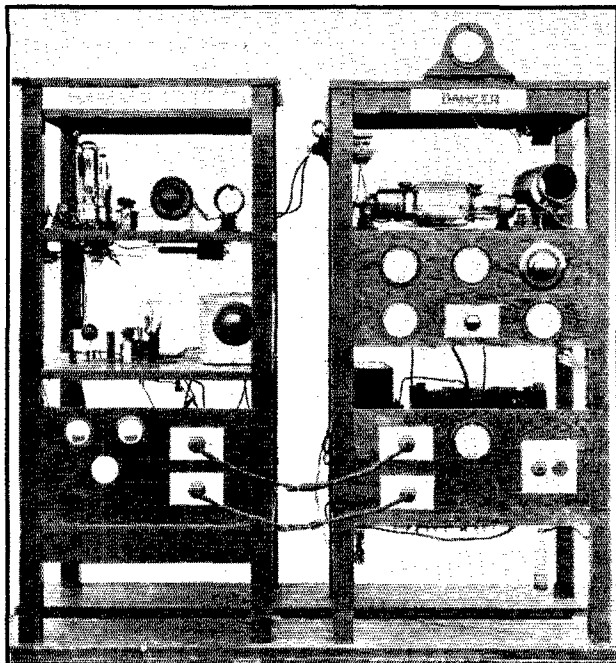


THE STATION BUILDING AND MAIN MAST AT CX7, CAMP WHITESIDE, FORT RILEY, KANSAS

regular copying.

The operating personnel were all licensed amateurs enlisted in the National Guard. Purely a voluntary proposition, their operating was in addition to the military training which constituted the purpose of the encampment. Ten in all, the operators were: E. N. Johnston, W9ICV; A. B. Unruh, W9AWP; Lewis Dickensheets, W9FKD; Philip Smythe, W9KSY; H. O. Byers, W9LFB; R. H. Frye, W9NV; Dana Pratt, W9BGL; J. D. Eickson, W9ESW; W. Crane, W9CUF and Leo Born, W9KVG. Occasionally other ham members of the outfit would assist the operator on duty. The work of CX7 was this year, as in the past, under the direction of Capt. W. A. Beasley, W9FRC.

Keeping schedules with some 36 stations in 22 different cities necessitates an accurate timing system, especially with the many opportunities for confusion existing when the station is handled by a large number of operators. To keep things absolutely straight a unique and mistake-proof clocking system was devised. This consisted of a seven-day clock with a tape attachment indicating a 24-hour day; the schedules were marked off on the tape, together with the call letters of the



THE TWO-UNIT TRANSMITTER

Either frame can be used alone in case a failure should develop in the other. Normally, however, the left-hand unit serves as an exciter for the high-power unit at the right.

scheduled station, his city, and the time allotted for that schedule. In addition, the tape was punched in such a way that a light would flash up during the last four minutes of the schedule, and one minute before the end of the allotted time a bell would ring. This arrangement effectually prevented running over time on skeds.

To keep all the scheduled stations within a small frequency band and thus facilitate locating them, crystals having frequencies between 3815 and 3845 kc. were loaned by the state to the amateur stations participating. All scheduled stations were therefore to be found within a 50-kc. band removed by about 200 kc. from the operating frequency of CX7. This frequency separation made break-in operation possible.

The activities of CX7 are not strictly a National Guard affair, but are sponsored by the Guard in the interests of developing close cooperation between the military organization and radio amateurs. The ham influence is responsible for the fact that this year, for the first time in its history, the Communications Section found it necessary to purchase a Vibroplex for the use of its radio operators! A large number of amateurs not on schedules used the transmissions of CX7 for code practice.

An interesting sidelight on this year's encampment is that fact that by far the greatest number

of messages handled with any one scheduled station were those between CX7 and W9YAB, at Lawrence. Most of these messages were between members of the two Indian units at the encampment and their girl friends at Haskell Institute.

The crew at CX7 and the amateur stations who made the record-breaking traffic handling possible are to be congratulated on a splendid achievement, planned and executed in true ham style.

Strays

QST Index (1933) Now Available

The annual index to *QST* for 1933 (Volume XVII) has been published as part of this issue, and sent to every member of the League. News stand readers may obtain a copy of this index for 6 cents in stamps.

Culver Re-elected

Mr. S. G. Culver has been re-elected director from the A.R.R.L. Pacific Division for the 1934-1935 term. Congratulations, O.M. Mr. E. J. Beall was also nominated but withdrew his name. Our by-laws provide that if there be but a single nominee, the Executive Committee is to declare him elected without balloting by the membership, and that is the case in this division. In the remaining areas that choose directors this year, however, there is competition, and ballots have been sent out. The results will be known about the end of the year.

The Official 'Phone Station field organization appointment is now available to qualified 'phone station operators. See details page 37, November, 1933, *QST*. If interested write your Section Manager (address on page 5, *QST*) for application forms.
—F.E.H.

56-Mc. World's Records?

THE amateurs of the United States certainly started something when they pulled 56-mc. out of the laboratory and installed it as an invaluable field for short-haul communication. However, it has remained for the amateurs of England and the Continent to beat us at our own game. G5BY started this record business by pushing his signals a distance of 200 miles from a mere hillock 3570 feet high and by claim-

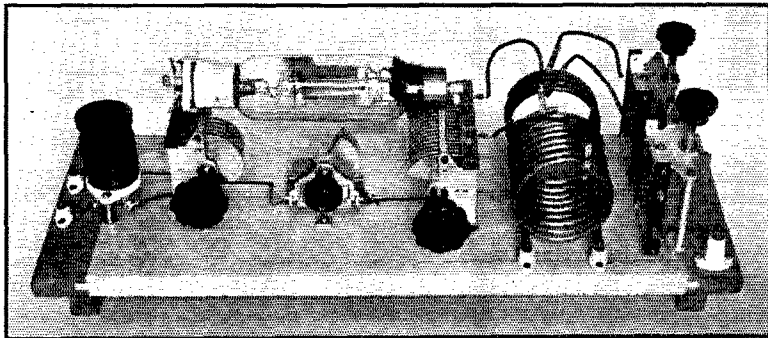
(Continued on page 68)

An Amplifier for the Universal Exciter Unit

By George Grammer, Assistant Technical Editor

A TRANSMITTER can hardly be considered complete until it delivers a reasonable amount of power to an antenna. Hence the universal exciter units described in the October and November issues of *QST* are not what ordinarily would be considered complete transmitters—except for QRP work—and it is therefore logical to describe an amplifier which not only will work well with those units, but also will use them to their fullest capabilities. Since the output of the exciter units is just about right to drive one of the newer intermediate-power

denser, C_1 , mounted edgewise with the “bottom” of the condenser facing left. The socket for the tube is mounted vertically from this condenser by a pair of brackets made from pieces of $\frac{1}{16}$ -inch by $\frac{1}{4}$ -inch strip brass, the brackets being fastened to the condenser by the two screws which hold the insulating strip to the end frames. This “204-A type” of mounting has been adopted to keep the r.f. leads short, without at the same time having the grid and plate circuits too near each other. The only precaution to be observed is that of keeping the plane of the tube filament vertical so



AN AMPLIFIER OF MODERATE POWER OUTPUT USING AN RK-18 TUBE

Although built particularly to go with the exciter units described in the two preceding issues of QST, it can be used with any low-power transmitter. With adequate excitation—about five watts from the driver—an output of 50 watts can be obtained at the rated tube input of 1000 volts and 85 milliamperes.

tubes at good efficiency, such a tube is a reasonable choice as against the use of one or two 10's. The amplifier described uses an RK-18 tube. Outputs of 35 to 50 watts can be expected from it on frequencies from 1.75 mc. through to 14.4 mc., assuming rated input to the tube.

The advantages of the circuit used are to be described in a later issue, so this article will be confined to the constructional and operating details which apply to the unit shown in the photograph. The general construction of the amplifier is similar to that of the exciter unit described in November *QST*, the two having been made to operate together as a complete transmitter. The baseboard measures 7 by 20 inches, and is fitted out with wooden runners underneath to elevate it from the table or whatever the unit is placed upon. The physical layout follows the circuit diagram, Fig. 1, as nearly as possible. The socket into which the grid coil plugs is near the left-hand edge of the board, with a pair of miniature porcelain standoffs alongside to serve as input terminals. To the right of the coil socket is the grid tuning con-

that the filament will not sag and touch the grid. The stationary plates of C_1 are connected to the grid prong on the tube socket; the filament leads drop down behind C_1 to a pair of midget bypass condensers and thence through the board to the terminal strip on the rear lower edge. This strip, incidentally, is identical with the one on the exciter unit described in November *QST*.

The plate end of the tube is supported by a grid clip soldered to a piece of stiff bus wire which in turn is mounted firmly on the terminals of one set of stator plates of C_2 , the plate tuning condenser. This condenser is mounted in the same fashion as C_1 , except that the rotary plates face inward. Between C_1 and C_2 is the neutralizing condenser, C_3 . One terminal of this condenser connects to the second set of stator plates on C_2 , while the other goes to the stator plates of C_1 . The length of grid and plate leads with this arrangement is almost zero, and the neutralizing condenser leads are likewise quite short; both these features aid in suppressing any tendency toward ultra-high-frequency parasitic oscillations.

The plate coil, L_3 , and antenna coupling coil,

L_4 , rest on the bakelite rods to the right of C_4 . These rods are mounted on midget standoffs to give the necessary clearance between the plate coils and the baseboard. The antenna tuning condensers, C_2 and C_4 , stand vertically at the right-hand edge of the board. The mounting pillars are underneath, and the machine screws holding the condensers in place run through the baseboard.

The grid-bypass condenser, C_8 , and the plate r.f. choke are fastened to the under-side of the baseboard in convenient locations. That is all there is to the circuit.

SOME OPERATING HINTS

Complete specifications for five bands are given under Fig. 1. It will be well to pay careful attention to the construction of the plug-in grid coils, since the amount of excitation furnished to the amplifier tube will be dependent to a large extent on the constants of L_1 and L_2 . Be sure that L_2 is wound at the filament end of L_1 ; if this is reversed, it is quite possible that the capacity coupling between the two coils will upset the operating conditions and reduce the excitation. The specifications for L_2 should not be regarded as iron-clad, since the number of turns often can be changed to good advantage. In any event the exact number of turns will depend upon the type of exciter unit used to push the amplifier, and had best be determined experimentally. The tuning procedure is to connect a milliammeter in series with the negative grid lead and bias source, set the neutralizing condenser at about half scale, start up the driver, tune its plate circuit to resonance, and then tune C_1 for maximum reading on the milliammeter. The plate voltage should be off and the amplifier should be neutralized (the neutralizing procedure is described below) before any alterations are made to L_2 . L_2 may make a

COIL DATA

Grid Coils

	L_1	L_2
28 mc.	4 turns, coil length $\frac{5}{8}$ inch	2 turns
14 mc.	10 " " " 1 " "	3 " "
7 mc.	18 " " " 1 1/2 " "	4 " "
3.5 mc.	30 " " " 1 3/4 " "	5 " "
1.75 mc.	80 " " " 1 7/8 " "	10 " "

No. 20 or 22 wire may be used for the first four coils listed; the 1.75-mc. coil will require No. 28 d.s.c. In each case L_2 is close-wound at the bottom of the coil form, tightly coupled to L_1 . Diameter of all coils is $1\frac{1}{2}$ inches.

Plate Coils, L_3

28 mc.	4 turns $\frac{3}{8}$ -inch copper tubing, inside diameter $2\frac{1}{2}$ inches
14 mc.	10 turns $\frac{3}{8}$ -inch copper tubing, inside diameter $2\frac{1}{2}$ inches
7 mc.	24 turns No. 12 wire double-spaced, inside diameter $2\frac{1}{2}$ inches*
3.5 mc.	45 turns No. 12 s.c.c. wire, no spacing, i.d. of coil $2\frac{1}{2}$ inches
1.75 mc.	68 turns No. 16 d.c.c. wire, no spacing, i.d. of coil $3\frac{1}{2}$ inches

* No. 12 enamelled wire, double-spaced, will run six turns to the inch.

Specifications for the 3.5- and 1.75-mc. bands call for plate coils of high inductance, since the plate tuning condenser has low maximum capacity. For 3.5- and 1.75-mc. work it may be more convenient to use a plate tank condenser, C_8 , of higher capacity, which will permit the use of smaller plate coils.

considerable difference in the grid current; the number of turns which gives the largest grid current is right.

Bias may be supplied by a 90-volt battery or can come from the voltage drop through a grid leak. With 90 volts "C" or a 5000-ohm leak the

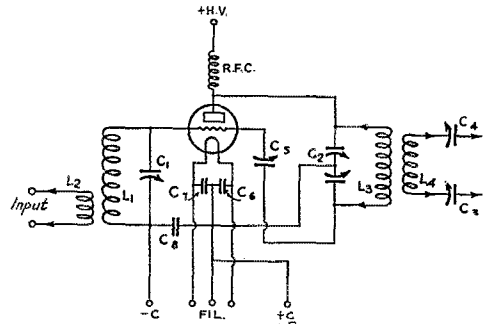


FIG. 1—THE CIRCUIT OF THE HIGH-FREQUENCY AMPLIFIER

C_1 —50- μ fd. variable (Cardwell 410-B).

C_2 —Split-stator condenser, 75 μ fd. each section (Cardwell 413-B).

C_3, C_4 —250- μ fd. variables (Cardwell 406-B).

C_5 —5- μ fd. variable (Cardwell 519).

C_6, C_7 —0.005- μ fd. mica condensers.

C_8 —0.002- μ fd. mica condenser.

RFC—High-frequency r.f. choke (National Type 100).

grid current should be between 15 and 20 milliamperes. A combination of battery and leak bias can be used, if desired. In such case it is recommended that the leak be 2500 or 5000 ohms and that at least 45 volts of battery bias be used. With greater leak resistance or more than 90 volts battery bias the grid current will be smaller than specified above and vice versa. The optimum operating condition seems to be with about 100 volts bias, regardless of the method by which it is obtained. The bias furnished by the leak will be equal to the product of the leak resistance and the grid current in amperes.

Neutralizing can be carried out quite simply. Connect in the plate coil, L_3 , for the band on which the amplifier is to work and, with the neutralizing condenser at about half scale, tune C_2 to resonance. This will be indicated by a flicker in the grid meter as C_2 passes through the correct tuning point, or can be found by touching a neon bulb to the plate of the tube. Having noted the resonance point, adjust the neutralizing condenser until no effect on the grid current can be observed as C_2 goes through resonance. When the amplifier is properly neutralized, C_2 can be swung over all but the portion of its scale near minimum capacity with no noticeable effect on the grid current, provided a condenser having good capacity balance is used. The capacity ratio between the two sections changes near minimum

(Continued on page 70)

Convert 'Phone Monologues to Conversations

A Quick and Simple Break-In System for the 'Phone Station

By Clark C. Rodimon, Managing Editor*

WHEN is a 'phone QSO not a monologue? Only when it is a conversation. And real conversation can be had only with an effective method of break-in operation. Break-in simply means a sure-fire, rapid method of cutting the carrier when no speech is being transmitted. Does this lend itself to snappy operating, no-loss transmissions and lessening of QRM? It does — and how.

Probably every 'phone man at some time or other has marveled at the snappy operating which goes on among the airway operators just below 3500 kc. The manner in which they dispatch information with an apparent minimum of effort and time is nothing short of marvelous to those who are used to nothing less than 5- or 10-minute, one-way contacts. These stations use a manually-operated "push-to-talk" system. The question naturally arises, "Why can't such manually-operated break-in be adapted to amateur 'phone transmitters?" Various voice-operated electronic stunts, recalled as having been described in *QST*, would seem attractive; but they always struck this amateur as being unnecessarily elaborate and too complicated, what with extra tubes and sensitive relays being the order.

After a simple change at W1SZ we were ready with high hopes for our first break-in conversation. But it was at least two weeks of talking up the idea before we had our first real break-in contact. It happened one Saturday afternoon while working W2AND of Bohemia, Long Island (one of the stations to whom the system had been described previously). *Then followed an hour and a half of conversation comparable only to a conversation over the telephone.* Both of us were so enthused with the success of the scheme that we were reluctant to call a halt, but it was necessary at this end. W3NK of Cedarville, New Jersey, heard this QSO and immediately contacted W2AND with a demand to know how he could change his transmitter to work in the same manner. Within ten minutes W2AND and W3NK were hitting it off in the fashion previously described. Later on W1SZ joined in for a three-way break-in contact. Since that time these stations have used it continually and find it of considerable interest to practically every station contacted. Its simplicity appealed to all as well as its practicability.

While all the advantages of this system have

*W1SZ, A.R.R.L. Headquarters 'phone station.

not, by any means, come to light in practice as yet, numerous advantages have appeared from the first. As the system is manually-controlled by a small spring switch at some handy spot in front of the operator (W3NK uses a foot pedal), it is necessary only to hold the switch closed while talking, and the moment talking ceases, allow the switch to release itself. The carrier is on the air only while the button is pressed and there is talking. It's simply a matter of coordinating the hand and the jaw. Immediately the switch is released the carrier goes off the air and one is ready to listen. Thus the station being contacted can break in with his comments during any interval. Every contact is "100%" and the usual 5-minute one-way transmissions, often lost because of interference, are a thing of the past. QRM is lessened to a great extent and much power and wasted speech are saved. Inspector Sterling, when told of the idea, remarked that it certainly would go a long way towards eliminating QRM on the 'phone bands.

There are several ways of accomplishing the end and we shall describe the simplest first. Incidentally, the simpler the transmitter the simpler it will be to install break-in. First off, dig out the old telegraph key or "bug," for it will make an excellent switch, and connect it in series with either the filament center-tap (cathode) of the crystal stage or in the high-voltage supply circuit of the oscillator. Thus, with the key open the crystal stops oscillating and there is no excitation on the remaining stages. Of course, it will be necessary to have some fixed or automatic bias on the remaining amplifier stages, to prevent plate current from rising excessively with excitation removed. Now to try it out: Tune in some 'phone station and, without touching the receiver, press the key and talk into the microphone. Either the system will work, or there will be considerable audio feedback from the speaker or head-phones to the microphone. If this audio howl is present when the carrier is not on it will be necessary to break the audio plate supply circuit as well as the r.f. If a double-pole relay is handy it can be put into use by having one set of contacts break the crystal circuit and the other set of contacts short the microphone transformer secondary or open the high voltage on some of the audio stages. It would be more preferable to do it this way than to cut the B supply on the receiver, since the latter is very likely to cause unpleasant clicks in the operator's ear. The audio howl is

more probable when a speaker is being used than when with head-phones.

Although elaborate deviations from these primary suggestions may occur, regardless of the complications (in the most elaborate layouts) it should be remembered that the relay or relays must work from a single small push-button switch (or the like) which is convenient to the operator. Otherwise the full advantages of this break-in arrangement would not be realized.

We have known several operators who mentioned that they could use "break-in," but it was not of the "push-to-talk" variety in that they

had to snap a switch to eliminate the carrier. It will be found operating a snap switch takes much too much time and that the switch one will finally end up with will have a spring release; that is, one merely releases the pressure on the switch to cut the carrier — and hear the answer to his question.

Remember that each station must sign his call at least every 15 minutes (when engaged in a QSO that lasts that long). It is not necessary to sign otherwise except when finishing the QSO, for "end of transmission."

Now, gang, just "press-to-talk."

QRR Log

MONDAY, August 21st. Heavy rains along eastern shore of Maryland, Delaware and Virginia.

Tuesday, August 22d. Rain increased, submerging streets.

Wednesday, August 23d. Northeaster was in full force, tearing everything before it. The Delmarva Radio Club met at Ed Thompson's Grill, moved W3CQS's transmitter to one of the booths there, it being the only place where power was available, and braved the fifty-mile gale in getting an antenna up. W3SN was contacted briefly, before his power went off. In Laurel, Del., E. L. Hudson of W3BAK found the weather too miserable to sell gas from his filling station, so he contacted W3AAJ early Wednesday morning, later working W3ZK with much press and other traffic. At 11:00 p.m. press was transmitted to W3AIS.

The Tidewater section of Virginia was struck equally hard, an eighty-mile wind costing the lives of 15 and \$10,000,000 damage in the Norfolk region. W1ZZAR, operated by Lyman Rundlett on the U.S.C. & G. Survey Ship *Oceanographer*, tied up at the Naval Base, was the only station able to handle traffic for the region, having its own power. On Wednesday W1ZZAR worked W3FJ, W3BVG, W3ZD, W9LLH and W8FJW. W3AAJ organized an efficient inter-Virginia traffic net during this period.

Thursday, August 24th. W3CQS established its first workable contact with W9CVW at 3 a.m., the operators working in their bare feet with inches of water on the floor. W2BPY, W3QV, W3GX (op'd by W3CL) W3ZD, WWB (an emergency battery station manned by officials of the Federal Radio Commission at Fort McHenry), took press and official and personal emergency traffic. At 5 p.m. Western Union had a wire going, so W3ADP, W3GE and W3VJ, who with the owner had manned W3CQS, called it a day after 36 hours continuous work. Meanwhile, W3BAK at Laurel worked W3ZD and W3ZK,

handling press and Western Union messages. W1ZZAR worked until noon Thursday with W3CA. The storm had ceased, the sky was clear, but the water was still high and roads impassable, so traffic flowed until late Thursday night.

Add stations doing good work: W3BZE, W3BNH, W3AKN, W3BAI, W3GZ, W3CL, W2CGG, W3OK, W3DG, W3HI, W3BR, W3BKC, W3LO, W3DF, W3FW, W3APF, W3BDZ, W3AKZ, W3CUR, W3COJ, W3CLV, W3AZT.

Sunday, September 3d. Two tropical storms, each of hurricane intensity, struck Florida and Texas Sunday evening. Early that day F. C. Elliott, chief engineer of the Internal Improvement Board, who is in charge of evacuation in the event of storm, called on S. M. Douglas, W4ACB, and asked for hourly storm reports. With W4AUA, also of Tallahassee, acting as alternate, these reports were received from southern Florida stations. W4WF transmitted first press news of hurricane imminence through W4KU. W4NN and the Florida emergency net functioned thoroughly.

Monday, September 4th. Early Monday morning all communications in Florida were wiped out. The AP called on W4ACB for information concerning the extent of the damage in southern Florida, which was secured largely through W4CJR. Later, W4SC was put on the air for emergency traffic. W4CHM and W4BPA handled press.

Monday morning Corpus Christi, Texas, was astir. A storm of great intensity was in the Gulf, and it seemed certain that it would hit that region. By noon the city appeared to be deserted, except for the Corpus Christi Radio Club, which had W5BXX on the air at the High School throughout the night, with W5AQK, W5MS, W5HP, W5CHI, W5BKG and W5BZW as operators. W5TG and W5BTK were worked Monday evening. Meanwhile, W5ALV had installed his

station in the Missouri Pacific baggage room, working W5OW and W5BTK.

In Houston, watches were maintained at W5TG, W5AFV and W5VB long after the actual storm danger had passed. W5CNA at Harlingen worked W5CA. W5BBR at McAllen and W5BZO at Bay City, also in the path of the storm, were active.

In Brownsville, W5CKS was on the air with the assistance of W5CGO, W5CZF, W5DQA, W5BQI, W5BIG, W5ATU and Dave DeKorte's gas engine. W5PJ took the first message announcing the disaster to the outer world, which was broadcast by WFAA, W5BFI and W5CTW did the principal relaying. W4OG, W5ASX, W6GAL, W7VY, W9DFY and W2ZZP did commendable work in clearing the air for the Q.R.R. traffic.

Tuesday, September 5th. The eastern tip of the richly developed Rio Grande Valley was the scene of a roaring tropical hurricane which took the lives of 26 and caused \$20,000,000 property damage. At 5 a.m. W5ALV rescued eleven passengers of Missouri Pacific train No. 215 which was marooned between Corpus Christi and Odem, later working W5OW, W5BKL, W5MN and W5BII. W5BXX contacted W9USA at 4:30 a.m., with traffic. Preparations were made to

take a portable transmitter and receiver to the stricken area in a special car filled with nurses and doctors, but this was abandoned after it was learned that W5OW of Sam Houston had left for that area with an Army transmitter.

Communications with St. Augustine being washed out, the Adjutant General of the Florida National Guard called on W4ACB to handle traffic to that point for the head of the Relief Board, from the Governor's secretary.

Friday, September 15th. Sweeping up the Atlantic coast came a terrific storm, probably of greater intensity than that of ten days before. Amateurs in Norfolk and Portsmouth, warned by the Weather Bureau, rigged emergency gear and stood by. W3NO, W3BPA, W3CLX, and W1ZZAR were on the job for WU, Postal, press and officials.

Saturday, September 16th. At 1:30 p.m. a change in barometric pressure indicated that the storm would head out to sea before passing Virginia capes, and danger to Norfolk was averted. The above operators ceased their 38-hour watch, along with W3COO, W3AUG, W3MT, W3MQ, W3SN, W2AJF (for C.B.S.), W2BGO, W8EIK, W4EG, W3QV, W3FJ, W3CQS, W3ADP and other scheduled stations.

—C. B. D.

Learning the Code

The A.R.R.L. Code-Practice Program—Schedules of Code Practice Stations

A SPEED of at least ten words per minute (five characters to the word) in both receiving and sending must be attained before an Amateur Radio Operator's license can be secured.

To assist newcomers in learning the code the A.R.R.L. during the active radio season conducts a program of code practice from various amateur stations throughout the United States. This program is conducted in the 1715-2000-kc. band. Most of the stations use a combination of 'phone and code in transmitting code practice, 'phone being used for announcements and a buzzer or audio oscillator keyed in front of the microphone furnishing the actual code signals. A list of the stations whose operators have volunteered their services as "code practice senders" is given here, together with locations, operating frequencies, and days and hours of transmissions.

Stations listed would be pleased to hear from listeners, and to render as much additional help as possible. They are particularly interested in receiving reports on how their signals are received, what benefits are obtained from their transmissions, and what progress their listeners are making in learning the code. Correspondence requiring a reply should be accompanied by a

stamped addressed envelope. If you cannot locate the complete address of any of the stations in your call book, you may send your letters care of the A.R.R.L. Communications Department.

Attention is called to the schedule of transmissions "To Radio Amateurs" from the League's Headquarters Station, W1MK.

Sunday	8:30 p.m. E.S.T.	3825 & 7150 kc.
"	Midnight "	3825 & 7150 kc.
Monday	8:30 p.m. "	3575 & 7015 kc.
"	10:30 p.m. "	3575 & 7015 kc.
Thursday	8:30 p.m. "	3825 & 7015 kc.
"	Midnight "	3825 & 7015 kc.
Friday	8:30 p.m. "	3825 & 7150 kc.
"	10:30 p.m. "	3825 & 7150 kc.

Many beginners put too much stress on their "sending ability" and not enough on their "copying ability." Master the art of "receiving" before you try to "send" at top speed. A good operator can copy as fast as he can send. Do as much listening to actual signals on the air as possible. Try to copy as many letters as you can. Write down every letter or numeral you recognize. Keep at it regularly. Soon you will find yourself getting whole words, and later whole sentences. Then you will find your speed increasing. Learning by actual listening on the air is in many ways preferable to learning by the use of a buzzer

as it accustoms you to copying through interference, static, fading, and so on.

Too many beginning amateurs become discouraged at their progress in conquering the code. To them (and to all other newcomers) we say, "Have patience!" Don't expect to learn it all in one day. Take things easily. Be optimistic! You will be surprised at your progress. If possible, get some one to practice with you. A well balanced program for the individual starting to learn the code might be to divide time between (1) one or more of the stations sending code practice on the

1715-kc. band, (2) periods of listening to general amateur work on any of the bands, and (3) periods of practice with a buzzer and key, preferably with another person.

Schedules of additional code practice stations will appear in future issues of *QST* as they volunteer their services. Any amateur operating a transmitter in the 1715-kc. amateur band who is willing to devote some of his time to the A.R.R.L. program of code practice transmissions, is invited to write the League's Communication Department, West Hartford, Connecticut.

1715-KC. STATIONS SENDING CODE PRACTICE

<i>Station</i>	<i>Location</i>	<i>Frequency</i>	<i>Days</i>	<i>Hours (Local Time)</i>
W1ASZ	Pawtucket, Rhode Island	1925 kc.	Tuesdays	7:00-8:00 p.m.
W1BTL	Plymouth, Massachusetts	1985 kc.	Tuesdays, Fridays	7:30-8:00 p.m.
W1DFT	Windsor, Connecticut	1830 kc.	Mondays, Tuesdays, Thursdays, Fridays Saturdays	7:15-8:00 p.m. 4:30-5:00 p.m.
W1DND	South Boston, Mass.	1875 kc.	Mondays, Fridays	8:00-9:15 p.m.
W1DOF	Lynn, Massachusetts	1888 kc.	Tues., Fri., Sun.	6:00-7:00 p.m.
W1SN	Melrose, Massachusetts	1880 kc.	Mondays Thursdays Sundays	6:45-7:45 p.m. 7:00-8:00 p.m. 8:00-8:30 p.m.
W2QY	Cornwall-on-Hudson, N. Y.	1950 kc.	Mon., Wed., Fri.	5:00-6:00 p.m.
W4BHR	Warren Plains, N. C.	1870 kc.	Wednesdays	6:30-7:15 p.m.
W6CTT	Los Angeles, California	1885 kc.	Fridays	7:00-8:00 p.m.
W6HS	Larkspur, California	1995 kc.	Mon., Wed., Fri. Daily exc. Sun.	3:30-4:30 p.m. 8:30-9:30 p.m.
W8ARF	Toledo, Ohio	1855 kc.	Saturdays	10:30-11:00 p.m.
W8CJQ	Sodus, New York	1752 kc.	Mon., Wed., Fri.	7:00-9:00 p.m.
W8CVF	Baldwin, Michigan	1912 kc.	Thursdays	8:00-8:30 p.m.
W8DDX	Toledo, Ohio	1811 kc.	Wednesdays	3:00-4:00 p.m.
W8FAZ	Cleveland, Ohio	1775 kc.	Fridays	9:00 p.m.
W8FFK	Cleveland Heights, Ohio	1950 kc.	Tuesdays Wednesdays Sundays	7:30-8:00 p.m. 7:00-7:30 p.m. 12:00 Noon-1:00 p.m.
W8FO	Toledo, Ohio	1825 kc.	Fridays	10:30-11:00 p.m.
W8GJM	Pittsburgh, Pennsylvania	1760 kc. 1979 kc.	Fridays Tuesdays, Thursdays	11:00-11:30 p.m. 8:00-8:30 p.m.
W8WE	Mansfield, Ohio	1900 kc.	Sundays	2:00 p.m.
W9BSP	Olathe, Kansas	1903 kc.	Daily	7:30-8:30 p.m.
W9GFS	Evansville, Indiana	1948 kc.	Saturdays	7:00 p.m.
W9IOB	Richmond, Indiana	1780 kc.	Tuesdays, Thursdays Saturdays	8:00-9:00 p.m. 10:00-11:00 p.m.
W9MKS	Granville, Illinois	1950 kc.	Tuesdays, Wednesdays, Thursdays, Saturdays	6:30-7:30 p.m.
W9NBZ	Terre Haute, Indiana	1805 kc.	Daily except Sat. and Sun.	6:30-7:30 p.m.

H A M D O M

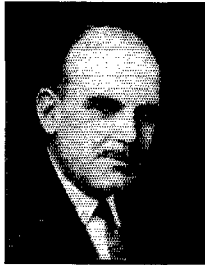


THE Federal Radio Commission is a pyramid of divisions. When amateur regulations needed recently to be revised, the work was delegated to Lieut. E. K. Jett, chief of the commercial communications section of the Engineering Division, by Dr. C. B. Jolliffe, the Commission's chief engineer. None better qualified could be found than this veteran of twenty-two years (out of forty) in the government service, eighteen in the Navy having seen him rise from apprentice seaman to lieutenant and of-



Regulation Writer

ficer in charge of the Navy Department's Radio Central, from where he went to the F.R.C. as senior engineer in 1929. His is now the responsibility for practically everything in radio outside of broadcasting. After months of work with other F.R.C. divisions and A.R.R.L. officials, the new amateur regulations were written and officially approved, and October 1st they went into effect.



*Photo by Bachrach
New Englander*

TYPICAL of the aptness with which A.R.R.L. directors, as a class, exemplify the qualities of their regions of the country is that genial New Englander, George W. Bailey, W1KH, director of the New England Division. Born at Quincy, Mass., May 14, 1887, he emerged twenty years later as treasurer of the Harvard class of 1907. He is married, has three children, aged 19, 15 and 7. In the New England tradition, he is a manufacturer, the product being rubber flooring. His favorite sport is yachting, but—his one and only hobby is amateur radio. One of the famed "radio twins," president of the Eastern Massachusetts Amateur Radio Association, ORS, OBS, OO, former RM of Eastern Mass., holder of the Public Service and Frequency Measuring certificates, "KH" is a real ham.

IT WAS at WNY that he learned to use a bug, and at New York Law School that he learned

to practice law, in which activity he still indulges when ham radio palls and he feels desirous of eating. Bernard J. Fuld, W2BEG, director of the Hudson Division, A.R.R.L., has some other fairly abstruse hobbies, too, such as sociology in general and penology in particular. Nonetheless, he holds a Class-A amateur ticket and a first class commercial with 'phone endorsement. Born in New York City in 1906, he moved to Brooklyn, with the aid of his parents, at the age of one year. There he lives now, a lonely bachelor, except for his radio, his violin, and a Boston terrier named Rex. Commissioned an ensign in the Naval Reserve, his "going to sea" usually takes the form of long automobile trips. Horseback riding is his sole sport; upholding the under-dog his chosen mission in life.

THERE'S been a little excitement in Chicago this summer. Some thirty million people traveled to town to see a Fair. Maybe ten percent of them saw the amateur radio exhibit in the Travel & Transport Building, a high-class stock pavilion there on the grounds. Anyway, there were enough to gladden the heart of Fred Hinds, chairman of the World's Fair Radio Amateur Council, and his fifty or more minions. Fred's been managing the hams of Chicago and all of Illinois since 1928,



Sea-Lawyer

when he was elected SCM, and as president of the C.R.T.A.; before that time he was ORS, RCC, and PRR. He lived in Galesburg, Ill., for one year, his first, that of 1901. Then he moved to Berwyn and has managed to stay there ever since, accumulating a YF (W2CC's sister) in 1927 and a YL op in 1932, as well as the calls W9APY and W9WR. His job is printing, commercial and advertising—and ham QSL cards. His hobbies, stamp collecting, model boats and art work.



Fair Chairman

The World's Fair Radio Amateur Exhibit

By Wallace F. Wiley, W9AZI*

WE HAVE all wondered how many hams—and others, for that matter—who visited A Century of Progress in Chicago, failed to find W9USA and the Amateur Exhibit. When you inquired, were you sent to the Electrical Building, to the top of the Sky Ride, or back of the Hollywood concession? Actually, W9USA and the Exhibit were located on the second floor of the Travel and Transport Building toward the south end of the grounds—almost as far from the Electrical Building and its bedlam of interference as possible and still be within the fence.

Even if the place was hard to find, about 4000 amateurs signed in the registration book—nearly 10% of those licensed in the United States. These were not all W's. The book shows registrations from Barbados, Canada, Cuba, Mexico, Argentina, Alaska, Porto Rico, Panama, Newfoundland, Hawaii, Guam, New Zealand, Australia, England, France, Austria, Japan and China. And if we manage to catch a visiting ham from Africa before the Fair is over, we are thinking of applying to Headquarters for a WAC certificate for the book.

That book contains many well-known signatures. Among them are those of our League's President, Mr. Hiram Percy Maxim, W1AW, and Senatore Guglielmo Marconi. The total list of prominent amateurs registered would require several pages in *QST*. Many of the old-timers, now off the air, are also registered. And, of course, there are included the various signatures of John Q. Public and family who did not know a Ham Register (very plainly marked) from a grid-leak. Rather than be impolite and refuse these last

* Exhibit Manager.

permission to register, we allowed some of them to sign. The column in the book marked "Call" had them stumped, and the results in many cases were startling. Some took a look at the signature above and mixed figures and numbers indiscriminately to fill this space. COD, FOB and BVD were also much in evidence. And one YL, after considerable thought, recorded her phone number.

One B but D YL asked if this book was where the amateurs registered. And the following conversation ensued.

"Certainly. Are you an amateur?"

"Yes."

"What is your call?"

A blank look and the scratching of the pen.

"Do you have a transmitter?"

Another blank look and more scratching.

"What is your station?"

"Oh, we listen to KYW."

As most amateurs know—the W's at least—considerable traffic was handled from the Exhibit by W9USA. At the time this was written (the middle of October) a great many more than 10,500 messages had been received at the information desk. The figures 10,500 represent those which were deemed sufficiently proper to be numbered. And of this number many were discarded because of insufficient

address, illegibility, etc.

Much of the traffic handled was of considerable importance. We received a message one morning which caused us to ask permission to page a man on the grounds through the Fair's PA system. Although the Fair had banned the use of the system for this purpose some time before, they made an exception in this instance. The man was located, came to the Exhibit for the message, and immediately returned to his home town.

An international exposition—a World's Fair—A Century of Progress—and amateur radio not represented? Never! cried Chicago amateurs, and proceeded to organize the World's Fair Radio Amateur Council. Two thousand feet of exhibit space in the Travel and Transport building were secured, exhibit space was sold to 25 manufacturers of amateur gear, apparatus of historical interest was gathered, high-powered modern transmitters were designed and built to operate under calls specially assigned by the Federal Radio Commission—and it only remained for 4000 hams, 400,000 of the general public, to see, to admire, to marvel, for five well-filled months of crowded activity.

In charge of this spectacular accomplishment was Fred J. Hinds, General Chairman of the World's Fair Radio Council. With him were associated many of Chicago's prominent amateurs, including a representative from every active radio club in the Chicago area. The work of the Council was organized under committees, each headed by a capable man. C. W. Glaser gave unstintingly of his time and experience in organizing the Exhibit, with W. F. Wiley, W9AZI, carrying on its active management through five months of existence. In charge of W9USA-USB as Communications Director was J. Edward Wilcox, W9DDE, with Operations Manager Laddie J. Smach, W9CYD; Traffic Manager C. E. Miller, W9VS and Chief Operator George Maki, K7HV. Fred Schnell, W9UZ, headed the Technical Committee, assisted by Dave Abernathy, W9MYH; Ralph Briggs, W9EMD; George Dammann, W9JO; Louis Gamache; P. D. Lamb, W9GHT; Earle Russell, W9HBX; C. F. Schultz, W9CSB and E. R. Word, W9BVY. Other committeemen were: Publicity, Art Bates, W9FO and Herb Griem; Historical, R. C. Schweitzer, W9AAW; Convention, Wm. E. Schweitzer, W9AAW; Forrest P. Wallace, W9CRT and Art Agazim, W9CN. The Secretary of the Council was W. D. Ferrell, W9CGV; its advisors, Marcus Hinson and H. D. Hayes.

—EDITOR

Several runaway boys who had come to the Fair sent messages back to their folks advising of their whereabouts and safety. Many messages were handled for the officials of A Century of Progress. But ordinarily the messages consisted more or less of notifications of safe arrivals, local address and change in plans.

Since one of the primary purposes of the Exhibit was to acquaint the public with amateur work—or at least to let them know there was such



ONE CORNER OF THE LOUNGE, AND A GLIMPSE OF THE HISTORICAL EXHIBIT

a thing—we expected some queer questions, but not the flood that was loosed on us. For example, after reading the sign and being given a long verbal explanation of the workings of ham traffic, a lady wrote a message and asked when it would be sent. After a look at the schedule sheet, the reply was:

“Eleven-thirty p.m.”

“But my folks won’t be listening at that time, and so they can’t get it.”

Followed some more explanation. And then:

“Oh, it won’t go over the NBC or Columbia? Well, my folks wouldn’t get it anyway, as they never listen to anything but NBC or Columbia.”

Or, take this one, which has been sprung several times:

“Do you have any samples of short-wave radios to give away?”

Or:

“You don’t know Johnny Jones in Spudtoe, Kansas? That’s funny. He has a short-wave receiver.”

The general public has shown considerable interest in the Amateur Exhibit. For the first two and one-half months of the Fair, every person who entered the Exhibit was counted, and we found we were drawing approximately 2% of the total gate of the Fair each day, which means that up to the first of October about 360,000 people had seen the Exhibit. When a sufficient number of attendants were on the floor, we guided small groups about the Exhibit and explained things in detail. In this way we tried to give them a good idea of what amateur work consisted, and the purpose of the apparatus used.

Without exception, this personal contact was greatly appreciated by the visitors; they were attentive and always interested. Sometimes a group would spend several hours in the Exhibit and absorb every bit of knowledge we could give them. Old, young and middle-aged, as soon as they saw what a fascinating hobby ham radio could be, fell like the proverbial ton of brick. Many an elderly couple, living alone and wanting a hobby of interest to both, have walked out with copies of “How to Become an Amateur,” the Handbook, and *QST*. And, in at least one instance, they returned a few weeks later with questions concerning the refusal of the detector of their first short-wave receiver to oscillate.

One surprising thing about the attendance was the number of teachers who visited us, and who made many notes on all phases of short-wave work. Not only the men teachers, but the women as well. Upon inquiry it developed that these teachers felt they were unable to cope with the knowledge their pupils were showing in this field and were determined to keep at least one jump ahead of them—if possible.

As far as the public is concerned, the Exhibit has done two things. It has given our visitors the knowledge that radio does not start at 0 on the dial of their BC receiver and end at 100, and that the short waves are much more interesting than the broadcast band. It also has created a large number of will-be hams.

Five months is a long, long time to keep a ham shack running with volunteer help. This is es-



THE TRANSMITTER CAGE, AND THE GLASSED-IN OPERATING POSITION

pecially true when the place is open to the public and it is necessary to handle the large number of visitors and messages that we have had. It would have been an utter impossibility without the generous participation by the hams in the Chicago area who have stuck through these long weeks on the floor and at the key; or without the splendid cooperation given us by Headquarters and *QST*. Neither could we have completed the job without the help of the boys on the other end of the *QSP*'s who completed the traffic moving job; nor without the manufacturers who were interested

enough in amateur work to furnish us with materials that were otherwise unobtainable. Our sincere thanks and 73 to all of these.

We have learned many things during these months. If this gang had the same job to do over, there would be many changes in plans and procedure. We have had to forget a lot of things we thought we knew, and in their places have received a lot of new ideas. But we have not yet found the correct answer to give when a sweet young thing approaches the information desk and asks, "Please, may I have an audition?"

W9USA—1000 Watts—7040 Kc

By F. H. Schnell, W9UZ*

RELIABILITY and simplicity are two desirable characteristics in any type of radio transmitter, especially in an amateur transmitter which is subjected to operation by many different operators. W9USA is just that kind of transmitter. It is one which had to be ready for operation twenty-four hours of the day if necessary, and it had to be free from the usual "tinkering" which often takes place before starting operation for each day. It had to be simple in construction and easily accessible for the benefit of the visiting amateurs who are interested in seeing "what is on the inside." Naturally, it also had to be somewhat along lines that would be representative of the type of transmitter almost every radio amateur would like to own, and it had to use the maximum power allowed by the regulations. Nothing else would do.

Chosen for the actual building and assembly of W9USA was Dave Abernathy, W9MYH. Dave not only knew what was wanted but he had had the necessary wide experience. He was familiar with all kinds of layouts for various types of transmitters. He knew how to go about the job and he did a splendid piece of work.

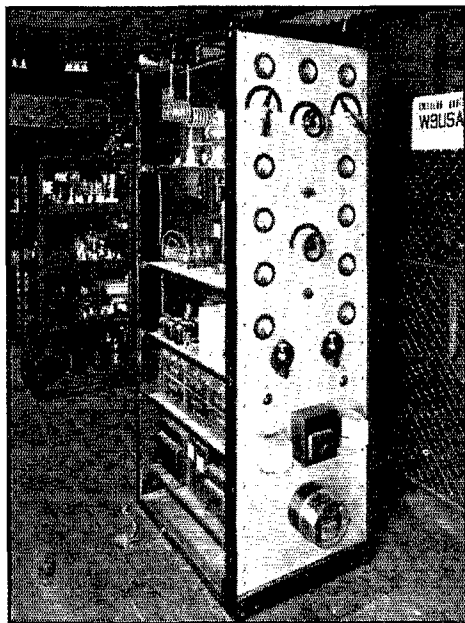
The crystal stage, using an RCA 210, has its own power supply which delivers very close to 500 volts to the plate at 30 ma. The fundamental frequency of the crystal is 3520 kilocycles and, in spite of Mr. Bliley's warning about using too much current on the crystal, we are working this crystal at least twice as hard as recommended and it has yet to show signs of failure. Sure, it gets hot, but we want it hot—and remember that W9USA operates from six to ten times as much as the average amateur station.

The doubler also is an RCA 210 and this stage is followed by an RCA 860. Up to this stage the transmitter may be considered something along the type of the desirable average since the output of the RCA 860 can be coupled to an antenna system. However, we go one step more; to the final stage which is two RCA 852 tubes in push-pull. This stage operates on about 2500 volts at

* Chairman, Technical Committee.

about 400 ma. and the plates of the RCA 852's remain cool.

The antenna system is of the Zepp type. The feeders being 92 feet long and the radiator 66



THE MAIN TRANSMITTER—W9USA

feet—not counting the stretching. Reception at W9USA is far from the best—yet reasonably good signals are copied with little difficulty. All reception has been done with National FBX single-signal superheterodyne receivers and the Silver Ham Super.

Strays

A fellow worker glancing over W4ACB's shoulder while he was reading the RM Bull wanted to know what team was leading in the American Radio Relay League!!!

S.S. Filter Crystals That Won't Work

Attention is called to a peculiar cause of poor filter operation in some s.s. receivers. A number of cases have been traced directly to the fact that the owner screwed down the cover of the crystal mounting too tightly. This can cause pressure on the top plate of the crystal mounting with consequent bending of the top plate and excessive damping of the crystal. Since the cover must be left loose and since it is natural for the operator to screw it down tight, this trouble undoubtedly has been responsible for considerable seemingly poor i.f. alignment, lack of sensitivity and failure of the crystal to oscillate in a test circuit.

Further Licensing Notes

A Correction

IN PREVIOUS notes on this subject published on page 31 of *QST* for November, and again on page 50 of the same issue, I made reference to the "proof of activity" which is required before modification or renewal of either operator or station license. I said that, since this had to be done during the last three months of the life of the license, and the new application had to be filed not later than sixty days before expiration, this demonstration of activity had to be made during the one month period between ninety-days-before-expiration and sixty-days-before-expiration. It has been brought home to me that I was thoroughly wet about this, through confusion with some earlier draft of the regulation. Sorry, fellows. Rule 402 plainly permits this proof of use to be made during the three months period *prior to the date of submitting the application* for modification or renewal.

Have you seen the new license? Funny looking thing. It is a piece of light-weight white cardboard, 3 inches by 5 inches, printed in black ink, station license on one side, operator license on the other. It may be trimmed to 2½ inches by 4 inches and then is the same size as driver's licenses, membership cards, etc. After years of engraved operator certificates this is certainly quite a change. We shall particularly appreciate, however, the portability of the operator authority.

Every ham used to tack up or frame his two licenses and his A.R.R.L. membership certificate. Wonder if we might not now just as well change the A.R.R.L. membership attestation to a traveling card, to keep pace with the F.R.C. tickets?

The Commission's Rule 221b, called 221 (3) at the time the regulations were first published in *QST* and the *License Manual*, provides that an operator may continue operating not longer than thirty days without having his operator license in his possession, if it has been mailed in for endorsement or other change (provided, of course, the license doesn't expire within that period). A.R.R.L. has pointed out to the Commission that this length of time is insufficient in the case of amateurs in Hawaii and Alaska, and sometimes a pretty close squeak in the case of the West Coast. The Commission accordingly has changed this rule so that the figure now reads sixty days.

An amateur has old-fashioned licenses, separate for station and operator. He desires a second station license in his school city or summer place. He wonders whether to

apply only for a second station license and merely mention that he is already a licensed operator, or whether he is obliged to surrender his existing operator license and have it reissued with the new station license in combination form. The instructions accompanying the new amateur application form state that any applicant holding a valid amateur operator license must submit that license with any new application in order that, to the extent appropriate, the old license may be canceled when new or superseding licenses are issued on the new combined form.

Should a person apply only for a station license, leaving the operator questions blank, the Commission would return the application, as it is impossible to secure station license without becoming, or proving that one already is, an amateur operator.

Rules 405 and 406 permit the issuing of amateur operator privileges to the holders of certain other types of license without complete examination. Some applicants apparently have thought that under this recognition of other licenses, no personal appearances were necessary, regardless of where the applicant lives. This is not true. A Class-A applicant who qualifies under Rule 405 and who is not a licensed amateur operator must appear *in person* for the code test and the remainder of his examination; and personal appearance is also required for the Class-B applicant under Rules 405 or 406.

Commission Rule 213 cites the limiting conditions under which the Commission will authorize remote control. On October 3d the Commission amended this rule from the form recently published in *QST* so as to delete the limitation to one-kilowatt stations and to a separation between control point and transmitter of not over five miles.

The Commission has adopted an addition to Rule 23 permitting the use of radio stations during emergencies for communication with points other than those specified in the license, and stipulating the conditions to be met by stations performing such service. This applies primarily to such stations as, for example, broadcasting stations, which normally are not permitted to engage in any point-to-point communication. It is not necessary for amateurs to comply with this Rule 23 and send notices to the Commission when their stations are engaged in emergency communications. The amateur case is covered in our Rule 370. It has been suggested to us informally that the word "emergency" therein should be construed to mean major disasters, such as earthquake, flood, hurricane, etc.

Many applicants fail to understand the distinction between the terms "new," "modification" and "renewal," which come into use in filling out the application form for either station or operator license. The Commission uses these terms as follows:

New

- Any amateur's first operator license.
- Any license successor to a T.A.
- Any other operator license issued on application lacking proof of use under Rule 402.
- An amateur's first station license.
- His first license for an additional station (additional call) to be maintained simultaneously with the other.

Renewal

- Any reissue in kind or equivalent, designed solely to overcome expiration, and issued at or before expiration on application showing proof of use under Rule 402.
- Any reissue, not necessarily in kind or equivalent, but designed primarily to overcome expiration, and issued after expiration on application showing proof of use under Rule 402.

Modification

- Endorsement of a valid operator license for higher class privileges.
- Reissue of station license before expiration, on application showing proof of use under Rule 402, to authorize change of station location or of trustee-licensee.

(Continued on page 70)

A.R.R.L. Fourth All-Section Sweepstakes Contest

Big Annual QSO Party Dates Set as December 9th to 18th—All W, VE, K, KA, CM and VO Hams Invited to Take Part and Report—69 Certificate Awards to Section Winners—Affiliated Radio Clubs Holding Local S.S. Contests With Additional Awards

By F. E. Handy, Communications Manager

ANY ham with an amateur station in the U.S.A.¹ or Canada can take part. Each station participating "works" as many other stations as possible in the contest period. In operating, the idea of making contact with amateurs in as many different A.R.R.L. Sections² as possible is also kept in mind. As necessary proof of "solid" QSO, a short message will be exchanged. Two week-ends and the time between them, nine days in all, will be available for participation. Fullest operating enjoyment is assured. Ask any amateur who took part last year!

The 1932 contest was the biggest national contest in A.R.R.L. history to date, a story of more taking part, larger scores, more fun. Letters urging this year's "S.S." have in many cases put forward December as "the" month, so December it is. To prevent misunderstanding of the starting and ending time of our 1933 Sweepstakes, consult your local time in the following table. The contest runs from Saturday, December 9th, through Sunday, December 17th (into early Monday, December 18th).

THE CONTEST PERIOD		
Time	Starts	Ends
A.S.T.	Dec. 9th, 5:00 a.m.	Dec. 18th, 5:00 a.m.
E.S.T.	Dec. 9th, 4:00 a.m.	Dec. 18th, 4:00 a.m.
C.S.T.	Dec. 9th, 3:00 a.m.	Dec. 18th, 3:00 a.m.
M.S.T.	Dec. 9th, 2:00 a.m.	Dec. 18th, 2:00 a.m.
P.S.T.	Dec. 9th, 1:00 a.m.	Dec. 18th, 1:00 a.m.

THE GENERAL CALL

"CQ SS CQ SS CQ SS de W . . . W . . . W . . ." is suggested as a special call to indicate stations looking for contacts during the Sweepstakes contest. During the active operating hours a single snappy "CQ SS" will bring results!

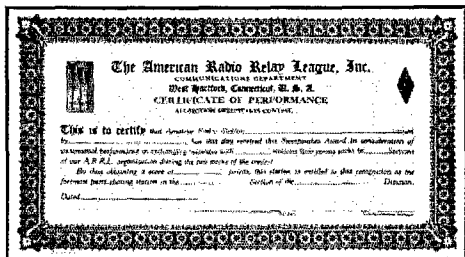
1. Including Cuba, Porto Rico, Hawaii, Alaska, P. I., etc. Amateurs in Newfoundland are included in the Maritime Section of the A.R.R.L. field organization.

2. See the complete list of Sections in the A.R.R.L. organization, page 5 of this issue of QST.

3. "Handling" a message always includes the transmission and receipt of radio acknowledgment (QSL) of same, and entry of date, time and station call on the traffic, as handled, for purposes of record. All messages should be handled in standard A.R.R.L. form.

KEEPING SCORE

As contacts are made and a score built up you keep a list of stations, their A.R.R.L. Section and the number of points for each QSO. Each station (c.w. to c.w. or 'phone to 'phone) worked can contribute a possible two



points. A message received counts one; a message sent counts one. More messages may be handled,³ but add no more to the score. At least one message must be handled between two stations as "proof of QSO"⁴ before points or Sections can be claimed. These exchanges have been simplified to the minimum for "proof of contact" at the same time they enable operators to keep in form by permitting short snappy texts. C.W. telegraph to 'phone station contacts count double credit . . . a possible four points per QSO.

At the end of the contest add all the points. Count the number of different A.R.R.L. Sections worked (those with which at least one message has been handled). Multiply the sum of your points with individual stations by this number. There are 69 Sections² in the League's organization so this is the greatest possible multiplier. Keep the summary of your score in the form suggested. List all operators⁵ whose work at your station is responsible for any part of the score.

PHONE WORK

'Phone possibilities are unlimited. In the last contest W3ALC worked 43 Sections on voice, running up a score of 9374 in the S.S. This year the scoring rule is changed so that every 'phone to c.w. station QSO gives twice the credit,

4. There is no point in working the same station more than once in the contest period if two points have been earned by exchanging messages. If but one point is made the first time you can add a point by working this station again and handling a message in the opposite direction.

5. The highest individually-attained score of any one of the operators of amateur stations having more than one operator is the official score for such a station. The summary of score must show all stations worked by all operators however, underlining, or circling, the entries of stations and of Sections that cannot count in the official total. Awards will be based on the official total and will be made to the individual operator accredited with this total. To show the possible scores that can be built up by several operators at one station, such scores (all Sections listed by all points listed) may be shown parenthetically after the "official" score that counts toward a possible award.

for both operators (2 points for msg. sent; 2 points for msg rec'd . . . a possible 4 points). What 'phone operator can break W8ALC's record?

LOW POWER POSSIBILITIES GOOD

Real operating is more important than power. Last year with a single '45 with 400 volts W8APQ had a score of 15,000 or more. In a previous S.S. one of the winners used a '01A transmitter with 180 volts B supply. So don't let uncertainty about your "power" deter you from getting in on a good operating opportunity. Let us know who can make the best record with low power. Report all work.

PROOF OF QSOs

Except when regular amateur traffic is sent or received (which it should be when it can be routed in the proper direction to assure promptest delivery), "contest messages," each of at least five words text, may be sent to create proof of solid contacts. The test messages, as with all messages must be sent complete, in proper A.R.R.L. form with city, station, number, date, address, text and signature. Those who take part may report improper message sequence or abbreviations in texts (abbreviated words are not ethical in texts). Where Sections are smaller units than states, the name of the Section should be included after the signature in originated messages to assist participants in properly crediting messages.

Example of a message in A.R.R.L. form:
Hr msg fm Linden, N. J. W2ALK NR 332 DEC 10
To C. B. Anderson, W6CDA
3226 A Nicol Ave
Oakland Calif
What days do you work Byrd expedition KJTY on 8250 kcs
C D Tobin
(Northern New Jersey Section)

Before each day's operating several different short test message texts can be written to use in swapping proof-of-QSOs in proper form. Progress of competitors can be discussed. A little humor and imagination inserted in texts

6. All hams are requested to submit lists, even if they only show a small score on a postal. By doing this they help support claims made in logs from other stations, and also they receive full credit in QST.

7. "Sent" and "received" are indicated as S and R in this summary. When reporting your monthly traffic total to your S.C.M. (as you are invited to do regularly the 16th of each month, although not required in connection with this contest) messages should be classified as "originated," "delivered," "relayed," with the sum of the three as your "total" for the Section report in QST.

should add much to the interest in this contest and insure no "73 cul" formula QSOs. Identical-text messages (rubber-stamp type) are ruled out of the count. A different text must be sent each station. All work must fall within the contest period, too. Failure to provide traffic files if called upon to do so will constitute disqualification. However, participants are requested not to send in message files with their reports, but merely to hold them for possible call. This will simplify arrangements for those who take part.

THE CERTIFICATE AWARDS

A classy-looking certificate award will be given the leading participant (highest official score) in each Section throughout the field organization of the League. This is a practical test of the reliability, general communicating ability, and efficiency of stations and operators. Certificates will be given as a permanent record and memento of the operating result attained.

The only competition each operator must consider comes from operators in his immediate Section. Awards are for the operator running up the best communication record for each Section (as indicated by the score), and will be made by the S.C.M. and A.R.R.L. Hq. In this manner, operators in each territory are placed on a basis of equality as to DX conditions and operating opportunity.

AFFILIATED CLUB PARTICIPATION

To encourage local QSO Party participation, especially by hams who have never previously enjoyed the benefits of a contest, additional certificate awards will be made through each club where three or more individual club members, or new local hams invited by such a club, take part. Reports must be made either direct to A.R.R.L., West Hartford, or through the club secretary, mentioning the name of the club, to be eligible for the affiliated-club-award. There is nothing more fascinating than to plan local competitions and swap results in a friendly way with the ham-across-town as the operating goes along. Entrants who mention their club will be eligible for both club and Section awards.

Most effective use of the available operating hours, intelligent choice of the different amateur bands, and a high degree of operating proficiency will take one a long way toward superlative results in this contest—or in any amateur radio work for that matter. Good notes, real frequency stability in transmitters, and the new really-selective re-
(Continued on page 60)

STATION W/V E . . . SUMMARY OF CONTACTS 4TH ALL SECTION S.S. CONTEST

Date and Time (local)	Station Worked	Freq. Band (mc.)	City or Town	A.R.R.L. Section	List of Different Sections	TFC†	Points
Dec. 9th							
4:05 a.m.	W1ZB	3.5	East Springfield, Mass.	W. Mass.	W. Mass.	1-R 1-R	2
4:19 a.m.	W6CIS	7	San Francisco, Calif.	S. F.	S. F.	1-R	1
2:08 p.m.	W9GHI-F	3.9	Baldwin, Kansas	Kansas	Kansas	1-S 1-R	4
3:15 p.m.	W8ALC-F	3.9	Defiance, Ohio	Ohio	Ohio	1-S	2
Dec. 16th							
11:00 a.m.	W9FUI	3.5	Walnut, Ill.	Ill.	Ill.	3-R 1-S	2
12:08 p.m.	W9IYA	3.5	Chicago, Ill.	Ill.	Ill.	1-R 1-R	2
12:25 p.m.	W8BJC	14	Tulare, Calif.	San Joaquin Valley	S. J. V.	1-S 1-R	2
12:48 p.m.	W2BKM	14	Schenectady, N. Y.	E. N. Y.	E. N. Y.	1-S 1-R	2
Dec. 17th							
3:37 p.m.	VE5HP	17	Victoria, B. C.	B. C.	....	1-R 1-S	2
6:59 p.m.	W6CIS*	7	San Francisco, Calif.	S. F.	....	1-R	1
8:09 p.m.	W9ACL	7	Davenport, Iowa	Iowa	Iowa	1-R 1-S	2
					Sections		22

Number and name of operators having a share in above work
 Claimed score: 22 points X 9 Sections = 198.

* Note this is a second QSO (W6CIS worked twice). F shows c.w. to phone contacts which count double. I hereby state that in this contest I have not operated my transmitter outside any of the frequency bands specified on my station license, and also that the score and points set forth in the above summary is correct and true.

Also please note this score in our affiliated-club S.S. contest as well as in general participation record.

Name of Club Secretary's address Address

Signature Call

Club Member
 Prospective Club Member

for the EXPERIMENTER



Volume Control in Terms of Decibels

IN MOST amateur 'phone transmitters the voltage-divider type of volume control is used. A simple method of graduating this type of volume control in terms of decibels is as follows:

It is known that attenuation varies according to the following formula:

$$\text{db} = 20 \log_{10} \frac{E_1}{E_2}$$

But since the voltage drop across a resistance is directly proportional to the resistance we may write:

$$\text{db} = 20 \log_{10} \frac{R_1}{R_2}$$

where R_1 and R_2 are as shown in the diagram, Fig. 1.

For example, suppose we wish to make a voltage-divider type volume control which has steps of 2 db for a type 56 or 27 tube. The total resistance, R , is usually around 100,000 ohms. Transposing we get

$$\begin{aligned} \text{db}/20 &= \log_{10} R_1 - \log_{10} R_2 \\ \text{or, } \log_{10} R_2 &= \log_{10} R_1 - \frac{\text{db}}{20} \end{aligned}$$

Substituting in this last formula the known values of 2 db attenuation and R of 100,000 ohms we get:

$$\log_{10} R_2 = \log_{10} 100,000 - \frac{2}{20}$$

$$\log_{10} R_2 = 5 - 0.1 = 4.9$$

The antilog of 4.9 is 79,430 ohms (from a log table). For the 4 db loss:

$$\log_{10} R_2 = \log_{10} 100,000 - \frac{4}{20}$$

$$\log_{10} R_2 = 5 - 0.2 = 4.8$$

The antilog of 4.8 is 63,090 ohms. This process is repeated on down till the required loss is a maximum. Usually a 20-db loss is more than sufficient. The results tabulated for a 20-db loss are as follows:

DB loss	R_2
2	79,430 ohms
4	63,090 "
6	51,900 "
8	39,810 "
10	31,620 "
12	25,110 "
14	19,950 "
16	15,840 "
18	12,580 "
20	10,000 "

Thus if we take a wire-wound resistor and bring out taps at the designated points, uniform steps of loss will be obtained when the volume control is used. The advantage of this is that we know just

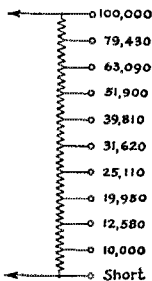
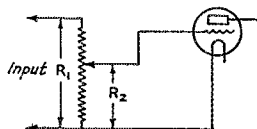


FIG. 1—THE VOLUME-CONTROL CIRCUIT AND THE TAPPED RESISTOR WHICH GIVES A TOTAL OF 20 DB ATTENUATION IN STEPS OF 2 DB

how much loss is introduced and we can turn to that loss at any time so that the excitation does not vary every time one goes on the air. If music is to be faded in and out, the taps will have to be right on the resistor so that the grid will not be free between taps. However, the slider can run directly on the resistor and stops be stationed so that the pointer arm stops at the right value of resistance. If a value of resistance other than 100,000 ohms is used the process is repeated, using the new value of resistance in the place of 100,000.

—Walter Fiegner, W6AST

(EDITOR'S NOTE—The values given in the table can be used as percentages to determine the correct point at which to place taps on resistors having a total resistance other than 100,000 ohms. For example, to get 2 db loss the tap should be placed at 79.4% of the total resistance; for 4 db loss the tap would be at 63% of the total resistance, etc. A chart giving a calibration for any voltage divider is shown in the article, "What is This Thing Called Decibel?", in August, 1931, QST.)

A Portable Power Supply

Several ways of getting plate power from low-voltage d.c. for a small transmitter have been described in past issues of *QST*.¹ A simplified arrangement operating on the vibrator-transformer principle has been worked out by A. P. and I. L. Brown, W8VJ-W8IDE, so that no special apparatus is needed—further, the power supply can be used on a regular a.c. line when such a line is available. In brief, the idea is to use an ordinary small power transformer, hook up the rectifier and filter in the regular way, and connect a 6-volt storage battery in series with a Ford spark coil to one of the unused filament windings on the transformer, preferably a 5-volt winding. When a.c. is available the regular primary is connected to the line. Fig. 6 gives the details.

W8VJ recommends that the transformer be one giving about 300 volts each side of the center-tap. The power supply as shown would be suitable for a low-power transmitter, but by the addition of a second filter choke and a third 8- μ fd. condenser section it can be used to supply a receiver. In the latter case it has been found advisable to put the Ford coil in a grounded metal can to help cut out the "hash" from the vibrator. Filaments of the tubes used in the receiver or transmitter can be supplied with power

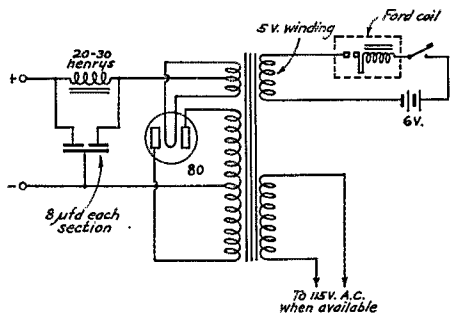


FIG. 6—POWER SUPPLY, FOR A SMALL TRANSMITTER OR RECEIVER, WHICH WILL OPERATE FROM EITHER A SIX-VOLT STORAGE BATTERY OR AN A.C. LINE

from appropriate transformer windings, but it is preferable to use tubes designed for battery use and operate their filaments or heaters directly from the battery—or from dry cells, if 2-volt tubes are used.

A D.C. Receiver With E.C. Detector

The receiver circuit of Fig. 5 is used by John M. Everitt, Ridgewood, N. J., to secure the benefits of the so-called "electron-coupled" or screen-

¹ Davis, "D. C. Plate Supply From Ford Spark Coils," June, 1932, and Farver, "Transmitter Power Supply From Low-Voltage D. C.," June, 1933, *QST*.

grid feed-back detector circuit, with filament-type tubes. In the original circuit (published in the *Experimenter's Section* in January, 1933, *QST*) the regeneration tap on the tuned-circuit coil was connected to the cathode of an indirectly-heated type tube; with directly-heated filaments a simple connection to one side of the filament will not work because it is necessary for the whole

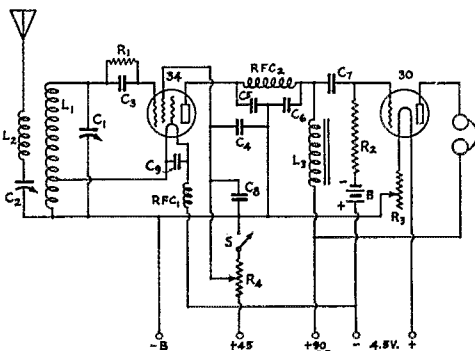


FIG. 5—RECEIVER CIRCUIT USING 2-VOLT TUBES AND SCREEN-GRID FEEDBACK

- C₁—135- μ fd. variable.
- C₂—250- μ fd. variable.
- C₃—250 μ fd.
- C₄—0.04 μ fd.
- C₅, C₆—100 μ fd.
- C₇—0.1 μ fd.
- C₈—5 μ fd.
- C₉—0.06 μ fd.
- R₁—5 megohms.
- R₂—1 megohm.
- R₃—20-ohm rheostat.
- R₄—100,000-ohm potentiometer with switch.
- B—3-volt flashlight battery.
- 6V—6v.
- RFC₁—See text.
- RFC₂—Any good short-wave choke.

Band	Coil Data	
	L ₁	L ₂
14,000 kc.	6 turns tapped at 2nd	3 turns
7000 kc.	13 " " " 1 1/2"	5 "
3500 kc.	25 " " " 2nd	10 "
1750 kc.	60 " " " 2 1/2"	10 "

The 14,000-kc. coil is wound on a tube base; all others are on regular plug-in forms, diameter 1 1/2 inch. No. 30 d.c.c. wire used for 1750-kc. coil; No. 20 for all others. All coils close-wound.

filament to be above ground for r.f. In Mr. Everitt's circuit this is accomplished by connecting one side of the filament to the tap on the coil and feeding the other through an r.f. choke. This is a thoroughly practical proposition with low filament-current tubes such as those in the 2-volt series.

Naturally the feature of greatest interest in the circuit is the filament choke, RFC₁ in Fig. 5. Of this Mr. Everitt says, ". . . almost anything works at RFC₁ with some success. I have used various cylindrical and bank windings on a piece of half-inch dowel. A choke made of 21 feet of No. 33 s.s.c. wire wound in three separated banks on the dowel seems a little better than anything else I have tried. . . . It makes but little differ-

(Continued on page 64)

Super-Power Made Possible With Class-B Modulation

IT'S just two years since *QST* rang the bell with the first practical information for amateurs on Class-B modulation. Since then we have seen its application grow and thrive in amateur work, despite criticism from the die-hards, and have watched with interest the inevitable adoption of Class-B modulation in other fields, especially broadcasting. There is no doubt that the demonstration of its practicability by amateurs has had no small influence in accelerating its progress in these other fields. Striking evidence of the tremendous strides in this progress is the use of Class-B modulation in the new super-power transmitter of WLW which is slated to go on the air experimentally with 500-kilowatt carrier, modulation capability 100 percent, sometime in December.

It's a far cry from the first 25- and 200-watt amateur modulators of two years ago to the 400,000-watt Class-B audio stage of WLW's new rig; but the basic principles and circuits are the same as we have been using in amateur 'phone transmitters. The only real difference is in magnitude—audio

transformers bulking car-load dimensions and weighing tons; potentials reckoned in kilovolts; plate currents measured in amperes. The circuit diagram would be familiar.



It's a boost of a few decibels from the tiny microphone transformer, scarcely visible in the OM's hand, to the mammoth double-unit Class-B output transformer in the background. This transformer, weighing upwards of 50 tons, has an audio output capability of 400 kw., as is required for modulating 100 percent the Class-C amplifier operating with 800 kw. average input. Besides its necessary ingredients of iron and copper, the transformer contains 1400 gallons of oil for cooling.

The new booster unit, which transforms WLW's present 50-kw. job to a 500-kilowatt, will use banks of Type 862 100-kw. tubes in push-pull-parallel, both in the 400-kw. output Class-B audio stage and in the 500-kw. output Class-C amplifier stage which is modulated, a total of 20 tubes of this type being used in the transmitter. In addition to the electrical power consumed—which, by the way, is less than would be possible with any other type of transmitter of equal power output—a million gallons of water per day will be required to cool the tubes.

Experimental transmissions on 700 kc. are expected to begin early in December, possibly sooner. Operating hours are to be 1:00 a.m. to 6:00 a.m., EST. It will be interesting to break a few early-morning skeds and crank up the broadcast receiver for a check on them.

Byrd Expedition News

SINCE November 1st the radio operators on the *Jacob Ruppert*, KJTY, have been listening in the 7-mc. amateur band daily, 9:30 to 10:15 p.m. CST, also 4:30 to 5:30 a.m. CST. KJTY on 8250 kcs.

W2ACY reported KJTY heard in this period on October 26th, R7 motor-generator modulated note. On November 4th W9UZ worked KJTY and took 14 messages. It is reported that NY1AA at Balboa, C. Z., is keeping a twice-weekly schedule also, and some personal traffic routed that way. Expedition schedules with WSL and other commercials sometimes hold KJTY until 9:45 or nearly 10 p.m. CST. W3CXL-WLM schedules WHEW daily.

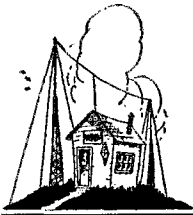
Both KJTY and WHEW (*The Bear of Oakland*) use the following calling frequencies, and specific adjacent working frequencies, for telegraph operation:

3105	6210	12,420
4140	8280*	16,560
5520	11,040	22,080

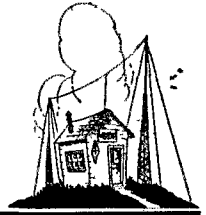
Operator Watson (of W1BGL) of the Byrd Antarctic Expedition advises as follows: "After leaving Panama we should have more time for amateur work. Due to the fact that amateur work is restricted, we will not be able to keep any definite schedules. We will look for calls on the 7-mc. band at the hours specified, when such operation does not interfere with the ship's duties."

The Federal Radio Commission has granted the permits for the main base, KFZ, 1 kw., and the forward base, KFY, 75 watts. These stations at Little America are both licensed to use the frequencies above 3000 kcs. listed by F.R.C. Rule 285A, for telegraph work. These are, substantially, the frequencies assigned to KJTY and WHEW and given above.

Four experimental station permits, 10XCC to 10XCF, have been granted for 5-watt stations to communicate with dog sledges. Two permits likewise have been granted for 10XCA, for geophysical research and investigation of frequencies above 30 m.c.



Amateur Radio STATIONS



W3QP, Philadelphia, Pa.

THIS month marks the tenth year of the existence of W3QP under the ownership of John B. Morgan, 2nd, of 8527 Germantown Ave., Philadelphia. After ten years of hamming many of us have nothing more impressive than experience to show for the time and money spent, but



W3QP

W3QP evidently has invested some of both in the makings of a good-looking and efficient station.

W3QP's transmitter is a four-stage crystal-controlled job, having a 10 oscillator, a 10 doubler, and an 865 buffer exciting a final stage in which two 852's are operated in parallel. The 852's take 3800 volts at 150 mils and evidently like it, since neither of them shows signs of the faintest blush. This rig is contained in the frame at the left of the operating desk.

A list of W3QP's receivers sounds like a catalog of manufactured sets. The one occupying the center plate on the desk is a Hammarlund Comet Pro, but there are also available a National AGS, an SW-5, and an M. & H.S.S. Super, as well as several home-made receivers. The R.E.L. portable in front of the loud-speaker horn is used as a monitor, while the gadget to the right of the receiver is a 50-kc. oscillator whose 100th harmonic is checked against WWV, other harmonics at 50-kc. intervals being picked up in all the ham bands. A couple of broadcast receivers are thrown in for good measure.

Practically all of W3QP's work is done on 7288 kc., on which frequency regular schedules have been kept with Australia and the West Coast.

Antennas seldom are left alone for more than a few weeks, but at the time this description was received good results were being secured with a 3/2-wave 7-mc. antenna fed at the center with twisted-pair feeders.

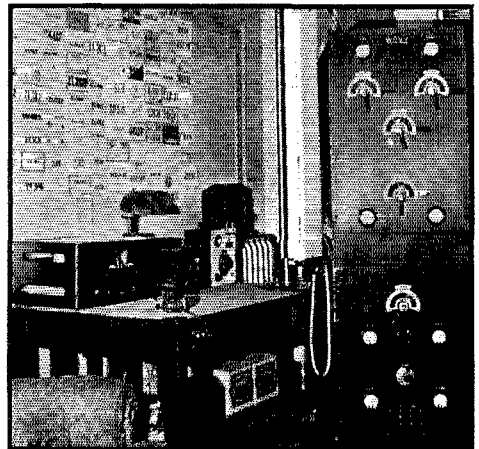
At various times Morgan has been an O.R.S., R.M., S.C.M., O.B.S., and O.O., some of which he still holds; also a member of the old R.C.C.

W2VY, Brooklyn, N. Y.

THE call originally assigned to George W. E. Shields was 3DS, issued in Philadelphia early in 1920. Operation under those call letters continued until November, 1927, when the family and station were removed to New York. W2VY has been in operation in Brooklyn, N. Y., from 1928 to date.

The transmitter shown in the photograph consists of two Hartley oscillators, an 852 for 20 meters and a 504-A for 40 meters. Both oscillators make use of the same power supply and antenna tuning controls. The 852 works with 250 watts input and the 504-A 600 watts. The power supply consists of a 1-kw. Thordarson plate transformer, 872 rectifiers, and a double-section

(Continued on page 70)



W2VY

● I. A. R. U. NEWS ●

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

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Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society: THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Ceskoslovenski Amatérský Vysílací
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Dienst
Experimenterende Danske Radioamatører
Liga Mexicana de Radio Experimentadores

Nederlandsche Vereeniging voor Internationaal Radioamateurisme
Nederlandsch-Indische Vereeniging Voor Internationaal Radioamateurisme
New Zealand Association of Radio Transmitters
Norsk Radio Relæ Liga
Polski Związek Krotkofalowców
Radio Society of Great Britain
Rede dos Emissores Portugueses

Réseau Belge
Réseau Emetteurs Français
South African Radio Relay League
Suomen Radioamatööriilitto r.y.
Sveriges Radioamatörer
Unión de Radioemisores Españoles
Union Schwets Kurzwellen Amateur
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

Tests:

It all started down in W4. Eddie Collins, W4MS-W4ZZP, in common with hundreds of other eastern U.S. hams, was eager to work Japan. Not content with sitting hopefully by awaiting that moment when a J call would split his ears, he wrote Masaomi Oshima, JIFF, suggesting a series of week-end tests. JIFF communicated the idea to J.A.R.U. headquarters, and Secretary K. Kasahara, J1EZ, undertook the organization work. First results weren't successful, so a new schedule for the last week of 1933 has been arranged. All eastern U.S. amateurs desiring to work Asia will then have a splendid opportunity to do so.

To alleviate QRM, alternate listening and calling periods have been arranged, so that we here will at least have a chance to hear the J's when they are on. The QRH is the 14-mc. band. The schedule, in G.T., with E.S.T. in parentheses, follows:

Dec. 23d	2045-2100	(3:45- 4:00 p.m.)
" 24th	2115-2130	(4:15- 4:30 ")
" 30th	2145-2200	(4:45- 5:00 ")
" 31st	1645-1700	(11:45-12:00 a.m.)
" "	1715-1730	(12:15-12:30 p.m.)
" "	1745-1800	(12:45- 1:00 ")
" "	1815-1830	(1:15- 1:30 ")
Jan. 1st	2215-2230	(5:15- 5:30 ")

These are the times for W stations to call Japan. Japanese stations will call in the intervening or following fifteen minutes, in each case. The times have been carefully selected as offering the best possibilities, with sufficient listening and transmitting periods for everyone to do some good work. GL.

Germany:

History will record the period from April to September of 1933 as a decisive turn in the D.A.S.D. and German amateur radio. Long years of struggle for the issuance of officially authorized amateur transmitting licenses were culminated during that time.

Never, in the past, had the D.A.S.D. found any governmental sympathy with its aims and intentions. The national socialistic government was the first to recognize the national German amateur organization as a part of all German radio, making it the only authoritative amateur society in the country, the representative of amateur radio in the "Funkkammer" or Radio Chamber which represents all non-commercial radio interests in the government, as well as the "Reichsverband Deutscher Rundfunkteilnehmer," the organization of broadcast listeners, and the "Deutscher Funktechnischer Verband," the familiar D.F.T.V.

In March of this year the government decreed a general ban on all amateur transmission, pending the settling of amateur problems on a carefully organized basis. In May about thirty amateurs got preliminary licenses, for the most part with their old calls.

In the meantime, the D.A.S.D. was acknowledged by the government to be the sole spokesman for German amateur radio. Licenses became available only through the D.A.S.D. After years of illegitimacy, German amateurs are at last able to work in the open light of free publicity, like their friends in other countries.

At the tenth German radio exhibition, the D.A.S.D. was able for the first time to exhibit as an officially recognized society. The Reichs-

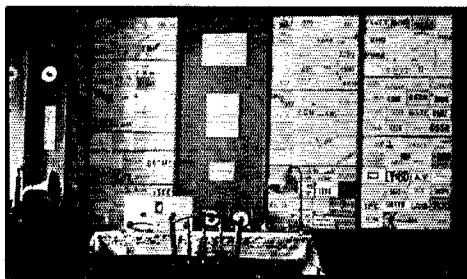
Propaganda-Ministry, which controls all German radio, invited the leaders of all districts (now augmented to 20 as a result of the large growth in membership) to Berlin for a course covering all of amateur radio. The district managers took home the knowledge that the national government energetically supports the intentions of amateurs.

On August 27th licenses were granted 180 German amateurs. On that day a general get-together meeting was held in the 3.5-mc. band, *QST*'s announcing to the world the final emancipation of German amateur radio. The licensing of new amateurs is now being accomplished by means of a regular system.

VP2:

Two letters:

"... I wish to advise that on May 15, 1933, the prefix VP2 was provisionally allotted to amateurs in the Bahamas by the Bahamas gov-



HB9V

Europe's highest station, operated at an altitude of 1710 meters by ing. Jacques F. Brocher, 8 Av. de Montfalcon, Geneva, Switzerland. The transmitter is an MOPA, with 50 watts input.

ernment, pending final approval by the Postmaster General of England. However, from 1928 until May, 1933, I was the only amateur in the Bahamas and operated under the call sign V1BA, having been given special permission to operate my station because I already had a Canadian amateur license—c1BA, 1925. Through the kind coöperation of Mr. D. Salter, the superintendent of the Bahamas Telephones and Telegraphs, amateurs were finally recognized in the Bahamas, and my call sign automatically became VP2NA in May, 1933. There are now two other amateurs, viz.: VP2NB and VP2NC. . . . I expect that there will be several new amateurs in the Bahamas during the next six months." (Signed) J. M. Cruikshank, M. D., VP2NA, Chief Medical Officer, Nassau, Bahamas. E. A. Boyce, VP2NB, is Deputy Director of Public Works in the Bahamas. He has recently been stationed at Hope Town, Abaco, on official duty.

The second:

"Nothing official is known here (Fiji) of any change in prefix. Large numbers of QSL cards intended for Bahamas, etc., are arriving here in

consequence of a recent statement in *QST* that Fiji was now VP2. Further numbers of cards are arriving addressed to non-existing VP1 stations. The only active and licensed amateurs in Fiji are VP1FF and VP1FR, any others that may appear in call books being defunct for a long time. Certain stations in another group, viz.: Gilbert and Ellice Islands, use prefix VP1, but details of licensed calls are not available. There is no Fiji Wireless Club and matter addressed there-to is undelivered. Correspondence on amateur radio matters should be sent to one of the two active stations." (Signed) F. Fleming, VP1FF, Suva, Fiji.

TBTOC:

Several applications followed the announcement of this new order in October *QST*, two of them being acceptable. Clyde C. Anderson, W6FFP, in fact, makes it an FBTOC affair, having worked L. M. Mellars, ZL1AR on 1.7, 3.5, 7 and 14 mc. with the equipment described on page 21 of the October issue. They are now striving for a five-band QSO, attempting to put signals over on 28 mc. as well as the other bands.

Don Wallace, W6AM, claims to be the original TBTOC member on the basis of a number of three-band QSO's with VK and ZL approximately five years ago.

Special:

"Krotkofalowiec Polski" is the official organ of the P.Z.K., a monthly 16-page publication filled with real ham material for the consumption of Polish amateurs. Our knowledge of the Polish language is, unfortunately, very much of a minus quantity, but to anyone able to read the language perusal of the magazine should be highly interesting. Detailed Calls Heard lists are given, filled with calls from everywhere, with large numbers of American stations. The subscription rate to foreign amateurs is \$1.00 yearly, the address Lwow, U1. Zyblikiewicza 33, Poland.

Silent Keys

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

William A. Brecht, Jr., W3CDE, Glenside, Pa.

Leonard W. Caywood, W9HAA, Wheaton, Ill.

Howard B. Hansen, W2EHA, Newark, N. J.

F. C. Hubbard, W6HLL, Daly City, Calif.

Aldred Martini, W8KGF, Cleveland, Ohio

Ralph C. Rothrock, W7PL, Adams, Ore.

THE COMMUNICATIONS DEPARTMENT



F. E. Handy, Communications Manager
E. L. Battey, Assistant Communications Manager



"Bk-in"—for Code and Voice Work

A "BREAK-IN" system has been used by up-to-the-minute amateurs for years. It is as useful in voice as in code work, and right now is rapidly gaining in popularity in the 'phone bands.

If you have never used break-in, give it a try. All radio communication involves back-and-forth two-way transmission. With break-in ideas and messages to be transmitted can be pulled right through the holes in the QRM. Snappy, effective, efficient, enjoyable amateur work really requires but a simple switching arrangement in your station. True, complicated arrangements with dozens of relays can be rigged to do the job, but the simplest of arrangements will be thoroughly effective.

The faster the change from transmitting to receiving can be engineered the better. A Morse-wire type key with a switch on the side, is quiet and fast for voice changeover and is a logical choice for every amateur. A push-button to put the carrier on the air only while talking is also a completely practical device. Current observations indicate that just as monitors are scarcer than they ought to be (discussed editorially last month) the advantages of break-in are not apparent to some code-hams newly on the air, and break-in is just beginning to get into regular use in many 'phone stations. But the trend is that way, and appreciation of the many advantages will make the use of break-in more wide-spread for both voice and code work.

Useless calling and unnecessary transmission during periods of heavy QRM can be prevented through intelligent use of break-in. Long calls, for example, are inexcusable, inconsiderate and unnecessary. Every transmitter can be so arranged that by lifting the key (and connecting 'phones to the receiver if these are cut off during transmission) the operator can ascertain if the station called is replying. Brief calls with frequent short pauses to listen for replies constitute intelligent operating, devoid of useless effort. During c.w. transmission insert a "BK" and pause briefly at intervals. This makes it possible

for the other operator to stop you, or get fills, if necessary. If not, transmission may be resumed. If you find that the station you are calling has, in the meantime, connected with another amateur instead of answering your call you will have at least saved yourself some wasted effort. QRM will also be lessened thereby. If the operators understand that break-in is being used, a "bk" and "g.a." will be of greatest value to interrupt transmission and direct when it shall be resumed. Where voice is being used similarly, conversations resemble wire telephone communication, and flow smoothly from subject to subject, and the "click" noted when the carrier is cut off momentarily can be as effective as the word "break" (so this can be eliminated) when two operators experienced in this mode of operating use this improved system of operation.

You use 'phone, or is it code, at your station. Either way, let us ask you a question. *Do you use any form of break in?* If not you are missing a bet. Use break-in. Give it a try.

—F. E. H.

The following contribution by Mr. Gene Clark, W6DQH, wins the C.D. article contest prize for this month. Your articles on any and all phases of amateur communication activity are likewise solicited, and may win you a bound Handbook, or equivalent credit applied toward League emblems, log books or other A.R.R.L. supplies. See announcement March 1933 QST (page 56).—F. E. H.

"What the NRA Suggests to an Amateur Operator"

By Gene Clark, W6DQH*

THE National Recovery Administration, in its efforts to give the nation a new deal, is administering not new but time-tested principles. Likewise, to give amateur radio the new deal it deserves for healthy existence, we amateur operators need only apply a few principles of correct operating practice that we have known ever since we first learned that "dit-dah" was "A."

Tune over one of the popular ham bands. Now picture in your mind what that band would sound like and how much more enjoyment everyone would get out of the game if a "code" such as the following were adopted and conscientiously observed by amateur operators generally.

* 1350 Sutter St., Apt. 54, San Francisco, Calif.

1. The operating frequency of the transmitter at this station is carefully checked and placed safely within the band before each operating period.
2. Conforming to regulations, the signal emitted by this transmitter is clean and sharp—the result of careful adjustment and the application of pure direct current plate supply to all stages.
3. A.R.R.L. "CQ" practice is observed.
4. Message traffic accepted at this station is relayed or delivered (by mail, if necessary) within 24 hours.
5. QSL cards are sent to all amateurs from whom a card is received.
6. Minimum power output is used for local communication.
7. Courtesy to the other fellow is always observed.
8. An accurate entry in the log is made of each transmission.

Yes, you're right—we could include lots more provisions in such a code, but as it is could you honestly post it in your station and write under it "WE DO OUR PART"?

Traffic Briefs

WHAT HAPPENS TO CALL BOOTLEGGERS?

If charged with "operating a station without a license" and convicted, such an individual, for violation of the provisions of the Radio Act of 1927, may be punished by a fine of not more than \$5000 or by imprisonment for a term of not more than five years, or both, for each and every such offense. (After all, are these risks of borrowing call signals, or operating without a license, worth while??? !!) Even if Department of Justice officials temper their prosecutions with leniency, as in a recent Seattle Washington case of illegal operation of a station, and reduce the charge to that of "violating an international treaty" by transmitting without proper licenses, conviction carries the possibility of a fine of not more than \$500 for such offense. In a Seattle case which resulted in conviction, the judge suspended sentence for three years, pending good behavior, and ordered monthly reports of the youth to the Federal court probation officer. Call borrowing is decidedly a dangerous game, bound to wane in popularity following such prosecutions, especially with the simplification of the government system, now providing for examination and concurrent licensing of operator and station under the new regulations effective in October.

VE9CNE (VE3XB) was installed at the Canadian National Exposition and handled a bunch of traffic in early September under the able guidance of operators VE3LX, VE3AU, and VE3XB. VE3LJ reports that "CNE" was located in the electrical building with the following line-up: '47 osc.—'10 buffer—'2 '10s—'2 '52s Class C. Mod. 56—'2 '50s—'2 '03A Class B with condenser mike, receiver a new Hammarlund. We regret that space limitations make it impossible to use photos from VE3DI and VE3LJ.

January 20th-21st has been set as the date of the next quarterly Official Relay Station QSO Party . . . also for the first quarterly test of Official 'Phone Station appointees, if a sufficient number of 'phones have received O.P.S. appointment by that time. All O.R.S. who wish another Transcon in January should send a radiogram to A.R.R.L. so that details may appear in January QST or the next bulletin issued.

W5BPM suggests that when you have a message for the city in which the station you are working is located, use wire procedure and say KK CITY KK. The man copying can then grab an A.R.R.L. (instead of plain) blank and copy the "delivery" thereon. KK is the Continental sent for a parenthesis.

Seven A.R.R.L. affiliated clubs in the Pacific Division have organized the "Federation of Radio Clubs, Southern California." The clubs making up this federation are Amateur Radio Club of San Bernardino, Associated Radio Amateurs of Long Beach, Glendale Amateur Radio Club,

Pasadena Short Wave Club, Santa Barbara Amateur Radio Club, San Gabriel Valley Short Wave Club, and Southeast Radio Experimental Assn. of Bell. An endeavor has been made to simplify this federation and to eliminate complicated by-laws and rules. It is an organization to correlate radio activities of amateurs in the Los Angeles Section. The seven club presidents constitute the Executive Committee and have chosen a chairman. Chairmen have also been appointed for each of the following committees: Technical, Interference, Publicity and Membership, Entertainment and Finance. Any club becoming affiliated with the A.R.R.L. in the Los Angeles Section is eligible for representation in the federation. This new organization publishes a monthly bulletin, the name of which is "73."

The Atlantic Division Phone Association was affiliated with the A.R.R.L. on October 18th. The purposes of this organization as expressed in its Constitution are "to further the art of voice communication, to be a medium for the exchange of opinion between 'phone operators in the Division, to be a medium to express the desire and opinion of the group to the Atlantic Division A.R.R.L. Director, to improve standards of 'phone operating procedure and fraternalism. . . ." The officers of the society: Robert Adams, W3SM, President; Dr. Burton T. Simpson, W8CPC, Vice-President; F. J. Wolff, W3BLZ, Secretary.

The Hudson Division Phone Association, Frank Carter, W2AZ, President, and L. J. Dunn, W2CLA, V.P., and the New England Division Phone Association, D. S. Boyden, W1SL, President, and Henry Izart, W1AUU, V.P., have also been organized in these Divisions, adopting constitutions with purposes stated closely similar to those discussed above.

O.B.S.

The following is a supplement to the list of A.R.R.L. Official Broadcasting Stations in September QST (page 44):

W1BD, W1DQK, W1FFS, W1SB, W1WV, W2QY, W3CZJ, W4CIQ, W5CEN, W6BLP, W8CHM, W8KMT, W9DDE, W9JP, W9ODV, W9YB.

December 10th—28-Mc. QSO Party

THE Milwaukee Radio Amateurs' Club announces a 10-meter QSO test to be held December 10th from 12:00 noon to 10:00 p.m. CST. All reports on Wisconsin signals should be mailed to H. F. Wareing, 4547 North 21 St., Milwaukee.

G6WY will call "Test Ten" at ten-minute intervals commencing at 1200 Greenwich and ending at 1300 Greenwich, every Saturday in December and January. Listening will be done between transmitting periods. Power used will be 150 watts, crystal controlled on 23,492 kcs. Reports are requested from any distance.

THE TEN-METER GANG are requested to keep up week-end tests, and drop a postal with any observations or results to A.R.R.L. each Monday morning. 28-mc. announcements and results will be addressed back to the gang via W1MK on Thursday and Friday nights following the "QST" (3825 and 7015 kcs.) at 7:30 p.m. and 11:00 p.m. CST.

F.R.C. EXAMS

The Federal Radio Commission office at Detroit is authorized to conduct regular exams quarterly at Cleveland, Cincinnati, and Columbus, Ohio. In mid-December examinations will be conducted in Cleveland. The date and place will be sent "QST" from W1MK and A.R.R.L. OBS in Ohio as soon as final arrangements are concluded.

Examinations will be held at Cincinnati in the first week in February, and at Columbus in the last week in February, 1934.

Don't miss the late December tests with Japan. These are announced in the I.A.R.U. Section of this issue. December should be a great month for operation of a ham station, with the A.R.R.L. Sweepstakes, Dec. 9th-18th.

Believe it or not, it took W . . . ('phone-only) three quarters of an hour the other day to "find his beat oscillator" before he could read that "station that called me on c.w." Maybe he was hunting for a key in his station, too?

For 'phone break-in, a telegraph key or bug with a side switch, is the fastest accessory. Use it to cut off the carrier for brief pauses in making a station call while you listen for a reply. It's a great time saver.

Famous last words; from c.w.t. and from 'phone stations we know: Answering QTC5 QRV? K . . . "Nil here nw 73 SK." After failing to answer questions, and misunderstandings on several transmissions . . . " . . . signing off after a very pleasant 100% QSO."

A number of low-power hams who have called 3.9-4 mc. 'phone stations (on telegraph) in vain for a pleasant QSO complain that either fraternal spirit or code speed is lacking. It is alleged that the stations seldom answer, and that when they do, the "pleasure" sometimes isn't mutual. True, there isn't a 'phone ham who would want to give up the right to use telegraph code in the 'phone band. Its use is logical and occasionally necessary to put through some intelligence, when in a voice-QRM-jam that a modulated signal can't penetrate. But many 'phone operators consider it unethical for a telegraph station to go into "their" band for even such a good purpose as a friendly chat with them, though such work is perfectly in accordance with regulations. How else is a fellow to communicate with a voice-operated station, if 'phone operators never listen out of their band? Anything to promote more 'phone-c.w. contacts helps to unify amateur radio, prevent narrow views, and insure complete understandings. That's why we have encouraged such work by double credit for such contacts in this year's S.S.

The President of the U.R.E., the national Spanish amateur society, announces that several competitions will be held in February, 1934—a Grand International Contest, an Asturias Cup Contest (regional), and an Ibero-American Contest (Portugal and Spain with North, Central, and South America). Incidentally, the new Spanish prefix EA (instead of EAR) will by then be in effect. More contest details as soon as received.

The A.R.R.L. announces dates for its annual DX Test, the Sixth International Relay Competition, as March 10-

BRASS POUNDERS' LEAGUE

(September 15th-October 16th)

Call	Orig.	Del.	Rel.	Total
W2BCX	175	176	1336	1687
W6PC	600	295	200	1095
W3CL	30	104	848	1082
W8CKO	5	25	84	94
W9KG	27	34	812	923
W9KJY	40	45	719	804
W8ASO	28	28	726	782
W8ADM	15	75	657	747
W8EIK	23	44	670	737
W3ALX	125	406	201	732
W6ALU	126	311	268	705
W6CDA	31	21	580	632
W6GQC	97	115	416	628
W9BMA	17	7	582	606
W3GUP	1	9	569	595
W9ABE	6	72	493	571
W9KNZ	67	48	455	570
W9BLG	175	389	4	568
W9EBA	11	55	501	567
W7WJ	93	394	61	548
W9DOU	45	61	398	504
W9ZZAF	21	22	460	503
W7BB	211	269	22	502
W2EKM	15	9	478	502
W7CZY	61	67	373	501

MORE-THAN-ONE-OPERATOR STATIONS

Call	Orig.	Del.	Rel.	Total
W3CXL	213	218	1646	2077
KAIHR	174	205	1266	1645
W9USA	1264	46	20	1330
W6DSU	1312	2	—	1314
W5OW	105	129	888	1122
NYIAB	173	127	778	1078
K6EWWQ	268	194	586	1048
W9BNT	265	362	354	981
W3BUG	780	—	12	792
W6TT	706	—	—	706
W5FC	638	11	—	649
W3BKQ	24	38	488	550
AC2BT	184	112	236	502

These stations "make" the BPL with totals of 500 or over. Many "rate" extra credit for one hundred or more deliveries. The following one-operator stations make the BPL for delivering 100 or more messages; the number of deliveries is as follows: Deliveries count!

W6DQN, 294	W2BNJ, 123	K6AIC, 103
K6AJA, 178	W6CXM, 120	W6GNM, 102
W6BWF, 173	OMITB, 117	K6EDH, 100
KAILG, 169	W6ZX, 117	More-than-one-opr.
W6AZU, 166	W3BWT, 109	W3ABT, 133
	W2EYQ, 106	

A total of 500 or more, or just 100 or more deliveries will put you in line for a place in the B.P.L. Make more schedules with reliable stations. Take steps to handle the traffic that will qualify you for B.P.L. membership also.

18, 1934. Details will appear in February QST, to reach all parts of the world in advance of the contest dates.

Relative Standings of the Ten Highest Sections—September-October

Messages Per Station (25%)	Stations Reporting Traffic (25%)	Gain or Loss (Traffic Reports) (25%)	Traffic Total (25%)	Standing Based on Average of All Four Ratings %	Section Communications Manager
M.-D.-D. C. 342.	Los Ang. (680)* 97	Wash. +40	Los Ang. 6261	Washington 62.5	Belliveau, W7AYO
P. I. 274.3	Wash. (374)* 84	Va. +15	E. Pa. 5938	Virginia 50.	Eubank, W3AAJ
Hawaii 265.4	Va. (150)* 73	W. Pa. +15	Ill. 4775	Los Angeles 50.	Martin, W6AAN
E. Bay 188.8	Mich. (624)* 69	Ore. +10	M.-D.-D. C. 3763	M.-D.-D. C. 42.5	Hudson, W3BAK
S. Texas 171.8	Ill. (890)* 59	San Joa. +10	Wash. 3717	E. Penna. 35.	Wagonseller, W3GS
E. Pa. 169.6	N. C. (140)* 54	Ky. +9	Hawaii 3716	Illinois 35.	Hinds, W9APY-WR
N. N. J. 163.3	Ohio (868)* 51	Colo. +9	P. I. 3567	Hawaii 32.5	Slaten, K6COG
Sac. V. 115.6	Mo. (324)* 49	Mo. +8	Va. 3346	Philippines 32.5	Thompson, KAIXA
W. Va. 109.6	W. N. Y. (563)* 42	Ind. +8	E. Bay 2632	East Bay 22.5	MacLafferty, W6RJ
Colo. 109.4	Ore. (260)* 41	Nebr. +8	N. N. J. 2614	Oregon 20.	Cummins, W7ABZ

WASHINGTON gets the Banner for September-October with a sizeable increase in "number of stations reporting traffic." While Virginia and Los Angeles both have an "all-around rating of 50%," the "second high" position goes to Virginia on the basis of "making" three departments (Stns rpt'g t/c, Gain/Loss, T/c Total); Los Angeles made two departments. The following Sections lead all other Sections in their Divisions, order of listing showing relative standing of their different Divisions: E. Penna., Hawaii, Wash., Ill., Conn., Colo., Va., N. Tex., Nebr. and Iowa tied, N. N. J. and E. N. Y. tied, S. Minn., Que., La., Ala. During the September 15th-October 15th month: 1408 stations Originated 21,947; Delivered 18,027; Relayed 55,839; Total 93,813. (74.3% Delivery) (62.8 m.p.s.)

* The Section A.R.R.L. membership (approx.) is shown parenthetically, so that the degree of traffic reporting activity may be indicated by comparison.

A-1 Operator Club

The amateurs listed below are new members of the "A-1 Operator Club." This club, organized to promote and encourage a high calibre of operating in the amateur bands, was first announced in July, 1933, QST. To become a member one must be nominated by at least two operators who already "belong". In making nominations members are requested to follow the qualification and rating system suggested in July QST. For previous lists of members see July, September and November QSTs.

C. W.: W1AFB, AJL, CPT, CRP, DF, DGG, SZ, WV, ZB, W8CWE, WP, W3ATJ, LA, NR, QV, "CJ" at W3BWT, "YB and White" at W3CXL, W4ABT/NC, ANZ, LL, ZH, "Dave and Mac" at W4OI, W5ATF, AVG, BMU, "H" at W5OW, W6ALU, AOR, CXW, ETL, OJ, PQ, K6AJA, COG, EWQ, K7AOA, W7SO, W8ARX, AVK, BAH, BGY, BME, CEC, CQA, DNK, EGI, FDY, FFK, FLA, FTW, FX, GUC, HSH, JM, "Geo. and Faries" at W8YA, W9ABE, ACL, AMB, BAZ, BBP, CNE, CTP, CYD, DFF, DI, DMY, DNU, DOU, EEW, EGU, EJC, FAA, FP, FQQ, HSK, HVA, "Booth (W8DDF/PV)" at W9YB, VE4DK, VESHP. PHONE: W1AVE, CCZ, SZ, W2JN, TP, W3AHR, AVL, AXT, DQ, GY, WX, ZA, W4OC, TR, W5AOT, ZA, W6KT, W8AOM, CFC, DLD, W9CJJ.

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.

Due to a resignation in the Georgia-South Carolina-Cuba-Ile of Pines-Porto Rico-Virgin Islands Section nominating petitions are hereby solicited for the office of Section Communications Manager in this section and the closing date for receipt of nominations at A.R.R.L. Headquarters is herewith specified as noon December 15, 1933.

Due to a resignation in the Philippine Section nominating petitions are hereby solicited for the office of Section Communications Manager in this section and the closing date for receipt of nominations at A.R.R.L. Headquarters is herewith specified as noon, March 15, 1934.

Section	Closing Date	Present SCM	Present Term of Office Ends
Mississippi	Dec. 15, 1933	Wm. G. Bodker	Jan. 15, 1934
Virginia	Dec. 15, 1933	R. N. Eubank	Dec. 15, 1933
Eastern Florida	Dec. 15, 1933	Ray L. Atkinson	Dec. 15, 1933
New Mexico	Dec. 15, 1933	Jerry Quin	Dec. 15, 1933
Ca.-S. C.-Cuba-I. of P.-P. R.-V. I.	Dec. 15, 1933	Chas. W. Davis (resigned)	.....
Alaska	Feb. 15, 1934	Richard J. Fox	Feb. 15, 1934
East Bay	Feb. 15, 1934	S. C. Houston	Feb. 15, 1934
Montana	Feb. 15, 1934	O. W. Viers	Feb. 15, 1934
Alberta*	Feb. 15, 1934	C. H. Harris	Feb. 15, 1934
Hawaii	Mar. 15, 1934	C. D. Slatin	Mar. 15, 1934
Alabama	Mar. 15, 1934	D. Elwell	Mar. 15, 1934
Philippines	Mar. 15, 1934	I. S. Limer (resigned)	.....

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager, Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

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 Sections concerned. Ballots will be mailed to members as of the closing date specified above, for receipt of nominating petitions.

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 as candidate for Section Manager. The following form for nomination is suggested:

Communications Manager, A.R.R.L.
38 La Salle Road, West Hartford, Conn.
We, the undersigned members of the A.R.R.L. residing in the..... Section of the..... Division hereby nominate..... as candidate for

(Place and date)

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 candidates 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 West Hartford, Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit to the number of petitions that may be filed, but no member shall sign more than one such petition.

4. 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.

Eastern New York	Robert E. Haight, W2LU	Sept. 16, 1933
Eastern Massachusetts	Joseph A. Mullen, W1AB1	Sept. 16, 1933
Idaho	Don D. Oberbllig, W7AVP	Oct. 16, 1933
San Diego	Harry A. Ambler, W6EOP	Oct. 20, 1933
Vermont	Harry Page, W1ATF	Oct. 20, 1933
Western New York	Don Farrell, W5DSP	Nov. 4, 1933

In the Ontario Section of the Ontario Division Mr. S. B. Trainer, VE3GT, and Mr. Arthur F. Ferguson, VE3HP, were nominated. Mr. Trainer received 51 votes and Mr. Ferguson received 49 votes. Mr. Trainer's term of office began October 18th.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Jack Wagener, W3G8—Watch for results of QSO contest in next QST. W3CL, BUG, ALX, ADM, BKQ and ABT make the BPL W3BUG was station at Phila. Radio Show. W3CL and ABT took most of the show traffic. W3CVS is moving to winter quarters. W3GFF is mostly on 'phone. W3AAD is on again. W3DXQ reports for AMR. W3AKB has 3.5-mc. zepp. W3EZ applies for ORS. W8VD is experimenting with RK18's. W8FLA is QRL A.A.R.S. W3ABZ got a job. W8ASW says traffic poor. W3CJA and AGK are QRL. W3CQU reports in person. W3BUIK is on 7 mc. W8EOH was visited by four W2's. W3AQN has odd working hours. W3BOL is on 1.7-mc. 'phone. W3ALX reports via radio. W3DWR, CPV and CUX report for first time. W3CUG and CBK are QRL school. W3YC, Dickinson College, will be on soon. W2CLP is chief op, W3CBK asst. W8IWT is interested in A.A.R.S. W3ECM is awaiting new crystal. W3CCD and ATR tied in a 56 mc. QSO contest sponsored by Beacon Club. W3CMW got notice from gov't about RAC note. W3CQP, BGD and BZC will soon be on with new rigs.

Traffic: W3CL 1082 BU 792 ADM 747 ALX 732 BKQ 550 OK 441 AKB 171 EZ 128 AAV 115 ABT 316 BRH 100 AQN 62 GS 40 CUX 38 AZF 31 AD 20 CJA-BOL 17 ADE 13 AMR 11 DWR-CQU-AGK 10 ABZ 9 DXQ 8 CPV-BUK 6 DIJ 5 CNP 4. W8FLA 234 CVS 121 EOH 47 VD 24 CFF 7 ASW 5.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, E. L. Hudson, W3BAK—RMs, W3SN-W3CJS-W3CQS. Chief RM, W3BWT. District of Columbia: W3CXL, ASO and BWT make BPL. W3ZD was QRL President's cup regatta 56-mc. broadcast. W3IL and CWE are rebuilding. W3ASE visited W9USA. Maryland: W3SN is QRL. W3BND worked WTEP. W3BHE is rebuilding. W3CDG built 1.7-mc. CW rig. W3CQS visited Phila. and Wilmington radio shows. W3ADP has unlimited license. W3VJ works 7 and 3.5 mc. W3CTD has nice schedule list. W3BQB gets R9 reports on West Coast. W3DAL is installing remote control. W3BNC is on 3.9-mc. 'phone. Delaware: W3BAK now has four licensed operators in family. W3DPA reports for first time. W3WI took unlimited exam.

Traffic: W3CXL 2077 ASO 782 BWT 389 SN 176 BND 117 BAK 82 CQS 30 CDG 10 ZD 1 CIZ 54 CTD 45.

SOUTHERN NEW JERSEY—SCM, Gedney Rigor, W3QL—W3CWL and CLQ have FB totals. W8BEI moved. W3ZX rebuilt. W3AVJ worked a VK6. The SCM, W3ACD, GU and Treasurer of SJRA visited the radio shack of the A.C.R.C. where W3KY will be located for

the winter. W3APV is new RM for that locality. W3DGF is QRL studies. W3CQO is QRL job. W3KW and BGP tell some weird tales re their sea-going days. W3BPT is rebuilding. W3ZI reports 4 schedules. 3CXV requested ORS. W3DPY returned to Jersey City after vacationing at Budd Lake, N. J.

Traffic: W3AEJ 9 DRP 52 ZI 19 CWL 119 AVJ 6 BPT 52 APV 67 CLQ 151 QL 24 BYR 3 DPY 22.

WESTERN NEW YORK—SCM, Don Farrell, W8DSP—New R.A.R.A. officers: W8BGN, pres.; DZF, vice-pres., EEN, secy.; APD, treas. W8BHK blew H.V. transformer. W8DSS is working overtime. W8DME spent the summer at his Owasco Lake camp. W8GPS uses 400 watts input. W8CJL is arranging Florida schedules. W8BWW wants schedules east and south. W8GPT reports gang from Glens Falls attended hamfest in Schenectady. W8BOL reports activity on 56 mc. W8AQE schedules Buffalo. W8FTB has full charge of amateur radio in his scout troop. W8EUY has new tritet rig. W8FYF has nice schedules. W8DMJ is busy with professional duties. W8IDJ has FB-7. W8AFM has applied for the first O.P.S. in the section. W8DSP is on three nights per week. W8DBX is back on the air. New calls reported in Lawersville: KQW-KUP. W8GZW worked G6WV on 14-mc. 'phone. W8DHU is rebuilding to c.c. W8JLG had rig in operation at Palmyra Fair. W8BJO plans to resume schedules on "G" Trunk. W8BEN moved his junk in from camp. W8FDY is working in Rochester. W8JJJ has plenty of trouble. W8BR has T.N.T. perking. W8BFG is on 3.5 mc. W8AWX is QRL football. W8DHU has new 50-watter. W8EKM is back after long absence. W8EBR and FFU are QRL college. W8GQ had his complete station in operation at the Radio Show in Utica. W8BEX is going after VK's. W8DWJ is putting in a c.c. W8JTN is back from trip through Adirondacks. W8JTT has a weekly schedule with KAIUP. W8JAK is highest traffic man. W8GZM moved to Sherrill. W8BHS is handling traffic. W8GWY reports things slow. W8AKX handled traffic with W9USA. W8FUG handled a nice bunch. W8KMC wants ORS. W2BIN and W2DQK are attending Cornell University. M.V.B.P. enrolled 10 new members. W8KJW wants OBS. W8FSY-BES-FYC-IY-CPJ and W1DQK have a fine 1.7-mc. 'phone chain. W8AON worked eight VKs in one week. W8LXL is building high power rig. W8ITT has new job. W8IMR is working DX. The SCM wishes to thank the League members in the Section for their confidence in him displayed by his reelection.

Traffic: W8JAK 238 CJJ 31 DME 23 GPS 62 BAL 13 HVS 16 DHQ 13 BWP 61 GPT 23 AQE 14 JTT 41 EUY 12 FYF 42 GZM 26 BHS 12 GWY 10 IDJ 55 DSP 37 DBX 10 DHU 43 FUG 37 BR 26 DSS 18 AGS 21 GQ 25 EBR-GWZ 2 BOL 8 FTB 7 DMJ 2 AFM-AKX 4 DNG 2 JLG 1 KMC 7 BFG 6 JJJ 5 GWT 7 BHK 3 EKM 1. BIN 16 DQK 13.

WESTERN PENNSYLVANIA—SCM, C. H. Grosarth, W8CUG—W8GUF is high man this month! W8YA is back for another year. W8GBC reports a new ham, KPU. W8BWL will soon be c.c. W8CRA schedules VOQH. W8EDG says W8JZ is football coach in Mt. Pleasant. W8HGG changed location of his station. W8IOH handled some traffic. W8IOI is 56-mc. experimenter. W8IFY is going on 7 mc. W8JZR announces arrival of Junior Op. W8INE is organizing a code class. W8KD says: "Don't forget the Banquet." W8CQA sends ORS certificate for signature. W8ECH reports for Waynesburg. W8DDU is awaiting cold weather. W8BFZ is on 14-mc. 'phone. W8CAF is QRL service work. W8WQ is portable KLZ on farm. Bradford Club station W8KGY is active. W8IQB has '45s. The QSO contest brings W8ESR to life. W8JSU and DNV promise to bust the ether during contest. W8FZG and GRZ are ORS applicants. W8HMJ wants one of those crystals. W8KVS is busy with U. S. Coast and Geodetic Survey. W8DYV built new modulator. W8FRA and CPE report by radio. W8DYY promises activity in contest. W8CCD reports new hams, W8KWA and KPG. W8KBJ is on 1.7-mc. 'phone. W8EJG is U.S.N.R. control station. W8FPD is operating KDWA on the Lakes. W8GVS is after traffic. W8HJC works 1.7-mc. 'phone. W8CMP says, "Getting ready to rebuild"!!!!

W8KQQ is adding a crystal. W8DKL's job interferes with schedules. W8FAD reports for FBE, JMP, AKU and EFB. W8GXU hopes to become ORS. W8KER reports for first time. W8HLM blew his fifty. W8IPL has transmitter trouble. W8FIP gives a good account of himself. W8AVY landed a job. W8FSZ reports for HUJ and CMK. W8ITV has 10 watts input. W8EVM is on 1.8-mc. 'phone. W8BTR sticks to 14-mc. CW. W8CGX is changing to crystal. W8BRM is building the new "Tritet." W8CEB is getting the itch to hammer a little brass. W8CAV is on again. W8CFR doesn't have much time for DX. W8HPQ has gone to 1.7 mc. W8CUG will increase power. Don't forget, fellows, your log of the contest must be in by November 30th! W8DYY and FRC visited the World's Fair.

Traffic: W8GUF 598 YA 367 GBC 292 CUG 251 CRA 151 BWL 220 EDG 106 HGG 105 KD 88 CQA 54 IQB 53 FZG 33 HMJ 28 DYY 27 FRA 24 CPE 23 DYY 22 CCD 19 KQK 17 DKL 14 FAD 10 CMP 8 GXU 6 KER 5 HLM-IOH 4 IPL-FIP 3 FSZ-GRZ 2 ITV 1.

CENTRAL DIVISION

ILLINOIS—SCM, F. J. Hinds, W9APY-W9WR—RMs W9DDE, W9CRT, W9ERU. W9ENH's aerial is one foot off roof. W9HYI has c.c. 'phone. W9CIA is going high power. W9AAK is adding a '52. W9IUL rejoined CCC. W9IWP wants ORS. W9LUY is building 1.7-mc. 'phone. W9BMN is building new receiver. W9JRL is putting up 1.7-mc. fundamental antenna. W9KJY says, "Send me a truckload of traffic to feed my schedules." W9ERU is tending police station at Rockford. W9NUF is building Jan. "QST" receiver. W9KEH organized ultra-speedy-reliable trunk line from coast to coast. W9NRY built four stage c.c. rig. W9MAJ got mixed up with A.L. Convention traffic. W9MKS sends code practise on 1.7-mc. W9AE is building 500-watt 'phone. W9ANQ has SS Super. W9BBR is on 3.9-mc. 'phone. W9ETU has 65-foot mast. W9IWD worked his first VK. W9JZV, MLQ and MWX are on 3.5 mc. W9OJJ and MFA are experimenting with c.c. W9HQH is putting in 'phone. W9AND and GFY visited Chicago. W9AAY installed inductive coupling to antenna. W5DFE (Peoria, Ill.) has doubler trouble. W9GYP does fine traffic work. W9HZA extends invitation to all hams near Western Springs to join their club—Suburban Order of Short Wavers. New autodyne receiver at W9JOC. W9GDI is headed for "WAC." W9GJJ had successful summer operating on lakes. W9HMB and KOQ have new c.c. rigs. W9KHD is chief op at EDC, New Trier High School. New SW3 at W9EMN. W9EVJ will join A.R.R.L. soon. W9FO and LOJ are QRL W9USA. W9FXE has been grinding crystals. W9HHQ is going to 1.7-mc. 'phone. W9LOK has 50-watter. W9BXL is all DX. W9HSB and NML have new baby boy ops. Congrats, Oms. W9ISG says, "Let's get rid of RAC on 7 mc." W9IBC's Zepp came down in wind. W9IVF says 1st district A.A.R.S. net FB. W9IYA has his eye on trunk line appointment. W9IZP worked 3 ZL districts. W9DZU is building some needed equipment. W9DOU says, "Lots of W9USA traffic." W9DBO went to Minn. for a truckload of spuds. W9ASZ, SG, LZP and BPU are rebuilding. W9CKC returns after 7-yr. absence. W9JZY completed his PA system. W9DDE is working up TL appointments. W9VS moved to 7618 North Eastlake Terrace, Chicago. W9MBQ has c.c. rig. W9MLE joined A.R.R.L. W9ODR says, "Let's eliminate RAC." W9RO is on 14-mc. 'phone. W9JO handled his traffic in 3 weeks of A.A.R.S. work. W9MKK is getting along fine with ORS. W9KA got on again. W9KXD asks why it is so hard to move traffic on 7000 kc. W9OBK and OCR are new Girouard hams.

Traffic: W9USA 1330 KJY 804 DOU 504 AND 425 JZY 346 VS 234 KEH 151 FCW-MDL 97 JOC 67 AMO 55 MLH 42 JO 40 FOC 39 IBC 36 MKK 35 CZL 29 IVF-NRV 28 LZP 27 CUH 26 CGV 22 GDI-HMB 19 IWP-IYA 17 IEP 16 EMN 15 GYP 14 FYZ-LOJ 12 MAJ 11 DBO-FXE-BIN 10 MTO 9 IZP 8 ICN-NDO 7 ODR-OVW 6 AAK-HQH-KXD-WR 5 CEO-ENH-MBQ 4 BPU-HUX-KHD 3 BSR-HPG-HZA-KA-KOQ 2 EDC-MKS 1 DDE 35.

INDIANA—SCM, A. L. Braun, W9TE—Every Indiana ham should take part in Indiana QSO Party held the first

Sunday of each month from 9 a.m. to 3 p.m. C.S.T. W9JVG, AEA and AEB have new receivers. W9AET is new A.A.R.S. NCS. W9AIP says efficiency of his amp. is 75%. W9AKJ is in Mich. W9AXH has a modulation indicator. W9BKJ went into ORS Party. W9BTR will be on with low power. W9DET gets out with his '45. W9DJJ liked the Indiana QSO Party. W9DJU has new bug. W9EGQ is awaiting license. W9EGV handles traffic. W9ELX has new mast. W9EPT is plugging along. W9EYF has been QRL chickens. W9FVI works lots DX. W9GFS has remote control. W9HML's ant. down. W9HSF is lining up schedules. W9HUO has trouble getting up ant. W9HUV is new OO. W9JRR is local NCS A.A.R.S. W9KDD is oping at W9NAA. W9LLV has homemade bug. W9LSW worked VK4. W9LWK was hot in ORS Party. W9MAT has new c.c. rig. W9MBG went to Chgo. W9MIG is working on MOPA. W9MQQ has an SW5AC. W9NCT is having trouble with grids. W9OLP uses DJU's old receiver. W9OXM has visions of PP '45s. W9PBS is a blind chap. W9QG says too much school. W9TE raised 2 VKs. W9YB has 25 ops. W9NAA has 7 ops. W9AXK blew a '66. W9LRH can't get his 211 to amp. W9CVX is back after several years layoff. W9DWR worked a W6 on 3.5 mc. W9JKK worked a K4. W9JQX joined CCC. W9JTU likes c.c. W9KKZ is planning 28-mc. 'phone. W9HPQ is building 50-watt rig. W9OFA works on 7 mc. W9IOQ is going to go on 56 mc. W9CKB has his mast up. W9FQ reports the radio club expects plenty activity this winter. W9KYM is getting schedules lined up. W9CHA was on with new receiver. W9HLF moved to Springfield, Ill. W9FKE ops 'phone and CW. W9NXN is U.S.N.R. NCS. W9HIU visited Indianapolis Radio Club. W9OGK is oping 1.7-mc. 'phone. W9LHC is spending winter in N.Y.C. W9LBQ is using LHC's rig. W9HBK blew transformer.

Traffic: W9YB 127 AIP 61 HBK 94 AET 37 AAL 25 EGV 55 EPT 34 BKJ 23 HML 47 HSF 15 MBG 30 MQQ 31 JJA-OXM 7 JTU 18 TE 19 DJJ 32 DET 14 JOQ-AXH 10 JRR-GFS 6 FQ-CHA-EGQ-HPQ 4 DJU-HUV 3 LJV 6 MIG 4 NCT 1 QG 2.

KENTUCKY—SCM, Carl L. Pfumf, W9OX—The second Ky. QSO Party was a "signal" success, with bigger attendance than ever. W9KKG has a 70-ft. tower. W9BAZ is trying to rebuild without going off air. W9JYO-EQO are reveling in delights of an FBXA. W9CJM has an FBXA ordered. W9FQQ takes traffic from NY1AA. Two brothers, who haven't seen each other for 30 years, talk over 'phone schedule arranged by W9IXN! W9CNE is Ky's laziest ham. W9ETT and FHZ visit Louisville. W9AUH is most consistent in Ky. QSO Party. W9BAN is striving for THE perfect note. Army schedules keep W9HAX occupied. W9CDA wants to "throw a binge." W9OFE craves more power. W9BWJ's results are off with low power. W9ERH and AQV divide time in order to enjoy QSO Party. W9ZZQ coaxes 150 watts into antenna. W9KTO moved to new location. W9HJD is blowing things. W9OX is experimenting with doublets and oxbaz. Illness of XYL keeps W9FZV off air. W9EDQ is about ready to "bust" loose. W9FGK says he is on 3700 kc. (?) W9EDV is rebuilding. W9DPW can't make new c.c. rig behave. W9NBD replaced '45s with '10s. W9ARU is gadding about. W9CKH gets out well with aid of a telephone pole. W9JVA wants to give up. W9OZO, PAM, PCK are new reporters. W9OMW, HBS, HCD, KOX, NMQ, NEP report traffic for first time. Watch for announcement of a Ky. traffic contest in December "Clippings."

Traffic: W9OX 193 KKG 119 BAZ 110 JYO 86 CIM 68 FQQ-LXN-CNE 54 ETT 47 AUH-BAN 37 HAX 28 CDA 25 IFM 23 OFE 22 OMW 20 HBS 14 BWJ 19 EQO 16 ERH 15 HCD-KOX-ZZQ 11 KTO 7 HJD 8 FZV-HBQ 6 EDQ 5 NMQ 3 FGK-EDV-NEP 1.

MICHIGAN—SCM, Kenneth F. Conroy, W8DYH-BIN—Keep a schedule after supper and watch the traffic go up. W8DZ-FTW-CETU-BIN-QT-JO-W9HK-W8DYH and, in fact, all the boys listed below will gladly QSP your traffic. W8FX resigns as RM and ORS. W8BRS is thru kibitzing. W9EEM reports 2 YL ops at W9PCU. W8JK works VOQH. W8DCQ-DSK-ERQ-GZJ-GOZ-JVV and AWE are working in sugar factory. W9OOQ has Collins

32-A. We hope the flue has flown from W8BMG-CFZ and W9NEZ. W8IWM wants to be a big message handler. W9DSJ reports new flock flocking the air. W8WG flashes a R-T 1st. W8JWJ's new Hertz is the Nertz! W8FVP's nose knows that gas-wagons and oak trees don't mix . . . it's broken! Says W8KOX. W8GRB saves for filter. W8AJJ gets it on 7 mc. and puts it out on 3.5 mc. W9IAO worked W5's on 3.5. W8DUR, ARR and BJ are on 56 mc. W8FAV wants swap crystals for '10 or '46s. W8KLR QSPed his first. W8DWB says QT pines for the heart-thumping, piano-thumper of G.R.! W8FTW-CEU-DZ pile up 7,400 pts. in ORS contest! W8DUN promises action. W8EBZ is QRL school. W9EGF is QRL. W8BGY and GQS report via radio. W8EGI is club 'em up. JARA is coming to life again. Goodfellowship Club of Dearborn and Detroit Amateur Radio Ass'n report FB ham-parties. W8FTV is recovering from ol' TB's clutches. DX stopped at W8HUU. W9CWR could do better if he had a crystal and power supply. W9CE plugs along. W8FTT is back! W8BMZ is for 25 kc. set apart for traffic handling. W8BIN has a bent 3.5-mc. zepp! Mrs. W8DYH doesn't like bread-board transmitters any more. All S. Range amateurs, W9EUC, HLW and IOV are c.c. now! W9HK says that DQT isn't in nut-house at Newberry, but works there. W8DVC is here again. Twelve years a ham and still W8BHH isn't ORS! W9CGP visited W9USA. W8BKU is pepping up. Ludington is there with W8HXT-CPY and IFQ. W8GUC is acting SNC for A.A.R.S. W8JO is our new emergency equipment Route Manager. W8AQD is getting started, reports IFD. W8IOR, AW, QT and EGX report. W8WA still runs his FB column in *Detroit News*—how about a report, Allen? W8EHD, IFE, IYN, DED, GSP, GJK, IXX, DYR, JVI, DCQ and IHN are in the throes of rebuilding to c.c. W8DLX is on for the winter. W9MXXM will brighten up Mohawk, Mich. Mention of whole gang in the *D.A.R.A. Traffic Bulletin*. Report to SCM each month for a copy. W8BJ is Editor.

Traffic: W8BIN 284 CEU 287 EGI 152 DVC 139 QT 92 FTW 88 DWB 86 GUC 75 AW 63 BMG 61 CFPY 59 BGY-EGX 56 ARR 54 IYN 50 BMZ 47 GQS-IFE 36 IHN 32 AEQ-BKU 30 IOR 29 DED 25 FX 24 HXT 23 DNM 20 EHD 19 CUP-HA-JK 17 FAV-GDR-JO 18 BJP 15 BHH 12 AIJ 10 DCQ-GRB-NR 8 CSL-HBZ-WG 7 GP-JVI-JWJ-WO 6 KOX 5 BRS-FTT 4 DSQ-DXL-HUD-KLR-WR 2 HSH-IFD 1. GRN 14 KSY 2. W9CE 17 CGP 11 IOV-NEZ 10 ADY 5 CWR-EEM-EK 3 IAO 2 AYO 1. MXM 1.

OHIO—SCM, Harry A. Tummonds, W8BAH—Acting Chief RM W8FO. Dist. No. 3: RM W8APC is ready for Western traffic. New Wauseon reporters: W8ABW, JJK, W8DIH is QRL club. W8SB is at Maryville District CCC, Marysville, Calif. Dist. No. 6: RM W8BBH reports trunk line going fine. W8FJW schedules GDC. W8KQO is attending college at Columbus. W8HWC hits the lucky 13. W8ARW helped a groom of one day find his wife. Four more schedules being arranged at W8ISK. W8IZQ schedules PO. W8GZ hits the century this month. W8GSO reports by radio. W8EQC reports for HZR, ECR and GGU. Dist. No. 7: W8EQB reports 14-mc. FB. RM W8VP is ready for schedules. Dist. No. 2: W8BDB operates pair of '60s. New rig at W8CGI. W8IUG worked W5CUX four times in five days. W8EJ maintains NCR schedules. W8EEZ has a new job. RM W8BKM attended World's Fair. Dist. No. 8: Welcome report from W8ESW. University of Cincinnati station, W8YX, wants schedules on 7 mc. Write Prof. W. C. Osterbrock. W8BRQ is attending U. of C. W8FSK uses 4 '66s in bridge rectifier. Write RM W8CGS for schedules. Dist. No. 9: RM W8DUV, member Tau Kappa Epsilon TKE, reports for CXM, DTD and AVT. Dist. No. 4: W8PO says advise Ohio ORS to be on toes to take any appointment that may be assigned for service in Ohio Net. W8ICC reports Bucyrus Amateur Radio Club started again with call W8JBL. W8UW schedules BZL, APC, QC, and DTW. W8WE has been sending code practice on 1900 kc. W8HMH has real plans for section activity. Dist. No. 5: W8FDV is working A.A.R.S. at IMC. W8KLP wants daytime schedules. W8BMK is trying to work DX. W8DDM schedules FVL and BDG. Dist. No. 1: W8FJX is now on Str. *Marquette*. New rig at W8FGP. Having first QSO

at W8KIP. W8HC entertains CATA members. New QRAs at W8IRM and DAT. W8GME says he is champion schedule misser. W8EFW is at Penn College. W8ZZB and BMX are rebuilding. W8GUL has a job. W8FNX tries new antenna. "Me for traffic from now on," reports W8ITR. W8ACZ is doing real Official Observing work. W8HGE is QRL work. W8AOA blew '10. W8FJE says Cleveland Heights High School Amateur Radio Club on again. W8EBY is QRL school. W8EPP schedules IMY, JAI, KJK, DUP, FOO. W8BAC is on 14 and 7 mc. W8FVL should be an ORS. Code practice sent from W8FFK on 1.7-mc. band. W8BON is busy with A.A.R.S., OBS and ORS. W8BAH notices many new hams taking part in traffic work. W8DVL says plenty A.A.R.S. activity. Schedules at W8CPS: W9USA, K6GUA, W6PQ, NYIAB, K6EDH, W4CA. FB, OM! OPS applicants: W8ESN, GDC, UX, HBN. ORS applicants: W8FMJ, AMF, HCS, FJN. Another Cleveland amateur was lost on the lakes, October 24th, when W8KGF fell down hatch on Steamer *Ishpeming*. Our sympathies to his relatives. Maumee Valley R.A. has resumed winter schedule of meetings. Medina County R.C. held successful hamfest. Committee: W8DXB, HPD, EMV, GMI, GAV, DCI, KNF, KOA. Cleveland A.T.A. elected officers: Pres., W8AXV; V.-P., DI; Secy.-Treas., CZT; Corr. Secy., HPW.

Traffic: W8BBH 386 CPS 226 DVL 178 GSO 135 GZ 101 PO 97 EQB 64 IZQ 56 ISK-BAH 54 BON 46 FJN 45 BKM-WE 39 EEZ 38 FFK 32 DAT 28 BMX-DDM 27 UW 23 EBYL-BAC 22 EPP 20 ARW 18 HWC-BKE 13 GDC 12 FV 11 KQO 10 BMK-FJE-HCS 9 DUV-IMH-UX 8 EJ 7 JJK-AOA-HGE-ACZ 6 AEW 5 BRQ-ITR-FNX-GUL 4 ZZB-EFW-GME-IRM-ICC 2 EQC 10.

WISCONSIN—SCM, Harold H. Kurth, W9FSS—W9HMS leads traffic. W9HSK is good R.M. W9FSS is organizing Wis. Net. W9HGF is putting in c.c. W9LFK is a traffic man. W9DXV handled radio week traffic. W9ETM is looking for schedules. W9HTZ on 14 and 3.5 mc. W9JCH finds traffic hard to get. W9ISD gets help from YL at station. W9HKL's antenna made 3-point landing in storm. W9IQW changed to parallel from P.P. W9GFC is on road. W9HRM is trying link coupling. W9ATA is QRL night school. W9OUP needs new ant. W9NMTK is on daily. W9GWJ has 3.9-mc. 'phone. W9EWY has c.c. W9IFS is working 1.7-mc. 'phone. W9DJK is in CCC. W9EXH gets out FB. W9AZN is QRL WX bureau. W9AKY is service man. W9EOB has been testing. W9IZT, IZH, KVV and ENP took Class A exam. W9HYA is still in Smoky Mts., Tenn. W9RH uses inductive coupling. W9DNU gets reports on his OM's condition by amateur radio. W9EHO has 21 H.S. students in code class. New hams: W9ONF, OJR, OME, PAQ. On 3.5 mc.: W9MUI, NKP. Milwaukee Radio Amateurs Club held 56-mc. contest. Southern Minn. challenged Wisc. to another traffic contest. La Crosse Amateur Club held first meeting on Oct. 14th. Northern Wisc. Radio Club opened season with a banquet. Sheboygan Radio Amateurs' Club elected officers.

Traffic: W9HMS 132 HSK 116 FSS 71 HGF 128 LFK 50 DXV 46 KJR 30 ETM 29 HTZ 26 MIE/JCH 14 HKL 8 IQW 7 DRO-GFC 3 ISD 14 MUI-NMK 4 EXH 6 EWY 2 ZY 5.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Wm. A. Langer, W9DGS —W9DYA uses a 199 for local work. W9IGR finds "tritet" FB. W9BTJ has TRF receiver. W9KBE hopes to live through initiation at the A.C. W9JAR schedules DYA. W9PCA is attending Coyne, Chicago. W9LHS is c.c. on 7 mc. W9EOZ, EGI, IK and YF, AVT and DGS were among those reporting an FB time at Redfield.

Traffic: W9DGS 50 DYA 23 IGR-BTJ 10 KBE-JAR 9. SOUTH DAKOTA—SCM, C. B. Miller, W9DKL-GIO —The Dakota Hamfest went over FB. W9KPK won an FB7A at hamfest. W9FDD won an SW3. W9TY visited MZJ. W9IQZ and DKL are in radio repair business at Redfield. W9AZR is QRL A.A.R.S. W9DGR is resigning as R.M. W9HAT wishes QST would use covers less attractive to children. W9GQH is planning a 1-KW 'phone.

Traffic: W9DKL 212 AZR 187 MVQ 40 DNS 30 DGR 29 IQZ 26 TY 8.

NORTHERN MINNESOTA—SCM, Robert C. Harshberger, W9JIE—W9HNS has QRNN. W9GIB and IHV worked first ZL and VK. W9OSB is new ham at Pine City. W9OYG reports first traffic. W9JIE schedules DKL, HSK and GSY. W9IPN wants reports on OBS. W9LAY has new zepp. W9JID is on 56 mc. W9HRB is on 7-mc. c.w. W9OOO had 50 QSOs first month W9OMI reports.

Traffic: W9IPN 125 JIE 56 HNS 22 IPA 13 OYC 2 JID 271.

SOUTHERN MINNESOTA—SCM, Norman Beck, W9EPJ-EMQ—W9BLG makes the BPL second consecutive time. W9BKK reports on fall activity. W9BKK has his rig all sandblasted! W9BN will continue work on TLS. W9CSY is AA DNCS. W9EPJ is going to monkey with 1.7-mc. 'phone. W9DEI worked Africa. W9IXQ put up new antenna. W9HCW is QRL Naval and Army schedules. W9DH finished his rig. W9GUX is interested in OBS. W9GLE sez, "Forty hath charms for me." W9LDQ reports fine time at Kato Hamfest. W9EYL expects to devote more time to radio. W9KDI reports W9EFW, W8BXT and W9MUF as going to Carleton College. W9FNK and GLE dropped in on the SCM. W9JBA visited Heron Lake. W9BNN is still working. W9HCC installed crystal filter in his AGS. W9OEV is new station at Mankato. W9JQA new QRA: 1928 Aldrich Ave., So., Apt. 6, Mpls. W9FMA new QRA: 3816 27th Ave., So. Mpls. W9CSJ has new receiver. W9EGG is building crystal superhet. Meeting of SMRA at Arlington Club, 57 E. 4th St., Winona, December 3rd. EXTRA—W9GFA won the FB7 donated by the SMRA at convention. He chased his YF out of bed and put in the FB7—?

Traffic contest between So. Minn. and Wisc. Dec. 16-Jan. 15. We lost last year—do your best this year.

Traffic: W9BLG 568 BKK 305 BKK 255 BN 109 CSY 80 EPJ 73 DEI 25 IXQ 16 HCW 15 DH-GUX 9 GLE-LDQ 7 EYL 4 KDI 3 FNK-JBA 2 BNN-HCC 1.

DELTA DIVISION

ARKANSAS—SCM, Henry E. Velte, W5ABI—W5BMI is on sick list. W5ABL has four-stage c.c. rig. W5JK sends nice report. Ex-5BU is applying for license. W5BXM has nice traffic report. W5DEN has a.c. receiver. W5CVO visited W9HJ. W5BUX is working DX. W5IQ winds FB r.f. chokes. W5SI is still navigating! W5UI copped plenty of prizes at convention. W5WH is having op's license renewed. W5DHG took in convention. W5BED expects to be back in L.R. for winter. W5ABI is c.c.

Traffic: W5BBI 260 BXM 58 ABL 12 JK 6 DHN 5 ABI 4.

MISSISSIPPI—Acting SCM, W. P. Allen, W5VJ—W5AZV is on 3.9-mc. 'phone. W5CLD supplied the dynamic "Mike" for AZV. Wanted: Applications for Officials Relay Stations. W5ANI puts out an R9 signal. Say, gang, please send your reports to W5VJ, P. O. Box 66, Jackson, Miss.

Traffic: W5CWQ 21 VJ 6.

TENNESSEE—SCM, F. F. Purdy, W4AFM—W4PL visited World's Fair. W4CIA is located at University of Chattanooga. W4ADX is a real DX'er. W4BBT says hard work plays havoc with his activities. W4AFI, ADI, OI, EM, LU, and AEP are active. W4AFI and BTQ are new A.A.R.S. W4AAD is working a fine arrangement of break-in with his 'phone. W4ACU is pushing work on new rig. W4AXN returned from trip to California.

Traffic: W4PL 146 RO 90 AFM 73 BUC 47 CBS 26 AYU 24 BPC 23 BOZ 16 AZM 9 BTQ 7.

LOUISIANA—SCM, W. J. Wilkinson, Jr., W5WF—W5BYX handles traffic. W5BZR visits Fair. W5IN changed to '10s. W5CVN is new ham. W5BID keeps lots schedules. W5EB and BPV visited in Shreveport. W5DLJ keeps five schedules. W5DKR joined A.R.R.L. W5HR's came via W5BPL. W5AFW schedules W1MK. W5AYZ wants all traffic she can get. W5BYQ 75 messages from State Fair. W5BYY and BYQ formed a partnership. W5NM reports from Bremen, Germany. W5RR has SW3. W5AXU is rebuilding. W5AGM has c.c. rig. W5DKR wants ORS. Active: W5KC, QH, YW, AOZ, CXQ.

Traffic: W5BZR 273 DLD 141 AFW 75 AYZ 29 BYX
58 HR 35 IN 20 BID 16 KC 6 BPL 1 DKR 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, R. E. Haight, W2LU
—Report monthly to your SCM and receive the ENY
Bulletin. W2BLU is again high man. W2BJA, CYW, GIR,
APF handled traffic at Albany Exposition. W2ACD
missed SARA Turkey dinner. W2EQD and ESO report for
Pelham. W2GCE promises his support. W2FPH joins
ORS. W2BKM is back again. W2CLL applies for ORS.
W2DYC and FXC make first reports. W2FEQ reports
DRS worked ZL4AI on 20-ft. indoor ant. W2DC won
FB7 at SARA Hamfest. Congrats, W2KW, best wishes to
you both. W2UL and CL visited W3BBB. W2GLI is out
for traffic. W2GCC is off MOPAs! W2BLL attended
SARA Hamfest. W2BZZ was out to break records at ORS
Party. W2QY is Head Coach Cornwall Football team.
W1EFM, ExRM, and ORS, joins Eny. Traffic hours:
W2EGF, ATM, CNF, CJS, BRS.

Traffic: W2BLU 490 BJA 249 APF 185 LU 157 EGF
136 ACD 74 CYW & GIR 42 EQD-EPH 38 ATM 20
BKM 31 GCE-CNF 15 FEQ 14 CLL 11 UL 4 DYC-KW-
FXC 3 DC-BRS 2 GLI 10. W1EFM 3.

NEW YORK CITY AND LONG ISLAND—SCM,
Ed. L. Baunach, W2AZV—All traffic men please send
W2AZV or W2DBQ a list of your schedules. W2BRB
reports plenty of activity. W2DTT sends code practice
daily on 7012. W2CLM is studying for unlimited 'phone.
W2EKD wants ORS. W2BNJ traded his FB7 for a
motorcycle. W2ELK reports that W2BYL has BCL
trouble. W2GMJ put receiver on the air! W2BTF
can QSY from 3505.5 to 7007 in two minutes. W2BNJ
and EYQ make the BPL. W2CEH's YF got her ticket
without the help of anybody. W2GMP sends first report.
W2BGO can be heard c.c. on 3545 kc. W2QM is looking
for operators for A.A.R.S. W2DJP schedules Canada.
W2F sends ORS bulletins every Saturday morning at
10 a.m. on 14226-kc. 'phone. W2EQA is QRL YLs.
W2EWS sticks to haywire. W2DBE pounds brass occa-
sionally. W2FDQ claims c.c. ng. W2FHB has new receiver.
W2BMH and EGA have new rigs. W2FFN's filter went
west. W2OQ says GDU is College for the Unemployed.
W2PF has Collins 4-A. W2CCD has taken on a YF.
W2DRG schedules BIN and DQK. W2ELB is on high
power. W2EBF was heard in Germany. W2BDV has new
receiver. W2GNX is new ham. W2EBE uses 'OAs.
W2BAS and ASG get out consistently. W2EPJ is c.c.
W2CAC is back at work. W2BED is one block from DUP.
W2EVA reports new men, EJP and GNO. W2DOG is
ready for winter schedules. W2FIP is member of Boy
Scout Relay League under W2SN. W2KR was busy in-
stalling transmitters on Admiral Byrd's ship. W2AGL is
experimenting. W2BEG has been busy getting his meet-
ings going. W2FIS made over 1000 QSOs in past six
months. W2AZV's YL takes up his spare time. W2BVT,
CPY, AGC, BKY keep 56 mc. hot. W2AA, LB, LR, BKP
hold down U.S.N.R. Net. The Second Tri-Club Hamfest,
under auspices of Nassau Radio Club, Northern Nassau
Wireless Association and Sunrise Radio Club, was held in
Jamaica, L. I., Oct. 20th. 200 hams were registered.
Those responsible for the success of the fest are W2VL,
BST, DJD, AOL, BKZ, AHZ, BNE, HN and CJY. The
Sunrise Radio Club was host to this event.

Traffic: W2DUP 265 EYQ 264 BNJ 228 ELK 98 QM
78 DJP 69 BGO 68 DBQ 54 DRG 43 CYX 32 AZV 30
FF 60 OQ 26 BTF 25 PF-FIS 20 BAS 15 CDD-
EBV-AGL 14 CAC 9 EVA 7 DOG-LB-LR-ASG 6 AGC-
AA 5 FIP 4 BVT 3 GMP-CEH 2 ELB-CLM 1 BKP-
JK 4.

NORTHERN NEW JERSEY—SCM, Walter A. Cobb,
W2CO—W2BCX runs away with traffic honors! W2EKM
makes BPL again. W2CPU and W3CGU are rebuilding.
W2BXM reports a few. W2EIC, ERJ, EVI, GZM, and
CTV, went hamming until 2 a.m. W2CJX vacationed in
Maine and Quebec. Sporadic operation reported at
W2AHL. W2GT received WAC. W2CIZ is QRL PA
systems. W2CIM, ALO, BPZ, and CDG passed unlimited
'phone. W2EJK attends Newark College of Engineering.
W2DGU reports on post card. W2EIP landed a job. Red

Bank Amateur Radio Club has been organized with
W2GAK secretary. W2CGG handles a little. W2SN has
Boy Scout traffic net in operation with W2EKM as
North Jersey outlet. W2EOH found three corners chipped
from his crystal. W2CZP is going to 1.7-mc. 'phone.
Ex2CVA made his OW take the exam to keep the family
on the air; she was rewarded with call W2GIL. W2DIU
is back in Jersey. W2EIC worked all districts on 3.5 mc.
W2AFK promises to join the League. Columbia High
School, Maplewood, has W2FUA manned by EJB, FAD,
EUP, DMY, CVG, and FLP. W2CSM complains skip
won't allow him to wire home for money. W2ESX built
new shack on his garage. The Memorial Radio Club of
Englewood has been organized and meets every Wednes-
day in Memorial House. Officers: W2CPA, pres.; FDK,
v.-pres.; AIF, secy.-treas. W2DNG finds new receiver
helps in DX. W2FMI is building 5-tube super. W2FCD,
EWA, ARS, and BPV are on 1.7-mc. 'phone. W2DOZ and
FDK have new c.c. rigs. W2IWF, CPA and ADP are build-
ing new outfits. W2DZA and ECW show no interest in
life other than DX. W2BVJ has a berth on Norwegian
ship. W2BGY moved to Rivervale. W2AIF is building
equipment for local hams. W2BYW got the bugs out of
his TRF receiver. W2BPY is not sure whether his new
job will furnish capital enough for new construction.
W2ENZ and CPT are ORS applicants. New stations:
W2GAK, FZY, FRC, GOJ, GNG, GMZ, GNT, GMR and
GNA. Rutherford Radio Club now meets second Tuesday
of each month. The SCM is released from airways work.
Bloomfield Radio Club has resumed activities. W2FB is
now with Federal Telegraph at Newark. W2BUH and
family hocked next year's income to visit W9USA.
W2EQS is putting up 250 ft. skywire at new QTH.

Traffic: W2EKM 502 DIU 212 EIC 30 CGG 28 CIZ
15 BXM 7 CJX 6 BCX 1687 FDD 34 EIP 23 AFK 21
CTV 18 AHL 7 GT-CTT 4. W3CGU 18.

MIDWEST DIVISION

IOWA—SCM, George D. Hansen, W9FFD—RM,
W9ABE, RM, W9HPA. W9ABE hands in leading
total. W9ZZAF visited HQs. W9LCX, our former SCM,
is going again. W9DNZ, CWG and EIV are busy with
A.A.R.S. W9DPO has 6 watts input. W9IO has schedules.
W9LEF has ORS aspirations. W9NQC reported by BFL.
W9DZW slips in a few. W9FZO says "long live 14 mc."
W9FFD gets about three hours a week for radio. W9GXU
is going well. W9FYX has daily schedules. W9FYC does
good work. W9HPA, RM, desires cooperation of all.
W9BFL is building new "Tritet." W9BPG is able to get
a few licks in. W9NTW promises more next time. W9JMB
is on 14 mc. W9FEB and CYL licenses expired. W9DEA
is new Ed. of TSARC STATIC. W9JDV is new in New-
ton. We need more ORS, OBS, OPS, OOs.

Traffic: W9ABE 571 ZZAF 503 LCX 92 DNZ 89 DPO
84 ACL 61 IO 54 LFF 53 EIV 52 NQC 40 DZW 36 CWG
35 FZO 34 FFD 27 GXU 21 FYX 20 FYC 19 HPA 18
BFL 8 BPG-NTW 6 JMB 3.

KANSAS—SCM, O. J. Spetter, W9FLG—W9KG and
W9CFN, CW R.Ms. W9ESL, 'Phone RM. W9KG takes
the lead. W9OKA, OQC and CWW are ORS applicants.
W9LGV is in State Sanatorium. W9HUS is at Caney.
W9CFN has '52 on 3.5 mc. W9II is leaving for Del Rio,
Tex. W9CRU will be on with new rig. W9LGR extends
invitation to all amateurs to come to KFBI at Milford.
W9MUY put up 60-foot poles. W9PB has new shack in
garage. W9KQJ-ex CUI reports for first time. W9OZN
and LVZ are new stations. W9AWP is rebuilding. W9DMF
and IGY are on 1.7-mc. 'phone. W9ABJ plans on 28 mc.
W9DWO moved to Iowa. W9DAL is in ham supply house.
W9BDB is grinding crystals. WARC of Wichita held big
banquet, Sept. 28th, with 56 present. Hiawatha Radio
Club elected following officers: W9PB, pres.; W9GXV,
vice-pres.; W9OQC, secy.; Charles Weltner, treas., and
W9IQI, activities mgr. W5ZZD is new SARC member.
W9GDS, EMT, HJF have gone c.c. W9BSK blew three
transformers, filter condensers and tubes. W9LGM was
set up at State Fair. W9FMX has FB7A. W9IXE has
FBXA. W9AWB has SW3. W9AWB says it will be FBXA
by Xmas. W9BUY reports Imperial Radio Club being

reorganized. W9FLG has new e.c. Osc. and Monitor per Jan. QST.

Traffic: W9KG 923 LGM 217 BYM 106 FLG 86 ICV 66 KFQ 44 MUY 41 AWP 36 KQJ 33 CFN 32 CWW 29 KDO 18 NI 17 OKA 15 PB 11 FMX 6 COA 5.

NEBRASKA—SCM, S. C. Wallace, W9FAM—W9BNT takes the lead and is arranging daily schedules except Sundays and Mondays with each State. W9DMY and FGS report by radio direct to SCM. W9EHW keeps a lot of good schedules. Any one wanting a schedule or having any dope on schedules get in touch with W9DI, Tobias, or W9DHA, Grand Island. W9FAM says, "Don't forget the Midwest Divn. Tfc. Contest starts Nov. 15th, ends Feb. 15th." W9BCX moved to new location. W9IFZ-AFD has been having transmitter troubles. W9EWO says he can't raise the SCM. W9BQR reports. W9FXP wants good East and West traffic schedules. W9DGL says DX FB on 14 mc. W9DXY says Omaha Club going FB. W9IFE has been working 3.9-mc. 'phone. W9EXP and FZX send FB reports via radio. W9CUY: Sure enjoyed the QSOs, OM. W9OPP: Always glad QSO you, OM. W9DHO says between radio sales and servicing and orchestra playing he doesn't have much time. W9KJP is building rack and panel job. W9CWM schedules DI.

Traffic: W9BNT 981 DMY 237 EHW 67 DI 38 FAM 24 BCX 24 IFZ/AFD 10 EWO 11 BQR-FXP 2 FGS 94 IFE 58 EXP 51 CUY 60 OPP 24 FZX 80 DHO 25 KJP 6 CWM 5.

MISSOURI—SCM, C. R. Cannady, W9EYG—W9FTA-W9BMA and W9CJR, RMs. Due to brevity necessary in QST reports and increased demand for a State Ham Sheet, the "social activities" of Missouri will hereafter be included in "The Missouri Bull" which will go free to ALL ACTIVE MISSOURI HAMS—reporting their activity. This space will be devoted to traffic reports only with a short announcement similar to the above. This, of course, is subject to the approval of the gang! Send your report in and get your copy of "The Missouri Bull" now, then give us your reaction to this system!

Traffic: W9BMA 606 CJR 167 BAU 46 HON 41 FEH-LLJ 6 HVV 31 RR 11 ZZ 1 FNO 35 FHV 20 KFL 4 BGE 14 KJK 1 DUD 15 EWT 1 HUZ 19 HWE 11 DOE 19 LXO 11 EYG 27 EHS 4 MAK 1 HCP 4 JPT 3 IJW 9 LWG 3 AAN 9 GTK-ENK 4 LLN 1 NNZ 30 AHH 6 BYN 4 ECE 26 EDK 21 IYT 17 DIC-LBM 1 LBA 21 GBJ 17 HNM 39 FYM 8 AIJ 75 HUG 13 LTN 10 CRM 27 ENF 24 JUB 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred A. Ellis, Jr., W1CTI—W1AMG tops the list this month! W1CJD complains of being QRL, but look at that total! W1FO is the 100% schedule station. Overheard W1BDI say that if he ran his input much over a couple hundred watts it blinked the lights! W1DOW has nine schedules. W1CTI bought a bug. W1GGX turned into a real traffic hound. W1AUK, EBI, CTO, BIQ and DGG report by radio. W1APW turns in fine total. W1BFS handled a lot of Longmeadow, Mass., Sesquicentennial traffic. W1YU operates on 3510, 3874, 3518 and low power 'phone on 3924 kc. W1BEM put up a single wire fed antenna. W1GC has '10 in final. W1FGV moved to East Hartford. New officers of New London Radio Club: W1ABN, pres.; DCM, vice-pres.; GXU, treas.; QV, secy. W1DOV got a great kick out of a W9USA QSO. W1EWD QSP'ed direct from G2ZJ. W1CNU uses 2AC as crystal osc. W1CBA will have new c.c. rig soon. W1CVL is QRL school. W1GKM is vice-president of Bulkeley Radio Club. W1HJW and HOP are latest additions to Bulkeley hams. W1BQS operated W2AIT on 'phone. W1HLS is at Loomis, Windsor. W1AKI moved. The Bristol Radio Club held a very successful hamfest at which 115 were present. Special broadcasts of interest to all Conn. operators are transmitted Sunday at 9:30 a.m. by W1CJD and at 10:30 a.m. by W1CTI. New officers of Twin City Radio Club of New Haven: W1AMG, pres.; BYW, vice-pres.; ATH, secy.; AUK, treas.

Traffic: W1AMG 364 MK 294 CJD 268 FIO 188 BDI 149 BMP 123 DOW 104 UE-CTI 90 GGX 84 AUK 83

APW 56 BFS 53 YU 52 BHM 47 GC 44 FGV 35 DGG 34 QV 30 BIQ 23 DOV 22 EWD 21 CTO 18 CNU 15 ERU 8 EEI 7 CVL-GKM 4 BNB 2.

MAINE—SCM, J. W. Singleton, W1CDX—W1BOF visited EF for few days. W1EFA is going deer hunting. W1GQA is a new ham at Dover-Foxcroft. W1FJP has a new 'phone. W1DEX is now located at Old Orchard. W1EBM has four stage transmitter. W1CHF is back again. W1OR is on at Bowdoin. W1DEH handled important rush traffic. W1BTG has new MOPA. W1DFQ handled a few. W1BNC sends code practice. W1CPT is very busy. W1EUIJ is portable AGL. W1HHL works good DX. W1APX is looking for new job. W1FNG has a nice P.P. rig. W1CRP is QRL work.

Traffic: W1BOF 239 EF 135 EFA 88 CDX 47 FJP 41 DEX 35 EBM 25 CHF 24 OR 44 DEH 24 BTG 20 DFQ 19 BNC 13 CPT-GKC-GGF 5 EUJ-HIL 2.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullen, W1ASI—W1ABG leads the traffic list with W1BEF second. W1AGA, RM, batted out third place. Eastern Mass. Amateur Radio Club elected officers as follows: Pres., W1KH; vice-pres., GL; secy., EUZ; treas., DK. South Shore Amateur Radio Club election shows: W1ASI, pres.; AJA and DFE, vice-pres.; AKY, secy.; CPD, treas. Newly appointed OBS. W1SB and WV, who is also OO. W1AGA got unlimited 'phone ticket. W1LM is lining up schedules. W1BBY is handling VE schedules again. W1EVIJ returned from the funeral of his '66s. W1BMW has FBXA. W1DFS is lining up the Cape traffic net with AGA. W1BZO has had nothing but hard luck since the SCM assigned him ORS No. 13. W1JL QRT'd until he can comply with new reg. W1ACH says he will report regularly. W1GEC is active on 3.5 and 1.7 mc. W1FRO found time to handle a little. W1FDS joined NCR. W1EVE is looking for schedules. W1CLE has '45s PP. W1RE is handling Needham traffic. W1ALP has a new shack away from jr. ops QRM. Attention of Club Secys.: Please report your club's activities to the SCM on the 15th of the month for use in this Section report.

Traffic: W1ABG 201 BEF 83 AGA 65 DFS 55 EVE 52 FRO 49 KH 42 BBY 39 RE 23 ACH 21 BZO 19 EVJ 12 FDS 11 BMW 25 WV-GEC 4 LM 3 JL 2.

WESTERN MASSACHUSETTS—SCM, Earl G. Hewinson, W1ASY-W1RB—The W.M.A.R.A. did an FB job handling traffic at Sesquicentennial Celebration in Longmeadow, Oct. 13th, 14th and 15th. Amherst College will be represented this fall under W1HHR. New ORS: W1EOB. W1HOD reports for first time. Locals for A.A.R.S. are wanted in Worcester and Franklin Counties. W1ETC says, "One Fly" is up at school. W1AIC is going south. W1ASY is rebuilding. W1AJD says, "Skip on again." W1AJ worked VK3WX. W1ZB is doing FB policing the air. W1BDW is building ultra-high frequency transmitter. W1BNL has a new "tritet" exciter. W1GUZ reports activity in Fisherville with four hams on the air: W1HIB, HJA, FOY, GUZ.

Traffic: W1FQA 127 FAJ 102 APL 80 AJD 71 EOB 66 FTS 61 ETC 48 BVR 36 DVW 29 ARH 21 DLH 16 COI 6 HOD 5 HHR 4 BNL-FNW 3 BDW 2.

NEW HAMPSHIRE—SCM, Basil F. Cutting, W1APK—Thanks, gang, for all the cooperation given me. W1CGJ has a fine radio business. W1AXL has a job. W1BFT plays in an orchestra. W1HOU, HQE, Hgz, and HOV are new hams. W1HPX is coming on with new rig. W1AVJ went to World's Fair. W1AVL blew '66. W1BJF is doing fine work. W1ERG leads the state in traffic with about 10 schedules. W1CBB sends Official Broadcasts 3 times a day. W1AUU received the first Official Phone Station appointment for N. H. W1DMI handles plenty of messages for Dartmouth College. W1FCI has new filter. W1EWF has fine DX list. W1DVG goes to Deerfield Academy. W1AIA is on low power 'phone. W1EZT is on 1950-kc. 'phone. W1UN leads White Mountain stations for messages. W1FEX is highest station in altitude in United States with year round operation on 56 mc. W1GKE is giving 14 and 7 mc. a try. W1HFO has a YL friend with the initials "R. F." W1FFL is a newspaper reporter. W1CVK sends code practice on 1920 kc. at 6:15 p.m.,

Tues., Thurs. and Sat. W1BHH is rebuilding rack and panel style. W1HET is Nashua's first YL operator. W1FGC is trying to erect a 3.5-mc. antenna. W1AFD is QRL. W1AGO is after DX. The operators at W1DNC at St. Paul's School are W2GFM, W9DST, W1FIB and W1GTI. W1FTJ, our YL, can do 30 words a minute on a bug. W1BII is in the north country working for Tel. Co. W1BMM changed QRA to 20 Walker St., Concord. W1BGZ of WHEB has a 250-watt. W1CCM's health has improved very much. Membership of Dartmouth College Radio Club is about 20. President is W1FZB; Secretary, FHE. The operators at W1ET are W1FZB, W2FTF, W1FHE, W1AXH, W1FBH, W2BAK, W3BGF, W4BBN, W1DUR, W1CGY and W1FGO. W1EFK is busy in a restaurant. W1EAW is c.c. W1AVG has an addition to his family, a new OM. W1SK writes fine letters. W1ATJ is on 3.5 and 1.7 mc.

Traffic: W1ERQ 300 BFT 104 DMI 62 UN 56 BJT 36 FCI 29 FFL 21 APK 19 GKE 14 AXL 13 CGJ 11 HOV 6 CBB-FTJ 5 EZT 3.

RHODE ISLAND—SCM, Stanley W. Atkinson, W1AFO—W1BOF again leads this Section. FBl W1CAB reports considerable NCR activity. W1AXS spends most of his time on 14 mc. W1DBA is going c.c. W1FAH wants to swap back the glider for his transmitter. W1BES, EZW, GTN and GV are new ORS. W1HIY is on 56 mc. W1GVH jumps from 3.5 to 1.7 mc. W1DJX reports 7-mc. DX FB. W1ASZ is building new 1.7-mc. 'phone. W1GOG sends code practice nightly on 3.5 mc. W1FNE sticks to 14 mc. W1GPE reports traffic on 1.7-mc. 'phone. W1FTO has new c.c. rig.

Traffic: W1EOF 213 CAB 65 AFO 57 AXS 28 DBA 20 FAH 21 BES-EZW 16 GTN-HIY 12 GVE-DJX 10 GOG-GV-FNE 8 ASZ 7 GPE-FTO 6.

VERMONT—SCM, Harry Page, W1ATF—Greetings. Old W1BD tosses the torch and a bunch of reports. W1DQK leads in traffic. W1FPS has new QRA, new XYL, and new Collins receiver. W1CGV and EFC went prowling around BD's shack. W1AXN is building new transmitter. W1BJP visited DQK, BLC, AOO, AVP, ATF, and VE2FE. W1BJP entertained DQK, AOO, EBF and CGU. W1DGU and GGT are prospective A.A.R.S.

Traffic: W1DQK 53 ATF 47 BJP 32 AXN 17 GGT 9 BD 8 BAS 7 GNF 5 CGV 4 EFC 2.

NORTHWESTERN DIVISION

IDAHO—SCM, Don Oberbillig, W7AVP-DKD—Gem State Radio Club organized with W7GU pres., AVP as vice-pres., DEQ secy-treas., and meets in Y.M.C.A. Idaho State QSO days showed W7GL high point man. W7DQC worked CNA for state DX record. W7BAR, CSP, AYH, AVP have race to see who gets on 28-mc. 'phone first. W7AXY is putting up new Zepp. W7EAY is new Boise ham. W7DBP has 80-foot tower. W7BRU put W7YA on air. W7CZO is dickering for SW5. W7BRY is flying. W7DAW works 3.5 mc. W7ASA is rarin' for DX. W7DKM is on with low power. W7CUG is putting new rig on air. W7CJK is to get FBXA. W7DKY has new receiver. W7DSL is traffic getter. W7ATN built QST exciter unit. W7ALY is working, thanks to NRA. W7IY dropped in on SCM. W7CGR is QRL teaching. W7CGU, CGW, CGB, OUL are on 7 mc. W7AHS is working CCC at WUBJ, Boise. W7BCU blew some tubes. W7BAA was heard in ZL on 3.5 mc. W7DZO and DLS joined A.A.R.S. W7BAU is QRL creamery. W7BJZ has radio business. W7BKF is back in Boise for visit. Idaho QSO days second and fourth Sundays, 11 a.m. to 1 p.m.

Traffic: W7AVP 116 DQC 4 BAA 30 BRU 3.

MONTANA—SCM, O. W. Viers, W7AAT—W7CCR takes traffic honors. W7FL worked VK3ZB. W7AOD reports CNE going c.c. W6DPJ left for home Oct. 11th. W7AQN will operate OCC station WUBL. W7BYR says Mont. schedules perking FB. W7BVE changed OBC schedule. W7BMX will resume schedules. W7BDS of Roundup reports, W7CRH reports W7OW and AEF putting up station at Kalispell. W7CEG cracked his crystal. W7AFS is out for DX. W7ASQ and CRH have string of schedules. W7BJZ is after ORS. W7BEB is back again. W7COX is pinch-hitting schedules for AAT.

Traffic: W7CCR 120 CRH 98 ASQ 75 BYR 46 BJJ 31 FL 26 AOD 22 COX 9 BVE 7 BDS 4 CEG-AFS 2.

OREGON—SCM, Ray Cummins, W7ABZ-CBB—W7WJ makes BPL. Visitors to SCM: W7CBA, AYW, ALM, CUJ, CAE, AOL, APG. W7PL no deer this year. W7LT has PDC. W7DWQ is QRL school. W7CVL is Baker CCC op. W7CUV goes to 7 mc. The Astoria Radio Club reports traffic 100%. W7ALM delivers daily papers. W7BBO puts '46s in final. W7BKL operates portable WDV. W7KL changes to c.c. W7QW has 14-mc. 'phone. W7CFM is building rack and panel. W7BDU is radio service man. W7DGD and EBQ are new hams. W7GQ is old-timer. '04A going in at W7BEK. W9FGK has job in Eugene. W7BRH is using 211E and 211D P.P. W7UJ gets on in spite of YLs. W7AIP, KR, BEE, BDN, DP, BKD, MQ, and XYL attended goose dinner at W7PL's. W7BMA is going c.c. OM2CJ is now living in Oregon. W7AXO says 14-mc. DX has fallen off. W7DJI wants a copy of "PARASITICS," the SCM's monthly bulletin, available only to reporting stations. W7DIL loaned his receiver. W7ANX is looking for DX schedules. W7WL worked a couple of Mexicans. W7CXK is a regular reporter. W7BDE is back from wilds. W7CIK works first W5, K7, and ZL. W7CTF, ex7NZ, moved to Calif. W7UN is building superbets. W7BHU is going to Notre Dame. W7CKK sends nice report from Medford. W7BNX is moving downstairs. W7DAV is rebuilding. W7DEA reports Coos Bay activity low. W7AJX and AEL are starting for Calif. in a trailer. W7BWD has new power supply. W7WR likes the bulletin. W7QY had to climb 70-foot mast to hang antenna. W7BUB is putting in 50-watters. W7SY is going c.c. W7CEJ says new rig FB. OO W7AYV wants to know what to do about RAC notes. W7AOI quit the unemployment ranks. W7ABZ goes back to '10s. "WE WANT THAT BANNER." On 1.7 mc.: W7ROO, CBA, BZS.

Traffic: W7WJ 548 WR 258 HD 190 DP 157 KL 138 CEJ 119 AYW 108 BWD 62 BRO 46 COU 33 AMF 32 CUV 40 CXK 26 BNK 24 PL-SY 23 BDU 17 QY 15 BZS 16 CVL 15 CBA 11 BXQ 10 LT-DXC 9 AIG-BOO 8 BUB-WL-KR-ABZ 7 DJI 6 DWQ 5 EBQ 4 AOI-BDE-ANX 3 AXO-BDR 2 ALM-BBO 1 BMA 6.

ALASKA—SCM, Richard J. Fox, K7PQ—K7ANQ schedules W7AJ, K7BOE, QS and BEJ. W7AF/K7AIF was first ham visitor at K7ANQ. K7BND was QRL fish. K7BOE schedules W7WY, K7ANQ and ALT.

Traffic: K7ANQ 142 BOE 22.

WASHINGTON—SCM, Stanley J. Belliveau, W7AYO—W7CZY sure gave W7BB a stan run for the money in making BPL. W7BRC is new OO. W7AHQ handled rush message. W7CJS and CZW are on 1.7-mc. 'phone. W7CCN QRod. W7DZX is in Navy. W7DJJ reports new ham, EAT. W7DRY is going MOPA. W7ABU reports lots of 1.7-mc. 'phone activity in Tacoma. W7APS building panel job. W7APR has receiver trouble. W7AWY has been trying 14 mc. W7CRY hopes to have portable DPG going at CCC Camp, Cherry Valley. Bremerton gang are planning big hamfest. W7AJ schedules K7. W7AFC hears W1MK on 3.5 mc. OO W7KO is on the job! W7AVM rounded up some Aberdeen reports. W7CPD was transferred to Astoria, Ore. W7CKH, CQA, and SJ are new reporters. W7CBI has three-ply WOODEN QSLs. New FB-X at W7CKZ. W7CXL clicked first ZL. W7BAK has pair '45s. W7AAN is first in state to apply for OPS. W7BBY gets Spokane gang to report. W7AMA has Collins 32-B. W7CFY went c.c. W7AXT worked first VK, ZL, and J all in one night. W7WY's total is going up all time. W7BKE writes whole letter on report card. W7BOF reports for Prosser gang. W7BUW has rig at WSC. W7CWY helps him push brass. W7CHEH is coming up in traffic. W7DET got "X" in Chemistry??? . . . W7BCS is QRL his gas station. W7AZI gets Tacoma hams to report. W7BMU got total of 90 all in last day. W7EK has A.D.M. back in '24. W7US is only 'phone OBS in state. W7AWX is busy with 'phone. W7CAM was on sick list. W7CFK missed BPL on deliveries by shadow. W7BHH has a new c.c. 50-watter. W7CQI leads Bremerton. W7DPH and W7DAX were in operation at Washington

Fair. W7DUJ prints QSLs. W7CCT got QSL from SM7RV. W7AGP is QRL NCR. W7DWB is on 7 mc. W7ADS is rebuilding W7AQ. W7BR8 clicks DX. W7BYF worked 3 cont. with '45. W7RT is now prexy of Seattle Club. Active: W7QI, AG, AWF, DGX, DPU, CND, AIT.

Traffic: W7BB 502 CZY 501 WY 429 LD 426 CHH 203 CQI 149 BKE 129 DAX 120 CFK 97 BMU 90 DPU 86 BHH 71 DPH 61 AWF 53 CBI 46 BUX 41 DGX 39 ABU 37 AHQ 35 DET 33 AG 32 DRY-AJ 30 APS 27 AWP-AWY-EK 26 BOF 21 DJJ-BYF 19 AZI 17 BUQ 15 AIT-BCS 14 CXK-QI 11 AQ-CSD-RL 10 AGP-ASZ-AXT-BAK 9 BRW 8 CAM-BLX-BUW-DLN-CCN 7 BRS-ACA-CND-DLC-DZX 6 CJS-CMQ-CCT-AWX-BBY-AAN-SJ 5 DUJ-DWC-AMA-CZW-BRC 4 CQA-CKH-AFC 3 BDW-CQJ-US-AWJ-BUB-BNC-KO-APR 2 CFZ-DWB-CSK-CFY-CXL-CKZ-CRY 1.

PACIFIC DIVISION

HAWAII—SCM, C. D. Slaten, K6COG—K6ENE is going as operator on fishing expedition to remote islands in South Seas. New hams: K6JJP, JRN, JEP, JPK. Three stations make BPL.

Traffic: K6EWQ 1048 COG 390 GUA 386 FAB 361 AIC 315 AUQ 254 EDH 162 JPT 146 GQF 134 EEE 63 AYD 30 HOO 29 CIB 23 AJA 375.

NEVADA—SCM, Keston L. Ramsey, W6EAD—W6UO reports traffic. W6GUR is moving. W6BTJ is building 56-mc. rig. W6FUO is on 'phone. W6HGL blew rectifier tubes. W6GYX has transmitter trouble. W6IKJ has 50-watt. W6HCE is rebuilding. W6HOB and HHY are working 1.7-mc. 'phone. W6HDD has trouble holding voltage down in last stage. W9EVR visited Nevada gang. W6BYR is working on transmitter for U. of N. W6EAD is working out in the hills. W6AJP is building "Tritet" exciter.

Traffic: W6UO 43 GUR—AJP 33 BTJ 6 FUO 4 HGL-GYX 3.

LOS ANGELES—SCM, Francis C. Martin, W6AAN—W6GNM is new RM. W6BTJ is home from CCC Camp at Medford, Oregon. W6CXW says African stations coming through FB. W5OY now resides at Ontario. W6ESK and FGT are QRL school. W6VB puts 500 watts on '03A final. W6CEM is on 3.9-mc. 'phone. 211 blows at W6GNZ. W6ADH joined the Navy. Law school keeps W6EUV busy. New station of W6TW is on Federal Building at San Bernardino. W6AFU reports reduced power. W6JBP changed from TNT to TPTG. Advanced mathematics course slowing down rebuild job at W6DYJ. The Bell Club handled station at Los Angeles Radio Show and made wonderful showing. W6EGJ is back for winter season. 56-mc. gang in Pasadena including W6BOB, IWO, GHW, FLY and EOG are active again. Broken collar bone at W6HQS. W6GAL gets WAC. W6NPF is now with Unit 2, Section 1, U.S.N.R., Pasadena. Good traffic record on 1.7-mc. 'phone at W6AHP. W6DHG handles traffic on 1.4- and 3.5-mc. 'phone. W6TE is back to medium power. New rack and panel job under way at W6INC. W6BMC moved to winter QRA at Bard. July-August report of W6EK lost in mail, er sumpin'—showed 11 orig., 102 del., 9 rel., total 122; BPL on deliveries. Following report: W6ALR, AXQ, DZL, ETJ, FDO, GVI, HDR, HQS, ITK, JEB, JLI, ON, SN.

Traffic: W6DSU 1314 GXM 420 CVF 367 ERC 364 BWF 320 GNM 277 AZU 263 GEX 282 BPU 222 JGA 183 JBP 176 EJZ 163 AHP 159 NF 148 TE 138 BGN 121 HML 105 BCF 101 GKZ 88 DEG 82 EDW 81 FTV 49 AFU-CZZ 45 GYU 37 EQW 32 TW 31 DYJ-DZC-EGJ-FGT 30 AAN 23 CPM 23 GFG-HXP 22 GLZ-TN 21 JJU 20 CVV-IRD 16 CIL-DWP 15 CEM-DQZ-EAR-LC 13 PNG 12 CXW-FMO-IFC 11 DCJ-GJA 10 BOB-VB 9 HEW-DIX-DYQ-ESK-EUV-WT 8 FWN-GAL-GTE-HZM 7 BVZ-DOK-EJW-IHA-IXH 6 BPP-INC 5 BQF-HAE-JMJ 4 DEH-DJC-DJS-DRQ-FEX-FYW 3 AGF-BAN-BXG-CLY-DUX-EK-FEW-FOZ-GHX-GOY-RZ 2 DYH-GMA-GNZ-GZQ-HZB-III 1.

SANTA CLARA—SCM, Bruce Stone, W6AMM—Due to W6AMM being QRL, W6DBB is writing this report. W6YG's 7- and 3.5-mc. rigs were rebuilt by J CZ. W6FQY has FB QSL cards. W6FBW schedules YG. W6AZC

worked ZL on 3.5 mc. W6QR claims first K7-W6 QSO on 1.7-mc. 'phone. W6NJ reports via radio. W6BOP re-enlisted in NCR. W6AOF has FB Patterson receiver. W6DBB rebuilt to '59 "tritet." W6DDS is building 7- and 3.5-mc. rigs. W6GOZ received card from ZL. W6YAG is back. W6DBQ's charger bulb went west. W6HTP uses two stage c.c. rig. W6HZW wants 3.5 mc. schedules. W6BSO, HPC is looking for new operating room at St. Joseph's College.

Traffic: W6YG 222 FQY 131 FBW 100 AZC 64 QR 41 NJ 31 BOP 27 AOF 18 DBB 9 YAG 4 DDS 2 GOZ 1. **EAST BAY**—Acting SCM, J. H. MacLafferty, Jr., W6RJ—RM, W6AUT. W6CDA BPLs. W6ZX says Trunk F going FB. W6RJ won Hammond memorial bug traffic trophy. W6EJA got ORS. W6IFO schedules East Coast. W6EDO went deer-hunting. W6HRN works JIEE. W6HRG does low power DX, W6ATR schedules his OW via W9BEZ. W6CIZ entertained W5VQ. W6IY likes A.A.R.S. W6AF is K7 at Manila. W6ELP reports. W6DHS gets out with a '10. W6HH, CAZ, IT, CBF, CA, FQE and ELW were ops at W6TT, A.R.R.L. station co-operating with "Radio Progress Week" at Oakland. W6AKB has 5-tube exhaust with 852 finally. W6ZM signed for another 6 months at CCC. W6CTE reports new Radio Club at Fremont High. W6FMY wants 28-mc. schedules. W6AUT reports for Napa. W6BPC and PAC are active A.A.R.S. W6RF holds fort for U.S.N.R. W6BYS still honeymooning. W6CZN likes new QRA. W6FII does his share. W6APB rebuilt. W6AOJ remote controls. W6CIQ is OBS. W6ANK rebuilt. W6AMC helps beginners. W6DUA is pres. Radio Research Assn. Always a good speaker and worthwhile discussions at East Bay Section meetings, second and fourth Fridays at Central Trades School, Oakland. Come and meet the gang.

Traffic: W6TT 706 CDA 632 ZX 297 RJ 210 EJA 73 IFO 51 HRN 45 ATR 43 CIZ 35 IY 19 AF 11 DHS 3 HH 1 Y 506.

SAN FRANCISCO—SCM, Byron Goodman, W6CAL—W6PQ BPLs for umpteenth time. New ORS W6JAL runs second. W6NK likes FB7. W6ATP worked RAGX, Arctic expedition in Russia. W6SC eliminated haywire. W6AWA uses 700-watt '04A final. W6DDO took 154-word message from K7. W6BVL is doing bug-hunting act with super. W6BTZ is back on 3.5 mc. W6CAL is losing his grip. W6MV is building VT voltmeter-Einstein! Money tree wanted at W6AZK. Five new countries for W6GPB. W6HIR is giving 1.7-mc. 'phone a whirl, as are AZX, DZQ, FPU, and AVX. W6HRY thinks his rig a hypochondriac. All continents for W6IU. W6BIP is in bad way over YL. Shielding for low power stages at W6OS. W6DO threatens to sue HAMFLASHES. W6FVJ aspires to QRO. Report from W6DXT and HTI. W6DQH qualified for Class A ticket. First reports from W6HSA and JMR. W6CIS is proud father of potential YL op. W6WB and AAR are on trail of last word in receivers. W6BJM reports Marin Radio Amateurs have 48 members. Remember, all stations reporting, traffic or no, receive HAMFLASHES gratis.

Traffic: W6PQ 1095 JAL 208 NK 133 ATP 47 SC 44 AWA 34 DDO 21 BVL-BTZ 20 CAL 17 MV-AZK 16 GPB 15 HIR-AZX-HRY-IU 14 BIP-OS-DO 10 FVJ 8 DXT 7 FPU 5 DQH-HSA-CIS 4 WB 1 DZQ 5 JMR 4 HTI 7.

SACRAMENTO VALLEY—SCM, George L. Woodington, W6DVE—W6CKO is still high man. W6HLQ and DFT are new traffic men. W6BBB returned to Idaho. W6JOR and IMJ are new calls. W6CNC passed his exam. W6HVM has trouble with c.c. W6FND has 'phone on the brain. W6FOD goes to bed with the chickens. W6CKV is QRL U. of C. W6GBB is going low power. W6DFT was heard in ZL on 3.5 mc. W6BTJ visited Susanville. W6DST is QRL college in Illinois. W6DZW still schedules. W6FEJ is with the CCC. W6ADS is home from Weimar. W6GL and ATQ have a Zepp a block long. W6BDX was married in Reno. W6EUH is the only single ham in Redding! W6JTS has a shack over his garage. W6HLQ and JTS tried to put up a 60-ft. mast. W6GSP bagged his buck. W6BSQ is holding down his job. W6AIM says the show is picking up. W6GCM has a National AC outfit. W6GUK

is perking away. W6FYF has new rig. W6FPH has FB 'phone. W6GSS wants cash for new rig. W6DZY is building. W6DD is on the air. W6GVM is building 1.7-mc. 'phone. W6FRP is working 3.5-mc. c.w. W6IQH has 211E final. W6EOU uses '10s as modulators. W6GDJ has a pair of '03As. W6GHN is building a super. W6IZE's '45 went west. W6IMV is getting out OK.

Traffic: W6CKO 944 GAC 22 E2H 19 CGJ 17 GL 12 DVE-EWB 8 HLQ 7 DFT 4.

ARIZONA—SCM, Ernesto Mendoza, W6BJF—The Arizona Short Wave Radio Club is affiliated with A.R.R.L. W6ALU BPLs on deliveries and total. W6FZQ has DSQ build his c.c. rig. W6HBR hooked a "J" after trying whole week. W6IIG worked a PK1. W6HEU changed QTH. W6JHF uses one '45. W6CQF had a visit from the R.L. W6FAI and OW were visitors in Phoenix. W6BJF and BLP dropped in on HAX. W6HCX tore up antenna coil for gas line on his strip-down! W6ISO is building c.c. rig. W6FFK moved to Michigan. W6DFE is attending U. of A. W6GFS gets heard in Poland. W6DGC will soon be active as W6 from Springerville. W6JVR is new Phoenix 'phone. W6ZZBC is starting "Radio Amateur Trading Post." W6DKX-HS is now W4BYR in Tampa, Fla., and W8KUH, Detroit. W6DCQ moved to basement. W6HUZ wants good receiver. W6CVR replaced CAP on Bisbee broadcast station construction work. W6HVV sticks to 7 mc. W6GBN is going in for high power. W6AGL moved to Pacific coast. W6GGS gets DC, PDC and XDC. W6LXC is Phoenix railroad man. W6HKX has PP '10s. W6EGI may settle down in Tempe. W6GZU conducts radio class in night school. W6AND went to 7 mc. W6DJH keeps 3-year-old schedule with 6EL. W6BJF has 50-watt MOPA at HEU. W6HAX had FKX build him receiver. W6DIE is operator at KTAR. New Phoenix calls: W6JND, JFO, JMS. W6JPH does lots of 56-mc. 'phone work. W6CTI (x6EAA) is almost ready to blossom out. W6HGD sticks to 14 mc. W6JIL talks, eats and sleeps radio! W6CUS-6DPS is attending radio school in Los Angeles. W6IUQ uses e.c. rig. W6JRK is trying to locate 1.7-mc. 'phones: W6JIW, EAW. W6DOW is busy doctoring receivers. W6EFC likes grid bias modulation. W6IUY has her own little 71-A Hartley. W6GJC is building new home. W6DNP is located in Phoenix. W6UG is in Tucson. W6EL keeps the Prescott boys interested in 'phone! W6ABY works at Tucson airport. W6IYZ is very active. DXers: W6IIF, DSQ, JCE. Active: W6GUQ, EBB.

Traffic: W6ALU 705 FZQ 15 HBR 8 IIG 5 HEU-JHF 4 IIF-CQF 2.

PHILIPPINES—Acting SCM, N. E. Thompson, KA1XA—KAILG has c.c. All principal KA stations are now crystal controlled.

Traffic: KA1HR 1645 NA 411 FS 306 LG 281 OR 138 CO 120 PS 56 XA 53 SE 42. KA4GR 28. KA9FS 102 WX 23. OM1TB 362.

SAN DIEGO—SCM, Harry Ambler, W6EOP—RMs: W6QA, W6FQU. W6DQN leads the Section. W6FWJ lost several ops. W6FQU is coming on with new rig. W6EFK says trunk line working FB. W6AXN is working DX. W6BAM says walnut harvest over. W6BVX is going c.c. W6BHV has been out to sea. W6GWY has 1.7-mc. 'phone. W6BMC is all set for winter traffic. W6FCT is QRL teaching new YL to be an op. San Diego Radio Club is putting on DX contest.

Traffic: W6DQN 332 FWJ 329 FQU 82 EFK 28 AXN 18 BLZ-BAM 9 FCT 5 BHV 2 GWY 1. EOP 7.

SAN JOAQUIN VALLEY—Acting SCM, Alfred H. Green, W6AOZ—W6BEQ's leading total is all Trans Pacific. W6EXH is runner up. W6BAT moves plenty traffic. W6GKE schedules AOA. W6GEG is laid up with Flu. W6CVT reports fine A.A.R.A. outing. W6CVA has new rig. W6YB is on again. W6AME and FFU report fine work with portables fighting forest fires. W6BYH has '52 on air. W6AOZ completed new rig. W6SF has new super —6BKR is getting ready for snow. W6FKL has two rigs. W6IYL was op at Merced Radio Show station. W6BBC has new Patterson Super. W6JNL is newcomer. W6HDE, new QRA Merced. W6CXT and YL attended Stockton Hamfest. W6EMU is Commander Unit 2 U.S.N.R.

W6FYM is new ORS. W6GJO is rebuilding. Stockton Amateur Club gave fine hamfest. Merced gang form new Radio Club; W6BTY, pres. W6DZN returns from Hills. W6LBL is rigging up dynamotor for power. W6BILL reports Tulare boys getting ready for heavy traffic. W6FFP reports 1.8 mc. dead. W6HPZ is new Bakersfield Club call. W6BMD has 400-watt 'phone. W6EJU sez fine DX.

Traffic: W6BHQ 295 EXH 246 BAT 167 GKE 60 GEG 30 CVT 26 CVA-YB 20 AME 17 BYH 16 A0Z 15 SF 12 BKR 9 FFU-PKL 8 IYL 7 JIN 6 BBC-JNL 4 HDE 3 GQZ-CXT-EMU-IWU 2 FYM-IGK 1.

ROANOKE DIVISION

NORTH CAROLINA—SCM, G. H. Wright, Jr., W4AVT—Reports must be in the SCM's hands by the 20th of the month to insure publication in QST. The Roanoke Division QSO Contest was a grand success. The Grand Prize, an SW-3 donated by National Company, was won by W4CS, who scored over 50,000 points. W4BOH is on the active list. W4TJ changed QTH. W4BHR has lots of good traffic schedules. W4AEH has lots of praise for the "Tar Heel Ham." By the way, fellows, you get it free by sending in a traffic report each month, or for 50 cents per year to W4DW, the editor. W4CJP made changes to meet DC regulations. W4DQ is adding pair of 50-watters. W4BST has '45s PP. W4BYA handled death message. W4ALK handled 45 messages in 56 QSOs. W4BCG comes through with FB report. W4AGX moved to 3.5 mc. W4MR pushed his total countries worked to 52. W4RE is doing FB with VCR. W4VB put new rig to work on Friday the 13th. W4ATY reports Wilmington Club going along FB. W4BIP wants OPS appointment. W4ANZ leads in traffic. W4BFB is an old Navy man. W4BSS recently rebuilt. W4BLN and CKJ have SW3s. W4ABT says business rushing in Winston-Salem. W4OG has transmitter trouble. W4BIU is operating his rig at fire station. W4NC is building 300-watt rig. W4CFR sends first report. W4CJU is new Winston-Salem ham. Ex-810D is W4COK. W4IF is operating at Oak Ridge Military Institute. W4ANU has trouble getting rid of hum in Class A modulator. W4EG won 1000-watt bottle at North Carolina Hamfest. W4JB has new 50-watter in last stage. W4BVI, BUE, BRT, BTR are QRL school. W4HV has SW-5. W4CGL is rebuilding for '52. W4BTC works lots of stations on 7 mc. W4QS is rebuilding for c.c. W4ET/AH was married Oct. 22nd. W4BHS met the operator of the "Bear of Oakland" while at Southport, near Wilmington. Next Carolina Radio Club meeting in Greensboro, Jan. 7th.

Traffic: W4ANZ 232 ANU 85 BCG 84 CS 75 BDU-EG 57 BJZ 32 BTZ 29 ALK 28 BLN 27 DW 25 ABT 20 BHR 18 BRK 17 BYA 15 AVT 13 BST 11 PBD 10 BOH-CJP-AMC 8 CGL-AEH 7 BPO 6 TP-BIU 5 RE-CAY-JB 4 DQ-BSS-CLB-HV 3 VW-ATS-MR-VB-BFB-BHP-ZH-OG-NC-CCF-CGY-BXK 2 BVD-ATY-AAK-AGX-BIP-BML-BKT-CFR-BUE 1.

VIRGINIA—SCM, R. N. Eubank, W3AAJ—Chief R. Mgr., Dave Woods, W3GE. W3DVT was operated at Roanoke Fair by Club. W3BZE, BJX, AUG, GE, AAJ are Trunk Line stations. W3AMB formed Richmond Boy Scout Radio Club. W3BGS renews ORS. W3CZJ is now OBS, 3.9-mc. 'phone. W3BRY is on 3576 and 7152 kc. W3BDQ is on 7 mc. W3BRA is building "Tritet." NORFOLK HAMFEST SATURDAY, NOV. 25th. GREAT TIME. COME. W3CYU worked VE2. W3GY wants OPS. W3FJ wants Va. A.A.R.S. on one freq. W3AKZ sends nice report. W3CFV's tower blew down. W3AKN is pres. Peninsula Club. W3CWS blew 2 meters. W3WM photo was in paper. W3CPN got 30W Collins. W3BPI has SW3. W3DRK added '0A. W3MQ has new super. W3CYM is working on club. W3BIW wants floating club. W3BTM worked W1MK. W3CMJ club meets Tuesdays. W3BEB is regular reporter. W3AZU has homemade bug. W3DON, BAI, DRK plan joint station. W3DVP has new receiver. W3BAD hopes to be NCS. W3NE's ant. came down. W3BKS is experimenting with e.c. Osc. W3GE is now Chief Route Manager. W3LY QSP'd Honolulu sick message and answer in 30 mins. W3BAN is sick abed. W3CZJ worked 45 states on 'phone. W3BEP QRL Lunch Ky. W3AII-V.M.I.: 6GKX, 1ERX, 3CIE, 3AII will operate.

New Zepps: W3DFU, DAM. W3BZA has new rig. W3BXP wants schedules from CC Camp. W3BUO's new rig most finished. W3ZA blew power supply. W3CLV got job. W3DZW has new c.c. rig. W3CUR, HV. W3BLE won crystal in RDC. W3AAF is out of town lot. W3ALS is taking rig to VPI. W3APF new QRA, Altavista. W3BRE blew '10. DXers: W3BDZ, CSI, BTR, CYK, AUG, DCU, CHE, BWA, AU, BSB, ADD. Active again: W3CKM, APT, DVO, AWY. First reports: W3DQD, DNR, DDG. Active on 'phone: W3COJ, ASK, AEI, AHQ. 1.7-mc. 'phones: W3DES, CDW. Traffic hounds: W3CZX, COO, CFL, BJX, CA, CYV.

Traffic: W8DVT 351 BJX 257 BZE 241 CA 217 WS 143 DCU 106 AMB 93 AAJ 85 CVQ 80 CYK 41 BGS 34 CSI 32 BRY 31 BDQ 7 BRA-CVK 4 CYU 2 DAM 1 AUG 220 FJ 160 AKZ 73 CYY 46 BAI 36 CFV 27 AKN 20 CWS 12 BWA 11 WM 6 CPN 4 ASK 3 BEI 2 DRK-MQ 1 BIW 115 BTM 40 CMJ 30 BEB 29 AEI 24 CHE 14 DDG 12 AZU-DON 6 DVP 5 AU-DDQ 4 BAD 3 COO 2 CDW 1 GE 27 BYA 56 CZJ 7 CFL 5 CZX 71 DNR 54 LY 2 BSB 1 BXP 9 APT 11 COJ 52 ADD-DVO 4 BLE 125 CXM 96 AHQ 55 BDZ 10 AAF 8 CLV 58 CYM 1 CLX 23 APF 12 BRE-MT 2.

WEST VIRGINIA—SCM, C. S. Hoffmann, Jr., W8HD-WLHF—The following A.A.R.S. calls are issued to be used on Army frequencies: WLHB (W8OK), WLHF (W8HD), WLHG (W8EIK), WLEN (W8IKN). W8EIK did fine work for 49th Bombing Squadron which visited Bluefield, keeping them in touch with Langley Field, Va. W8ELJ installed station at Fall Festival in Logan, with cooperation of W8KHD, KLZ, KDP. W8EZR (ex-8VZ) is new ORS. W8BDD is A.A.R.S. W8JJA, KSS and JCB are new hams. W8LY is installing 1.75-mc. 'phone. W8CDE has FB7. W8AQB, TI and ex-GCGR visited HD. Ex-W8CAY is going up for 3rd-class mate's license (U.S.N.R.). W8CHEM is new OBS on 3959-kc. 'phone 6 p.m. daily and 1 p.m. Sunday. W8FZH and KSJ are on 3.5 mc. W8HBQ worked first VK. W8CYV and CDV use c.c. W8BOW is attending Carnegie Tech. W8BTW uses ZCZO at college. W8HD visited Chicago. W8JWL is building "Tritet" exciter. W8ETX and CAL threaten to get back. W8EIP is rebuilding. W8DPO worked a VK. W8HCL. CVX, CAY, JM, ASI won prizes in RDC contest. W8JM has been appointed RM for Northern District. Your cooperation with him will be an aid to putting W. Va. over. W8GAD has Junior Opr. Listen for State Traffic Net each eve at 7 p.m. Net stations are: W8JM, EIK, ELJ, EZR, HD. New ORS: W8ELJ.

Traffic: W8EIK 737 ELJ 203 EZR 202 HCL 116 JM 107 DMF 71 DPO 54 CMJ 11 FQB 10 CYV 7 BOW 4 ELO 7 JWL 4 TI 2.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING—Acting SCM, Arty W. Clark. W6GQC-IDM—W6FBY reports from CCC. W6AXA is working at KTFI "In Southern Idaho." W6DGR and AHD play checkers by radio. W6EQY has new 50-watt rig. W6BAE is heard on NCR. W6JVA and JVB are new Salt Lake City stations. W6FRN gets VKs and ZLs. W6BSE is changing to c.c. W6EXL gets out FB with new 'phone. UARC found new meeting place in Public Safety Building, thanks to NCR. W6GCJ is thrilled with new job of cooking for the OM W6BAE. W7NY has fun with flea power. W7AMU is crowing over FBXA. W7BXS can't get whole rig on at once. W7ACG has new QRA under more open sky. W7CHER got back from Chi. W7CJR helps at KBFN. W7CYN is building transformers. W7CMN had contest with his OW and she got more cards than he. W7ABF got 'phone on air. Casper Radio Club met at W7ADP's house to celebrate his birthday. W9OUI from Denver visited hams in S.L.C. W7AXG is active A.A.R.S. W7COH blew transformer. W7EX is QRL being dentist, sheriff and judge. W6GQC, Acting SCM, will be QRX 3689 kc. from 8 to 9 p.m. from 16th to 19th inclusive each month to receive reports.

Traffic: W6GQC 628 APN 435 GQR 130 HHI 64 AHL 46 EXL 29 FRN 17 BTK 15 DGR 11 ZZN 5 BSE 4 EWW-ZZBI 1. W7AMU 30 AXG 1 COH 32.

COLORADO—SCM, T. R. Becker, W9BTO—The

Greeley gang threw a very successful hamfest Oct. 23th. W9JNV is now an "OO." W9CCM likes 3.5 mc. W9RX QSOed W7ASQ for first time in seven years. W9MXJ is having trouble with the R.I. W9DQD reports sky wires down. W9GNK has schedules working FB. W9ABZ uses B Batts supply. Rocky Ford Amateur Club had a booth at the fair. W9CVE is coming on with c.c. W9MDN has two ops. W9GLI has FBXA. W9NQQ was elected vice-pres. of R.F.A.R.A. Active: W9BRZ, LEK, MST, EDN, YL. W9GLG is out of town. W9CIW schedules EYN and AVI. San Isabel Radio Club is going FB. W9EYN worked South America on 14 mc. W9EHC and EYN handled traffic while running off the football game from the Springs. W9FXQ and GHY are on 3.9-mc. 'phone. W9DNP used '04A final. The Pike's Peak gang and Pueblo gang met together and consumed cider? and Donuts. The Colo. Springs fellows are experimenting with "Tritet." W9LL was QSO Mexico and Honduras. W5ZZY holds call W9OND. The University Radio Club of Boulder have exhibit in Boulder store using the call W9NRA—"a new deal hi." W9BYC is working in East. W9IUH worked 4 countries in one week. W9HIR is in Oklahoma. W9LLP got R9 from LU. W9LZH has '10 Hartley. W9GUW is on at Ft. Warren, Wyo., using W9ZZP. W9FEX and KOL use '45s P.P. W9KQC and OAY are rebuilding to c.c. W9FSJ and NPP use MOPA 210s. W9JB is active in NCR. The Loveland gang are 100% c.c. now. FB, fellows. W9KKY has '45 final. W9IFD uses 205D in last stage. W9NIT, JFD, OQL, ACV, OAF, ALH use '10s final. W9ODS and OTR are new hams. W9NIK is Chief Eng., West Central Radio Co. at Greeley. W9DQL has new c.c. rig. QRL school: W9HGL, LNB. W9NSP can't find bias for his '10s. W9GSN is building MOPA. W9BJN is hunting bugs in his rig. W9HQT has new Collins transmitter. W9BTO has crystals for sale. W9OUI: "Pop" is key shy. W9OLL worked Honduras. W9AAB moved to a new QRA and has new AGSX rec. W9LYV and LMN were visitors in Denver. W9IJU has nice note. W9FYY and IPH has '52s final. W9BYK uses grid modulation. W9GSK claims largest 30-volt meter in world. W9OGV and FQJ are rebuilding. W9ECY changed QRA. W9ESA makes the BPL again. W9EMU is known as the "Little Ostrich." W9CJJ has a pair of 212Ds as modulators. W9LYE uses one 212D. W9HOO is operated by Radio Class of North High. Flash!! W9FRP is on again! W9EKQ and AYP are active in A.A.R.S.

Traffic: W9ECY 6 BYY 11 ESA 567 FYY 30 BYK 4 KNZ 570 EHC 150 YL 15 CIW 41 EYN 310 BTO 44 GNK 80 GCM 50 GLI 24 IPH 30 LYE 35 FRP 1 CJJ 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, L. D. Elwell, W4KP—Star traffic station: W4BOU, W4AYK, PDR and BOU are at U. of A. W4BJA is next in line with traffic. W4BAI has a time with EE studies. W4SN reports for first time. W4CIQ is Mobile Club station. W4DS has several schedules lined up for trunk lines. W4BXA is headed for c.c. W4GL has been QRL job. W4BXV has '03A. W4BRA's Jr. op keeps his vocal chords oscillating. W4BLL has two transmitters. W4DD renewed ORS. W4APU has new QRA. W4BSL has a.c. receiver. W4AAQ will raise power. W4BIW has '45s PP. W4AUS took his transmitter to Chattahoochee Valley Fair. W4LT is working 3.9- and 14-mc. 'phone. W4AGI has gone to C.C.C. camp. W4AHU sold out to go to the Navy. W4GN sports new super-het. W4KP got the "best regards" auto tag, A73. W4BZG reports.

Traffic: W4BOU 212 BJA 72 DS 59 AAQ 54 SN 41 DD 16 BIW 15 KP 14 BZG 12 BXA 5.

EASTERN FLORIDA—SCM, Ray Atkinson, W4NN—W4BNI leads with traffic. W4PDA is Yacht "Ripple." W4VP sends nice report. W4CJR schedules W4BDG, DT and BGR daily. W4BRI is teaching code. W4BIN reports from U. of F. RM W4ALP reports that W4AZF is working on c.c. job. W4BNR is building 1.7-mc. 'phone. W4AKJ is back in Tampa. W4AI is on the high seas. W4BOT, AJX and BGL send traffic reports. W4AWE built a new "Tritet." W4ANY uses 'phone on 3928 kc. W4UX is home again. W4AZB is in wholesale tobacco business. W4AGB is on 14-mc. 'phone. W4BHE is 3.9-mc. 'phone

W4HY is QRL radio shop. W4NN is on 7- and 3.5-mc. CW. Write SCM for OPS application.

Traffic: W4BNI 56 AJX 16 VP-NN 14 ALP 8 BOT 6 BGL-BRI 5 CJR-AKJ-AGB 4 ANY-BNR 2.

WESTERN FLORIDA—SCM, Eddie Collins, W4MS—Route Managers: W4ACB, W4AUW. W4AUW is arranging 28-mc. tests. W4QR is going FB. W4BSJ is knocking them out. W4BPI is going c.c. New hams: W4CLP, COG. W4KB schedules BBO. W4AGS is after WAC. W4ACB is getting set on 28 mc. W4BKV reports signals FB over his way. W4AUA is doing excellent U.S.N.R. work. W4AUV is working 3.5 and 1.7 mc. W4CMB gets out OK. W4CDE reports everything rosy. W4BKD is on 7 mc. W4AQY is moving to 28 mc. W4AXP reports traffic. W4ALJ is selling tubes. W4QK has an SW3. Rebuilding: W4ASV-ABK. W4CFP is leaving for the West Coast. W4SZ' shack was robbed. W4BOW is applying for op license. W4BGA is fighting the c.c. rig. W4MS works 14 and 7 mc. J1EZ and J1FF will be on the lookout for Western Fla. stations during 14-mc. tests in Dec. W4CMJ is interested in 56 mc. W4BMJ sends FB traffic total.

Traffic: W4KB 22 BMJ 13 BGA 12 BFD 4 ACB 20 AUW 3 CDE 8 BSJ 16 COG 12 AQY 17 QR 2 MS 18 BPI 3 CLP 1.

GEORGIA - SOUTH CAROLINA - CUBA - PORTO RICO-ISLE OF PINES-VIRGIN ISLANDS—Acting SCM, G. A. Love, W4UT—W4UP has c.c. 50-watt rig. W4SI is in Atlanta working at the EAT station. W4CBY discarded sine rectifier. At the meeting of the Atlanta Radio Club, W4BZ gave an FB talk on mechanics of modulation. W4AW says his traveling representative, W9ZZAF, is getting lots of business. W4ZL won crystal raffled at club meeting. W4CFJ works VE5 and ZL. W4EF is giving 'em fits with his 'phone. W4CDH is anxious for traffic. W9LMS uses an FBX rcvr. W4WC rebuilt his 75-fone rig. W4BZW sends nice tlc. report. CM2ZW spent several days in Atlanta. Please send your reports to 1202 Springdale Road, Atlanta. W4CE, ex-W3CVN, is at Georgetown, S. C., teaching at the high school; he is organizing a S. C. Net.

Traffic: W4BZW 52 BWN 20 CDH 2 IN 2 UT 47 CE 33. W9LMS 4.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, Glen E. Talbutt, N1W5AUL—W5BIL, Chief Route Manager, District No. 1: W5ANU, RM. W5FC, Dallas Club station, makes BPL at State Fair. W5BII has 12 schedules. W5DJL is lining up Boy Scout net. W5BZT handled "rush" traffic from Tampico. W5NW and "YF" W5MZ are on air. W5BTT wants schedules. W5AAD, AHC, CPX, BKC and DAA report traffic. District 2: W5IA claims to be youngest RM. W5AJG resigned as RM. W5ARV is a "benedict." Congrats. W5CAV is ORS. Another "ham family" are W5AMK and "YF" W5DQF. W5JA is putting NCR over big. W5BKJ tests on 28 mc. Sundays at 2:00 p.m. C.S.T. W5BTS, TR and CHK are active. W5CIS reports for Hillsboro. District No. 3: W5ARS, RM, took the SCM to the Convention. W5BCW is building c.c. W5CLJ has MOPA. W5DMQ "is on the air"! W5CY is awaiting new license. W5DRH is new ham. W5CPB worked an OA. W5CPT gets 2800 MPW from 45 v. B battery. District No. 4. RM W5BKH has fine signal. W5AW emerged into limelight as traffic man. W5BVF is c.c. W5DMD is new ham. W5BAY is on 14-mc. 'phone. W5BXY and CTU are QRL school. W5CYU, DKF and AUJ joined A.A.R.S. The SCM welcomes OPS applications. Fellows, we have made a good start in building our Section up to a high standard. Let's keep these reports coming every month.

Traffic: W5FC 649 CCD 364 BII 280 ANU 237 AJG 204 AW 113 ARS 98 TA 95 CAV 85 CIJ 75 AUL 50 AHC 48 BKH 43 BKJ 39 DKF 29 BCW 24 AAD 21 BVF 20 AMK 18 CYU 17 DAA 13 JA 12 NW 10 DJL 7 BZT 6 TR 5 CPX 7 AUJ 5 DMD-BAY-BKC 2.

OKLAHOMA—SCM, Emil Gisel, W5VQ—W5CEZ is doing FB as RM. W5BDX has gone c.c. W5BOE handled request to local BC station from Hawaii. W5CNC is new ORS. W5BDE has high level. W5CRS handles a little traffic. W5BRD is QRL YF. W5JP has 211. W5CAI is newcomer. W5AUG uses '10s in parallel P.P. W5CBY

worked a W9 with .014 watts input. W5BAR is active A.A.R.S. W5GW worked a K6. W5CJZ and BMT have SW3's. W5PP is putting up a couple towers. W5ANB is QRL school.

Traffic: W5CEZ 427 CNC 137 BOE-BDX 44 CBY 33 CJZ 14 BAR 10 GW 7 OCA 5.

SOUTHERN TEXAS—SCM, David H. Calk, W5BHO—W5OW has same FB schedules. W5MN keeps ten schedules. W5BKE works five schedules. W5PF visited his first African, ZS2F. W5YL is building 'phone. W5CWW reports DX getting better. W5ADZ schedules W5AYZ, YL. W5CET is rebuilding to 100 watts. W5AFQ has new AUTO. W5CVW visited in Bath, Maine. W5AYB and HX visited World's Fair. W5BKL reports nice total. W5JC works 14-mc. 'phone. W5ES moved to New Mexico. W5BHO was glad to meet all you fellows at the Convention.

Traffic: W5OW 1122 MN 330 BKL 127 PF 38 BKE 26 AFQ 14 CWW-AUC 2 ADZ 4 HX 3.

NEW MEXICO—Acting SCM, J. M. Eldodt, W5CGJ—W5AOP, AUQ and CPO were called for Nat'l Guard duty at Gallup. W5CFY has dismantled temporarily. W6HHN was a visitor. W5BNT is on the air. W5BUY threw a mast party. W5MP is going to college. W5BVC has new YL op. W5BHF will soon be c.c. Warr, of W5ZM, is back again. New hams: W5DSN, CXP, DEV.

Traffic: W5CGJ 36 AVE 17 CJP-BNT 2 ZM 1.

CANADA

MARITIME DIVISION

NOVA SCOTIA—SCM, A. M. Crowell, VE1DQ—M.A.R.A. station at Provincial Exhibition increased traffic interest. 1BV jumps ahead with 74. 1EX handled Exhib. traffic. 1EP is swatting DX. 1FL piles up good total. 1FB has '45s parallel. 1FP is new Dartmouth man. 1EA sports Comet Pro. 1EK has FB report. 1YL is GENUINE Halifax YL call. 1CZ works "G's" and "OK's." 1AG's new photo QSL is worth a swap. 1AX is putting in time on 14-mc. rig. Has 1BL an 860 e.c. oscillator now? Regular monthly meetings M.A.R.A. at home of secy., 1DH.

Traffic: VE1BV 74 EX 27 EK 26 EP 9 ER-DQ 4.

ONTARIO DIVISION

ONTARIO—Acting SCM, W. Stephen, VE3AD—3GT has organized Toronto traffic net including NO, RT, DJ, WK, SG, LZ, JT, IB, CE, VX, EM, LD, XR, GT and 9AL. 3KC is QRL new c.c. rig. 3GC is in the "Bug" business. The Western Ontario A.R.C. is being reorganized. 3HZ sneaks on the air occasionally. 3QC is manufacturing "Spartans." 3LX blew his Class B input transformer. 3GF is playing with c.c. 3SG, of Queen City Club, is looking after Centennial QSLs. 3GV is building 8V converters. 3EQ is building 14-mc. 'phone. 3EU is experimenting on 56 mc. 3TA and LR are building new receivers. 3OR and QA are on 1.7 mc. Welcome to 3UU in Parkdale. 3LR says LS admits the Mrs. DW incident. 3QD is c.c. on 7200 kc. 3TG and TO are on 7 mc. 3KP has an FB portable. 3DE is DXing. 3PT is candidate for R.C.C. 3NJ is trying to push the moon of his '71A over the mountain. 3FZ is QRL farm. 3HA says the northern gang will show us all up this season. 3GX is back at home QRA in Bracebridge. 3EN went south to school. 3LY is back from visit to the SOO. 3FQ has been relicensed. 3IP has PP job. 3RX is doing sales work. 3RA is back from OFB. 3CX and OZ are stirring up the ole fire. 3PY has gone to Ft. Francis. 3LY, SO, and Ex-3AAZ held an impromptu convention on the street and nearly ended up with striped uniforms. 3DX is again coming to life. 3UA is trying to QSP "G" traffic. 3GS says if someone will build 'em he'll work 'em. 3GB is selling radios. 3AD is on regularly from HB.

Traffic: VE3GT 166 JJ 107 CE 68 RK 24 CD 23 HP 22 DU 21 NO 16 QB-HB-MX 13 EA-SQ 12 LI 11 WK 10 DW 8 EE-GL 3. VE9AL 17.

QUEBEC DIVISION

QUEBEC—SCM, J. C. Stadler, VE2AP—2CO was in charge of booth in Radio Show. 2CX visited 3JI. 2FE motorbiked to see 2BB and AP. 2CA worked eleven

countries in eleven QSOs in 2½ hours. 2GO is after VKs. 2DG had a taste at traffic. 2AA gets DX on 14 mc. 2DL is returning to ham radio. 2AC has completely new station. 2HP was on 3.5 mc. 2BB moved his shack downstairs. 2HH says somebody borrowed his call. Welcome to 2HS and IA. 2GE is getting c.c. rig finished. 2HM took his station up-country. 2AB is having a try at traffic. 2HT is recuperating from severe illness. 2HC pounds away at black ducks. 2GH is on 3.5-mc. 'phone. Our sympathies to 2CU for the loss of his sister.

Traffic: VE2CX 62 FE 67 DR 19 CA 11 GO 16 AA 3 AC 14 CU 17I BB 249 AP 44 DG 73.

VANALTA DIVISION

ALBERTA—SCM, C. H. Harris, VE4HM—4EO is going c.c. 4NB, BV, DR, EX and AB are active. 4LX works lots DX. 4DT is handling traffic. 4DQ is lamenting poor QRA. 4ID and DC are on c.c. 1.75-mc. 'phone. 4BJ says 95 cent crystals OK. 4EC returned from north. 4EA is rebuilding. 4HM building. 4HW and FI returned to varsity. Glad to hear 4GM 'phone again. 4HQ is RI at Calgary. 4IZ sports pair of 50-wattors. 4BW put on good 56 mc. field day at 4GY's farm. 5EM from the Arctic stayed few days in Edmonton.

Traffic: VE4DT 58 ID 14 DC 12 HM 11 LX 10.

BRITISH COLUMBIA—SCM, J. King Cavalsky, VE5AL—In retiring as SCM I wish to thank you all for the way you have kept our Section on top. I hope you will do even more for our new SCM. 5BR is operating police CKJ. 5DE is new station at Cortez Island. 5GT left for the north. 5EH is on 14-mc. 'phone. 5AM has new job. 5IM and DV have c.c. 5JC is working plenty of DX. 5JL is new Victoria station.

Traffic: VE5HP 118 JE 41 DF 79 EC 3 ED 34 EO 4 EU 7 HQ 12 FG 18 BM 8 AG 5 AC 2.

PRAIRIE DIVISION

MANITOBA—SCM, Reg Strong, VE4GC—4MW has c.c. job. 4OX has pair of tens. 4DU has new antenna. 4KU is building MOPA. 4CV was a visitor. 4NW is building c.c. 4NT put up 60-footer. 4MY is looking for high power. 4KX is getting an FB 7. 4AE is building new receiver. 4BG and GC have new QRAs. 4DK uses '46 osc. and doubler. 4CI has new rig. 4FT and GL are building "Tritets." 4FP is back at the U. 4CD gave a talk on freemeters at MWEA. 4MV worked a "G." 4LH is looking for DX. 4DJ worked two ZLs. 4NY is going strong. 4NI is ex 3NI. The M.W.E.A., at the annual meeting, elected new officers.

Traffic: VE4DK 8 GC 7 DJ-MV 1.

SASKATCHEWAN—SCM, Wilfred Skaife, VE4EL—Saskatoon gang held first fall meeting with good attendance. Two new hams there are 4PD and PE. 4BF worked a "G" and "F" on 14 mc. 4IM got 2 "ZL" QSLs. 4JV is doing fine. 4EJ is finishing an MOPA. 4FD is off to Coast Navy Station. 4HX visited Manitoba Assoc. Mr. and Mrs. 4EU visit World's Fair. Regina gang held meeting, 27 present. 4EL demonstrated PP rig. 4ML has 'phone on 28 mc. 4AO changed QRA. 4EH does lots of "Plane"ing. 4MH and AV are qualifying for ORS. 4BB visited 4AH, BI, BJ, BV, BW, CX, EA, EC, FR, GT, GY, HA, HM, IZ, and CN and was visited by CN, BN.

Traffic: VE4BB 26 MH 16 GR 12 EL 4 AU-FF 2 BF-EO-IM 1.

Traffic Briefs

Upon completion of the Norcross-Bartlett Expedition to the Arctic Ocean, 1933, Robert B. Moe, W2UN, operator of VOQH, the Schooner *Morrissey*, writes: "We depended entirely on amateur radio for all communication. Special credit goes to W2KJ for keeping daily schedules and handling the major portion of the traffic. We also wish to add that the cooperation and interest shown by every station worked was most commendable."

To "Work All Continents" is getting to be an everyday occurrence at W6CUH, operated by Chas. Perrine, Jr. and Herb. Becker, W6QD. On October 31st, W6CUH

made WAC in 7½ hours; on November 1st, in 6½ hours, and then, "record of records," they WACKED in 1 hour, 58 minutes, on November 2nd!!

3.9-mc. 'phones W9EDW, Aurora, Ill., and W7AQX, Pendleton, Ore., on June 28th completed their 232nd consecutive QSO without missing a night!

The S.S.—December 9th—18th

Each year the Sweepstakes has met with increased popular favor. It is the one contest suited to low power as well as high, to neophytes or old-timers, 'phone or c.w., to all ham bands. Plenty of QSOs to go around guaranteed. Whether in the S.S. for an hour, a week-end, or the whole contest enjoyable operating is assured. Increased operating proficiency results, too. See details page 34 this issue. Take part and report to A.R.R.L.

Flash—Madrid Changes

THE Madrid Convention takes effect the first of 1934. A number of changes then effective in the Q Code and miscellaneous abbreviations will be of general ham interest. QRV once again means "Are you ready?" (Since 1929 the interpretation "Shall I send a series of V's?" has been effective.) After January 1, 1934, our self-adopted MK? will not be required to assist the traffic handler. "QRV" will again be full of meaning to the traffic-handling brotherhood. QSV replaces QRV in the list, and will mean, "Shall I send a series of V's?"

QRI (previously meaning, "Is my note bad?") now becomes, "Is my note good?", and the reply, "Your note varies." QSX (now, "Does my frequency vary? . . . Your frequency varies.") will become, "Will you listen for — on — kca.?"

QSD will be, "Is my keying correct; Are my signals distinct?" with the answer, "Your keying is incorrect; your signals are bad." QSC and QSE are deleted from the list.

Ham use of QSK meaning "Suspend Traffic" under the present Q Code will be inappropriate to go with the usual sign off. It will mean, "Shall I continue with the transmission of all my traffic? I can hear you through my signals?" and will carry the answer, "Continue; I will interrupt you if necessary." The new meaning will be FB for the real brass pounding gang just the same.

For repeats QSM? means, "Shall I repeat the telegram I sent you?", and as a reply the meaning is in the affirmative.

NIL has been added to the miscellaneous abbreviations, meaning "I have nothing for you."

A bunch of new amateur intermediates seems inevitable in call signals of the following countries, where blocks of prefixes different to the Washington allocations have been assigned:

Country	Present Amateur Prefix	New
Austria	UO	OE
Dutch East Indies	PK	—
Hedjas	UH	HZ
Lithuania	RY	LY
Luxemburg	UL	LX
Monaco	CZ	—
New Hebrides	YH	YJ
Panama	RX	HP
Persia	KV	EP or EQ
Roumania	CV	YO, YP, YQ or YR
Saar	TS	EZ
U. S. S. R.	AU, EU	U
Uruguay	CX	—
Vatican	—	HV
Yugoslavia	UN	YT or YU



CORRESPONDENCE

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

Marconi at W9USA

2046 Lane Court, Chicago

Editor, QST:

I do not know what report was made of the visit of Mr. Marconi to the amateur station at A Century of Progress. . . .

It was the last day of Mr. Marconi's visit to Chicago, and the long round of dinners, broadcasts, and receptions was over. The time was 11 p.m., and everyone in the party was tired. Everyone, too, was hoping that the next event would be the journey back to the hotel, but they did not reckon with Mr. Marconi.

"I hear that there is an amateur station in the Fair," said he, "and I want to go and see it." Some one suggested that all the buildings had closed an hour before, but that did not dampen the great inventor's insistence. So his big Cadillac, with the Italian and American colors flying, turned in the narrow street before the Federal Building, and started slowly down the avenue toward the Travel and Transport Building.

The building was *not* closed. I cannot tell you whether this was exceptional or the regular procedure for this building, though I suspect the latter. We were the only guests in the building. Up the blue-green-red-yellow escalator we rode, turned here and there on the floor above, and finally arrived at the small room which houses the official station of the Fair.

The two operators on duty did not seem to know their visitor, but he at once introduced himself. He inspected the equipment carefully, especially one of the transmitters, and said concerning the latter, "That is a very fine piece of workmanship."

The proud builder deprecated his efforts, as amateurs will, saying, "But it was built by only an amateur."

"Ah," said the Senatore, "but I am only an amateur myself."

With the above, I will end. . . .

—G. H. Clark, Secretary,
RCA Radio Museum Board

Not Enough Room?

North Hibbing, Minn.

Dear Old QST:

In answer to 6BO's letter, "In a Bottle" page 56 of October QST, wish to tell Franklin that something must be wrong with his receiver. I

would be in favor of the A.R.R.L. campaigning for new ham recruits—at least 20,000 new members—and let 'em park on "40," too. My FBX spreads "40" over 100 dial divisions and every night for months over half the dial is unused. We need more hams, we need more of them on "40" or we will be finding our government will think we quit ham radio. Perk up your receivers, OM's, there's more room than you think.

—W. J. Ryder, Jr., W9CIY

NX1XL

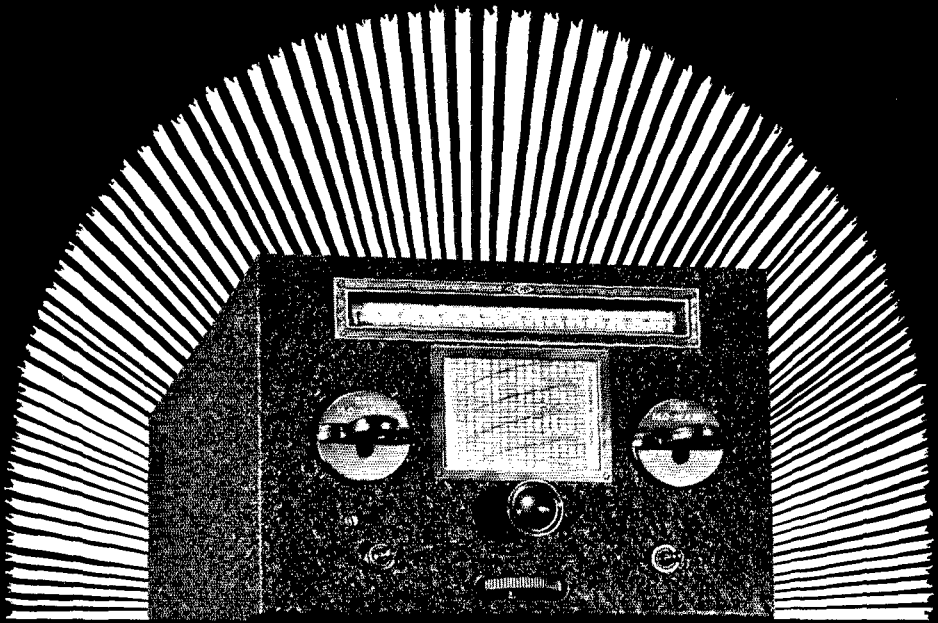
Lawyers' Club, Ann Arbor, Michigan
Editor, QST:

On behalf of Prof. William H. Hobbs, Director of the University of Michigan Greenland Expeditions, and myself, as in charge of radio communications with NX1XL, the Expedition station, I wish to thank the A.R.R.L. and the many friendly radio amateurs who have endeavored to facilitate radio communication with the University of Michigan Greenland Expedition during the past exploring season. The amateurs of this and other countries have proved of inestimable value to the Expedition. . . .

The expedition, and NX1XL, has just concluded another successful season of exploration on the vast inland ice of Greenland. This season they were located northeast of Upernivik, several hundred miles north of the Arctic Circle. Radio communication was hampered by the necessarily limited power and the poorness, "radioli speaking," of the location. Two-way contact on the higher frequencies with the United States was restricted by the high horizon to the south of the expedition's camp. It was found necessary to relay messages out from the expedition via stations in northern Canada and Europe to the east and west of the expedition, and it was in this regard that the amateurs proved their worth. The mountains apparently did not prove to be as effective a shield to the incoming signals, as Karl V. Hanse, radio operator of NX1XL, had little difficulty in receiving our signals from the University of Michigan station, W8AXZ, in Ann Arbor, Michigan.

Special thanks are due VE5EM, VE4HM, VE5FS, VE4IZ, VE1BV, TF3B, LA2W, PA0HR, PA0UP, G5HC, and Mr. G. P. Anderson, of London, for their most splendid work.

—Fred W. Albertson, W8DOE



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IRC RESISTORS

Compton and California Earthquake

Compton, California

Editor, *QST*:

In the July issue of *QST*, we Compton hams read with a great deal of interest W6HMW's description of the 1.7-mc. 'phone activities during our recent earthquake. In the name of justice we wish to take exception to the phrase, "The City of Compton, right in the center of the devastated area, was without any means of communication."

The day of the quake the hams in and around Compton (W6FHE, W6BY, W6DNR, W6GAL, W6DVT, W6ECQ, W6DZP, W6BKI, W6DYM, and W6DYH) began immediately to try to get on the air. Much of our equipment was damaged, and it was with a great deal of difficulty we finally managed to set up our stations. W6DVT, W6DNR, W6FHE, and W6GAL negotiated with army officials who were in charge of Compton, and with the able assistance of Lieut. Bickel, W6BKY, we finally managed to obtain the tent, beds, etc., "in front of the city hall." W6FHE's Zepp was strung to the flagpole there, W6GAL's low power c.w. transmitter on 7 mc. was set up, batteries, receivers, etc., were furnished by other hams in Compton, and schedule was obtained with W6GZQ in Huntington Park on 160-meter 'phone long before the fellows mentioned in the article by W6HMW were even heard of!! Operations were under the competent direction of W6BKY. Of course as none of us had a 160-meter 'phone going, it was difficult to keep sked with the 'phone men; but, nevertheless, we handled many messages.

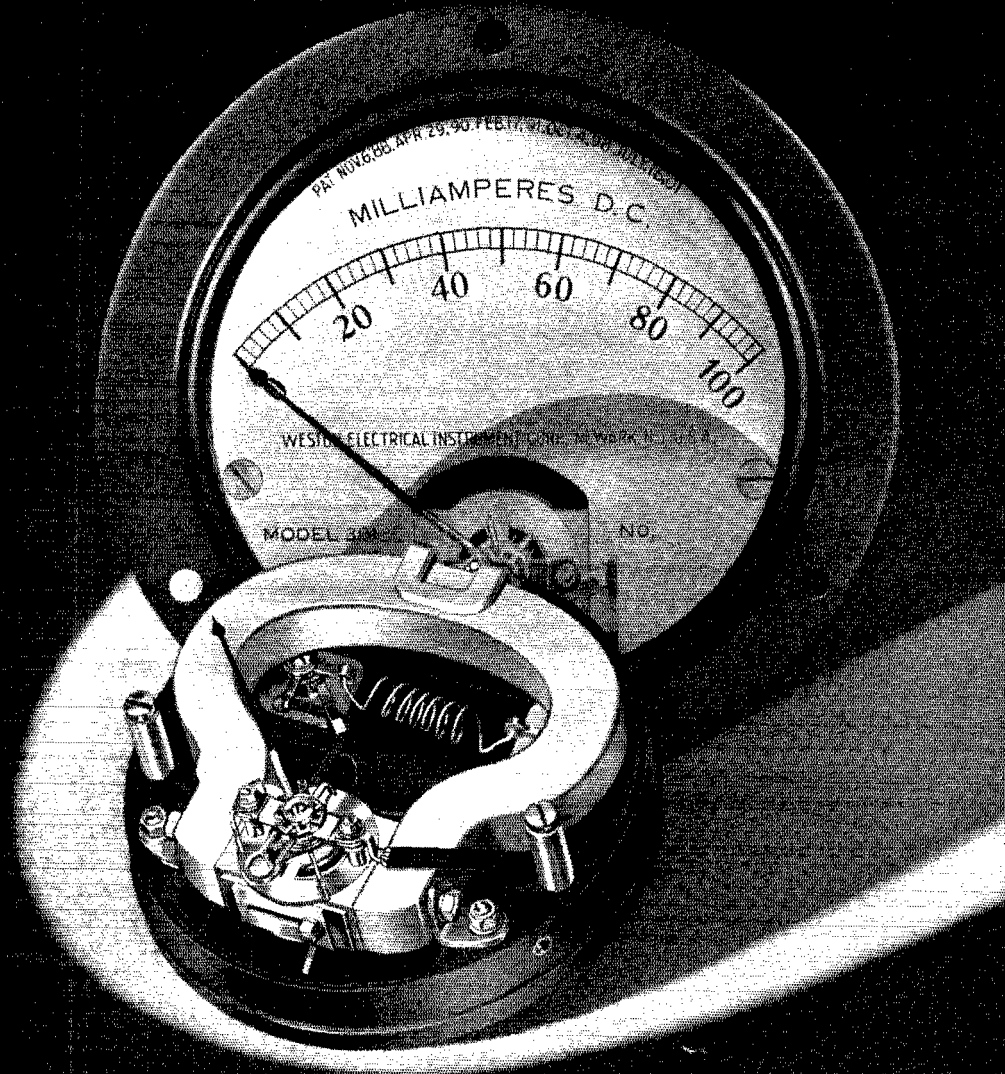
The following day 6FXE and GXH brought their 'phone rig down and installed it after we'd obtained and set up the tent, tables, antennas, beds, etc. We c.w. fellows then went to our home stations and handled hundreds of QRR messages with east and northern California. W6HMW was not in Compton until about two days later. As the 'phone men used our equipment after we had "broken the ice" we did not consider it quite fair to give them *all* the credit.

We Compton men were not going to mention our work; but when we read, "Compton was without means of communication" we wanted to set the *QST* board and other hams straight on this matter so as not to give them the impression we had to have external operators. Although the 'phone facilitated our work, we could have done nicely without the extra-territorial help, and no Los Angeles operator needed to lose 48 hours' sleep on our account.

—The Compton Bunch

[EDITOR'S NOTE.—In thus belatedly straightening out the record, we wish to point out that in the interest of giving everyone his fair due and keeping an accurate history of the part played by amateur radio in public emergencies, the amateurs concerned should not "let George do it" when the time comes to report activities. If you take part in emergency work, by all means send a complete account of it to A.R.R.L. Headquarters at the earliest possible moment.]

ENDURING ACCURACY



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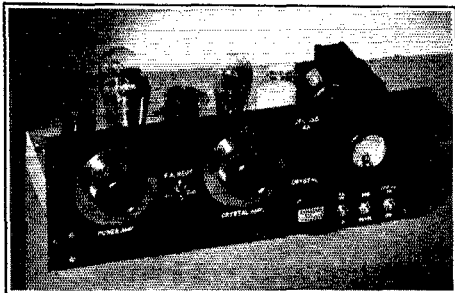
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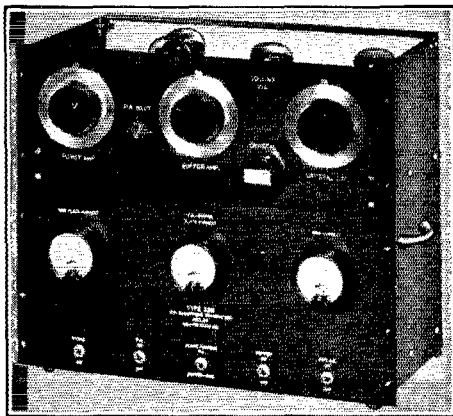
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A.R.R.L. Sweepstakes Contest

(Continued from page 54)

ceivers will help, but operating proficiency is what counts! The best equipment is only as useful for communicating as the man behind the key or "mike" can make it. Operating proficiency is what counts!

It is not absolutely necessary that every station you swap messages with be actually taking part in the contest to make your points count. However, logs will be checked and compared with each other to insure complete fairness and accuracy of results and awards. Any operator who doesn't know "what it's all about" can be referred to these columns. First of all ask the station to come through with a message and take yours.

The highest scoring stations will have literally "swept the air," piling up points by skilful operating work . . . hence the name "Sweepstakes" has become one of our most interesting and popular operating activities. The contest is extremely simple. For any hams who have taken part it is unnecessary to explain the opportunities for making new contacts and friendships. It is of interest to see how many Sections can be worked in the contest period; to determine how many stations can be worked! If you have never tried to work "all Sections," take this as an opportunity to try it. You will add new Sections, and new stations. Any frequency bands can be used, and either voice or telegraph.

Scoring system in brief:

For c.w.-c.w and 'phone-'phone contacts:

1 point for each QSO when message exchanged one way.

2 points for each QSO when message exchange is made both ways.

For c.w. to 'phone or 'phone to c.w. contacts:

2 points for each QSO when a message is exchanged in one direction.

4 points for each QSO when messages are exchanged both ways.

For final scores:

Multiply totaled points by the number of A.R.R.L. Sections² worked, that is, the number in which at least one bona fide S.S. point or exchange has been made.

All active ham stations are invited to take part and report. You will work a new bunch of stations, make new records for your station, get a new bunch of QSL cards, have a whale of a lot of fun, meet new friends, and perhaps rate an A.R.R.L. award at the conclusion. If you are a newly licensed ham or one who has never majored in "traffic work" you will get some FB operating experience and have a chance to work with a "swell" gang of operators and real friendly fellow hams. The chances have been made as equal as they can be made for all. So put in your best licks at operating and send A.R.R.L. the results for QST mention.

REPORTING RESULTS

Report* to A.R.R.L., West Hartford, Conn., giving your list of QSO's, showing Sections, stations and total, as soon as the contest is over. Include a signed statement that the points as enumerated are correct and true. Hold message files for checking but do not send them unless and until called for. Use the form suggested herewith in reporting.

QUESTIONS ON THE CONTEST

How short a message is permitted to prove a QSO? Five-word text.

Is a long signature required? It can be shortened to nickname or station call, plus Section identification where necessary.

When must Section be identified? When smaller than a state or province. Not in Iowa or Conn. for example, but in California, N. Minn., E. Minn., E. N. Y., W. N. Y., N. C., L. I., E. Mass., W. Mass., etc. Signature to the example of message form is brief and thoroughly informative if changed to "W2ALK N N J."

What about the address? Call signal, city and state must be given, and are deemed adequate on originator to addressee messages. Where relayed through even one station, a complete address, with name, street, and number, should always be given to facilitate delivery.

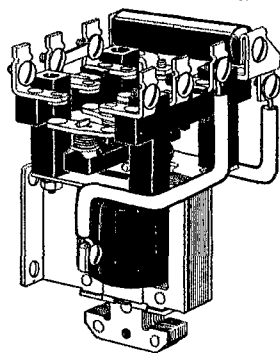
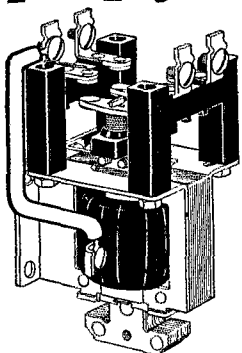
Can Hq. staff stations take part? Yes, but the operators are ineligible for awards. WIMK will send the usual addressed transmissions to members, but in the remaining time will work with contestants whenever possible to add the point or Section or those in the S.S.

What can I write texts about? Anything at all. See almanac,

A.C. RELAYS

Made by

Allen-Bradley



These A. C. solenoid relays are ideal for remote control of transmitters, for control of crystal ovens, and for any general remote control application except for keying. **THESE RELAYS WILL NOT OPERATE IN KEYING SERVICE.** Silver-to-silver double break contacts are used throughout.

The maximum contact rating is 10 amperes at 220 volts. The relay coils are wound for 115 volts 60 cycle alternating current. Relays for other voltages can be supplied on special order. Use coupon below when ordering.

Type No.	Poles	Nor- mally	Circuit Diagram	Price		Type No.	Poles	Nor- mally	Circuit Diagram	Price	
				Open	In Cab.					Open	In Cab.
A107	1	Open		\$3.00	\$4.00	A177	1	Closed		\$5.00	\$6.00
A117	1	Closed		3.00	4.00	A207	2	Open		3.50	4.50
A127	1	Open and Closed		3.50	4.50	A217	2	Closed		3.50	4.50
A137	1	Open		3.50	4.50	A227	2	Open and Closed		4.50	5.50
AT47	1	Closed		3.50	4.50	A237	2	Open		4.00	5.00
A157	1	Open and Closed		4.00	5.00	A247	2	Closed		4.00	5.00
A167	1	Open		5.00	6.00	<p>Radiostat—A stepless graphite compression rheostat for primary of 550 watt filament or plate supply transformer. Range 4 to 150 ohms. Price \$6.50</p>					

ORDER BLANK—MAIL WITH REMITTANCE TO

Allen-Bradley Co., 108 W. Greenfield Ave., Milwaukee, Wis.

Enclosed find money order for \$.....for which please send me, shipping charges prepaid, the following items:

Name.....

Address.....

To Our Readers who are not A.R.R.L. members

YOU should become a member of the League! That you are interested in amateur radio is shown by your reading of *QST*. From it 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 the page opposite the editorial page 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 *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
West Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose \$2.50 (\$3.00 outside of the United States and its Possessions, and Canada) 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.

.....

.....

.....

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*?

.....

Thanks

magazines, etc. Ask about apparatus, DX, conditions, altitude, phone work, frequency bands, new registrations, N.C.R., A. A. R. S., commercial operating, high quality signals, transcons, club membership, the New Deal, favorite sport, occupation, age, temperature, *QST* articles, etc.

Is it necessary to be a League member, to take part? No, any ham who follows the rules is eligible for mention and awards.

REPORTS FROM PARTICIPATING STATIONS MUST BE RECEIVED AT A. R. R. L. HDQ. FROM ALL STATIONS EXCEPT THOSE IN ALASKA, HAWAII, AND P. I. ON OR BEFORE NOON JANUARY 24, 1934, TO BE CONSIDERED IN THE RESULTS OR CERTIFICATE AWARDS. FROM THOSE OUTLYING POINTS NAMED REPORTS MUST BE RECEIVED ON OR BEFORE FEBRUARY 24, 1934.

MAIL YOUR REPORT IMMEDIATELY AT THE END OF THE CONTEST TO AVOID DELAY AND INSURE THAT YOUR RESULTS ARE CREDITED AND KNOWN THROUGH *QST*.

Standard Frequency Transmissions

Date	Schedule	Station	Date	Schedule	Station
Dec. 1	BB	W6XX	Dec. 30	BX	W6XX
	A	W9XAN	Dec. 31	C	W6XX
Dec. 2	BX	W6XX	Jan. 5	A	W6XX
Dec. 3	C	W6XX	Jan. 7	C	W1XP
Dec. 8	A	W6XX	Jan. 10	A	W1XP
Dec. 10	C	W1XP	Jan. 12	B	W9XAN
Dec. 13	A	W1XP		B	W6XX
Dec. 15	B	W9XAN	Jan. 17	BB	W1XP
	B	W6XX		C	W9XAN
Dec. 20	BB	W1XP	Jan. 19	B	W9XAN
	C	W9XAN		A	W6XX
Dec. 22	B	W9XAN	Jan. 24	B	W1XP
	A	W6XX		BB	W9XAN
Dec. 27	B	W1XP	Jan. 26	BB	W6XX
	BB	W9XAN		A	W9XAN
Dec. 29	BB	W6XX	Jan. 27	BX	W6XX
	A	W9XAN	Jan. 28	C	W6XX

STANDARD FREQUENCY SCHEDULES

Time	Sched. and Freq. (kc.)	Time	Sched. and Freq. (kc.)		
(p.m.)	A	B	(p.m.)	BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3600	7100	4:08	7100	14,100
8:16	3700	7200	4:16	7200	14,200
8:24	3800	7300	4:24	7300	14,300
8:32	3900		4:32		14,400
8:40	4000				

Saturday Mornings

Time	Sched. & Freq. (kc.)
(a.m.)	BX
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 W6XX, Pacific Standard Time.

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 followed by call letters and statement of frequency. The characteristic letter of W1XP is "G"; that of W9XAN is "O"; and that of W6XX is "M."
- 1 minute—Statement of frequency in kilocycles and announcement of next frequency.
- 2 minutes—Time allowed to change to next frequency.

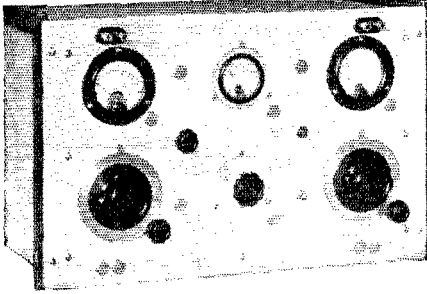
56-Mc. World's Records

(Continued from page 21)

ing it to be the last word in ground-to-ground 56-mc. DX. Now comes another claim from across the Atlantic—a claim for recognition of what would certainly appear to be the world's best DX in plane to ground work. The job was done by F. C. C. van Baerle, PA0HI, and R. A.

Suggestions for Santa

We know most Hams don't need them—
but just in case



GENERAL RADIO Unit Panels & Accessories

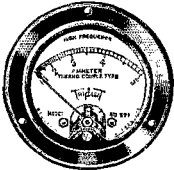
set a new standard in experimental equipment design. Space does not permit a detailed description, so write us for Bulletin No. 935. The 661-A panel shown, for example, size 19" x 12" complete with all the gadgets is only **\$6.00**. The 661-K end and base plate assembly for above, **\$5.00**. The 661-R dust cover **\$1.50**.

SYLVANIA SPECIAL

Quantity production has enabled Sylvania to reduce the price of the 830 Forty watter to..... **\$8.75**

A pair will give you 80 watts of audio in class B or 120 watts output in class C amplifier at 750 volts plate. The sturdy 10 volt, 2 amp. thoriated tungsten filament and graphite plate insure long life. The logical tube for the 210 user who desires increased output at a reasonable price. Sylvania 203-A, \$17.50; 210, \$4.75; 825 Now.... \$10.

TRIPLETT METERS



are rapidly making a name for themselves as quality instruments at popular prices. Now we can supply Thermo coupled antenna meters in the standard 3 1/2" bakelite case, in 0-1, 0-2 1/4 and 0-5 amp. ranges at only

\$6.67

A novel feature is the use of an external coupler which may be readily replaced at the small price of **\$1.00**.

Descriptive bulletin on the complete line is available.

READRITE flush mounting meters; range from 0 to 15 to U to 400 M.A. D.C. 59c

NATIONAL FB-7A \$34.20

F B X A \$47.70. All coil ranges, each \$6.00. SW-3. All models \$17.70. All band spread and short wave coil ranges **\$3.00**.

We carry a complete stock of National parts.

FEDERAL

New 366-A shielded mercury vapor rectifier, 10,000v. inverse peak. ... \$5.65

Bulletins on request

The New Deal is with us. Prices are changing rapidly. Why order from an obsolete catalog? Our quotations by return mail will save you both time and money.

Leeds Transformers

For Every Amateur Need

Mounted Filament Transformers

2 1/2 v. 6 amp. 2000 v. ins. **\$0.95**
2 1/2 v. 10 amp. 2000 v. ins. **1.25**
5 v. 3 amp. 2000 v. ins. **.95**
6.3 v. 2 1/2 amp. 2000 v. ins. **.95**
7 1/2 v. 2 1/2 amp. 2000 v. ins. **1.25**
Two 2 1/2 v. 5 amp., one 5 v. 3 amp. **2.25**
Two 7 1/2 v. 3 amp., one 2 1/2 v. 5 amp. **2.50**
Two 7 1/2 v. 3 amp., one 5 v. 3 amp. **2.50**
Three 5 v. 3 amp. for 83 Bridge Rectifier. **2.50**

2 1/2 v. 5 amp.; 5 v. 3 amp.; 7 1/2 v. 3 amp. **2.50**

2 1/2 v. C.T. 10 amp. 10,000 v. insulation. **\$2.75**

10 v. C.T. 7 amp. with tap primary. **\$3.95**

Mounted Plate Transformers

1100v. C.T. 150 M.A. 7 1/2 v. 3 amp.; 5 v. 3 amp.; 2 1/2 v. 5 amp. **\$4.75**
950v. C.T. 200 M.A. two 2 1/2 v. 5 amp. one 5 v. 3 amp. **3.75**

Universal cased plate trans. with stand-off insulator terminals, 300 w. capacity; 750-1000-1500v., each side. C.T. shipping weight 40 lbs. **\$10.95**

Leeds uncased class B transformer for 46 and 59 tubes, pair. **\$3.50**

Western Electric Phones

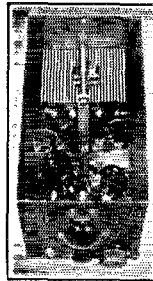
Type P-11 Signal Corp phones. These would ordinarily sell at \$7.50. All new — all perfect. Here's a genuine bargain at. **\$3.95**

The Grammer low powered transmitter kits as supplied by us include all essential parts except tubes.

We have supplied several hundred hams with these kits. Why not join this gang with a signal well within the law? The cost is low and both higher power and phone can be added without junking any parts.

Oscillator doubler kit. **\$12.95**
Power supply kit. **6.95**
Amplifier kit. **7.75**

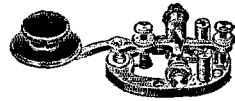
LEEDS BAND SPREAD MONITOR



furnished complete — Sylvania 30 tube, A and B batteries and 20-40-80 coils. 50 division spread on 20 meters — 35 divisions on 40 meters and 70 divisions on 80 meters. Unconditionally guaranteed.

\$9.95

NAVY TYPE TELEGRAPH KEY



With regular knob. **\$1.10**

List **\$3.60**. Navy knob — 1/2" Tungsten contacts. Only a few left at

\$1.25

A New Chrissel Condenser Microphone. An assembled guaranteed head at a sensational price; only **\$4.50**. Flat frequency response from 40 to 10,000 cps.

JEWELL TUBE CHECKERS

A few of the 214 and No. 533 Jewell tube checkers left at the same price **\$33** Complete with adapters. See last month's adv.

The New Hammarlund "Pro"

with crystal filter (less tubes)..... **\$111.72**

with automatic volume control..... **\$11.86** extra

We carry complete stock of Hammarlund parts.

CONFIDENCE

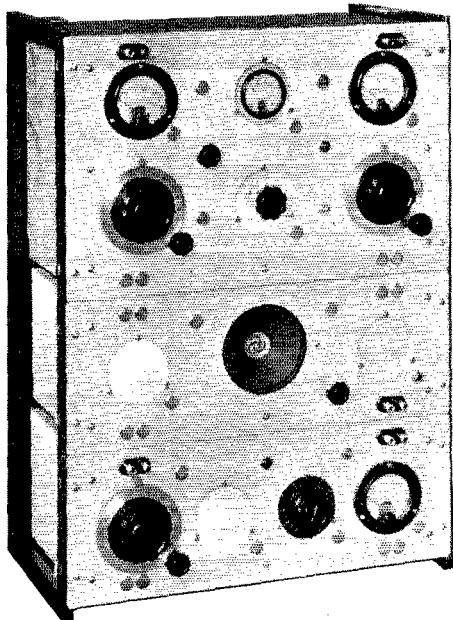
An increasing number of amateurs are sending us orders and money for considerably more than the merchandise desired when they are not sure of prices. We appreciate this confidence in our ability to supply the right thing at the lowest price. They appreciate the prompt refund of balances due them.



45 Vesey Street, New York City
New York Headquarters for Transmitting Apparatus

Say You Saw It in QST — It Identifies You and Helps QST

GR STANDARD UNIT— PANEL CONSTRUCTION



**INTERCHANGEABLE
READY TO USE
NO DRILLING
LOW PRICE**

Panels, bases, end plates, and dust covers are made of Eraydo, the new non-magnetic panel material. Holes are cut for standard navy-type meters with a liberal supply of $\frac{1}{2}$ inch holes for rheostats, jacks, terminals, toggle switches, and whatnot. Covers of the same material are furnished for mounting condensers, coils, and other gear; also adapter rings for 2-inch meters. Push-in buttons cover the small holes that are not in use, and bushings are supplied so that parts mounting in holes smaller than $\frac{1}{2}$ -inch can be utilized.

**GET THE WHOLE STORY
SEND FOR DESCRIPTIVE BOOKLET**



A 12-page booklet that answers all questions and shows dimensions, prices, and assembly suggestions is yours for the asking. Ask for Bulletin 935-Q and address the General Radio Company, Cambridge, Massachusetts.

GENERAL RADIO

Fereday, G6FY, in a plane flying at 4000 feet over Dover and Folkestone, and by a listener at Etrick Church who copied a message in the Dutch language with but a single error. The distance covered was not a foot less than 235 miles.

Can we let 'em get away with this sort of thing, gang, when we still have 14,000-foot mountains and planes flying to 20,000 feet?

Experimenters' Section

(Continued from page 58)

ence if C_3 , across the filament, is omitted. Slightly more feedback is necessary with the 34 than with a 58. The rig is at least as sensitive as the 32 or 34 in the conventional hook-up, and the regeneration control is as smooth and definite as on the a.c. model. The 34 seems to be a little better than the 32; with the 34 fringe howl is almost entirely absent. A disproportionate amount of tickler is necessary on the higher-frequency coils, probably because of capacity leakage between the filament choke and the aluminum chassis."

Band-spreading can be secured by using two variable condensers, one having a maximum capacity of 100 $\mu\text{fd.}$ and the other 35 $\mu\text{fd.}$, in parallel in place of the single condenser shown at C_1 . In this receiver the filaments are connected in series, and the voltage drop through the 34 detector filament and the choke, RFC_1 , is used to bias the Type 30 amplifier. Additional bias is provided by the 3-volt battery in the amplifier grid-return circuit.

Strays

R.f. chokes can be had by yanking apart those old R.C.A. r.f. transformers and using the coils out of them. The connections in the center should be soldered together, as these wires are not otherwise connected after dismantling. They make fine chokes for 40 and 80, and will easily stand anything a 210 can do to them.

—WIUT

Talk about the one-armed man with the 7-year itch. We used to know a chap who had one 201-A and it did both the transmitting and receiving. He used to slap it in the transmitter and call a CQ, then deftly jerk it out and juggle the hot tube into the receiver, set the regeneration on edge and tune the boys in. In a minute back the trusty bottle would go into the transmitter, its white hot plate going through an accordion-like motion under the 100-watt input.

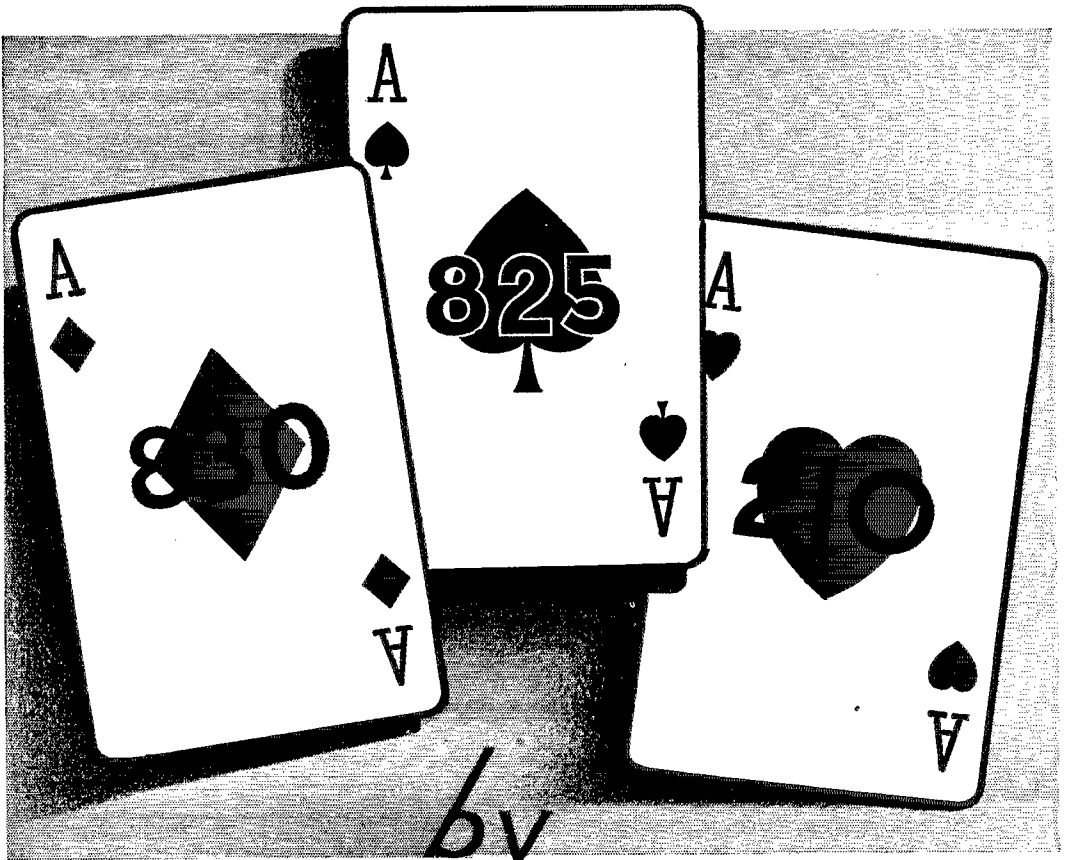
—Delta Division Convention Program

Our Cover Illustration

For the benefit of readers worried to distraction by the cover photograph, and about to write us for an explanation, we suggest the following possible interpretations:

- (a) Unnerved by the problems of QRM, a 'phone ham has gone hay-wire.
- (b) Overcome by the problems of producing QST covers, a photographer has gone bug-house.

THREE ACES



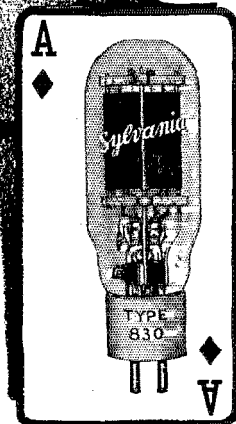
by
Sylvania
(Reg. U. S. Pat. Off.)

● The "Three Aces" represent Hygrade Sylvania's latest contribution in the field of amateur radio. These three tubes, the 830, 825 and 210, meet a long felt need among amateurs. These tubes will give the amateur the kind of service and long life he has wished for. And further, the reasonable prices of these SYLVANIA Tubes make the buying of used tubes and "seconds" unjustifiable and uneconomical . . . and Fellows, remember, SYLVANIA engineers have not stopped here, they are always striving to improve upon tubes available for amateur use. Of course the "Three Aces" employ SYLVANIA'S GRAPHITE ANODE construction.

"ACE" NUMBER ONE

THE SYLVANIA 830

● The Type 830 SYLVANIA Tube is a star performer. It is possible to place an 830 tube in a standard four prong socket . . . just increase the filament voltage to 10 Volts and the plate Voltage to 750. Very simple. And, what output! In Class C service under normal conditions the Type 830 is capable of 55 watts. This tube is meeting with wide-spread approval among 'phone men for Class B service in modulating systems. The GRAPHITE ANODE construction in the Type 830 makes this a real he-man tube. This tube particularly should make the amateur realize that the purchase of a 50 watter of the "used" or "second" variety is uneconomical.



THE 830
8.75

CHARACTERISTICS

Filament Voltage	10
Filament Current	2.15 Amps.
Maximum Overall Length	5 7/8"
Maximum Diameter	2.1/16"
Bulb	T16-26X
Base	Medium 4 pin Isolantite

Class "A" Service

Maximum Operating Plate Voltage	450 V
Maximum Plate Dissipation	17 Watts

OPERATING CONDITIONS

Plate Voltage	250	350	450
Grid Voltage	-15.0	-26	-38
Load Resistance	9300	8800	8000
Amplification Factor	8.0	8.0	8.0
Plate Resistance	4600	4250	4000
Mutual Conductance	1750	1900	2000
Plate Current	15.0	17.5	20.0
Undistorted Power Output, Watts . . . . .	.35	1.1	2.0

Class "B" R. F. Service

Maximum Operating Plate Voltage	750 V.
Maximum D. C. Plate Current	60 Ma.
Maximum R. F. Grid Current	6 Amps.

OPERATING CONDITIONS

Plate Voltage	600 V
Grid Voltage, Neg.	70 V
Power Output (Peak at 100% Mod.)	12 Watts
Maximum Diameter	2 1/16 inches
Bulb	T16-26X
Base	Medium 4 pin Isolantite

Class "C" Service

Max. Operating Plate Voltage (Modulated)	750 V
Max. D. C. Plate Current	110 Ma.
Max. D. C. Grid Current	18 Ma.
Max. R. F. Grid Current	6 Amps.

OPERATING CONDITIONS

Plate Voltage	750 V.
Grid Voltage, Neg.	180 V.
Power Output	55 Watts

DIRECT INTERELECTRODE CAPACITANCES

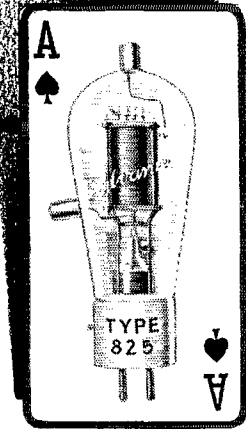
Cgp.	9.9 mmf.
Cgf.	4.9 mmf.
Cpf.	2.2 mmf.



AMATEURS PLEASE NOTE: This is the December issue of Q.S.T. A Sylvania Tube will make an excellent Christmas gift. Show Father or Mother, YL or Ex-YL these Sylvania pages.

"ACE" NUMBER TWO

THE SYLVANIA 825



THE 825
10.00

● Widely-spaced, low inductive plate and grid connections and unusually low inter-element capacity make the Type 825 Tube the most efficient short wave oscillator and amplifier. The Type 825 is suited to all short wave work, but it is outstandingly superior for the frequencies between 20-100 megacycles. The Type 825 Tube embodies in design and performance the results of specialized research in ultra high frequency work, and knowledge of high frequency phenomena. This tube is excellent for amateur work on the 20-10 and 5 meter bands.

CHARACTERISTICS

Filament Voltage	7.5
Filament Current	3.25 Amp.
Average Characteristics at:	
Ep, 1000 Eg, 70 Ef, 7.5 A. C.	
Plate Current . . . . .	.040 Amp.
Plate Resistance	10,000 Ohms
Voltage Amplification Factor	10
Mutual Conductance	1000 μ Mhos
Maximum Plate Voltage:	
Modulated DC	750
Unmodulated DC	1000

Maximum Plate Dissipation	40 Watts
Normal R. F. Output	40 Watts

Interelectrode Capacitances:	
Grid to Plate	3 μ u Fd.
Grid to Filament	2 μ u Fd.
Plate to Filament	1 μ u Fd.

Max. Overall Dimensions:	
Height	6 1/4 inches
Diameter	2 7/16 inches

Bulb	S-19
Base	Medium 4-pin Ceramic

EIGHT POINTS OF SUPERIORITY

- | | |
|--|--|
| 1. Wide separation of input and output leads for lowest possible capacity. | designed and processed for ultra-high frequencies. |
| 2. Plate lead. Maximum insulation. | 5. Low-loss ceramic base. |
| 3. "Floating Anode" held only by low-loss ceramic spacers. | 6. No mechanical strain on press. |
| 4. Thoriated tungsten carbide filament, specially | 7. Grid lead. Maximum insulation. |
| | 8. Graphite anode. |

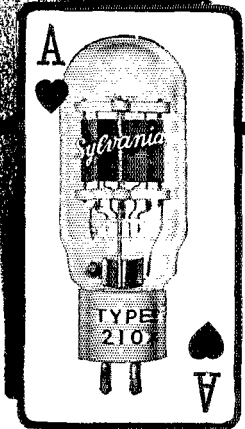


● ALL CORRESPONDENCE concerning our other transmitting tubes for amateur use should be mailed to Hygrade Sylvania Corporation, Amateur Radio Division, Clifton, N. J.

AND THE THIRD "ACE"

THE SYLVANIA 210

● This SYLVANIA Type 210 is the first 210 ever designed and manufactured strictly as a transmitting tube. This tube has a punch, the like of which has never before emanated from a 210. This 210 can take it! It is a powerful tube..efficient, and sturdily constructed. Don't miss the first opportunity to try a SYLVANIA 210. There is a surprise in store for you.



THE 210
4.75

CHARACTERISTICS

General Characteristics

Number of Elements	3
Filament Voltage	7.5
Filament Current	1.25A
Filament Type	Thoriated Tungsten

Average Characteristics at:
EP=425, EG=-39, EF=7.5

Plate Current	0.018 Amp.
Amplification Factor	8
Plate Resistance	5450 Ohms
Mutual Conductance	1550 μ Mhos
Interelectrode Capacitances	
Grid to Plate	7 μ Fd.
Grid to Filament	4 μ Fd.
Plate to Filament	2.2 μ Fd.

Max. Overall Dimensions	
Height	5 7/8 inches
Diameter	2 inches
Base	Medium 4-pin, ceramic
Bulb	1-16
Type of Cooling	Air

Class "A" Operation

Max. Operating Plate Voltage	600
Max. Plate Dissipation	15 watts
Typical Operation at:	
EP=600, EG=-58, EF=7.5	
D. C. Plate Current . . . . .	.018 Amp.

Peak Grid Swing	55 Volts
Load Resistance	10,000 Ohms
Power Output	3 Watts

Class "B" Operation

Max. Operating Plate Voltage	600
Max. D. C. Plate Current (Unmod.) . . . . .	.070 Amp.
Max. Plate Dissipation	20 Watts
Max. R. F. Grid Current	5 Amp.
Max. D. C. Grid Current . . . . .	.015 Amp.

Typical Operation at:
EP=600, EG=-80, EF=7.5

D. C. Plate Current (Unmod.) . . . . .	.066 Amp.
Peak Power Output	12 Watts
Carrier Output (Mod. Factor 1)	3 Watts

Class "C" Operation

Max. Operating Plate Voltage	
Modulated D. C.	450
Unmodulated D. C.	600
A. C. (R. M. S.)	600
Max. D. C. Plate Current . . . . .	.070 Amp.
Max. Plate Dissipation	20 Watts
Max. R. F. Grid Current	5 Amp.
Max. D. C. Grid Current . . . . .	.015 Amp.

Typical Operation at:
EP=600, EG=-125, EF=7.5

D. C. Plate Current . . . . .	.066 Amp.
Peak Power Output	15 Watts

● **OTHER AMATEUR TYPES**— immediate deliveries on the following— all employing the GRAPHITE ANODE Construction— 203-A, 211, 845, 852, 865, 866 and 872.

● Sylvania's Amateur Radio Division invites inquiries from amateurs on Sylvania's Transmitting Tubes. FREE characteristic charts and Price Lists. See your dealer . . if he cannot supply you, send your order to:

HYGRADE SYLVANIA CORPORATION

Hygrade Lamps

ELECTRONICS DEPARTMENT
AMATEUR RADIO DIVISION

Sylvania Tubes

FACTORIES:

Salem, Mass.

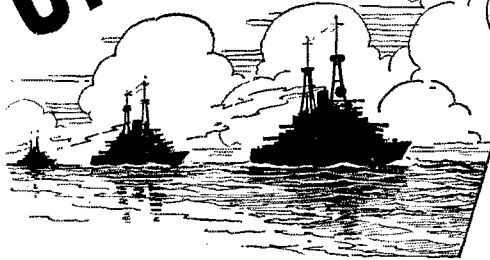
CLIFTON, N. J.

Emporium, Pa.

St. Marys, Pa.

Clifton, N. J.

The UNERRING TEST



U. S. S. SALT LAKE CITY

Navy Yard,
Puget Sound,
Bremerton,
Washington,
22 October, 1933

Series Manager
The Allen D. Cardwell Mfg. Corp'n.
83 Prospect Street,
Brooklyn, New York

Dear Sir;

Due to the fact that the Navy uses your variable condensers to a great extent in its receivers, I desire to use them in a high frequency superheterodyne receiver that I intend to design and build.

Later, I intend to construct an Amateur transmitter which, of course, will involve the use of variable condensers with higher break-down voltage than the receiving type have.

Please forward your bulletins for transmitting and receiving.

"EXPERIENCE," said Andrew Jackson, "is the unerring test of all human undertakings." This Navy Radioman knows from everyday, first-hand experience the efficiency and reliability of CARDWELL condensers; that the lesson has not been lost upon him is indicated by his letter.

Experience has shown him that the CARDWELL survives where many "fair weather"

condensers would fail, and that a condenser *must* be good if it can survive violent shocks, unavoidable abuse, the ravages of salt water and salt air, extremes of heat and cold — *and still indefinitely retain the 100% efficiency required of all Navy apparatus.*

To benefit by others' experiences will cost you nothing but may save you much.

Use CARDWELLS. Send for literature.

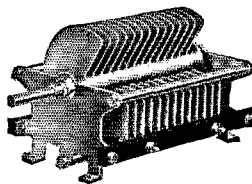


Is it News to you that CARDWELL

in 1924, was called upon by a distinguished client to design and complete within a very few months the necessary apparatus for pilotless airplane control, both from the ground and from another plane? Within the specified time the apparatus was designed, completed, successfully demonstrated and accepted by our client. It still is in operation.

A super-sensitive relay, the heart of this apparatus, and especially designed for the purpose, is one of the products of CARDWELL, available for any use which may suggest itself.

Have you a designing or manufacturing problem? Put it up to CARDWELL.



CARDWELL MIDWAY "FEATHERWEIGHT" CONDENSERS, RECEIVING and TRANSMITTING

CARDWELL "STANDARD" MODELS FOR RECEIVERS and MEDIUM POWER TRANSMITTERS

CARDWELL 16-B TRANSMITTING CONDENSERS FOR LARGER TRANSMITTERS

CARDWELL HIGH VOLTAGE CONDENSERS FOR COMMERCIAL RADIO-TELEGRAPH and BROADCASTING STATIONS

CARDWELL 5-2244 OIL DIELECTRIC FIXED CONDENSERS FOR HIGH FREQUENCY FURNACES and TUBE BOMBARDERS

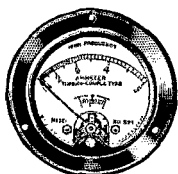
THERE'S A CARDWELL FOR EVERY TUBE, PURPOSE and POCKETBOOK

"THE STANDARD OF COMPARISON"

The ALLEN D. CARDWELL MFG. CORP'N.
83 Prospect Street, Brooklyn, N. Y.

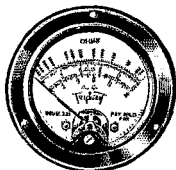
These **TRIPLETT** Meters Were Especially Designed to Suit Your Requirements

NO pains or expense have been spared to make Triplet meters the finest instruments obtainable. They were designed by prominent instrument engineers and are the finest development of their many years of experience. These instruments are advanced in design, dependably accurate and absolutely guaranteed.



Triplet offers you a complete line of precision instruments — one for every purpose. These instruments include: Thermo-Couple Ammeters (High Frequency), Universal A.C.-D.C. Meters (Copper Oxide), Portable Instruments, A.C. and D.C. Panel Instruments. These instruments are made in several sizes: 2", 3 1/2", 5 1/4". They are obtainable in these types of cases: Wide flange, projection, portable — metal and Bakelite.

The metal dials of these meters are enameled permanently white with black lithographing . . . resulting in a most durable and attractive finish. The finest sapphire jewel bearings are used. The aluminum needle and other parts are ribbed and made unusually strong throughout. The moving coil is light in weight. The scales are extra long, uniform and easy to read. All have zero adjustments.



Your Jobber Can Supply You

THE
**TRIPLETT ELECTRICAL
INSTRUMENT CO.**

32 Main St. Bluffton, Ohio

Mail This Coupon NOW

The Triplet Electrical Instrument Co.
32 Main Street,
Bluffton, Ohio.

Gentlemen:

Please send me information about Triplet meters.
Also catalog on servicing instruments.

Name.....

Street Address.....

City.....State.....

W2VY

(Continued from page 38)

filter with 8 μ d. of condenser. Tube keying is employed with both oscillators. An automatic tape transmitter is sometimes used for calling DX and stations with whom schedules are maintained. A 300-watt crystal-control outfit is now under construction.

Receiving equipment consists of a Hammarlund Comet Pro and National SW-3 and SW-5 receivers. A commercial dynatron frequency meter is employed for frequency checking.

The antenna system, which for the past three years has given exceptionally good results, consists of a 66-foot flat top, current fed through a pair of heavy weather-proofed twisted feeders 45 feet long.

DX is as expected for the power used. All continents have been worked.

Further Licensing Notes

(Continued from page 32)

Any reissue of station license occasioned solely by renewal of operator license.

Any reissue of operator license occasioned solely by renewal of station license.

Any reissue of operator license occasioned by modification of station license.

The station license is not reissued, however, when an operator license is modified to grant higher class operator privileges. This is accomplished solely by an additional endorsement on the operator license, and it is not necessary to file any application with respect to the station.

The Commission has also revised its commercial operator license regulations. Included amongst them is Rule 420 which again states that amateur stations may be operated only by licensed amateur operators. Amateurs will be interested in Rule 445 which permits an amateur to operate any station in the experimental service licensed for and operating on frequencies above 30,000 kilocycles, solely by virtue of his amateur operator license.

—K. B. W.

An Amplifier for the Universal Exciter Unit

(Continued from page 23)

capacity, so the size of the tank coil should be such that resonance is reached with 50% or more of the total capacity of C_2 in the circuit. If this rule is followed the amplifier will remain neutralized for any tank coil, L_3 , and the first neutralizing adjustment will be the last.

After the amplifier is neutralized, C_2 should be set at resonance and the plate voltage applied; a final touch should be given C_2 to bring the plate current to the lowest value possible. Following this the antenna coil may be coupled to L_2 and the feeder condensers adjusted for maximum feeder or antenna current. The driver stage tuning condenser, together with C_1 and C_4 probably will require final readjustments to bring the output up to maximum. The grid current will drop when the amplifier is taking power, but this is a normal condition.

DOUBLING

The amplifier will work with rather good efficiency as a doubler, if the occasion should arise to

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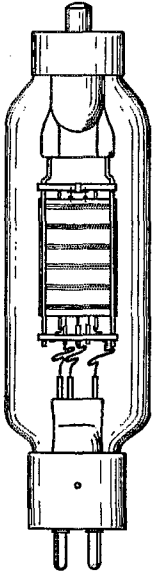
**G
E
T**



Here are the essential accessories to the operating equipment of a well-run and efficient amateur station. Buy them ahead of your actual needs—don't wait until you run out—check up now—how's your supply? The **LOG BOOK**, bound in heavy paper covers, 8½ by 10¾, contains 39 log pages and the same number of blank pages for miscellaneous notes. Also there is a list of Q signals, a message number sheet and a sheet of cross-section paper. Price, 40¢ each or 3 for \$1. The **MESSAGE BLANKS** are the most convenient form for handling and delivering messages. Designed by the Communications Department for maximum ease and efficiency. Well printed on good bond paper. Size 8½ by 7¼. Price, 35¢ per pad of 100 sheets, three pads for \$1. You should write your radio letters on the official League **MEMBER'S STATIONERY**. It identifies you instantly and is good-looking and convenient. Lithographed on heavy 8½ by 11 bond paper. Price, 10 sheets for 50¢, 250 sheets for \$1, 500 sheets for \$1.75. The neatest and simplest way to deliver a message by mail is to use a standard **MESSAGE DELIVERY CARD**. It explains what it is and how it got there. Price, 2¢ each on U. S. stamped postal cards or 1¢ each on plain cards. All above prices are postpaid. Please do not remit in postage stamps. Stock up now with these various supplies for a flying start into the new year. **THE AMERICAN RADIO RELAY LEAGUE, INC., WEST HARTFORD, CONNECTICUT.**



RK-18



**Low capacitances
for good 5-meter
operation — yet
low impedance
and high mutual
conductance for
high output at
any frequency**

The RK-18 is designed to meet every requirement of the amateur from a 5-meter self excited oscillator to a high power Class B modulator. A molybdenum plate tells when proper plate dissipation is reached. Isolantite insulation insures against dielectric loss. Grid and plate leads are positioned for convenience and efficiency in the transmitter assembly.

RATING

	Class A	Class B	Class C
Filament Voltage.....	7.5		
Filament Amperes.....	2.5		
Maximum Plate Volts.....	1000	1000	1000
Grid Bias Volts.....	-40	-50	-150
Amplification Factor.....	18		
Mutual Conductance.....	3000		
Max. Watts Plate Dissipation.....	35	35	35
Nominal Watts Output Per Tube...	8.5	40	40
Max. over-all Length.....	8 1/2"		
Max. Diameter.....	2 1/8"		

List Price — \$10.95

Write for Technical Data on the RK-18, RK-15, RK-16, RK-17 and R-866A.

*If your dealer cannot supply you
order direct from us*

RAYTHEON PRODUCTION CORPORATION

General Sales Office — New York City
 New York, N. Y. 30 E. 42nd Street
 Newton, Mass. 35 Chapel Street
 San Francisco, Cal. 555 Howard Street
 Chicago, Ill. 445 Lake Shore Drive

use it for that purpose. The neutralizing condenser need not be touched; to get second-harmonic output all that it is necessary to do is to insert the proper plate coil, L_3 , and to excite the grid on the next-lower-frequency band. Doubling is particularly likely to be advantageous when the amplifier is to be used on 28 mc., where the excitation available from the exciter unit is lowest and is critically dependent upon the amount of regeneration in the doubler stage. Should regeneration be low, it may be found that the 28-mc. output of the amplifier is greater when the excitation is on 14 mc. and the amplifier itself does the frequency multiplication. At any rate, for occasional 28-mc. operation this practice will obviate the necessity for the three or four extra coils required for straight-through 28-mc. excitation.

The Overmodulation Racket

(Continued from page 19)

design. The methods of adjustment that accompany their description will result in proper, symmetrical modulation. Actually these instructions vary but little in their essentials, from one transmitter to another. Neutralize r.f. circuits precisely, apply the right bias and plate voltages, insure proper excitation, adjust r.f. load so that the modulator will be loaded as it requires, keep all r.f. circuits tuned to resonance—and never allow the gain control to get above the point where the indicator of the modulated stage's plate milliammeter begins to quiver. No need to repeat the details here; we have them in 'phone transmitter articles in *QST*, in the 'phone chapter of the *Handbook* and, for review of the high spots, in the 'phone section of the *License Manual*.

Let's take this thing seriously. The business is a serious one. Let's call a halt to the crime wave afflicting amateur 'phone. The unbounded and needless slaughter of useful kilocycles, not by just a few overmodulation racketeers but by the vast majority of us, must be stopped. We have only ourselves to blame and only we, cooperating intelligently, can clear up the mess by operating our individual transmitters to give proper modulation. There's no other way of retrieving the wasted kilocycles. And until we reach the state of making the fullest possible good use of the 'phone territory already assigned we are in a poor position to ask for more.

An Efficient C.W. and 'Phone Transmitter Using the New Tubes and Circuits

(Continued from page 17)

ma. This is the maximum rated current for the Type 46 and should not be exceeded. The output from the 841 should be quite high — at least as much as from a Type 10 self-excited oscillator at the same voltage.

THINK OF IT!

100 to 150 WATTS OUTPUT
USING only three tubes—

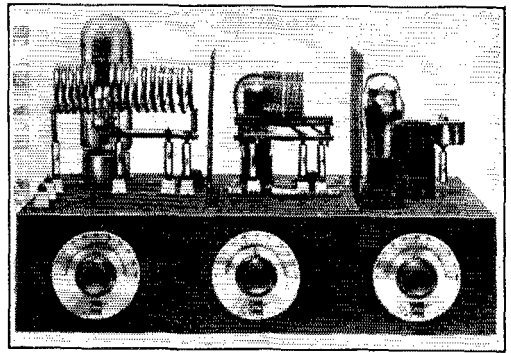
The "CW 100" transmitter kit was designed to fill the requirements of the most discriminate purchaser. The performance, appearance and quality are unsurpassed — the value offered unequalled. Straightforward, efficient design thruout. The smooth and easy handling of the "CW 100" even on 20 meters will be a revelation.

TUBE LINEUP

47 osc. — '10 buffer or doubler — output stage choice of '03-A, RCA 800 or Raytheon RK-18.

Special jacks are provided so that entire transmitter can be tuned with one milliammeter. All parts are supplied including one set of coils for either 20, 40, or 80 meters. When ordering transmitter with 160 meter coils add \$3.00 to the price of kit.

TRIPLE POWER SUPPLY KIT on matched chassis is available at \$36. This supply furnishes all filament voltages also 400-600-1200 volts, all with separate filters.



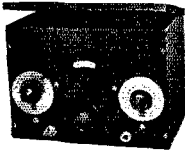
"CW 100".....Price \$24.50

The Gross "20-W Jr." Crystal Control Transmitter Kit, \$10.95

The "20-W Jr." transmitter kit due to its low cost makes it possible for anyone to own a crystal controlled station for greater efficiency, stability and compliance with the new rulings which require all of the above. The cost is much less than you would expect to pay for a self excited transmitter of this type. A schematic hookup and parts layout sheet as well as tuning instructions are furnished, thus enabling the most inexperienced operator to wire and put the set on the air, for real results. The "20-W Jr." is supplied with a neat metal chassis under which all the parts are mounted, making the wiring and components dustproof. The overall size of the chassis is 7" x 18" x 3". A plug-in crystal holder is furnished with the kit at no additional cost. Only one milliammeter is required for tuning the transmitter and each stage is provided with a jack for this purpose. The "20-W Jr." uses one '47 as crystal oscillator, one '46 as buffer or doubler and two '46's in the amplifier. One set of three wound coils is supplied with the kit for the 20, 40, 80 or 160 meter band. When the 160 meter coils are ordered add 50 cents extra to the price of the kit. Any additional coils can be supplied as listed below at only 75 cents for each coil.

Gross "20-W Jr." Power Supply Kit, \$8.45

Mounted on metal chassis which matches the "20-W Jr." transmitter. Heavy duty power transformer, chokes, condensers, etc. supplied. Uses one '83 as rectifier. This unit and the transmitter make a neat combination as well as an efficient one.



The "EAGLE" Three-Tube Short Wave Receiver

"Band Spread" over any portion of the tuning range — only finest material used thruout. Employs one 32 R.F., one '32 detector and one '33 Pentode Audio — 15 to 200 meters — four coils supplied. The "EAGLE" is economical — two dry cells will operate the filaments. See March or April QST for full description of this most excellent value in short wave receivers.

"Eagle" completely wired and tested..... \$11.95 Three tubes tested in your receiver..... \$3.00

Gross Special Power Transformer

for use with '83 tube will give an output of 500 volts D.C. at 350 MA with choke input. Run your entire R.F. and Class B off this transformer. The regulation for the Class B is about 5%, filaments are two 7 1/2v. and one 5v. **Special... \$5.75**
A transformer having the same filament windings as above — at 300 MA having 750 volts each side of C.T. **Special... \$6.00**
750-1000 V. each side of C.T. 300 watts. **Extra special... \$6.80**
1000-1500 V. each side C.T. 300 MA. **\$8.50**
1500-2000 V. each side of C.T. 800 Watts. **\$11.95**
Case 6.3 V. 2 amp. transf. 1.25
2.5 V. 6 amp. C.T. (midget)80
5 V. 3 amp. C.T. for '83 (midget) .. .80
2 1/2 — 2 1/2 and 5 Volt C.T. 1.45
2 1/2 — 7 1/2 and 7 1/2 Volt C.T. 1.45
2 1/2 — 5 and 7 1/2 Volt C.T. 1.45
5 — 5 and 5 Volt C.T. 1.45
5 — 7 1/2 and 7 1/2 Volt C.T. 1.45
Thord. 30 H 75 MA.69
Thord. 15 H 250 MA. 2.95

Thord. No. T-2458 double 18 H 250 MA. **\$6.50**
Gross cased 30 H 200 MA choke. . 2.25
Ward Leonard Vitreous Resistors 200-Watt 8 1/2" Long with Variable Sliders.
1000 ohms. **\$3.99**
2500 ohms. 1.05
5000 ohms. 1.05
10000 ohms. 1.11
15000 ohms. 1.20
25000 ohms. 1.29
35000 ohms. 1.35
50000 ohms. 1.44
60000 ohms. 1.49
80000 ohms. 1.59
100000 ohms. 1.65

HAMMARLUND CRYSTAL "PRO"
Transportation prepaid anywhere in U S. A. **\$111.72**

GUARANTEED TUBES
Heavy Duty Isolantite top 866. **\$2.15**
888 or 871. 1.15
83 and 47's.70

DeForest 481. \$.90
210's. 1.30
46's.60
DeForest 450's. 1.35

Gross Class "B" Transformers
A pair of cased high grade transformers for 46's. **\$4.95**

Power Transformer 600 volts each side of C.T. 200 MA 2 1/2 V. 10 amps., 5 V. 3 amps., 7 1/2 V. 3 amps. **\$3.95**

Combination Fil. Transformer **\$3.65**
2 1/2 V. C.T. 10 amps for 866's.
10 V. C.T. 7 amps for '50's or '52's.
10,000 volt insulation.

Filament transformers shielded in metal cases, center tapped secondaries.

2.5 Volt 10 amperes for 866's. **\$2.50**

10 to 12 Volts at 8 amperes. **2.50**

Special 10-12 Volt 7.5 ampere filament transformer, extra special. **1.10**

Oil Impregnated cased condensers

1400 Volt D.C. 2-2 mfd. **1.85**

MORRILL 2 mfd. 3000 V. D.C. working, extra special. **\$7.25**

Polymer cased cond. 8 mfd. 1000 V. D.C. **\$1.65**



Hoyt Antenna Meter

Hot wire antenna meters. 2 1/4" mounting hole, flange 3" diameter, supplied in 1 1/2, 3 and 5 ampere ranges. Why work without antenna meters when you can buy them at this special price?..... **\$2.95**

Hoyt Milliammeters and Voltmeters

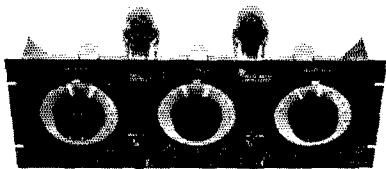
Perfectly damped meters at a price. These are not to be confused with the usual inexpensive meters. 2" mounting hole, flange 2 3/8" diameter, supplied in the following sizes: 10 ma, 25 ma, 50 ma, 100 ma, 150 ma, 250 ma, 300 ma, 4 V. AC, 10 V. AC, 15 V. AC, 10 V. D.C. Price each... **1.50**, 3 for **\$4.00**

20% deposit with all C.O.D. orders. Remit by M.O. Include postage. Prices subject to change without notice.

GROSS RADIO, INC. 51 VESEY STREET NEW YORK CITY

ANNOUNCING the first in a series of transmitting units employing recently developed circuits and tubes—

THE TRITET UNIVERSAL EXCITER UNIT



This unit retains all the basic circuit features of the original Tritet as developed by J. J. Lamb, and fills the need for an exceedingly flexible unit which may be used as an exciter for larger tubes or may be worked directly into the antenna as a low powered transmitter.

The Harvey Tritet is ruggedly built of aluminum with the front panel finished in black crackle lacquer, fully engraved, and is made for standard relay rack mounting. It uses two 59 tubes, has all plug-in coils, and has a switch to select crystal or electron-coupled control. It is constructed of the highest quality parts with isolantite sockets and coil forms, and comes complete with coils for three band operation. Price, **\$49.50** fully wired and tested, less tubes and crystal.

Transceivers as advertised in November QST;
2-volt model, one 30, one 33; 90 volts 20 ma | **\$19.50**
6-volt model, one 37, one 41; 180 volts 40 ma |

HARVEY RADIO LABORATORIES

12 BOYLSTON ST. BROOKLINE, MASSACHUSETTS

FEEDING THE DOUBLET

A new idea of great importance in short wave transmitting antenna construction, using a balanced, non-radi-

ating feed line of ANY convenient length, with a simple solution of the impedance problem.

Complete plans and specifications for construction of this feeder system will be mailed free on request. Get the dope on the simple parts we have developed before you build.

The heart of the system is the correct construction of the tubing section, plus the perfection of the JOHNSON Transposition Insulator. Parts will be available through all Johnson jobbers.

Your anti-noise receiving antenna will be better and easier to build with the unique JOHNSON No. 31 Transposition Insulator.



Bulletin 933 describes these and other original JOHNSON parts. Send for it

E. F. JOHNSON COMPANY
Waseca, Minnesota

Coupling coil L_7 may now be placed in L_4 as shown, the "plus" plate supply lead to the 800's being left disconnected. With the negative B lead of the high-voltage supply connected and the filament return circuit closed, the neutralizing condensers C_{12} should be adjusted simultaneously in small steps, until complete neutralization is accomplished. A neon bulb is not very satisfactory for this operation. A superior method is to connect a 0-100 d.c. milliammeter in the center-tap lead of L_4 to ground (the 800's grid return). The grid current, which will be about 80 milliamperes while the 800's are being neutralized, will remain perfectly steady when C_6 is tuned through resonance, if the neutralization is correct. If the condensers C_{12} are even slightly out of adjustment, the pointer of the grid meter will "kick" as C_6 is slowly tuned through the resonant point.

The positive 1150-volt lead may now be connected to the 800's, after the biasing resistor is set for maximum resistance. The primary circuit of the high-voltage transformer should be open while the high-voltage lead is being handled, unless self-electrocution is desired. A key should be inserted between R_6 and ground, so that the filament return circuit may be quickly opened if the plate current of the 800's is unreasonably high or something in the circuit breaks down.

If everything is working properly, the d.c. grid and plate currents of the 800's will be quite low. The biasing resistor may now be adjusted to about 800 ohms, the plate tank being left tuned to resonance. The d.c. plate and grid current (for both 800's) should now be about 80 ma. and 50 ma., respectively. As C_6 is tuned each side of resonance, the plate current will rise sharply to values of the order of 200 ma. Since this condition somewhat exceeds the maximum plate current rating of the tubes, the detuning (as a check of circuit operation) should only last a few seconds. To give a rough idea of the r.f. voltage that should be developed, a steady arc of about $\frac{3}{4}$ -inch can be drawn from either side of the main tank condenser to a pencil lead.

The antenna used with this transmitter consists of a half-wave Zeppelin 33' 4" long, fed with 10-foot feeders spaced 10 inches apart. The antenna coil, consisting of six turns the same diameter as L_6 and parallel-tuned, is loosely coupled to one end of the 800 plate coil. Although feeder currents mean little except as a method of comparison between identical antenna and feeder systems operating at the same frequency, it may be of interest to note that the feeder current of this rig is about 1.5 amperes. With other radiating systems, it may be more or less.

When the antenna is taking power, the plate current of the final amplifier should be adjusted to 160 ma., this adjustment being accomplished by varying both the grid bias and the antenna coupling. The total d.c. grid current is then about 30 ma. To reduce the antenna load on the 800's, the coupling of the antenna coil should be loosened; load should not be reduced by detuning the antenna condenser. All circuits should be tuned

**How to become
A RADIO
AMATEUR**



Third Edition Price 25 Cents

MAKING IT EASY FOR THE BEGINNER TO BEGIN . . .

▶ It's the elementary things that are discussed in the League's carefully prepared book for beginners, "How to Become a Radio Amateur." Now in its third edition, completely done over in 1934 style, its 32 pages are filled with concise, clearly written material telling how to build the first receiver, a simple transmitter, an inexpensive monitor — in fact, the entire beginner's station.

"How to Become a Radio Amateur" (No. 8 in the A. R. R. L. series entitled "The Radio Amateur's Library") is the standard elementary guide for the would-be amateur. 25c (no stamps, please) postpaid anywhere.

THE AMERICAN RADIO RELAY LEAGUE WEST HARTFORD, CONNECTICUT

PANELS — BAKELITE — RUBBER — ALUMINUM
All Sizes Cut to Order

ALUMINUM CANS — Stock sizes. Special sizes, made to order.
ALUMINUM CHASSIS — Threaded brass studs for 6/32 screws.
Length from 1/2" to 6" — price 5c to 30c.

Insulating bushings
for all size shafts
75c to \$1.90 per dozen



Couplings in
brass or bakelite
— 15c



**UNITED RADIO
MFG. CO.**

Est. 1923 191 Greenwich St., New York
Transmitting frames and racks.

METAL WORKING

LATHE Precision equipment for the small shop. New designs and manufacturing processes make this amazing bargain possible. Complete metal working lathe with compound slide-rest, combination universal face-plate and chuck and tail center; 3 1/2" swing; 24" length, 20 lbs. Send \$1.00, balance plus postage C.O.D. Lathe for wood-turning alone, \$4. Attachments for milling, grinding, sanding, saw-table, etc., available at low prices. Order from ad at once and have a complete machine shop.

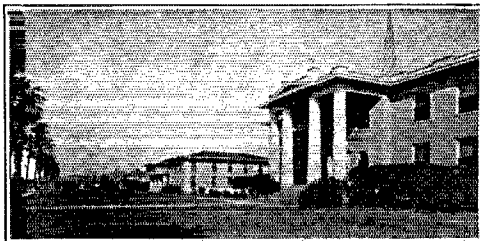


AMERICAN MACHINE & TOOL CO., Dept. Q-6 120 BROADWAY NEW YORK

*Technical
Training Station*

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Phone C. W.



*Studio Technique
Guaranteed*

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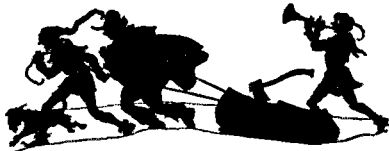
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EDITOR'S NOTE.—*The 100-watt modulator unit for this transmitter will be described by W2BR0 in an article to appear in a subsequent issue.*

Pre-Selection and Image Rejection in Short-Wave Superhets

(Continued from page 18)

The schematic of a typical arrangement is shown in Fig. 4. This represents coupling of a two-wire transmission line (as from a "doublet" antenna) to the receiver, through a link circuit. The antenna coil is coupled to the link-circuit coil, with the electrostatic shield between the two. As suggested, the link-circuit coil is enclosed in a shield can having a diameter approximately twice that of the coil, facing a hole in the end of the can which is of a diameter slightly greater than that of the coil. The Faraday shield is simply interposed between the feeder terminating coil and the shielded link-circuit coil. The coupling is, then, of the magnetic type, practically unaffected by the Faraday screen. Elimination of the electrostatic coupling effects a marked improvement of the selectivity, as evidenced by a several-hundred-percent reduction in image response. Such screening may, of course, be applied to receivers with or without other means of improving the signal-image ratio. It is the final step in cleaning up image trouble in the receiver already equipped with a pre-selector.

New Unit-Type Transmitter Housing

APPLYING the sectional bookcase idea to radio equipment, the panel assembly and enclosure shown in the photograph is so designed that it is a complete shielding container for a small transmitter or other apparatus, while at the same time several similar units can be stacked one on top of the other to take care of more elaborate layouts. Each section is so arranged that it bolts firmly to the one below; thus there is room for indefinite expansion upwards without the necessity for a mounting rack of inflexible dimensions.

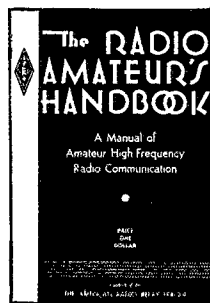
The assemblies are constructed of sheet steel, heavily copper plated, and finished in black crackle outside and aluminum inside. The panel, which has the standard relay-rack measurements of 19×10 inches, is furnished with an attached sub-base on which apparatus can be mounted. The sides of the enclosing shield are provided with ventilating louvres, while the perforated rear shield is easily removable so that the con-

IT IS impossible to give in a small space a comprehensive description of the Radio Amateur's Handbook. The best we can do is to point out a few highlights.

► It is the only really authoritative guide to Amateur Radio. First published in 1926, it has run through ten editions and fifteen printings. A total of over one hundred and ninety thousand copies have been sold. The current Tenth Edition is a complete revision. It has been almost entirely rewritten and it incorporates large amounts of new material and new illustrations. The Handbook has 240 pages and 230 illustrations. It is the work of the entire headquarters staff of the American Radio Relay League.

► As an example of the thoroughness with which the Handbook treats each branch of the subject of Amateur Radio, suppose we examine the chapter headed, "Planning and Building Transmitters." We find the following subjects discussed: Types of Transmitters, Self-Controlled Oscillator Circuits, Frequency Stability and Efficiency, the Crystal Controlled Oscillator, Crystal Cuts and Grinding, the Crystal Oscillator Circuit, Crystal Mountings, from Oscillator to Antenna, Neutralizing, Transmitting Tubes, Planning the Transmitter, Building a Transmitter, Construction of the Set, Tuning the Transmitter, Coupling the Antenna, Using Two Tubes, a Push-Pull Transmitter, an Alternative Design, Building an Amplifier, Excitation for the Amplifier, Tuning and Neutralizing, Oscillator-Amplifier Combinations, a Crystal-Controlled Transmitter, Tuning the Crystal Transmitter, Operating the Doubler, a 100-Watt Transmitter, Other Combinations, a Single-Tube Amplifier, Push-Pull for High Power, Meters, Transmitter Assemblies, Other Bands, Condensers, Unsteady Signals. Forty-one illustrations appear in this chapter — and two tables, one of tubes and one of coil specifications.

► The Handbook is composed of sixteen chapters, each treating a particular subject in this same detail. The chapters are: "The Story of Amateur Radio," "Getting Started," "Electrical Fundamentals," "Radio Fundamentals," "Receivers," "Frequency Meters and Monitors," "Planning and Building Transmitters," "Radio-telephony," "Ultra-High Frequency Work," "Power Supply," "Keying and Interference Elimination," "Antennas," "Assembling the Station," "The A.R.R.L. Communications Department," "Operating a Station," "Message Handling." An Appendix containing a great quantity of useful data and an excellent index complete the book.



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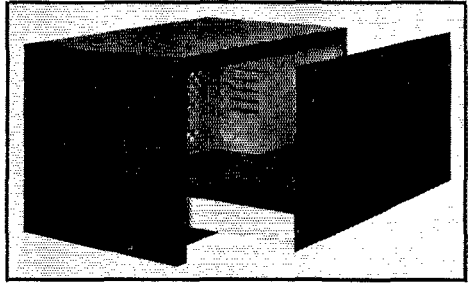
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structor can get at the back of the set. The panel and sub-base slide out the front for easy access. Provision is made for cabling all wires, which



can be fastened to binding posts on the rear of the sub-base to facilitate removal of the panel. The sections are 14 inches deep. A mounting base is available for the lowest section.

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—G. G.

The Midwest Division Convention

THE convention held in St. Louis, Mo., on September 2d and 3d, turned out to be a "bang-up" affair and fully up to the anticipations of all. Amateurs were present from all parts of the division and the final registration was one of the largest ever held in the division.

The first scheduled event on the program was a trip to the Anheuser-Busch Brewery where lunch was served after an inspection of the plant. The trip was all the more impressive as motorcycle policemen headed the caravan to and from the brewery. After this trip "Grandpa" Kerr, Midwest Division Director, formally opened the convention and greeted all present, being followed by A. A. Hebert, representing A.R.R.L. headquarters, who spoke on the latest news in amateur regulations. SCM Cannady followed with a pertinent talk on amateur operating. During the technical section Mr. H. L. Gay of the Westinghouse Electric and Manufacturing Company; Jack Sampson; Mr. Paul Grivet, Dr. Hund and Arthur Collins, W9CXX and Collins Radio Company, all gave interesting and instructive talks on their various subjects. Mr. Robert Martin of the American Airways talked on radio in his particular field. Evening sessions were devoted to entertainment headed by Mickey O'Connor and his bevy of beauties.

Always a headliner the R.O.W.H. initiation lived up to its reputation as staged by the Hannibal Radio Club, of Hannibal, Mo. Mr. Ryan, 73 years of age and one of the oldest amateurs in the world, calling himself the "Wooden Indian," played the principal part in the initiation. Miss Opal Sisk, W9CMV, of Pittsburgh, Kansas, was present, as well as numerous XYL's.

The committee headed by Chairman E. H. Fisher, W9TA, deserves recognition for putting on one of the finest Midwest Division Conventions ever staged. Helping on various commit-

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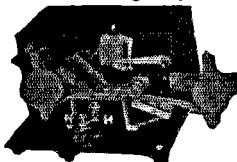
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tees were: Frank Ecoff, Jr., W9HWD; W. C. Plumb, W9BGE; F. E. Norwine, Jr., W9EFC and Doc. Klenk.

The banquet was the final event on the program, and after a few remarks by Director Kerr and A.R.R.L. Treasurer Hebert, plus entertainment furnished by Harry Glatstein, W9FTA, and WIL talent, the curtain was lowered on a very enjoyable convention with particular credit going to the efforts of the Missouri Clubs for the excellent spirit of coöperation which was displayed.

—A. A. H.

The Rocky Mountain Division Convention

PIKE'S PEAK or bust was a by-word years ago, and it must have been the motto for the seventh annual convention held at Colorado Springs, Colo., August 26th-27th under the auspices of the Pike's Peak Radio Club, for the very efficient manner in which all activities were handled by the convention committee, and credit goes to Joe Rohrer, W9EYN, Carl Drumeller, W9EHC, G. E. Drumeller, W9FXQ and the others for a program that left nothing to be desired.

Starting with a general "pow wow" with visitors from Mexico, Texas, Utah, Wyoming and Colorado getting acquainted, Director R. M. Andrews found a receptive group when the convention was declared opened. From then on there was not an idle moment. B. P. Hansen, Western Electric Engineer, but better known as W9KNZ, showed he knew his amateur radio; Prof. Louis Schnell, W9KI, formerly of Colorado University, gave some worthwhile information on key-filters and Mr. H. C. Strang, Chief Engineer of KNOR, gave the 'phone boys some good "dope" on modulation. A. A. Hebert, A.R.R.L. headquarters, recounted some of the struggles of the past and Director Andrews made a complete report of the last Board Meeting. The Acacia Hotel was the starting point for all the visits, which included trips to Alexander Film Co., ham shacks (W9KNZ's seemed to have a great attraction), Mt. Manitou, where a wonderful picnic was given the delegates—and those cantaloupes furnished by the Rocky Ford Amateur Radio Association were a treat. However, the most impressive ceremony was the initiation in the R.O.W.H., in a cavern at midnight in the Cave of the Winds, three hundred feet under ground, and the degree team has the distinction of having done something unique, and will be hard to equal by others. Returning to town another group, renown for their mountain climbing proclivities, decided to return to the mountain side, and there in a hunter's cabin with a log fire burning, imagination was allowed to run wild, and this probably may account for some of the good liar's stories told later.

Some of the scenic trips taken were the Narrows, Garden of the Gods and several others, which has left an impression never to be forgotten.

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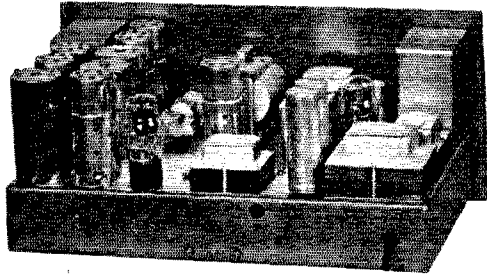
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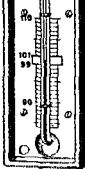
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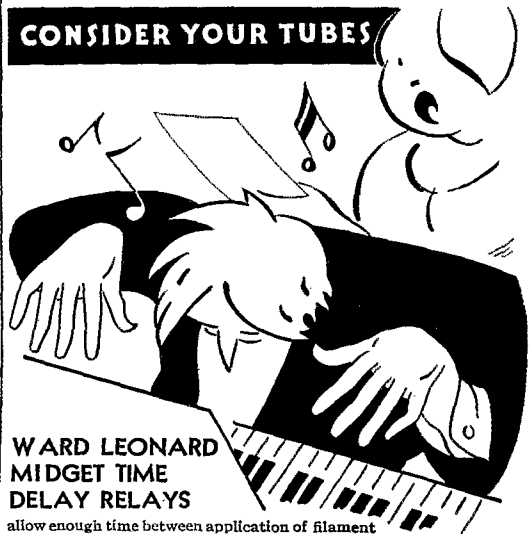
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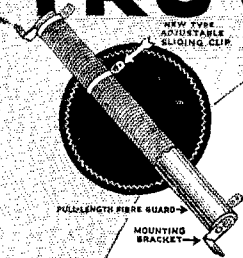
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Clubs in the division were well represented in the Greeley, Rocky Ford, Salt Lake and Denver Radio Clubs. After so much running around everyone was glad to sit down to a real good banquet with Warren M. Andrew of Craig, Colo., acting as toastmaster, and when it came to the awarding of prizes his voice carried weight and made us think he got his training using 'phone instead of c.w. It was inspiring to see so many ladies present at the banquet, and some of the OM's who had their YF's felt good because it gave them two chances at the prize drawing—and such good prizes, too. What about it, "Felix"? Those melons from Rocky Ford were so much appreciated that when Archie Haase, W9GLI, President of Rocky Ford Radio Association, made a plea for the 1934 convention, the vote was unanimous; and as Lowell Thomas would say: "So long until 1934" at Rocky Ford, Colorado, and a rising vote of thanks for Colorado Springs.

—A. A. H.

The Northwestern Division Convention

RALPH GIBBONS, W7KV, the flying director, flew the night mail to Salt Lake City and back, arriving in time to open the eighth annual division convention, held in Portland, Oregon, under the auspices of the Rose City Radio Club, August 18th and 19th. There was not an idle moment thereafter. A welcoming address by Police Chief Lawson representing the Mayor, and greetings by Ray Cummins, W7ABZ, chairman, placed everyone in good mood.

Entertainment being the key-note of the convention the guiding hand of George Ellison, Jr., W7AGX, and Ray Cummins saw to it that the delegates were kept going. However, there were some good talks: Mr. Deardorff from the A. T. & T.; Commissioner Jenkins and Sergeant Drapeau of the Police Department not only explained the progress made in police radio but gave also an astonishing demonstration by actually having four police cars report to the Commissioner in the convention hall, and when the gun-squad reported with their machine guns ready for action everyone was ready to run away. The first car reported in two minutes and the fourth (gun-squad) in nine minutes, the latter being seven miles away at the time of the call. A. A. Hebert, A.R.R.L. representative, gave a complete report on the new F.R.C. regulations, and participated in many discussions. Ensign Randall, U.S.N.R., W7ATP, spoke for the communication reserve; other speakers being Don Wallace, W6AM, and Mr. Norman, W7OK, radio inspector, who also conducted examinations. At the general meeting Ray Cummins, SCM, Oregon and Stan Belliveau, SCM, Washington, took the opportunity to meet those interested in communications and everyone also had a chance to express himself.

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They are accurately calibrated and will be supplied to your specified frequency in ke.—1750 or 3500 kc. band—\$3.90 ea. 7000 kc.—\$4.75.

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Crystals and ovens for commercial use quoted on at your request. When ordering a PRECISION crystal you are assured of the best obtainable. A PRECISION crystal will put new pep in your transmitter. Your satisfaction guaranteed.

Wishing you a MERRY XMAS and a HAPPY NEW YEAR.

PRECISION PIEZO SERVICE

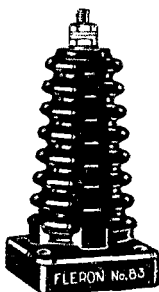
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Fleron Insulators

Complete line of new sizes and shapes for Amateur use

NEW FLERON-WALLACE ALL GLAZED Transposition Block for S-W Doublet Antenna. List Price 20c. ea.

NEW FLERON-WALLACE S-W Doublet Antenna outfit contains 200 ft. No. 14 Solid Enameled Copper Aerial Wire; 3 Tugite Glass Insulators; 20 Fleron-Wallace All Glazed Transposition Blocks; 2 No. 32 Terminal Insulators; 32-page Don Wallace S-W Instruction Book. List Price \$4.95. Catalog Q-553 Free



M. M. Fleron & Son, Inc. Trenton, N. J.

GUARANTEED

AMATEUR EQUIPMENT

NEW LAMPKIN MICROMETER FREQUENCY METER

Complete with calibration chart. \$39.50
(Refer October issue QST)

NATIONAL EQUIPMENT

FB7A, receiver only. 34.20
FBXA with crystal. 47.70
FB7A coils, pair. 6.00
5887 AB power pack for FB7A. 14.70
SW 3 AC or DC, set only. 17.70
SW 3 coils, pair. 3.00

HAMMARLUND COMET "PRO"

Complete in cabinet with RCA tubes and coils. 95.49
Complete in cabinet with RCA tubes and coils and crystal filter unit. 119.01

IT PAYS TO:—

- ▶ Get our quotations, write or call for prices.
- ▶ Get your name added to our mailing list.

H. JAPPE COMPANY

46 CORNHILL BOSTON, MASS.

MID-WEST WINTER BARGAINS

THORDARSON — 2½V at 10 A. 7½V at 1¼V. 1200-Volt insulation. Limited quantity. \$1.95

THORDARSON — T3956-A 2H-200 Mill Input or key thump filter choke. \$1.95

THORDARSON — 210 Power Transformer. Two 7-½ Volt at 2½ amp. windings. One 3 volts at 7 amp. 1100 Volts CT at 140 mills. \$1.95

MID-WEST TUBE SPECIALS

15 Watt 210. \$1.10
25 Watt 210 Plate connection at top rated 750 Volts normal. \$3.95

TAYLOR — 866-7500 Volt. \$1.65

TAYLOR 825 — 40 Watt R.F. amplifier 7½ Volt 2 amp. 50 Watt base 211 size envelope. \$4.95

All prices F.O.B. Chicago

FULL LINE OF NATIONAL SETS AND PARTS ALWAYS IN STOCK

Write for our free special Bulletin
Your order shipped the day it is received

MID-WEST RADIO MART

Builders of W9USA

520 South State Street CHICAGO, ILLINOIS

Amateur Headquarters

"Everything for the Ham"

A Receiver for Every Pocket Book

Famous National SW-3 \$17.70

3-tube tuned R.F. Available in either A.C. or D.C. models. Band-spread coils \$3 per pair. Our special price. *Less tubes and coils*

Latest National FB-7 \$34.20

7-tube Super-Heterodyne. Any set of coils, \$6 pair. Air-tuned IF's standard equipment. *Less tubes and coils*

Hammarlund Comet "Pro" \$76.44

8-tube "Superhet." Continuous Band Spread. Air-tuned IF's. Complete set of coils, \$11.70. *Less tubes and coils*

Special M. & H. Transformers

Universal Plate Transformer \$10.75

300 Watt 750-1000-1500 volts. Each side C.T.

866 Filament Transformer \$2.75

Very FB. 10,000 volt insulation 2 1/4 volts, 10 amps.

Special Transformers for \$1.75

83 rect. filament 5 volts, 3 amps., cased. Special

M. & H. 512 MARKET ST. PHILADELPHIA, PA.

ALUMINUM BOX SHIELDS Genuine "ALCOA" stock, silver dip finish, 5 x 9 x 6, \$1.65. 10 x 6 x 7, \$2.65. *Any Size to Order. SOMETHING NEW!* Your call letters, or any marking for your panel, on BLACK aluminum ribbon. Looks like engraving on bakelite. Sc up to 2 inches. Sc each additional inch, Sample 8c. U.S. Army V.T. 1 tubes 35c, 10 for \$2.50. Foil for condenser or velocity mike 1/2 mil., 25c ft. New Master Teleplex on demonstration.

W 2 GT.

BLAN, the Radio Man, Inc. 177 Greenwich St. New York City

DELUXE 5 meter antenna impedance matching transformer and rods



— Pickard type — highly efficient — especially suited for portable installations, quickly taken down, self supporting. Now used by many 5-meter experts. Enclosed transformer with sockets for 3/4" brass rods. Outhit including transformer and two 46" brass rods \$2.50 complete plus postage. Transceiver in aluminum case 6" x 6" x 6" \$15.00

CHAUNCEY WING'S SONS, GREENFIELD, MASS.

AMATEURS OF THE WEST

We carry in stock at all times all **NATIONALLY ADVERTISED** parts and kits of all **STANDARD MANUFACTURERS** for **TRANSMITTING and RECEIVING**

Prices are advancing
Write for latest quotations

Amateur's Headquarters of the West

RADIO SUPPLY CO.

H. A. Demarest, President

912-14 So. Broadway Los Angeles, California
(W6FBI located in building)

delegates had plenty of exercise, so that the "dutch" luncheons at Kelly's restaurant tasted good and gave everyone a good chance to become better acquainted. The radio dealers of Seattle and Portland had open house at the Hotel Multonah; both R. C. James Co., as well as Wedel Co., had a fine display of parts and complete equipment. The Municipal Airport was visited, with Ted Parker in charge, and a good chance for all to see the new 10-passenger Mono-Mail planes and inspect aircraft radio equipment. The famous ship "Constitution" was also inspected. And when it came to stunts, W7AGX was kept busy, and what fine prizes he also had for the winners. There were so many YL's and XYL's, the Ladies Auxiliary, with Mrs. Cummins, in charge, was kept busy and did not forget the "hams," for they prepared a "Sinker Swim," which upon investigation proved to be doughnuts and coffee served at 11:00 p.m. This put everyone in a proper mood for the midnight theatre party at the Broadway, where unusually good movies were seen leading up to the stunts by Rose City Radio Club; Yakima and Vancouver Radio Club,—result, a typical ham stunt, up all night. With Saturday forenoon to rest up and several contests in the afternoon, the banquet in the Gold Room, with Ted Olsen, W7AJM, as toastmaster, was the refuge to a hungry crowd—and what a menu! The closing event was the initiation in the R.O.W.H. at midnight. Large delegations from Yakima, Walla Walla, Tacoma and Seattle assured a successful attendance. Seattle after a fine appeal by John Gruble obtained the convention for 1934—so on to Seattle next year.

—A. A. H.

Club Directory Available

A directory of the local amateur radio societies affiliated with the League, showing their times and places of meetings, is available to members upon request, enclosing three cent stamp, please. Address the Communications Manager. Traveling amateurs will find this list helpful in visiting other clubs.

Ramsey's RADIO BOOKS

By R. R. RAMSEY, Prof. of Physics, Ind. Univ.

EXPERIMENTAL RADIO



Third Edition (255 pages, 128 experiments.) "All Experimenters! Here is Your Book at Last!" The experimenters manual: Measurements, Tests, Calibrations, with ordinary radio and physical apparatus. "In general, Ramsey manages to provide that missing fact which seems to be hidden in other books." Review, QST. "This book recommends itself to service men, custom-set builders, testers, and advanced experimenters." Radio Engineering.

THE FUNDAMENTALS OF RADIO

(372 pages, 6" x 9", 402 figures) A text-book of radio giving the fundamental theories and their applications to modern practice. It explains many theoretical and practical points which have not found their way into other books. "Prof. Ramsey is the clearest radio writer in the world." — Seattle Ham. "You find it in Ramsey's." Experimental, \$2.75. Fundamentals, \$3.50 postpaid.

RAMSEY PUBLISHING CO. Bloomington, Indiana

As Necessary in Your Shack as Your Monitor

(and don't tell us you haven't one of *those* . . .)

The Radio Amateur's LICENSE MANUAL

(No. 9 in the series entitled *The Radio Amateur's Library*)

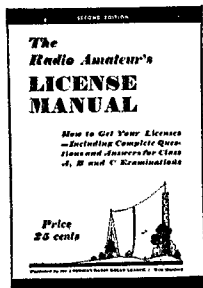
A necessity for the beginner—equally indispensable for the already licensed amateur. Going after your first ham "ticket"? You need the manual for its instructions on where to apply, how to go about it in the right way—and, most important of all, for the nearly 200 typical license exam questions and answers. Already got a license? The manual is still necessary—for its dope on renewal and modification procedure, the Class A exam (with questions and answers), portable procedure, etc.

All the dope on every phase of amateur licensing procedure, and, of course, the complete text of the new regulations and pertinent extracts from the basic radio law.

Order your copy today, 25c postpaid (no stamps, please)

THE AMERICAN RADIO RELAY LEAGUE

WEST HARTFORD, CONNECTICUT



LOW RANGE FUSES

- *Littelfuses for Instruments:* Amps.: 1/100, 1/32, 1/16—20c ea.
- 1/8, 1/4, 3/8, 1/2—15c ea. 1, 2—10c ea. For milliammeters, ham rectifiers, etc. Use 1/8 for radio B circuits. *High Voltage*
- *Littelfuses:* 1000, 5000, 10,000 volt ranges in 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2 amps. Renewable. Price 35c to \$1.25 ea.
- NOW—\$100 PROTECTION GUARANTY. Get New Cat. #5.

LITTELFUSE LABS.

1784 Wilson Ave., Chicago

LITTELFUSES

LEARN RADIO

New Classes Now Forming! Send for 40-page catalog, explains fully, 180 licensed graduates placed in past 2 1/2 years in broadcasting, shipping, police radio, aviation, etc. We teach all branches. Oldest, largest and best equipped school in New England. Equipped with Western Electric sound and broadcasting equipment and RCA marine transmitter. Course prepares for United States Government telegraph or telephone license.

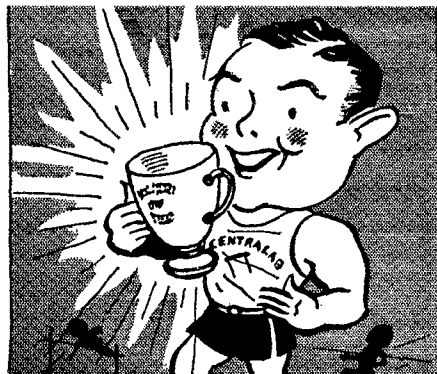
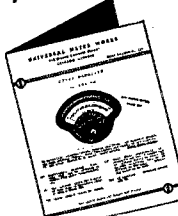
MASS. RADIO SCHOOL, 18 Boylston Street, BOSTON

Send for this

New METER BULLETIN — all bargains —

Just issued, lists many types— all new meters— big selection: Ammeters, Radio Frequency Ammeters, Thermo-ammeters, Volt-meters, Milliammeters, A.C. DC Universal Meters, D.B. Power Level Meters and Volt-meters, Volt-Ohm-Milliammeter Circuits, Resistor Kits, Shunts, Resistors— every item a real bargain and guaranteed. Send postal now for free bulletin.

Universal Meter Works
410 N. Leavitt St., Chicago, Ill.



"What-a-Man"

Holder of ALL records—takes the cup for superior performance on Every Test.

No wonder they out-perform and out-wear so-called "just-as-good" fixed resistors. Service men take note: Specify Centralab.

Centralab FIXED RESISTORS

CENTRAL RADIO LABORATORIES
MILWAUKEE, WISCONSIN

Your Nearest Dealer

Your nearest dealer is entitled to your patronage. You can trust him. He is equipped with a knowledge and understanding of amateur radio. He is your logical and safe source of advice and counsel on what equipment

Patronize the dealer nearest you—

<p>ALLENTOWN, PENNSYLVANIA Radio Electric Service Co. 1024 Hamilton Street Complete stocks transmitting equipment</p>	<p>HARTFORD, CONNECTICUT Radio Inspection Service Company 227 Asylum Street Complete line of guaranteed parts</p>
<p>BALTIMORE, MARYLAND Radio Electric Service Co. 303 W. Baltimore Street Everything for the amateur</p>	<p>KANSAS CITY, MISSOURI Burstein-Applebee Company 1012-14 McGee Street "Specialists" in supplies for the Amateur and Serviceman</p>
<p>CHICAGO, ILLINOIS Chicago Radio Apparatus Company 415 South Dearborn Street Dependable Radio Equipment. Established 1921. All Standard Lines</p>	<p>KANSAS CITY, MISSOURI Radio Laboratories 1515 Grand Avenue Amateur Headquarters — Complete Stock — Quality Parts</p>
	<p>LOS ANGELES, CALIFORNIA Radio Manufacturers Supply Co., Inc. 1000 S. Broadway Amateur Headquarters of the Pacific Coast</p>
<p>CHICAGO, ILLINOIS Mid-West Radio Mart 520 S. State Street All standard lines carried in stock</p>	<p>MANCHESTER, NEW HAMPSHIRE Radio Service Lab. of N. H. Amateur Supply Headquarters for New Hampshire Amateur discounts allowed</p>
<p>CLEVELAND, OHIO Northern Ohio Laboratories 2073 West 85 Street Wholesale Distr. for National, Hammerlund, Thordarson, Cardwell</p>	<p>MILWAUKEE, WISCONSIN Radio Parts Company, Inc. 332 West State Street Complete stock Nationally Known products</p>
<p>CLEVELAND, OHIO Radio Servicemen's Supply Co. 206 Prospect Street Wholesale Distributors catering to Amateurs, Dealers, Servicemen</p>	<p>NEWARK, NEW JERSEY Kaltman & Romander 62 Court Street Drop in for an over-counter QSO</p>
<p>DENVER, COLORADO Inter-State Radio & Supply Co. 1639 Tremont Place Amateur Radio Headquarters in the Rocky Mountain Region</p>	<p>NEW ORLEANS, LOUISIANA Rose for Radio 129 Camp Street Complete stock quality radio parts</p>
<p>DETROIT, MICHIGAN Radio Equipment Sales Co. 14036 Woodward Avenue, Highland Park A complete stock of amateur, shortwave and service parts</p>	<p>PHILADELPHIA, PENNSYLVANIA Radio Electric Service Co., Inc. N. E. Cor. Seventh & Arch Sts. All nationally advertised lines in stock</p>
<p>DETROIT, MICHIGAN Radio Specialties Company 171 E. Jefferson Avenue Ham Supplies — National & Hammarlund Sets and Parts</p>	

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Is Your Best Friend

you should buy. His stock is complete. He can supply your needs without delay. His prices are fair and consistent with the high quality of the goods he carries. He is responsible to you and interested in you.

You can have confidence in him

PHILADELPHIA, PENNSYLVANIA Eugene G. Wile 10 S. Tenth Street Complete Stock of Quality Merchandise	ST. LOUIS, MISSOURI Walter Ashe Radio Company 1100 Pine Street W9FIS in charge of the oldest and largest parts store in St. Louis
PITTSBURGH, PENNSYLVANIA Cameradio Company 603 Grant Street Tri-State "Ham" Headquarters Standard Apparatus Standard Discounts	ST. PAUL, MINNESOTA Lew Bonn Company 2484 University Avenue Rex L. Munger, W9LIP, Sales Engineer Radio Wholesaler Complete Stock
PORTLAND, OREGON Wedel Company, Inc. 443 Washington Street "The Ham's Paradise." Transmitting and receiving parts and tubes	SPRINGFIELD, MASSACHUSETTS T. F. Cushing 345 Worthington Street An amateur, endeavoring to sell good parts
PROVIDENCE, RHODE ISLAND W. H. Edwards & Company 32 Broadway, Room 23 A full line of reliable Amateur Equipment & Supplies	SYRACUSE, NEW YORK Roy C. Stage, W8IGF Complete stock of standard Ham & BCL parts Standard Discounts. Free technical service
SAN FRANCISCO, CALIFORNIA Offenbach Electric Company, Ltd. 1452 Market Street "The House of a Million Radio Parts"	UTICA, NEW YORK Vaeth Electric Company 701 Varick Street Wholesale Distributors of Radio Parts and Supplies
SEATTLE, WASHINGTON Wedel Company, Inc. 520 Second Avenue "The Ham's Paradise." Transmitting and receiving parts and tubes	WILMINGTON, DELAWARE Wilmington Electric Specialty Co., Inc. 405 Delaware Avenue Amateur headquarters — Collins, Hammarlund, National, etc.
SHANGHAI, CHINA Amateur's Home, Ltd. 323 Kiangse Road The Radio Store of the East	WINNIPEG, MANITOBA Electrical Supplies, Ltd. 310 Ross Avenue A complete parts service for amateur and servicemen
	ZANESVILLE, OHIO Thompson Battery & Radio Service 393 West Main Street Distributor radio equipment for amateurs and servicemen

are invited to apply for rates, etc., to Advertising Department, QST

Say You Saw It in QST — It Identifies You and Helps QST

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 15¢ 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 7¢ 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 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15¢ rate. Provisions of paragraph (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

Having made no investigation of the advertisers in the classified columns, the publishers of *QST* are unable to vouch for their integrity or for the grade or character of the products advertised.

OVER six pounds radio data, circuits, bulletins, 50¢ postpaid. Beyond Rockies 75¢. Kladag, Kent, Ohio.

MICROPHONE and meter repairs. Low prices. Quick service. Sound Engineering Corp., 416 N. Leavitt St., Chicago, Ill.

QSLs, modern, different. Samples? W8DDS, 2155 West 81st St., Cleveland.

BUM QSLs? You are the judge. Samples. W6DYL, Exchange, P. O. Box 607, El Monte, Calif.

QSLs—SWLs. W6DOU, Hayward, Calif.

QSL cards, two color, cartoons, message blanks, stationery, snappy service. Write for free samples today. W1BEF, 16 Stockbridge Ave., Lowell, Mass.

GENERAL Electric 24/1500 volt Dynamotors \$35; 24/750 volt \$25. Westinghouse 27½/350 volt \$10. Mounted pair \$15. 6-15 volt 500 watt Aircraft with propeller \$10. 500 cycle 500 watt with exciter 110-220 volts \$7.50. Dynamotors give pure DC outputs. Perfect results from battery plants. Henry Kienzie, 501 East 84th Street, New York.

NEW Velocity Microphone complete with transformer. Three types \$18, \$21.50, \$22.50 list. Send for folder. E. A. Schlueter, 3382-62nd Ave., Oakland, Calif.

GO-DEVIL—see November *QST* page 83.

TRADE two RCA211s for good 852. W1CAE, 18 Stephen St., New Bedford, Mass.

SEE page 87 October *QST* for "Something different in QSL cards" by *QST*'s cartoonist. Samples on request. "Gil" Cartoon Service, West Hartford, Conn.

211Es, guaranteed, \$2.50, f.o.b. Write W2DCJ.

GUARANTEED Cardon 585 tubes, 75¢ each. Works in the place of 250 or 210 tubes. Takes 650 volts at 100 ma. W9IMG.

CRYSTALS: \$1.35 Hipower Oscillators, close to your specified frequency, 3500-1700 Kc. bands, 1" square. 7000 Kc \$4.25. Exact Calibration with each crystal. One inch blanks 65¢. Dust-proof plug-in holder with mounting, nothing else to buy \$1.00 Complete. You cannot purchase a better oscillating crystal than a Hipower Crystal at any price. We have been supplying Broadcast Commercial and airline crystals for the past five years. Our frequency standard is accurate to one part in five million. Prices on request for crystals for any use and degree of accuracy. Immediate Delivery, no delay or waiting. Hipower Crystal Co., 3807 N. Luna Ave., Chicago, Ill.

SMITH-precision crystal prices back down: Husky, full-size, single-frequency oscillators. Unconditionally guaranteed. Zero calibration error. Close to frequency 1750-4000 kilocycles \$1.95, 7000-7500 kilocycles \$3.95. X cut filter crystals, excellent response, \$2.50. Exact frequency 1750-4000 kilocycles \$2.50. All postpaid airmail. Immediate deliveries. 2400 sold. W6BCX Santa Maria.

SELL—RCA 204A with holder, \$16. RCA 203 new, \$5. RCA 203A, \$7. WE261-A, \$7. Teleplex with key, buzzer, 6 rolls, \$12. Tubes A1 condition. W9BZC.

QSLs! QSLs! World's finest! Made to your own specifications! Free samples! W8DED, Holland, Mich.

GO-DEVIL—the \$6, mechanical fist.

QSLs, samples free. W9IHM, Escanaba, Mich.

SELL Pilot all wave twenty dollars. W4ATS.

WANTED—used Jewell pattern 579 test panel. V. W. Hodge, Claremont, N. H.

SELL \$100 Silver-Marshall receiver 760 "Bearcat" with coils and dynamic speaker, \$35. W5DQK, Ft. Sam Houston, Texas.

VELOCITY microphone parts—new couplers given 50 to 80% better results. Corrugated ribbons. Melotte Radio & Electrical Mfg. Co., North Lawrence, N. Y.

SWAP sixteen millimeter Cinekodak movie camera and projector, perfect condition, for National AGX or other single signal receiver. VEH3W, Kapuskasing, Ontario.

SELL rack and panel class B phone and CW transmitter. National ACSW3 and power supply. *QST*'s 1918, October, November; 1917, May, June, July, August; 1919, June, July; 1920 except January, March; 1921, except December. Complete from February 1922. W. Brecht, Jr., Glenside, Pa.

NEW \$140. aito saxophone. Swap for transmitter. W2CVT.

QSLs and SWLs—finest material and printing. Send for samples. Steg Printing Co., P. O. Box 577, Emporia, Kansas.

HAM apparatus bought, sold. Joe's, Route 1, Johnstown, N. Y. W8GPA.

TRANSFORMERS—quotations given. W9CES, Frank Geben, Accurate Radio Service, 2920 W. Cermak Rd., Chicago, Ill. Phone Crawford 2050.

COLLINS 9C amplifier-modulator. Like new. \$40. Collins 90C speech amplifier, new \$20. W8BCA.

GO-DEVIL for beginners or old timers.

BRAND new Readrite resistance analyzer, oscillator and tube checker. Every offer considered. Carlisle, 3119 Shannon Drive, Baltimore, Md.

VIBROPLEXES, bought, sold. Rebuilds \$7. up. Trade-ins accepted. Lydeard, 28 Circuit, Roxbury, Mass.

200 one color QSLs, \$1. 100 two color QSLs, \$1. Jake, the Specialty Printer, Box 215, Franklin, Penna.

METERS—all makes and types repaired and rebuilt. Prices reasonable. Electrical Instrument Labs., 1542 Hertel Ave., Buffalo, N. Y.

TRADE—old model Jewell 199 tester for good mike. W9ADS.

QUALITY QSLs. Samples? T. Vachovetz, Elmsford, N. Y.

PANELS—Aluminum faced, ¼ inch thick 70 cents square foot; Guaranteed 866's 5 day approval \$1.49; plate and filament transformer for 203-A \$3.50; other bargains. Commercial 20 watt CC transmitters \$39.00. Stamp for sample, lists, etc. Howard Radio, 314 Pine Ave., Chicago.

50 watt cw or phone transmitter complete, \$39. and \$69. W9KQO, Topeka, Kans.

QSLs—80¢ per 100 up. Samples. W2AEY.

CRYSTALS. See last month's *QST* Ham-ad for special. Wm. Threm, W8FN, 4021 Davis Ave., Cheviot, Ohio.

TRANSMITTING and receiving equipment manufactured to order. Holmes C. Miller, Radio Engineer, Box 105, Palo Alto, Calif.

UNIVERSAL exciter unit described in October *QST* complete with power supply. Transmitters any type or wattage designed, constructed or parts supplied. Write for complete details. Radio Research Labs., Ft. Wayne, Ind.

CRYSTALS, \$1.75. 1" blanks, 60¢. W9ECI.

QSLs, two color 50¢ up. Stationery. W9ECI, RR3, Clayton, Mo.

GUARANTEED GO-DEVILS \$6. A. H. Emery, Poughkeepsie, N. Y.

INSURE maximum performance, station appearance. Broadcast type relay racks, straight-line regulation power equipment, Edison batteries. See September display, March ham-ad. Rectifier Engineering Service.

QSLs—where quality speaks. W8BTP. (NRA member.)

CARDWELL 166Bs, \$17.50. Heavy duty mesh filament 866s, \$2. 872s, \$7.50. New RCA UX250s, \$1.50. Meters. 204As, 212Ds. Universal ¼ kw. 5000 volt Westinghouse oil condensers, 2.75 mfd., \$18. Large class B xfms. Ewing, 1057 Pratt Blvd., Chicago.

WHEATSTONE bridge—Precision Laboratory instrument. Sell or trade for new FBXA and coils. W5BOW.

FBTs, Omnigraphs, Teleplexes, Vibroplexes, meters, receivers, converters. Bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

CRYSTALS: Guaranteed excellent oscillators, 160 or 800 meters, your approximate frequency \$1.35; no specified frequency \$1.00; postpaid. "Crystal Maker's blanks" 1" 65¢-dozen \$6.00; ¾" 50¢-dozen \$4.80. Irregular shapes 25¢. Standard dust-proof plug-in Holders 75¢-dozen \$5.40. Fisher Laboratory, 1200 E. Nevada, El Paso, Texas.

HARD rubber. See Sept. *QST*. W8BSR.

VOLOVOX dynamic microphones—adopted by dozens of broadcast stations, \$9.75—\$18.50. Baker Engineering Labs., Ft. Wayne, Ind.

TRANSFORMERS, reactors, custom built. Real quality at reasonable prices. Baker Engineering Labs., Fort Wayne, Indiana.

QSLs, two color, 70¢ up. Free Samples. Printer, Corwith, Iowa.
 QSLs, 50¢ per 100. Samples. 2143 Indiana Ave., Columbus, Ohio.

QSLs by Maleco. Finest in country. Free samples. Maleco, 1512 Eastern Parkway, Brooklyn, N. Y.

CLASS B transformers—for 46s, \$4.95 pair. Universal transformers for two or four 46s, 210s, etc., \$7.75 pair. 70 watts of audio from 46s. Write for details. W8UD, Douglas, Mich.

CRYSTALS: 95¢ in 80 or 160 meter band. 40 meters at \$2. Ground to your approximate frequency and calibrated to within 0.05%. Blanks 3 for \$1. Fully guaranteed. Over 500 sold month of September! Get yours while prices are still low. White Radio Lab., Sandpoint, Idaho.

NATIONAL ACSW5 with power supply, tubes, 8 pair coils, \$35. Ernst Laug, 411 Bergenline Ave., Union City, N. J.

SELL—Acme plate transformer, 1000, 1500, 2000 volts, 500 watts, \$15. W40A.

BUGS—nickel-plated, \$2.75. No ham can afford to miss this bargain. John Kurmer, 3956 N. Sixth St., Philadelphia, Penna.

CRYSTALS: x cut, accurately and neatly finished, 1" sq., \$2. Oscillating blanks, x or y cut, with comp. \$1. Bliley holders, \$1.50. W8DLM, Rochester, Minn.

CONDENSER microphones \$7.50, desk or suspended amplifiers, \$10. Stands, foil. Literature. Microphone Labs., 345 Eighth, Ann Arbor, Mich.

QSLs, 75¢ a 100, two colors. W0DGH, 1816 5th Ave., N., Minneapolis, Minn.

PHONE transmitter, panel type, electron-coupled or xtal oscillator, '46 buffer, fifty watt final. Three speech stages, class B '10s modulators. Husky power supply with 866s, lots of filter. Price includes mike, remote control panel, meters, tubes. 80 watts of beautiful signal. Price \$110. W6DQG, 4130 East 2nd St., Long Beach.

"RADIO" and "R/9", Christmas special, \$3. Licensed hams only. "R/9".

"SPARKS" and "R/9" now combined!

"THREE in one!" New "R/9" larger, many new features. U.S.A. \$1.50 yearly. 1455 Glenville, Los Angeles.

"AMATEUR'S Telephone Directory" lists active stations, hours, frequencies, etc. Subscribers' listings free. "R/9".

"HAM News" (Maryland) has combined with "R/9"!

CALLBOOKS—new Winter 1933-34 Radio Amateur Call Book, many pages of the new W calls and hundreds of new DX stations, is yours for \$1.10. Next four issues for \$3.65 (Foreign \$1.20 and \$3.75). W9FO—610 S. Dearborn, Chicago.

BEST offer takes National FBXA with four sets coils. Leach break-in relay \$3, Leach keying relay \$4, new. Hickok precision portable 5 ampere a.c. d.c. meter, \$14. Siemens-Halske bridge, \$15. Chas. Drescher, 1145 Erieview Rd., Cleveland Heights, Ohio.

ATTENTION—Canadian Hams. We are distributors for National, Utah Carter, Electrad, Bud, Beede, Hoyt, etc. Write for big free catalogue with many bargains. A & A Radio, 101 Queen W., Toronto.

IMPOSSIBLE to list all parts here. Selling all short wave equipment including 100 watt crystal controlled transmitter and receivers. Also broadcast receivers and parts. Over 250 parts. Write for list and prices. W9CKU, L. W. Robson, Heron Lake, Minnesota.

TUBES, meters, receivers, condensers, crystals, and other equipment. Write needs. Buy, Sell, Exchange. Loether-Ross, Fredonia, Kansas.

LOETHER-ROSS, 823 Garfield, Kansas City, Kansas, are Kansas and Missouri distributors for the A. C. Ross Co., Van Wert, Ohio. Finest line of transformers, chokes, condensers, racks, frames, and steel towers. Write for catalogue.

RELAY-RACKS, Cans, Sub-bases, Panels. Write! Commercial Radio, Sycamore, Illinois.

QSL! New and Unusual 200 Two Colors \$1.00 up. W6FZQ, Box 1804, Phoenix, Arizona.

QSLs, SWLs, wall cards, etc. Satisfaction guaranteed. W3BHG.

PHONE men—Eliminate BCL troubles. Write for details on filters guaranteed to work. Delta Laboratories, Detroit, Mich.

NEAT 20 watt push-pull xmtr built-in pdc supply \$18.00. W4CMQ, c/o WEEF, Spartanburg, S. C.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezoelectric crystals. Diamond Drill Carbon Co., 719 World Building, New York.

GULF RADIO SCHOOL

Radiotelegraphy Radiotelephony

Radio Servicing

SECOND PORT } 1007 Carondelet Street
 U. S. A. } NEW ORLEANS, LA.

YOU'RE AN EXPERT
GET EXPERT RESULTS!

USE ONLY
Majestic
 GENUINE PARTS
 FOR YOUR REPLACEMENT WORK
 on Majestic radios



You save time and you
 save money — you get
 better results every time!

See the authorized
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 in your territory

GRIGSBY-GRUNOW COMPANY

Manufacturers of Majestic Radios, Tubes and Refrigerators
 5801 DICKENS AVENUE CHICAGO, ILLINOIS

AMATEURS, ATTENTION!

We Carry a Complete Stock of NATIONAL
 Parts and Receivers—Prompt Service

Latest model FB-7A S.W. Receiver.....	\$34.20
Famous SW-3 Receiver, in 3 models, AC or DC, less tubes and coils.....	17.70
FBX-A Crystal Filter Receiver—with crystal.....	47.70
"FB-7" Coils, regular and bandspread types.. pair 10, 20, 40, 80, and 160 meter band Coils for SW- 3's.....	pair 3.00
National R.F. Choke, type 100.....	45c
National 4-5-6-7 prong Isolantite Sockets.....	36c
National Power Pack for ACSW-3 receiver—Model 5880-AB.....	15.90
National Power Pack for "FB-7" receivers—Model 5897-AB.....	15.90

NATIONAL MIDGET VARIABLE CONDENSERS—
 "ST" TYPES

35 mmf.....	\$.90	100 mmf.....	\$ 1.35
50 mmf.....	1.08	140 mmf.....	1.50
75 mmf.....	1.20	150 mmf.....	1.50

40% off on all NATIONAL parts and receivers.

40% and 2% off on Hammarlund.

Bliley "BCX" one inch square Crystals, unmounted 40-80-160.....	\$3.90
Bliley BC2 moulded bakelite Holder for BCX crystals.....	1.50
TOBE 8 mfd. dry electrolytic condensers, in moisture-proof cardboard cases, 500 volts.....	49c
TOBE 8 mfd. dry electrolytic condensers, in round aluminum cans, 500 volts.....	55c

We are distributors for all NATIONALLY advertised manufacturers of Transmitting and Receiving Equipment. Write for quotations. Free bulletin. 20% deposit with all C.O.D. orders. Remit by M.O. Include postage.

MAURICE SCHWARTZ & SON
 710-712 Broadway, Schenectady, N. Y.

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

Quoted from QST's advertising rate card.

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

● See Editorial April issue of QST

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GENERAL ELECTRIC

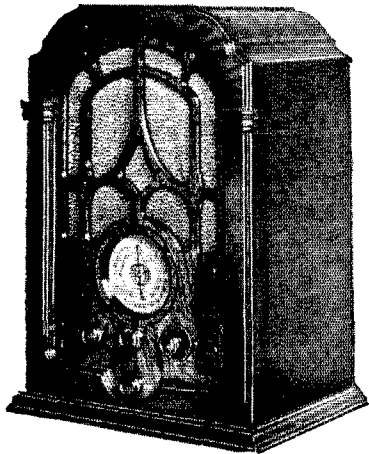
Announces a Real All-Wave Receiver

WITH PRESELECTION

COIL SWITCHING

**AUTOMATIC
VOLUME CONTROL**

You old timers know what G-E has done in the development of short wave communication. Here is a G-E all wave receiver — that is a good broadcast set and a swell short-wave receiver as well. You can safely recommend it to your non-technical friends and neighbors. It brings short-wave reception up to date — this job has all the refinements you expect in the very best broadcast receiver.



**General Electric All-Wave Radio
Model K-80—Price \$92.50**
Price slightly higher West and South.
Subject to change without notice.

FEATURES

SUPERHETERODYNE CIRCUIT: An eight-tube chassis employing three new dual-function tubes: three type 58, one type 2-A7, one type 2-B7, one type 56, one type 53, one type 80.

FREQUENCY RANGE: Continuous tuning range from 540 to 18,000 Kilocycles (555-16.7 meters) in four frequency ranges:

- A—540-1500 Kilocycles
- B—1500-3900 Kilocycles
- C—3.9-10 Megacycles
- D—8-18 Megacycles

COIL SWITCHING: Eliminates inconvenience of changing coils. Permits instantaneous change from one band to another.

You will be interested in seeing and operating this remarkable development at your local G-E Radio Dealer. We cordially invite you to do so.

PRESELECTION: Preselector tuned R. F. ahead of 1st detector eliminates image frequency response and increases selectivity. One stage on bands A, B and C. Two stages on band D (8-18 megacycles) compensate for natural loss in sensitivity on highest frequencies.

AUTOMATIC VOLUME CONTROL: Minimizes fading and prevents blasting from strong stations when tuning.

VERNIER TUNING: Double reduction vernier, 55:1 ratio, makes band spreading unnecessary.

AIRPLANE TUNING DIAL: Full vision illuminated dial accurately

calibrated in kilocycles and megacycles.

NEW INTERMEDIATE FREQUENCY: In order to minimize the possibility of image frequency response, an intermediate frequency of 445 kilocycles is employed.

CLASS "B" OUTPUT: Twin push audio output using type 53 tube. Maximum output 12 watts, undistorted 6 watts.

DYNAMIC SPEAKER: Large dynamic speaker capable of handling high power output.

TONE CONTROL: Full range tone control permits tone shading to suit the ear.

GENERAL ELECTRIC

RADIO

Radio Sales Section R-6812
General Electric Company
Merchandise Department
Bridgeport, Conn.

Please send me, free of charge, full technical details and circuit diagram of the new General Electric All-Wave set.

Name.....

Address.....

City.....State.....

Check here if you do radio service work.



Be Santa Claus to Your Friends

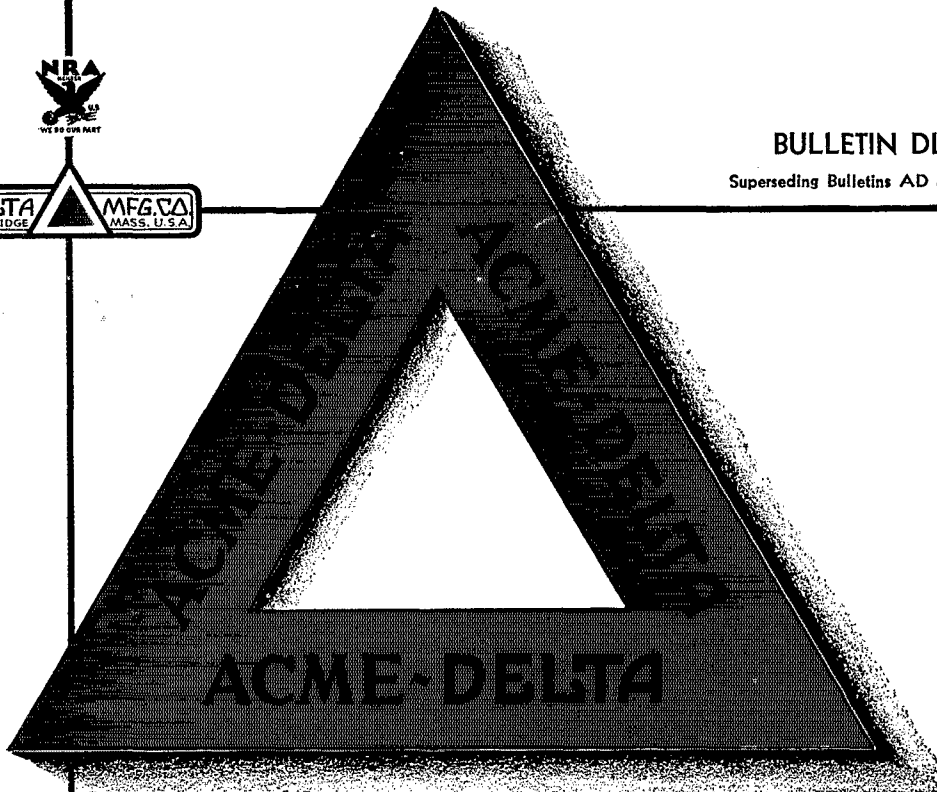
COMPLETE THE CIRCLE WITH 1934 COPIES

QST can help you with your Christmas list. Each year an increasing number of individuals finds it to be the ideal gift. A subscription present is unique, too. It serves as a monthly reminder of your thoughtfulness. A yearly subscription, including League membership, costs only \$2.50, little enough for the ones you have in mind. And — we'll send an appropriate gift-card conveying your Christmas Greetings at the proper time.

Once you form the habit of giving *QST* as a Christmas present you'll come back year after year with the same thought.

QST

38 La Salle Road, West Hartford, Connecticut



INGREDIENT OF SUCCESS

The success or failure of your entire transmitting equipment is largely dependent upon the excellence of your power supply. Far from being a mere detail the amateur's power supply is a unit which performs a major function.

The best R.F. or Modulation equipment is obviously useless, with no power supply at all.

It works after a fashion with inadequate power equipment.

Powered by soundly engineered and accurately rated* Acme-Delta equipment, optimum operation and performance are assured.

Delta Manufacturing Company

***ACCURATE RATINGS** — The amateur and experimenter cannot be sure of their equipment unless they know the correct characteristics of each component they use. Accurate rating of its chokes and transformers is a fundamental policy of the Delta Manufacturing Company.

RIPPLE — Under the new radio law low ripple is of paramount importance to all amateurs. Delta has standardized ripple measurements by expressing in percent the ratio between the r.m.s. value of the AC ripple voltage and the average DC voltage. The stated ripple values of Acme-Delta components are correct and may be depended upon when the equipment is used as recommended.

A USEFUL TABLE OF RIPPLE VALUES

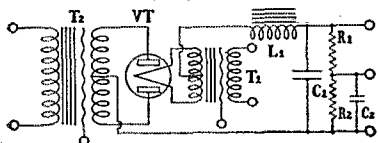
PERCENT RIPPLE	TRANSMITTER	RESULTS
0.1 to 0.25%	Phone or telegraph	Standard practice
0.25 to 1.0%	Phone or telegraph	Phone unsatisfactory
1.0 to 10.0%	Telegraph only	Telegraph set sfactory approaching poor tone
Over 10%	Telegraph only	Noisy, poor tone

ACME-DELTA

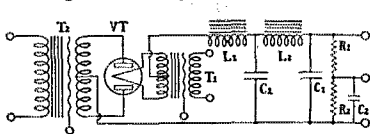
RECTIFIER CIRCUIT INFORMATION

Rectified A.C. power supplies must 1st DELIVER SUBSTANTIALLY CONSTANT VOLTAGE. This requires good transformer regulation and a low-resistance swinging choke of proper inductance range. 2nd they must ADEQUATELY SMOOTH THE RIPPLE. Acme-Delta engineering provides filters reducing the ripple to low values obtained in best commercial practice. When using accurately rated Acme-Delta parts, filter circuits can be and are designed for

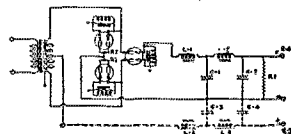
predetermined characteristics. 3rd they must PROPERLY OPERATE THE RECTIFIER. The swinging choke originated by DELTA prevents high current peaks, contributes materially to smoothing and improves regulation, thus combining three important features. The variation of inductance must be correct. 4th they must PREVENT OUTSIDE INTERFERENCE. Metallic shields described below aid in accomplishing this.



CIRCUIT "A" (CW ONLY)



CIRCUIT "B" (CW OR PHONE)



GROUP V CIRCUIT
(Described in QST, March, 1933)

RECTIFIER CIRCUIT COMPONENTS

Group	For Operating	Rect. Tubes	D.C.		Res. Ohms Bleeder	Catalog Numbers					Ripple		Regulation	
			Volts	Amps.		T1	T2	L1	C1	L2	Cir. A	Cir. B	Cir. A	Cir. B
I	47+	1-83	400	.175	25,000	AD18 or AD17	AD20	AD30	4 Mfd	AD40	5%	0.25%	13%	18%
	46													
II	830	2-66A	750 or 500	.200	40,000	AD15 or AD11	AD21	AD31	4 Mfd	AD41	3%	0.12%	8.9%	11-13%
	'10													
III Note 2	03A	2-66A	1250 or 1000	.500	25,000	AD1011	AD22	AD32	4 Mfd 1250V or 2 Mfd 2500V	AD42	5% at 1250 or 1000V	0.25% or 2500V	7-8%	10-11%
	11													
	RK18													
	800													
IV Note 4	'52	2-66A	1950 or 1000	.250	100,000	AD15	AD26	AD35	4 Mfd	AD46	3%	.15%	7-8%	11-13%
	'04													
V Note 5	RK18	3-83 Special Bridge Circuit	1000 and 500	.250 total	40,000	AD19	AD23	AD33	INPUT 2 Mfd OUTPUT 4 Mfd	AD43	5%	.20%	7-8%	11%
	800													
	'11													
	.03A													

Note 1. Circuit "B" is made by adding L2 and C1 to Circuit "A" and moving bleeder to termination. Value of bleeder given in tables is sum of R1+R2 and value of R1 is determined by tap-voltage and current. C2 value to suit tap-voltage and R.F. or A.F.

Note 2. Group III is a universal power supply for the excitation of high power transmitters. The same plate transformer and chokes are used for either pair of D.C. output voltages. The necessary adjustments being obtained by means of convenient link terminals.

Note 3. Transformer AD22 and chokes AD32 and AD42 are convenient and economical. Transformer output and choke inductance may be changed to suit either voltage in Group III by moving the convenient Link-terminals (illustrated). An initial 03A set-up may be changed to '04A or '52 easily without additional expense.

Note 4. Group IV is new and designed particularly for use with the new Raytheon RK18, RCA 800 and Sylvania 830, 210 and 825 tubes.

If the maximum voltages required are 750 and 600 they may be obtained in place of 1250/1000 by using Delta Auto Transformer AD82, list price, \$16.50, in the plate transformer primary without sacrificing regulation or operating characteristics.

Note 5. This is the popular circuit described by Delta in QST March 1933. Delta Auto Trans. AD83, list price, \$13.50, added to the plate transformer will provide voltage selection of 750/375 and 500/250 for lower power transmitters and general experimental use in place of 1000/500. Complete circuit print sent on request.

Note 6. Continuous variation of the D.C. output voltage from any of the above power supplies can be obtained without impairing regulation or operating characteristics by using a General Radio Co. "Variac" of the correct size in the plate transformer primary.

Note 7. Ripple and regulation values are those shown when recommended apparatus is used throughout the circuit.

Note: All prices in this catalog are subject to 40% discount to Amateurs and Experimenters

ACME-DELTA PLATE TRANSFORMERS

Acme-Delta transformers are designed and constructed in accordance with the best modern engineering and manufacturing practice.

All units are assembled with static shields between primary and secondary to minimize "tunable hum," key-click interference, and R.F. radiation from lightning lines.

They will deliver their rated voltage within limits of minus 0 plus 5%. This is important in filament excitation to obtain maximum tube life.

They will operate continuously at full load without the temperature rise exceeding 50° C. This gives long life and the ability to stand large temporary overloads.

Their mountings are simple to reduce cost, but due to careful design are nevertheless attractive and adequate. All terminals are non-rotating type mounted on engraved bakelite panels.

Standard Primary Input—115 Volts—60 Cycles, 1 Phase

Cat. No.	Type	D.C. from Filter		A.C. from Secondary		Output		Insulation	Weight lbs.	List Price
		Volts	Amps.	Volts	R.M.S. Amps.	Power VA	Sec. VA			
AD20	A	400	.175	525-0-525	.130	95	137	2500	6¾	\$11.00
AD21	B	750 or 500	.200	900-600-0-600-900	.150	200	270	4000	13½	16.00
		{ 1000 or 1250	.500	1500-1250-0-1250-1500	.380	845	1140	13000	39	50.00
AD22	C	{ 2000 or 2500	.250	3000-2500-0-2500-3000	.190					
AD23	B	{ 1000 and 500	.250 total	600-0-600	.300	350	360	3500	16	21.00
		{ 1250 or 1000	.400	For Bridge-Rectifier	.300	675	900	7000	28	29.00
AD26	E			1500-1250-0-1250-1500	.300					

ACME-DELTA

ACME-DELTA FILAMENT TRANSFORMERS

Standard Primary Input — 115 Volts — 60 Cycles, 1 Phase

Delta believes in separate transformers for plate and filament excitation. This permits leaving filaments on while receiving to facilitate quick changeover. Every unit is carefully tested before shipment for insulation, shorted turns, and voltage output.

Cat. No.	Type	Tubes	Output		Insulation	VA	Wgt. lbs.	Price
			Volts	Amps.				
AD10	A	82-27-45-46-47 2A3's	2.5 CT	3.0	2500	25	3¾	\$7.20
			2.5 CT	3.5				
			2.5 CT	3.5				
AD11	A	{ '66, '10, 41, 42 '50, '65, '81 RK-18's }	2.5 CT	10.0	{ 3500 2500 }	62	5½	11.75
			7.5 CT	2.5				
			7.5 CT	2.5				
AD12	B	{ '66, '03A, '11 '17C, '52, '60 }	2.5 CT	10.0	{ 7500 2500 2500 }	90	8½	13.50
			10.0 CT	3.25				
			10.0 CT	3.25				
AD13	B	3-'04A or W.E.	{ 10, 11 or 14 CT }	12.5	2500	175	10	16.00
AD14	B	Federal F 100A	{ 10, 11 or 14 CT }	25.0	2500	350	16	19.00
AD15	A	2-'66 etc.	2.5 CT	10.0	4000	25	3¾	6.40
AD16	B	2-'72	5.0 CT	20.0	7500	100	8¼	13.50
AD17	A	82 or 83	{ 5.0 or 2.5 CT }	3.0	2500	15	2¾	6.80
AD18	A	83-27-45-46-47	5.0 CT	3.0	2500	32.5	4	8.40
			2.5 CT	3.5				
			2.5 CT	3.5				
AD19	A	3-83	5.0 CT	3.0	3500	45	4½	11.00
			5.0 CT	3.0				
			5.0 CT	3.0				
AD1011	G	2-66	2.5VCT	10.0	13000	25	4	12.00
AD1012	B	{ '10-RK18-800 825 }	7.5VCT	6.5	5000	50	5	11.00
			7.5VCT	13.0	5000	100	8¼	13.50

Note:
For basic "swinging" choke engineering see articles by F. S. Dellenbaugh, Jr., Chief Engineer Delta Mfg. Co., QST Feb'y, March, and April, 1932.

ACME-DELTA SWINGING CHOKES

Cat. No.	Fig.	Ind. Henries	Max. D.C.		Min. Input Cond. Mfd.	Res. Ohms	Insulation	Wgt. lbs.	List Price
			Current	Volts					
AD30	A	5.25	.175	400	3	135	2500	6	\$8.70
AD31	B	8.40	.200	750	2	110	2500	11	10.50
		5.25	.500	1250	3	70			
AD32	E	{ 20/100 250	{ Above with coils parallel connected .250 2500 }		2	975	6000	17¾	22.00
AD33	B	8/40	.275	1000	2	120	3500	12¼	17.00
AD35	B	5/25	.400	1250	3	50	3500	16	18.50

Note: Substantially constant rectifier output voltage with varying load is desirable with all transmitters and MUST BE OBTAINED FOR CLASS "B" AUDIO MODULATION.

This necessitates the use of an input choke whose inductance "swings" up to a maximum value at least five times the minimum which is established by the load voltage and current.

Such a wide variation is difficult to obtain unless such chokes are carefully designed and laboratory means are available for their accurate adjustment and measurement.

Acme-Delta swinging-chokes are accurately rated, will operate satisfactorily at lower load voltages than those listed, but should not be used for higher load voltages without consulting our engineers.

Note:

ACME-DELTA SMOOTHING CHOKES

Delta test methods give the actual inductance as obtained in filter circuits. Most commercial choke ratings are obtained by tests not comparable to operating values.

Cat. No.	Fig.	Inductance		Max. D.C. Current Amps.	Resistance Ohms	Energy Storage Watt Secs.	Insulation	Wgt. lbs.	List Price
		Smoothing Rating Henries	Commercial Rating						
AD40	A	8.5	13	.175	135	0.13	2500	6½	\$8.70
AD41	B	10.0	16	.200	110	0.20	2500	11¼	10.50
		8	10	.500	70	1.00			
AD42	E	30	{ 40 40	{ Above with coils parallel connected .250 275 }	2	1.00	6000	17¾	22.00
				{ Above with coils series connected }					
AD43	B	12	18	.275	120	0.45	3500	10½	17.00
AD44	F	10	16	.110	197	0.06	2500	4	6.40
AD46	B	8.5	13	.400	50	0.68	3500	16	18.50

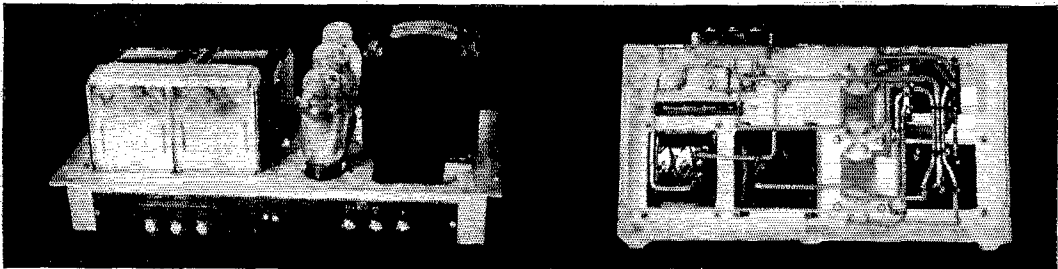
The inductance value selected for Acme-Delta smoothing chokes is based on ripple requirement and the ratio of inductance and capacity which will obtain maximum smoothing for a given use of active material — thus resulting in a minimum cost.

ACME~DELTA

COUPLING TRANSFORMERS

CLASS "A"	Cat. No.	Type	Purpose	For Coupling	Wgt. lbs.	List Price	
	AD90	F	Input Trans.	S.B. Mic. D.B. Mic. Phono or 500 ohm Line			to Grid	2 3/4	$7.50
AD91	F	Interstage either single tube or pushpull	Plate 10,000 ohms to 50,000 ohms	to Grid	2 1/2	7.50	
CLASS "B"	AD70	A	Class B Driver	{ 2-2A3 Class A 2-50 " B 2-59 " B 2-46 " B }	to { 2-203A Class B Grids }	5	13.75
	AD71	E	Class B Output	2-03A Class B	to { Class "C" RF 2500 or 10,000 ohms }	27	30.50*
	AD72	F	Class B Driver	{ 1-46 1-45 } Class A 1-59	to { 2-46 or 59 Class B Grids }	2 3/4	7.50
	AD74	B	Class B Output	{ 2-46 or 2-59 } Class B	to { Class "C" RF 4000 or 16,000 ohms }	11	13.00*
	AD75	F	Class B Driver	{ 2-45 } Class A { 2-2A3 } Push-Pull	to { 2-RK18 Class B Grids }	2 3/4	7.50
	AD76	B	Class B Output	2-RK18 Class B	to { Class C.R.F. 5000 or 5700 or 6250 ohms }	15 3/4	15.50*

Note: Transformers will be available for Class B operation of RCA 800 Tubes. Delta has a firm policy not to offer such apparatus until tested under operating conditions and as tubes were not available before going to press, the transformers could not be included in this catalogue. *Secondary will carry class C plate-current.



ACME-DELTA COMPLETE POWER SUPPLIES

Delta offers three "engineered" power supplies. In each, advantages have been taken of every known modern engineering method to obtain the specific results with a minimum of apparatus. In spite of their extreme compactness, making it possible to use them in standard relay-rack mountings, Delta has actually taken advantage of the close relations of the chokes and transformers and gained thereby a very definite improvement in ripple reduction.

Cat. No.	D.C.		Rectifier	Ripple	Regulation	List Price
	Volts	Amps.				
AD60	1000 and *500	.250 Total	3-83	0.20%	11%	\$100.00
AD61	400	.175	1-83	.01%	18%	70.00
AD63	1250 or 1000	.400	2-66A	0.15%	10%	160.00

*Note. No filter included for 500 volt tap. Auxiliary filter required consists of two AD44 Chokes and one 2 x 8 mfd. Electrolytic Condenser.

ENGINEERING SERVICE. Delta is fully familiar with the new requirements of minimum ripple, to which all Amateurs will be obliged to conform under the new Law. We are glad at all times to recommend to Amateurs the proper standard AD equipment to fill their requirements if they will write us fully and comprehensively regarding their problems.

GUARANTEE. We guarantee all parts of Delta manufacture to be free from defects in materials or workmanship. Furthermore should any of them under normal use and service be found to be defective within five years from date of delivery, we will repair said goods without charge, f.o.b. our plant at Cambridge, Mass., or will replace any defective parts f.o.b. our plant at Cambridge, Mass., provided the original parts are returned to us, transportation charges prepaid, and provided also that our examination shall disclose to our satisfaction that such parts have not been subjected to abuse.

DISTRIBUTORS. Acme-Delta equipment is obtainable through selected distributors, through whom Amateurs and Experimenters may receive a discount of 40% from list price given in this catalogue. We recommend that you deal directly with the distributor in your territory for obvious reasons of greater convenience and service to you. If your regular distributor is not able to supply you, please write us direct.

TERMS OF SALE. Prices in this catalogue are list prices and are subject to a trade discount of 40% to Amateurs and Experimenters. All prices are f.o.b. our shipping department at Cambridge, Mass., and are subject to change without notice. Terms are 20% of purchase price with order, balance C.O.D., except in cases of approved credit. Money orders, express checks and certified checks accepted. For established credit, terms are net, 30 days, 2%, 10-day discount. In absence of shipping instructions we use our best judgment. Our responsibility ceases with delivery to common carrier.

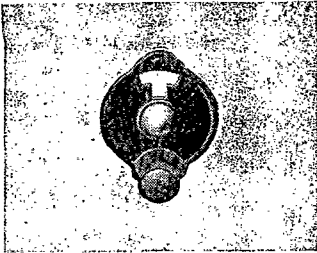
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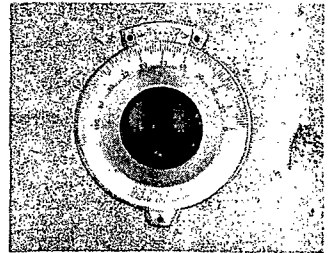


TYPE BM—3" DIAL

Similar in appearance to our Type B, the little 3 inch BM Dial (above) has the famous Velvet Vernier Drive. It is particularly suitable for compact receiving and transmitting equipment where space is limited. List Price \$2.50.

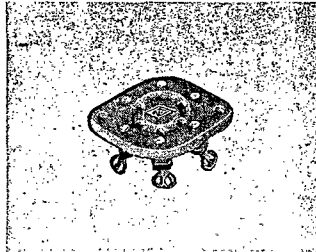
NATIONAL RADIO PRODUCTS

A complete list of National Radio Products appeared in catalogue form in October QST. To those who have no copy, our Bulletin No. 220 will be mailed on request.



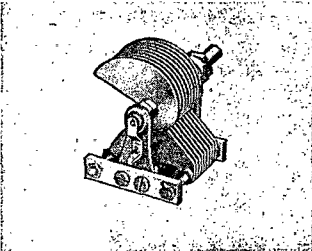
TYPE N DIAL

A Precision Dial, unusually well adapted to H. F. purposes, the Type N is accurate and handsome. The 4 inch scale and vernier are engine divided on solid German Silver, and read to 1/10 division. The drive, 5 to 1 ratio, is of planetary construction, and incorporates a built-in, insulated flexible coupling. List Price \$6.75.



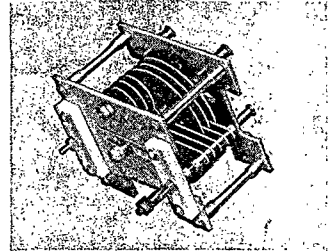
NATIONAL SOCKETS

National Isolantite Coil and Tube Sockets give maximum efficiency in ultra high frequency circuits. They are equipped with a locating groove for convenience in inserting tubes, and are glazed on top and sides. Available in standard 4, 5, 6 and 7 prong styles, as well as 6 prong special for coils. List Price \$.60.



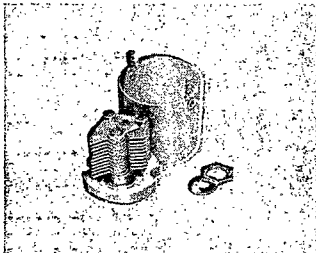
H. F. CONDENSERS

Designed as a special series for Short Wave use, National H. F. Condensers have isolantite stator insulation, constant impedance rotor connections, and insulated front bearings (in two bearing models) to eliminate shorted turns through the frame, as well as aluminum plates and unusually rigid frames. List Prices range from \$1.50 to \$6.50.

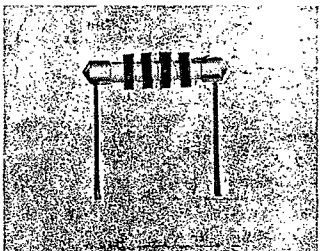
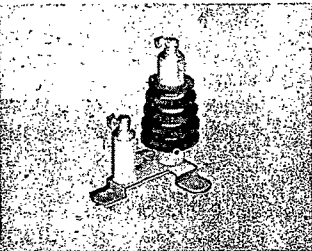


FREQUENCY METER CONDENSER

A special purpose condenser designed for use in amateur frequency meters and monitors. When used with a 100 division dial the 160 or 80 meter bands spread over 80 divisions. 75 mmf. maximum, 40 mmf. minimum. List Price \$5.50.



The extremely small shielded air dielectric padding condenser, above, is designed to replace the older mica types which are unsatisfactory for many H. F. applications. Case 1 1/4" diameter. List Prices, 75 mmf. \$2.00, 100 mmf. \$2.25. At left, the Type R152 Transmitting Choke, at right, the Type 100 choke.



NATIONAL
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The same batteries that accompanied the Byrd Expedition to both the North and South Poles

1933

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The D.C. Field Type (Melotte)	23, Feb.
Correction	18, Apr.
The Permanent Magnet Type (Elliot)	24, Feb.

RECEIVERS—REGENERATIVE

A D.C. Receiver with E.C. Detector (Exp. Section)	36, Dec.
A Portable that Works at Home or Abroad (Douglas)	17, Jan.
Detectors with Screen-Grid Feedback (Exp. Section)	49, Jan.
Modernizing the Long-Wave Receiver (Bondy)	29, Aug.
R.F. Control on the SW3 (Exp. Section)	21, Apr.
R.F. Volume Control Connections (Exp. Section)	34, June
Rationalizing the Autodyne (Grammer)	11, Jan.
Regenerative Detectors (Robinson)	26, Feb.

RECEIVERS—SUPERHETERODYNE

A Single-Tube Converter (Exp. Section)	49, Mar.
About the S.S. Receiver	23, Jan.
Automatic Gain Control for the Superhet (Lamb)	32, Nov.
Checking the Performance of a Superheterodyne First Detector (Chaney)	34, May
Converting Standard Superhets to S.S. Receivers (Lamb)	25, June
Cutting the Cost of Single-Signal Reception (Lamb)	8, Apr.
Developments in Crystal Filters for S.S. Superhets (Lamb)	21, Nov.
Getting the Most from the Single-Signal Superhet (Lamb)	33, Mar.
Improving the Sensitivity of the S.S. "Five" Receiver (J. J. L.)	19, May
New Pentagrid Tubes and Coil-Switching in the Amateur-Band Superhet (Allen)	12, Aug.
Pre-Selection and Image Suppression in Short-Wave Superhets (Lamb and Handy)	9, Dec.

RECEIVING—GENERAL

A Simple Tape Recorder for C.W.	21, July
Air-Type Alignment Condensers for Plug-In Coils	32, June
Preventing Oscillation in R.C. Amplifiers (Exp. Section)	37, Sept.
R.F. Transformer With 5-Prong Coil Forms (Exp. Section)	50, Feb.
Recording Signals with the Teleplex	22, July
Screen-Grid Detector Coupling (Exp. Section)	36, Aug.
Super-Regeneration? (Exp. Section)	66, Sept.
The Dial-Coded Universal Tube Checker and Circuit Analyzer (De Soto)	21, June
Tunable Hum (Dellenbaugh)	46, Jan.
Volume Control in Terms of Decibel (Exp. Section)	35, Dec.

RECTIFIERS

(See POWER SUPPLY)

TRANSMITTING—CRYSTAL CONTROL

A C.W. and 'Phone Transmitter Using the New Tubes and Circuits (Waller)	13, Dec.
A More Stable Crystal Oscillator of High Harmonic Output (Lamb)	30, June
A Simplified Five-Band Exciter Unit (Grammer)	10, Nov.
An Amplifier for the Beginner's Crystal Transmitter (Grammer)	18, Feb.
An Amplifier for the Exciter Unit (Grammer)	22, Dec.
Inexpensive Crystal Oven (Exp. Section)	33, June
Silvering to Lower Crystal Frequency (Exp. Section)	48, Feb.
Temperature Control (Pigford)	75, Mar.
The Goyder Lock (Exp. Section)	33, Aug.
Tritet Multi-Band Crystal Control (Lamb)	9, Oct.

TRANSMITTING—GENERAL

A Handy Test Lamp (Exp. Section)	21, Apr.
A Neutralizing Kink (Exp. Section)	50, Jan.
A New Unit-Type Transmitter Housing	76, Dec.

A Pinch-Hitting Neutralizing Stunt (Exp. Section)	32, May
A Power Type Electron-Coupled Exciter Unit (Houldson)	11, Mar.
A Sensitive Tuning Indicator (Blitch)	20, May
A Versatile Temperature-Controlled Master Oscillator Unit (Kemp)	19, Mar.
Circuits Within Circuits (Grammer)	11, June
Economical Use of a Milliammeter (Pierpont)	28, July
Link Coupling (Exp. Section)	31, May
Metering Several Stages (Exp. Section)	41, Nov.
Minimizing Frequency Drift (Exp. Section)	31, May
More on Transmission-Line Interstage Coupling (Exp. Section)	34, June
Rotten Signals: How to Cure Them (Grammer)	13, Apr.
The Inverted Ultraion Amplifier (Romander)	14, Sept.

TRANSMITTERS—PORTABLE AND LOW POWER

A Flea-Powered Portable 'Phone With Crystal Control (Fox, Pieracci, and Huebner)	32, July
A Portable that Works at Home or Abroad (Douglas)	17, Jan.
A Practical Crystal-Controlled Portable	20, Nov.
A Shack on Wheels (Rand)	26, July
A Simple 1750-ke. Auxiliary Transmitter (Grammer)	9, Aug.
An M.O.P.A. Transmitter Using Receiving Tubes (Exp. Section)	47, Mar.
Duplex Portables (Keefer & Grant)	8, June
Inexpensive Individual-Band Transmitters (Anderson)	21, Oct.
Midget Transmitters (G. G.)	25, Oct.

TUBES

New Intermediate-Power Transmitting Tubes (Grammer)	33, Sept.
New Tube Type Designations	28, May
Putting the Type 800 Transmitting Tube to Work (Reinartz)	27, Nov.
Still More Tubes (G. G.)	30, May
Straightening Out the Socket Connections (G. G.)	30, Mar.
Stray	33, June
Ten More Tubes (G. G.)	23, Mar.
The Dual-Coded Universal Tube Checker and Circuit Analyzer (De Soto)	21, June
Tubes of the Month (G. G.)	16, Apr.

ULTRA HIGH FREQUENCIES—APPARATUS

28-mc. Band-Spread Coils (Exp. Section)	41, Nov.
A New Regenerative Detector Circuit for Ultra-Short Waves (Hilferty)	15, Nov.
An Unusual 56-mc. Super-Regenerative Receiver (Haydock)	14, July
BCL QRM from 5 Meters (Exp. Section)	22, Apr.
Featherweight Sets of the Ultra-High Frequencies (Hull)	27, Sept.
Finding the 28-mc. Band (Exp. Section)	42, Nov.
"Five-and-Ten" Oscillator-Amplifier Transmitters (Griffin)	18, Aug.
Graduating to Oscillator-Amplifier Transmitters on 56 mc. (Griffin)	21, May
Improving the 56-mc. Receiver (Hadlock)	23, May
The Tool-Box 56-mc. Transceiver (Leonard and Hadlock)	23, Aug.
Correction	22, Sept.

ULTRA HIGH FREQUENCIES—TESTS

56-Mc. Airplane Tests	26, May
56-Mc. Tests	42, June
A Chance for Ten-Meter Records	18, Mar.
Attention, 56-Mc. Crew!	30, Nov.
Checking the Behavior of Ultra-High Frequency Waves (Jones)	14, Mar.
Flash! OKIAW Reports Successful 28-Mc. Work	22, Aug.
International Tests on 28 Mc.	57, Mar.
Let's Crack the 28-Mc. Nut (R. A. H.)	18, May
M.I.T. Airplane Tests (R. A. H.)	8, Dec.
More 28-mc. Tests!	8, Feb.
More DX on 56 Mc.	16, July
Ten-Meter Band Hot! (Rodimon)	21, Aug.
Ten-Meter Band Still Holding Up (C. C. R.)	26, Sept.
The Ultra-High Frequency World (R. A. H.)	20, Oct.