Complete
In this Issue—
The New
Amateur-
Regulations
No longer is there the slightest need for worrying about Analyzer obsolescence. Weston has found the solution, providing a design which is always up-to-date regardless of tube developments. It's a method of Selective Analysis involving the new Weston Model 665 Selective Analyzer and suitable Tube Selectors.

Weston Model 665 Selective Analyzer contains all the necessary voltage, current and resistance ranges. Tube Selectors to accommodate 4, 5, 6 and 7 prong tubes are provided. You merely attach the proper Tube Selector to the Selective Analyzer.

Next insert the plug into the tube socket of the radio set. Then by plugging into the proper jacks, voltage, current and resistance may be read in any part of the entire network leading to the tube socket.

The Weston Model 665 Selective Analyzer with Tube Selectors truly is universal in its capacity to analyze radio receivers. New tubes merely mean a new Selective Analyzer can be brought up-to-date and kept that way by means of the new, inexpensive Weston Tube Selectors, which can be used with all models and makes of Analyzers. Return the coupon for descriptive bulletin.

Modernize Your Analyzer with Weston Socket Selector Units

Your present Analyzer can be brought up-to-date and kept that way by means of the new, inexpensive Weston Tube Selectors, which can be used with all models and makes of Analyzers. Return the coupon for descriptive bulletin.

Weston Electrical Instrument Corporation
602 Frelinghuysen Avenue, Newark, New Jersey.

Please send bulletin describing Model 665 Selective Analyzer and Tube Selectors.

Name __________________________________________

Address ________________________________________

Say You Saw It in QST — It Identifies You and Helps QST
Westinghouse Rectox Instruments
MAKE YOUR SUPER TELL THE TRUTH about percentage modulation

"HAMS" that are combing the ether with a superhet, either of the "siggle sniggle" type, or just a plain super, can now equip their sets with a percentage-modulation indicator at low cost.

A Rectox milliammeter or voltmeter (depending on the type of sound reproduction) in the output circuit of a superheterodyne receiver, calibrated in conjunction with a second detector plate milliammeter, gives percentage-modulation readings on a received signal.

When thus calibrated the instrument can be used for fidelity or frequency runs on transmitters, or speech equipment associated with them; for checking and adjusting operation of the modulated stages on transmitters; and numerous other adjustments requiring readings of percentage modulation.

Another Westinghouse folder is just off the press giving data on the theory, installation, and calibration of the percentage-modulation indicator, including wiring diagrams. Send for your copy.

Watch future Westinghouse advertisements in QST for announcements of other instrument application folders.

SEND FOR INFORMATION

Gentlemen: Please send the booklets checked below.
☐ F. 8310—Rectox Instruments as Output Indicators.
☐ Catalog 43-340—Types MX and NX Instruments.

Name .................................................................
Address .................................................................
City ..................................................... State .......... T 79660
Call Letters ................................................................. QST 9-33

Say You Saw It in QST — It Identifies You and Helps QST
Published monthly, as its official organ, by the American Radio Relay League, Inc., at West Hartford, Conn., U. S. A.; Official Organ of the International Amateur Radio Union.

devoted entirely to

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September 1933

Volume XVII

Number 9

Kenneth B. Warner (Secretary, A.R.R.L.), Editor-in-Chief and Business Manager; Ross A. Hull, Associate Editor; James J. Lamb, Technical Editor; George Grammer, Assistant Technical Editor; Clark C. Rodimon, Managing Editor; David H. Houghton, Circulation Manager; F. Cheyney Beekly, Advertising Manager; Ursula M. Chamberlain, Assistant Advertising Manager.

Editorial and Advertising Offices
38 La Salle Road, West Hartford, Conn.

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Title registered at United States Patent Office.
HAMMARLUND's interpretation of "Single-Signal" reception with a crystal filter is unique.

Characteristically thorough, Hammarlund has not rushed blindly into premature enthusiasm. It has required time and care to perfect the application of a quartz crystal to so excellent a receiver as the COMET "PRO," without losing more efficiency than is gained.

Now it is here — the famous COMET "PRO," retaining all of its former desirable features — PLUS 100 PERCENT OF CRYSTAL SELECTIVITY.

A flip of a switch on the front panel instantly converts the standard "Pro" to the crystal "Pro." Another front-panel control varies the response characteristics of the crystal filter, without detuning the circuit or reducing efficiency in any respect.

Specially-tested quartz crystals are used, carefully selected for their low resistance and absence of spurious frequencies.

The COMET "PRO" thus reaffirms its leadership. It is a complete receiver, with built-in power supply. It provides bandspread tuning at all frequencies. Four sets of coils (included) cover all bands from 20,000 to 1,200 kc. No extras to buy.

The intermediate transformers are Litz-wound and are tuned by AIR-dielectric condensers. Peak I.F. selectivity is thus maintained regardless of weather or atmospheric conditions.

Built to professional standards, the COMET "PRO" is used all over the world by armies, navies, broadcasting networks, steamships, air-transport lines, police and news services. No finer recommendation could be made for any receiver.

A.C., D.C., and Battery models are available.

SPECIAL: — New 10-meter coils now ready — $5 a pair.

MAIL COUPON FOR DETAILS
## Section Communications Managers of
### THE COMMUNICATIONS DEPARTMENT, A. R. R. L.

<table>
<thead>
<tr>
<th>Region</th>
<th>Manager Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Division</td>
<td>Jack Wagenausser</td>
<td>24 South Fairview Ave.</td>
</tr>
<tr>
<td>Central Division</td>
<td>Fred J. Hinds</td>
<td>6618 West 34th St.</td>
</tr>
<tr>
<td>Dakota Division</td>
<td>Wm. Langer</td>
<td>313 First Ave., S.</td>
</tr>
<tr>
<td>Midwest Division</td>
<td>Robert R. Height</td>
<td>1060 Helderberg Ave.</td>
</tr>
<tr>
<td>New England Division</td>
<td>George D. Hansen</td>
<td>3734 Summit St.</td>
</tr>
<tr>
<td>Northwest Division</td>
<td>Oliver O. Viera</td>
<td>1150 Western Ave.</td>
</tr>
<tr>
<td>Pacific Division</td>
<td>Samuel C. Wallace</td>
<td>803 Sixth St.</td>
</tr>
<tr>
<td>Rocky Mountain Division</td>
<td>G. H. Wright, Jr.</td>
<td>4186 Magnolia St.</td>
</tr>
<tr>
<td>Southeastern Division</td>
<td>C. D. Slaten</td>
<td>3734 Summit St.</td>
</tr>
<tr>
<td>Southwestern Division</td>
<td>C. D. Slaten</td>
<td>803 Sixth St.</td>
</tr>
<tr>
<td>Western Division</td>
<td>C. D. Slaten</td>
<td>4186 Magnolia St.</td>
</tr>
</tbody>
</table>

### Notes
- * indicates appointments to act until the membership of the Section choose permanent SCM's by nomination and election.
- The communications department of the ARRL is responsible for managing the technical and operational aspects of amateur radio communications, including the operation of radio links, frequency allocation, and technical standards.
# A Complete List of Collins Transformers

For some time, the Collins Radio Company has made a practice of selling separately all the transformers which are used in the construction of COLLINS transmitters and speech equipment. These transformers have been widely used by broadcasting stations, sound equipment engineers and others. Rapid developments in tubes and circuits within the last few months have made it desirable to add many new items to the list of standard COLLINS transformers and this complete list has been prepared showing most of the new items.

## Broadcast Series

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>605</td>
<td>200 ohm to single or pushpull grids</td>
<td>$4.00</td>
</tr>
<tr>
<td>610</td>
<td>500 ohm to single or pushpull grids</td>
<td>$4.00</td>
</tr>
<tr>
<td>516</td>
<td>10,000 ohm plate to 500 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>517</td>
<td>10,000 ohm plate to 500 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>307</td>
<td>10,000 ohm plate to single or pushpull grids</td>
<td>$4.00</td>
</tr>
<tr>
<td>309</td>
<td>Pushpull 10,000 ohm plates to pushpull grids</td>
<td>$4.00</td>
</tr>
<tr>
<td>450</td>
<td>Pushpull 45's to 500 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>451</td>
<td>Pushpull 45's to 3-8-15 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>460</td>
<td>Pushpull 2A3's to 500 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>461</td>
<td>Pushpull 2A3's to 3-5-8-15 ohms</td>
<td>$4.00</td>
</tr>
<tr>
<td>720B</td>
<td>Single 2A3 Class A to 2 46's Class B</td>
<td>$4.00</td>
</tr>
<tr>
<td>718</td>
<td>Pushpull 2A3's to Class B 20A3's</td>
<td>$8.00</td>
</tr>
<tr>
<td>100</td>
<td>2.2v CT 10A</td>
<td>$3.60</td>
</tr>
<tr>
<td>794A</td>
<td>203A's or 211's Class B to 5000 ohms - 200 Ma. D. C. in secondary (Bass response to 70 cycles)</td>
<td>$400.00</td>
</tr>
<tr>
<td>754X</td>
<td>60Ma. 2A 4.5ACT 1.75ACT</td>
<td>$3.85</td>
</tr>
<tr>
<td>791A</td>
<td>203A's or 211's Class B to 5000 ohms - 200 Ma. D. C. in secondary (Bass response to 70 cycles)</td>
<td>$400.00</td>
</tr>
<tr>
<td>790A</td>
<td>203A's or 211's Class B to 5000 ohms - 200 Ma. D. C. in secondary (Bass response to 70 cycles)</td>
<td>$400.00</td>
</tr>
<tr>
<td>791A</td>
<td>203A's or 211's Class B to 5000 ohms - 200 Ma. D. C. in secondary (Bass response to 70 cycles)</td>
<td>$400.00</td>
</tr>
<tr>
<td>792</td>
<td>20A4's or 845's to 5000 ohms - 300 Ma. D. C. in secondary (Bass response to 35 cycles), including oil tank</td>
<td>$92.00</td>
</tr>
</tbody>
</table>

## TINYTRANS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>911</td>
<td>325-325v 5v</td>
<td>2.5v 2.5v Price 60 Ma. 2A 4.5A CT 1.75A CT</td>
</tr>
<tr>
<td>910</td>
<td>350-350v 5v</td>
<td>2.5v 2.5v</td>
</tr>
<tr>
<td>904</td>
<td>500-500v 2.5v</td>
<td>2.5v 2.5v</td>
</tr>
<tr>
<td>905</td>
<td>500-500v 3v</td>
<td>150 Ma. 4A CT 4A CT</td>
</tr>
<tr>
<td>918</td>
<td>650-650v 7.5v</td>
<td>100 Ma. 4A CT 10A CT</td>
</tr>
<tr>
<td>916</td>
<td>600-600v 7.5v</td>
<td>2.5v 2.5v</td>
</tr>
<tr>
<td>919</td>
<td>750-750v 7.5v</td>
<td>2.5v 2.5v</td>
</tr>
<tr>
<td>920</td>
<td>900-900v 10v</td>
<td>150 Ma. 2.5A CT 10A CT</td>
</tr>
<tr>
<td>921</td>
<td>200-200v 2A</td>
<td>100 Ma. 4A CT 10A CT</td>
</tr>
</tbody>
</table>

## Large Plate Transformers

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>934A</td>
<td>1350-1350v 400 Ma.</td>
<td>$22.50</td>
</tr>
<tr>
<td>937A</td>
<td>1500-1500v 600 Ma.</td>
<td>$36.00</td>
</tr>
</tbody>
</table>

## Filter Chokes

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>807C</td>
<td>20-5 hy 150 Ma. D. C.</td>
<td>$4.00</td>
</tr>
<tr>
<td>811C</td>
<td>20-5 hy 400 Ma. D. C.</td>
<td>$9.75</td>
</tr>
<tr>
<td>840C</td>
<td>20 hy 100 Ma. D. C.</td>
<td>$2.50</td>
</tr>
<tr>
<td>841C</td>
<td>10 hy 150 Ma. D. C.</td>
<td>$4.00</td>
</tr>
<tr>
<td>845C</td>
<td>8 hy 300 Ma. D. C.</td>
<td>$9.75</td>
</tr>
</tbody>
</table>

## Mountings

Broadcast series audio transformers are supplied with screw lug terminals unless insulated leads out base are specified. Tinytrans are furnished in open frames with insulated leads. Plate-class transformers and filter chokes are fully enunced with insulated leads out base. Large plate transformers are fully enunced with porcelain terminals.

## Prices

Prices shown are subject to change without notice and net f. o. b. Cedar Rapids or Chicago. Collins transformers are fully guaranteed. Order direct from Collins Radio Company or from authorized Collins distributors.
Select the Proper Class B Transformers at a Glance
from this table and Figs. 1 and 2 below

<table>
<thead>
<tr>
<th>Fig</th>
<th>Audio Power Watts</th>
<th>V1 Class A</th>
<th>V2 Class B</th>
<th>T2 Input</th>
<th>T3 Output</th>
<th>B1 Volts</th>
<th>B2 Volts</th>
<th>R1 Ohms</th>
<th>R2 Ohms</th>
<th>R3 Ohms</th>
<th>Ct</th>
<th>C Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25</td>
<td>15's</td>
<td>46's</td>
<td>716</td>
<td>761, 762, 764</td>
<td>270</td>
<td>400</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>28</td>
<td>45's</td>
<td>59's</td>
<td>716</td>
<td>770, 763</td>
<td>270</td>
<td>400</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>60-70</td>
<td>45's</td>
<td>10's</td>
<td>719</td>
<td>780</td>
<td>270</td>
<td>650-750</td>
<td>200,000</td>
<td>20,000</td>
<td>750</td>
<td>none</td>
<td>60-90v</td>
</tr>
<tr>
<td>D</td>
<td>100-240</td>
<td>2A3's</td>
<td>203A's</td>
<td>718</td>
<td>790, 791, 793</td>
<td>360</td>
<td>1000</td>
<td>1250</td>
<td>200,000</td>
<td>10,000</td>
<td>700</td>
<td>20mfd (100v) 30-45v</td>
</tr>
<tr>
<td>E</td>
<td>500</td>
<td>845's</td>
<td>204A's</td>
<td>717</td>
<td>792</td>
<td>1250</td>
<td>2500</td>
<td>200,000</td>
<td>10,000</td>
<td>600</td>
<td>none</td>
<td>100-180v</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>30</td>
<td>30's</td>
<td>750X</td>
<td>751Z</td>
<td>180</td>
<td>180</td>
<td>757X</td>
<td>50,000</td>
<td>13.5v</td>
<td>22.5v</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>1.6 to 2.1</td>
<td>31 or 19 (elements in parallel)</td>
<td>19 (elements in pp)</td>
<td>752X</td>
<td>740Z, 741Z, 742Z</td>
<td>135</td>
<td>135</td>
<td>0.5 to 1.0meg</td>
<td>none</td>
<td>22.5v bias</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>3.5</td>
<td>49</td>
<td>49's</td>
<td>752X</td>
<td>&quot;</td>
<td>135</td>
<td>135-150</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>none</td>
<td>20v bias</td>
</tr>
<tr>
<td>I</td>
<td>8</td>
<td>37 or 85 (triode sec)</td>
<td>79 (elements in pp)</td>
<td>753X</td>
<td>&quot;</td>
<td>250</td>
<td>250</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>10</td>
<td>50 or 50 (elements in parallel)</td>
<td>53 (elements in pp)</td>
<td>754X</td>
<td>&quot;</td>
<td>300</td>
<td>250-300</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>2500</td>
<td>25mfd (25v)</td>
</tr>
<tr>
<td>K</td>
<td>20</td>
<td>46</td>
<td>46's</td>
<td>714Z</td>
<td>761, 762, 765</td>
<td>250</td>
<td>400</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>1500</td>
<td>20mfd (50v)</td>
</tr>
<tr>
<td>L</td>
<td>25</td>
<td>2A3</td>
<td>46's</td>
<td>720B</td>
<td>&quot;</td>
<td>300</td>
<td>400</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>700</td>
<td>20mfd (100v) 0</td>
</tr>
</tbody>
</table>

T1 — 605, 610, 307, 309, 756X or 307Z

FIG. 1

BROADCAST CLASS B TRANSFORMERS (at right)

FIG. 2

Say You Saw It in QST — It Identifies You and Helps QST
The 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 fraternity 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.

OFFICERS

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Hartford, Connecticut

Vice-President ............CHARLES H. STEWART, W3ZS
St. David's, Pennsylvania

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West Hartford, Connecticut

Treasurer ............ARTHUR A. HEBERT, W1ES
West Hartford, Connecticut

Communications Mgr., F. EDWARD HANDY, W1BDI
West Hartford, Connecticut

General Counsel ............PAUL M. SEGAL, W3EEA
1010 Shoreham Building, Washington, D. C.

Address all general correspondence to the executive headquarters at West Hartford, Connecticut
YOUR old A.R.R.L. is in its twentieth year, a long period embellished with a history of constant accomplishment on behalf of the radio amateur. We hams who make up the A.R.R.L. have created in our organization a spectacle unique in American life—a democratic, non-commercial, self-governing society which has built up our hobby and art to its present tremendous proportions. Down through the years the League has represented the radio amateur, fought for him, preserved his rights and privileges, made amateur radio what it is. The record shows an unperturbed course of doing things, regardless of the criticisms of those with ulterior motives. The system behind this progress is right because in all its fundamentals the things for which A.R.R.L. works are specified by a governing board elected by you readers, the members. Through the whole history of amateur radio you can see A.R.R.L. the true and recognized spokesman of the amateur, year after year actually doing the things that make amateur radio. You fellows can be proud of your ol’ League.

It isn’t done with mirrors, either. A.R.R.L. history is an open book, a record that stands anybody’s inspection. It isn’t particularly remarkable that your League, with all these years of experience, should know how to do things for amateur radio. It’s only natural that a Board with nineteen years of experience should know how to chart the course of amateur radio, that a Headquarters with personnel who are devoting their lives to the advancement of amateur radio should know how to accomplish the things that are needed. To hear some folks talk you’d think somebody always had to stand behind A.R.R.L. with a sharp pitchfork to get the League to do even the simple little things that are necessary for our well-being as amateurs. And without boosting your gain-control a bit you can hear minute particulars as to just how A.R.R.L. ought to have done a certain job in a distinctly different manner. Now we ask you, who ought to know what can be done and what is the best way of going about doing it? Force? Sure, when that’s the indicated treatment, and plenty of it. We modestly assert that nobody should know better than your own A.R.R.L. how to raise the devil and exert force when it is necessary to protect some amateur right. Even when we amateurs don’t have everything we want, believe us that A.R.R.L. still knows what is what, what is possible, the ins and outs of this and that. With the same modesty we wish to state that nobody is in position to know as well as your A.R.R.L. what tactics really ought to be employed in a given situation, and to have the necessary realization of possible ultimate cost and that saving sense of proportion that may dictate withholding the Big Berthas when there are merely small jackals present to be shot at. The record of the League through the years is one of constantly doing the necessary things to preserve the grand old traditions of amateur radio. Surely it isn’t necessary for your Headquarters to rush into print every time it accomplishes an item and shout the glad tidings, to the utter cluttering up of QST. That’s what we’re here for, and we’ve thought that knowledge and the League record itself sufficient.

Of course we have our critics, we regularly receive our modest quota of pan mail from some of our friends who have a gift for using intemperate language in an effective manner, and occasionally some ham-sheet addresses to the League, or the Board, or Headquarters, or your humble servant, some dear little buttercups of compliments and good wishes—not! If we were sensitive to such things they’d probably interfere with our work. But the main job of A.R.R.L. Headquarters is to continue to add to the progress of amateur radio by carrying out the orders and policies laid down by the Board of Directors in response to the expressed wishes of American amateurs, and as long as we have you fellows behind us and you know that your League is going places and doing things, we shall get on.

In a recent editorial Fourth-of-July with red smoke and everything, the amateur world was told (not by us) of the possibility of getting for amateur use some unoccupied or “abandoned” commercial channels. You can almost see the A.R.R.L. asleep at the switch. We know, from our correspondence, that hope in this idea persists amongst amateurs. But the idea is not new and it isn’t a bet that A.R.R.L. overlooked. More than five years ago, in fact, the A.R.R.L. first took up that idea, with a plan for what we then called the American Eagle band. It was a good plan, we had a good patriotic story to back it up, and a wholly friendly administration at Washington to listen to it. But it was not possible.
then, and it isn’t possible now. There’s a reason, of course: The international radio treaty assigns bands to services, such as fixed, mobile, amateur. Every nation has the right to assign frequencies to other than the specified kind of station but only on condition that no interference results to the primary use of that frequency in another country. Now we might chisel from a willing government an amateur assignment in frequencies not otherwise occupied by United States stations, say in the fixed band. But the instant our operation there interfered with fixed-station operation in any other country on the globe, our government would be treaty-bound to make us cease and desist. You may think the situation unfair but it is precisely this arrangement that protects our own bands. Periodically some foreign commercial cuts loose in our bands on the theory that it’s all right if they can get away without producing international interference; then A.R.R.L. steps in and makes representations through our government that drive the marauder out. The same thing would happen to us with the boot on the other foot. (Incidentally, that business of shoosing foreign non-amateur stations off our frequencies is just one of the many details that Headquarters constantly handles, without ballyhoo.)

But the chief point we want to make is that that idea of additional amateur frequencies isn’t exactly so new that it is rattling the back teeth of A.R.R.L. Headquarters. Lord knows we’d like it well enough and for five years we have dug into the idea, reluctant to accept the unanimous verdict of all the experts that it’s simply impossible under treaty. But that’s the verdict. We write this just to let you fellows know that the idea has previously been thoroughly explored by A.R.R.L. But it may still sell subscriptions.

An interesting thing is happening in this business of d.c. plate supply for all stations, a thing that ought to show us amateurs something about ourselves. As we write it is exactly ten weeks since the Board meeting resolved upon that recommendation. Directors reported to their members, bulletins and broadcasts carried the word everywhere. QST reported it in detail. For nine of those weeks we received not one single letter from an amateur objecting to this course. All the letters approved it. We know that amateur radio generally has wanted this thing, that every director present at the meeting reported his division in favor of it, and that the board unanimously so voted. Clearly amateur radio wanted d.c., clearly it accepts that action of our Board.

Yet a week ago we got a few letters and a resolution of protest and it may be that another “movement” is on. As we observe it from this particular swivel chair, we radio amateurs are a pretty temperamental bunch. “Movements” can start in some far region of our vast ham empire and snowball across the country in great swaths, gathering adherents by the way and crashing into West Hartford with the impact of a meteor. We’ve seen a number of these snowballs and in most cases their genesis is simple: Somebody doesn’t like something, gets up in a club meeting and sells a few fellows on it, they talk it over the air, other fellows pick it up—and another rolling crescendo is on its way to Connecticut.

Now don’t misunderstand us. There’s a big difference between honest difference of opinion and destructive criticism for ulterior motive, and we’re not confusing them an instant. A.R.R.L. isn’t run on “gag rule” and we don’t tell you what you must think. Anybody has the right to like or to dislike a regulation, just as he jolly well chooses. It is to be expected that some amateurs will not like the new regulation requiring d.c.; Utopia will have arrived when 40,000 amateurs unanimously agree upon anything. You are not to be characterized as a dangerous radical if you do not like this regulation yourself. The fellow amateur who tells you of his disapproval of it is not for that reason an unwholesome agitator.

But we want to say that if another snowball gets headed down east on this particular question, it cannot honestly be regarded as indicative of the true desire of radio amateurs. We know that we, the hams of the country, have wanted such a regulation for a year or two and that a big majority of us in every division have so told our directors. For over two months after the announcement we all accepted it as fine business. Will it not tell us something unpleasant about ourselves as a tribe if we let ourselves be led into joining a movement of protest at this date? Really now, isn’t this cause for each one of us to resolve to go slowly and to do our own thinking when approached to join a movement of protest about this or that?

K. B. W.

Kansas State Convention
(Midwest Division)

Place: Topeka, Kansas, Chamber of Commerce. Date: September 9th–10th. Auspices: Kaw Valley Radio Club. Registration Fee: $2.50. FREE LODGING with cots and blankets at the Armory, through courtesy Kansas National Guard. Further information from W. A. Beasley, 1481 Byron Ave., Topeka, Kan.

Southeastern Division Convention

Thomas Jefferson Hotel, Birmingham, Ala., October 27th and 28th

A CORDIAL invitation is extended to all hams within this division to attend the official division convention being held under the auspices (Continued on page 62)
IN THEORY, at least, it should be akin to carrying coals to Newcastle or something equally ineffective to attempt to tell a fellow who has complied with the old regulations, by using an unfiltered plate supply only on amplifier stages, how to get d.c. because he has already installed a good filter on his oscillator and buffer stages and knows what he needs to do. There is some room for discussion, though, because (economic conditions being what they are) it is of importance to a good many hams to know what constitutes “adequate filtering,” and how it can be obtained without having to sell the transmitter to buy high-voltage filter condensers.

What is an “adequate” filter? Since we amateurs always have contended that our transmitters should be judged by their effects and not by the type of apparatus employed — on the perfectly sound thesis that the best of apparatus in the hands of an incompetent operator is likely to cause more QRM than the simplest equipment operated by a man who knows what he is about — and further, since the new plate-supply regulation is the result of an overwhelming determination on the part of a great majority of us to rid the air of rotten signals, we may say what should or should not constitute adequate filtering because we are the ones concerned with the effects. What we have asked for is that every transmitting amateur be required to adjust his transmitter so it will cause the least QRM; therefore, the remaining question is simply that of washing out unwanted sidebands to a sufficient extent.

There, it seems to us, is the explanation of the word “adequate.” A signal which has no frequency modulation and carries with it no band-wrecking sidebands caused by amplitude modulation is what most of us want to hear. Of course the fellows who already have oscillator-amplifier transmitters with d.c. on the oscillator and buffer stages have taken steps to prevent frequency modulation; therefore, the remaining question is simply that of washing out unwanted sidebands to a sufficient extent.

It does not seem to us that the regulations demand a signal absolutely free of the slightest trace of plate-supply-ripple modulation. The kind which most of us call “near d.c.” or “d.c. with slight ripple” causes no more interference than the “pure d.c.” signal in ordinary heterodyne reception, assuming equal signal strength in both cases. The sideband power in such a signal is an extremely small percentage of the power in the carrier frequency and hence will not cause appreciable interference, even in an S.S. receiver capable of separating the carrier from the sidebands. In a receiver without such selectivity the difference in interference-producing propensities between the two types is nil. It is a fact, although not often recognized, that a pure d.c. signal will cause every bit as much QRM as one having a small amount of residual plate-supply modulation, in receivers having anything less than razor-sharp selectivity. Much of the interference that has been blamed on r.a.c. plate supplies has not been the fault of the transmitter but simply that most hams have horribly unselective receivers — and the r.a.c.-on-amplifier fellow has the high power which makes an unholy mess in such receivers.

PRACTICAL PLATE SUPPLY SYSTEMS

Not a great deal of equipment is needed to make the kind of plate supply that will satisfy all but the man who wants purest d.c. or nothing. The power transformer is of course already in the shack. Plate supplies of 1000 volts and higher will require at least a pair of 866 rectifiers. The newer 866's (866-A) are rated at an inverse peak voltage of 10,000, which means that a pair of the tubes will handle a full-wave center-tapped rectifier system with r.m.s. voltages up to 3500 each side of the center-tap. The older tubes with the 7500-
The output voltage of a rectifier tube filament is not safe to take more than 200 milliamperes from a pair of 866 tubes working into a condenser-input filter; with an input choke of about 10 henrys this current can be doubled with less strain on the tube filaments. Naturally the increase is not obtained without sacrificing something, so we find that the output voltage is lowered with choke input. On the other hand the voltage regulation is considerably better and in the final analysis it will be found that more actual power can be taken from a plate-supply system with a choke-input filter than from the condenser-input type. The reason for this is that with condenser input a current as large as not larger than that delivered to the transmitting tube plates flows around the circuit formed by the power-transformer secondary, the rectifier tubes and the first filter condenser. This is a useless current since it does not get to the load circuit, but it heats the transformer secondary and uses up plenty of filament emission so that the plate-supply system cannot deliver all the power externally that the transformer capacity and rectifier peak-current ratings would warrant. It is easy to see that if half the current flowing in the secondary of a 1000 va. transformer is doing nothing but heating the transformer winding, only 500 va. is available for the load — and that is not far from the type of performance obtained with a condenser-input filter. With a fairly large input choke, however, very nearly the full transformer va. capacity can be realized.

The same thing is true of the rectifier tube filaments. With a large input choke, the current that can be drawn from the circuit approaches the peak-current rating of the tubes. A pair of 866's will handle a kilowatt in a properly-designed plate-supply system.

FILTER CONSIDERATIONS

With either type of filter the output voltage is likely to be quite different from that obtained from the same transformer when straight a.c. or rectified but unfiltered a.c. is used. Self-rectified systems are apt to mislead one in power calculations; a d.c. meter in the plate circuit reads the average value of the current, whereas the current that should be used for power calculations is the effective value; actually 1.11 times the meter reading. The effective voltage is the r.m.s. voltage of the transformer secondary. Now when a filter is used the story reverses; if the ripple in the output voltage is small the d.c. meter will read the actual current, but the voltage may be something quite different from the rated transformer voltage. Just what it is will depend upon the load current, the characteristics of the apparatus used in the plate supply system, and the type of filter.

A single-condenser filter such as is shown in Fig. 2A is not very good practice, as the discussion above indicates, but often is sufficient from the purely filtering standpoint to give a note which is nearly pure d.c. — if the condenser is large enough. Something like 2 to 4 µfd. will do a pretty good job of smoothing the output of a full-wave rectifier on 60-cycle supply; about twice that much will be needed for 25 cycles. But this type of filter has poor regulation; the output voltage will build up to 1.41 times the r.m.s. transformer voltage at light loads and will swoop rapidly to lower voltages as the load is increased. From two angles this is bad business; the filter condenser must be rated to stand the peak voltage, which costs extra money because otherwise unneeded insulation is being paid for, and the voltage build-up during keying spaces puts a considerably higher-than-normal voltage on the tubes at the instant of starting dots and dashes, making key-thumps much worse than they would be if the power supply had good voltage regulation.

The simple filter shown at B, using an input choke in conjunction with the same 2- or 4-µfd. condenser, is much superior to the single condenser in every way except that of available out-

![Diagram of filter circuits](image-url)
input voltage. The load on the transformer and rectifier tubes is less; the actual power that can be taken from the system is greater although it is delivered at a lower voltage; the filter condenser need be rated only for the working voltage when the light bleeder resistance is used (one should be used in any case for several very good reasons), the voltage regulation is good, making it easier to eliminate key clicks, and finally, the addition of the choke materially improves the smoothing. Furthermore, the actual d.c. voltage at the plates of the tubes can be calculated to a fairly close approximation. The choke tends to reduce the rectified transformer voltage to the average value of the a.c. input wave, which, for waves of normal sine shape, is in round figures 90% of the r.m.s. or rated transformer voltage. Then if the resistances of the choke and the transformer winding are known (one side of transformer center-tap only) the voltage drop caused by these resistances can be calculated for the normal load current, and the result subtracted from the 90% value. The drop in the rectifier tubes also should be subtracted, although it can generally be neglected with mercury-vapor rectifiers. A filter condenser with a rated working voltage equal to the rated transformer voltage will have a 10% factor of safety.

The bleeder resistance is necessary to prevent the build-up of voltage which is characteristic of the condenser-input filter. If no current at all is drawn from the system, this build-up to the peak of the a.c. wave will take place, but if the sizes of the choke and bleeder resistance are properly proportioned the voltage will drop very rapidly with small currents until it reaches the average of the a.c. input wave, after which the additional drop is caused by the resistance in the circuit. The relationship between input-choke inductance and load resistance (the bleeder constitutes the only load on the plate supply system during keying spaces) has been discussed thoroughly in the articles by F. S. Dellenbaugh, Jr., and R. S. Quimby in the February and March, 1932 issues of QST, and for 60-cycle supply with full wave rectification can be expressed by the formula

\[ L = \frac{R}{1000} \]

where \( L \) is in henrys and \( R \) in ohms. In other words, the greater the bleeder current the smaller will be the choke inductance required. Assuming a 20,000-ohm bleeder — a good size for most plate-supply systems — the choke inductance from the formula is 20 henrys. At 2000 volts the bleeder current will be 100 milliamperes, requiring resistors capable of dissipating a total of 200 watts. Assuming a pair of 866 tubes is being used, 300 ma. is left for the tubes. If this looks like too much power being wasted in the bleeder, the choke inductance can be increased to 30 henrys and the bleeder to 30,000 ohms, which will reduce the bleeder current to 67 ma. and the power loss to 133 watts. Fortunately the chokes only need the high inductance at light loads, so that a decrease of inductance with load current does no particular harm — unless the decrease is much greater than would be expected from a choke of good make. A “swinging” choke actually is advantageous, as explained in the articles referred to above. For supply frequencies other than 60 cycles, the required choke inductance will be inversely proportional to the frequency.

![FIG. 3 — ILLUSTRATING THE METHOD OF USING RESISTORS TO EQUALIZE THE VOLTAGES ACROSS A STRING OF CONDENSORS IN SERIES](image)

Although a simple filter like that shown in Fig. 2B will not wholly eliminate plate supply ripple, it will get rid of much the biggest part of it. Provided real d.c. is used on the lower-power stages of the set — where cost is negligible — the resulting signal will be all that anyone except the most hypercritical could ask for. The bigger the choke and condenser, of course, the better will be the smoothing. Let the monitor be your guide.

The combination at C in Fig. 2 will be of interest to those who want the purest practicable d.c. It amounts to a combination of two of the filters shown at B, using the same values as suggested above — perhaps going in a little more heavily on condenser capacity if desired. This type of filter should be adequate for a ‘phone transmitter, since the ripple will be less than 1%.

**CHOKEs AND CONDENSORS**

Regarding the chokes and condensers themselves, there is only one safe rule to follow — buy the best ones you can get. Real economy often results from spending a little more at the outset. There is nothing so useless as a blown-out filter condenser — unless it’s a burned-out tube. High-voltage filter condensers often can be made up quite economically by putting low-voltage condensers in series. One scheme many amateurs have found useful is to buy inexpensive high-capacity electrolytic condensers rated at about 400 volts working; five such condensers of 8 µfd. capacity each strung in series will provide a condenser of nearly 2 µfd. suitable for 2000 (actual) volts. When condensers are put in series they

(Continued on page 60)
The Inverted Ultraudion Amplifier

Working the Triode as a Screen-Grid Transmitting Amplifier

By Hugo Romander, W2NB*

There is no part of the average amateur's equipment whose basic principles of operation are so little understood as the r.f. power amplifier. This is particularly true of the Class-B and Class-C amplifiers, where the load impedance for maximum output has no simple relation to the plate impedance, and where the limitations in operation are of an entirely different nature than is the case of the Class-A amplifier. A clear understanding of these principles, fortunately, is not as essential to the successful operation for the triode amplifier at frequencies above 1500 kc. as is a thorough knowledge of the nature of the incidental coupling between the grid circuit impedance, the difficulty in modulating both its screen and plate voltages for 'phone transmitters, and most important of all, the relatively high cost of the tubes. Thus the amateur prefers to put up with the inconvenience of having to neutralize his 210 or 852 stage rather than to invest in the more expensive 865 or 860.

Now it would be very desirable to use the three-element amplifier in a circuit in which the feedback through the tube was not only minimized but was of such phase as not to cause self-oscillations. Such a circuit has been evolved as the result of an investigation of the possibilities of using the triode as a screen-grid amplifier in such manner as to take advantage of the electrostatic shielding effect of the control grid between the plate and the filament. To elaborate upon this idea, let us suppose that a three-element tube has been especially designed with a close-mesh (high-mu) grid structure which completely surrounds and shields the filament from the plate in exactly the same way that the screen grid shields the signal grid from the plate in a tetrode. A type 860 tube with the signal grid missing would be an example of such a tube. A measurement of the direct inter-electrode capacity between the plate and filament of our specially designed tube would then show a capacity of only a fraction of one microfarad.

Still further, if this minute capacity could be made the only capacity through which feedback from the output circuit to the input (excitation) and the plate circuit through the plate-to-grid capacity, the complications arising from this coupling, and the operation of the circuit network which compensates for or "neutralizes" this coupling.

The neutralization of capacity feedback in the triode amplifier to prevent self-oscillation came to be such an added complication that the screen-grid type of tube was evolved to eliminate the necessity for such neutralization. In receiver circuits this has proved an excellent solution, but in the transmitter power amplifier the screen-grid tube is at a disadvantage because of its high plate capacity of a stable amplifier, requiring no further neutralization, is solved. To explain the evolution by which such a circuit was obtained, reference is made to Fig. 1, where a type of circuit commonly known as the ultraudion is shown. With proper adjustments of $I_0$, $C_p$, and of the tank circuit $L_r$, $C_r$, this is a vigorous oscillator at low frequencies as well as at high frequencies. A significant feature of this circuit is the fact that self-oscillation requires a certain amount of capacity current from plate to filament, through the condenser $C_r$. With most triodes the inter-electrode capacity from plate to filament is sufficient to provide this capacity current at frequencies...
above 10,000 kc. and an externally connected condenser need not be used. With our specially constructed tube, however, the circuit would not oscillate without an external condenser, except, possibly, at ultra-high frequencies.

The next logical step, then, is to take our special tube and further simulate the screen-grid tube by grounding the grid. This, of course, means that the filament must be at other than ground potential for radio frequencies, resulting in the circuit of Fig. 2. It will be noted that the essential change from the circuit of Fig. 1 is the point at which it is grounded. The capacity \( C_p \) is intended to represent the direct plate-to-filament capacity of the tube which, in our special tube, is so small that its effect can be neglected.

We now have an interesting situation wherein a three-element tube may be operated as an amplifier at frequencies at least as high as 30,000 kc. and, without an external neutralizing network, will have negligible tendency to self-oscillate. In fact, the only material effect the plate-grid circuit has on the filament-grid circuit is that resulting from electronic coupling. Tests have shown that this electronic coupling effect is not materially different from that experienced with the ordinary neutralized triode amplifier.

**Practical Tubes**

First on the list of practical considerations in connection with this circuit is the question of what tube now readily available to the amateur would operate successfully as an inverted ultradion amplifier. Since there are no three-element tubes with grid structures designed to meet exactly the specifications of the tube just described, one must compromise with such standard tubes as do not have an excessive plate-to-filament capacity. Foremost among these are the 852 and the Federal F-108-A. Both of these tubes come under the 2 µfd. plate-filament capacitance limit which tests so far have indicated as the maximum allowable for satisfactory operation without neutralization.

The feedback which does occur because of an appreciable plate-to-filament capacity is degenerative for most adjustments of the plate tank circuit. This means that if a neutralization network is used on the inverted amplifier, failure to adjust this network correctly will not cause the tube to self-oscillate. The principal object of using a neutralization network with this amplifier would be, therefore, to reduce or eliminate the degenerative feedback into the input circuit, making its excitation easier by isolating its source of excitation from its load circuit.

It may seem that, after having achieved an amplifier circuit which required no neutralization to prevent self-oscillation, it would be a step backward to introduce the added complication of neutralization; and so it would be, if tubes with a \( C_p \) of less than 1 µfd. were available. But let us consider the advantage of adopting the simple expedient illustrated in Fig. 3, as compared with the orthodox neutralized amplifier circuit. In the first place, nearly all transmitter tubes have considerably less plate-to-filament capacity than plate-to-grid capacity. Hence, neutralization is made less critical than when neutralizing a larger capacity coupling. Furthermore, one is neutralizing by choice, rather than necessity, and the penalty of a poor neutralization adjustment is not instability, but simply a loss of excitation energy and a decrease in the isolation effect.

For the transmitter, therefore — and especially where tubes like the F-108-A or the 852 are in use and where plenty of excitation energy is available — no neutralization at all is needed. For the modulated stage of a 'phone transmitter, however, where greater isolation effect or minimum

**Figure 1** — In the ultradion circuit self-oscillation requires plate-to-filament coupling through \( C_p \).
reaction upon the exciter stage is required, neutralization of the inverted amplifier is recommended; that is, until tube manufacturers can be persuaded to design transmitting tubes with a grid that more perfectly shields the filament structure.

**FILAMENT CHOKE**

The only other design feature of any importance wherein the inverted amplifier differs from the orthodox amplifier is the pair of filament r.f. choke coils, $L_2$. It might seem that these coils should present a very high impedance to the excitation frequency, but actually there appears to be no harm in using an inductance whose value is so low that it has an appreciable effect on the net inductance of the driver stage tank circuit. The idea is, when planning to operate over a wide range of frequencies, to make $L_2$ as small as practicable for operation at the lowest frequency used, in order that the frequency for which the coil is “too large” will be as high as possible. Tests have shown that with a properly designed choke, the working frequency range can be as much as six to one with the same inductance.

The design of this filament choke is similar to the one used for the type 860 tube in the electron-coupled oscillator. A dual winding of copper wire, tight-wound on bakelite tubing in a single layer, is recommended. Since the two coils composing $L_2$ are wound on the coil form together, the coupling between them is practically unity and the net inductance is the inductance of either winding taken by itself. This makes calculation of the inductance easy. In designing the filament choke, it is recommended that about 500 circular mills per ampere (filament current) be allowed in determining wire size and that the value of $L_2$ be about twice the inductance of the driver tank circuit coil at the lowest frequency band used.

If greater flexibility as regards frequency range is desired, taps may be provided on the filament choke to short out sections on it for operation on the higher frequency bands. The filament choke may even be tuned by a variable condenser, if one wants to be very particular, but the added complication does not seem to be justified.

**A TYPICAL TRANSMITTER**

The smaller details entering the design of this circuit, such as the size and disposition of the various by-pass condensers, the ratio of $L$ to $C$ in the output tank circuit and the method of coupling to an antenna, are all similar to those of the orthodox amplifier. If the amateur has a clear understanding of the principles of operation of the inverted amplifier, he should have little trouble in making one operate satisfactorily. As an example, a transmitter will be described whose output tube is used in the inverted amplifier circuit, and it is hoped that a study of this will make him more familiar with the circuit.

This transmitter has been designed for c.w. operation only, although it is planned to try plate modulation of the output stage on the 3.9- and 14.2-mc. 'phone bands—just to see if the two-tube combination can be made sufficiently stable to avoid frequency modulation. The tube line-up is simply a Type 860 electron-coupled oscillator and a Federal Type F-108-A amplifier. The oscillator generating circuit operates in the range 1.75 to 2.0 mc., with its plate circuit tuned to the second harmonic, for operation in the 3.5- to 4.0-mc. band. For operation in the 7- and 14-mc. bands, the oscillator generates on 7.0 to 7.3 mc. with its plate circuit tuned to either the 7- or 14-mc. bands. Operation in the 28- to 30-mc. bands requires the output stage to act as a frequency doubler.

The circuit diagram is shown in Fig. 4. Features
fitted with a locking device so that it may be fixed in a desired position. It is intended that only $C_3$, a 350-µfd. condenser, should be varied, giving the desired band-spread together with a relatively large total capacity.

Passing on to the inverted amplifier, an interesting feature is the use of a split-coil plate tank circuit. This circuit permits the use of a type of capacity coupling which, although commonly used in commercial transmitters, is seldom found in amateur practice. As compared with the popular inductive type of coupling, this method is more efficient and provides a higher order of discrimination against all harmonics of the frequency to which the circuit is tuned. It lacks the flexibility of inductive coupling in that a two-wire transmission line is required, but its advantages should offset this limitation.

This type of output circuit lends itself well to the shorting-strip method of changing inductance. It has been pretty well demonstrated that this method of changing inductance does not involve any serious losses and its convenience, by avoiding a rack of interchangeable coils and the difficulty of making them quickly changeable, is well worth while. If, by a few simple motions, the operator can shift from one band to another, it is possible that the amateur's reluctance to change his hand of operation may be overcome. Here, again, the advantages of the inverted amplifier become apparent, since there are no critical neutralizing adjustments to worry about when changing frequency even though a neutralization circuit is provided.

Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided. Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided. Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided. Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided. Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided. Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A circuit is provided.

FIG. 3.—THE ESSENTIALS OF AN INVERTED AMPLIFIER FOR PRACTICAL OPERATION

Neutralization is employed to make excitation easier although not required to prevent self-oscillation. Typical circuit values are as follows:

- $L_1/C_1$ — Usual high-L output tank circuit.
- $L_2$ — Filament choke. See text for design.
- $C_2$ — 0.01 µfd.
- $C_3$ — 0.002 µfd., mica, high-voltage.
- $C_4$ — Neutralizing condenser. See $C_5$, Fig. 4.

FIG. 4.—SCHEMATIC OF THE OSCILLATOR-AMPLIFIER TRANSMITTER USING A TYPE 860 AS AN ELECTRON-COUPLED OSCILLATOR AND A FEDERAL TYPE F-108-A IN THE INVERTED AMPLIFIER

$C_1$ — 500-µµfd. fixed air condenser.

$C_2$ — 250-µµfd. low-voltage (mica).

$C_3$ — 0.002 µfd. low-voltage (mica).

$C_4$ — 0.002 µfd. high-voltage (mica).

$C_5$ — 600 volts (paper).

$L_1$ — 450-µµfd. conden er.

$L_2$ — 100-µµfd. fixed air condenser.

$L_3$ — 16 turns No. 10 wire, 4 turns per inch, on 3-inch diameter form. Tapped every other turn except last 6, which are tapped every turn.

$R_1$ — 2000-ohm 50-watt.

$R_2$ — 1000-ohm 10-watt.

$R_3$ — 2000-ohm 50-watt.

$T$ — Filament transformer. Note: Two separate filament transformers could be used and the primary voltage adjusted to give rated filament voltage at the filament terminals of each tube, allowing for drop in the respective filament chokes. The 860 takes 3.25 amp. at 10 volts, the F-108-A takes 11 amp. at 10 volts.

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wobbulation is very much improved in the event
the transmitter is to be used for 'phone. Fixed
condenser $C_8$ is the neutralizing capacity. Its
value can be adjusted by changing the spacing of
a 2-inch square copper plate with respect to a
3.375-inch square plate which, in turn, is spaced
$\frac{3}{4}$-inch from the metal compartment wall. This
results in the capacity $C_7$ to ground which is in­
tended to balance the plate-to-ground capacity
plus the choke distributed capacity and the stray
capacity of the blocking condenser $C_6$ to ground,
from the other end of the tank circuit. This is
calculated to be 10 µµfd. The value of $C_6$ may be
adjusted to give best results with a given tube,
and this adjustment need not be changed when
changing to the various frequency bands. Thus,
with a simple and easily constructed device, the
circuit may be both neutralized and balanced
electrically with respect to ground.

A combination of grid leak and cathode-drop
self biasing is used in order to permit keying of the
oscillator without the F-108-A drawing an exces­
sive plate current when not excited. The self­
biasing resistance was chosen to permit the F-108­
A to draw just enough plate current to keep the
voltage of the rectifier substantially constant
during non-oscillating intervals. This eliminates
the need for bleeder resistors.

The usual precautions in the disposition of the
circuit elements must be observed as with any
screen-grid amplifier. The filament leads as well
as the filament choke should be shielded from the
plate circuit, or at least placed at a safe distance
from it. Complete shielding with $\frac{3}{4}$-inch alumi­
num panels is used in the transmitter described.

**ELECTION NOTICES**

To all A.R.R.L. Members residing in the
atlantic, DakotA, Delta, mid­
west, Pacific and southeastern
Divisions of A.R.R.L.:

1. You are hereby notified that an election for
an A.R.R.L. Director, for the 1934–1935 term, is
about to be held in each of the above divisions,
in accordance with the constitution. Your atten­
tion is invited to Sec. 1 of Article IV of the
constitution, providing for the government of A.R.R.L.
by a board of directors; Sec. 2 of Article IV, de­
fining their eligibility; and By-Laws 10 to 19,
providing for their nomination and election. Copy
of the constitution and by-laws will be mailed
any member upon request.

2. Voting will take place between November 1
and December 20, 1933, on ballots which will be
mailed from the headquarters office in the first
week of November. The ballots for each division
will list the names of all eligible candidates nomi­
nated by A.R.R.L. members residing in that
division.

3. Nomination is by petition. Nominating pe­
titions are hereby solicited. Ten or more A.R.R.L.
members residing in any one division have the
right to nominate any member of the League in
that division as a candidate for director there­
from. The following form for nomination is
suggested:

```
Executive Committee,
American Radio Relay League,
West Hartford, Conn.

Gentlemen:
We, the undersigned members of the A.R.R.L.
residing in the Division, hereby nominate
as a candidate for director from this division for the
1934–1935 term.

(Signatures and addresses)
```

The signers must be League members in good
standing. The nominee must be a League member
in good standing and must be without commercial
radio connections. His complete name and ad­
dress should be given. All such petitions must be
filed at the headquarters office of the League in
West Hartford, Conn., by noon of the first day of
November, 1933. There is no limit on the number
of petitions that may be filed but no member shall
app 3orp his signature to more than one petition.

4. Present directors from these divisions are as
follows: Atlantic, Prof. Eugene C. Woodrufl,
W5CMP, State College, Pa.; Dakota, Mr.
Lawrence E. Lindesmith, W9GKO, Duluth,
Minn.; Delta, Mr. M. M. Hill, W5EB, Natchi­
toches, La.; Midwest, Mr. H. W. Kerr, W9DZW­
W9GP, Little Sioux, Ia.; Pacific, Mr. S. G. Culver,
W6AN, Oakland, Calif.; Southeastern, Mr. J. C.
Hagler, Jr., W4SS, Augusta, Ga.

5. These elections are the constitutional oppor­
tunity for members to put the man of their choice
in office as the representative of their division.
Members are urged to take the initiative and file
nominations immediately.

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For the Board of Directors:
K. B. Warner, Secretary.
West Hartford, Conn., August 1, 1933.
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To all A.R.R.L. Members residing in the
Dominion of Canada:

1. You are hereby notified that an election for
an A.R.R.L. Canadian General Manager, for the
term 1934–1935, is about to be held, in accord­
ance with the constitution. Your attention is in­
vited to By-Law 29, defining the policy of the
League in Canada; Sec. 1 of Article IV of the
Constitution, providing for the government of A.R.R.L.
affairs by a board of directors, of which the
Canadian General Manager is a member; Sec. 2 of Article IV, defining the eligibility of
directors; By-Laws 26 and 27, specifying the

(Continued on page 78)
Our Regulations Are Revised

New Rules Effective October 1st; 'Phone Subbands Widened at Once; D.C. Power Supply Required; Combination Station-Operator Licenses Provided; Extensive Changes in Procedure

By K. B. Warner, Secretary, A.R.R.L.

WE TRUST every amateur is now aware that on June 23rd the Federal Radio Commission made certain additions to the subbands open to radiotelephone operation by all licensed amateurs, pursuant to recommendations made by the A.R.R.L. Board of Directors at its May meeting. The "160-meter 'phone band" has been widened to a full 200 kc., one-quarter of the "10-meter" band has been opened to 'phone, and 'phone is now OK in the 75-cm. band for everybody interested in trying it. The general 'phone allocations now read:

- 1,800 to 2,000 kc.
- 28,000 to 28,500 kc.
- 56,000 to 60,000 kc.
- 400,000 to 401,000 kc.

These are unrestricted bands, open to every amateur, in addition to the two restricted bands open only to the specially-qualified. The opening of the additional range 1800-1875 kc. should do much to alleviate QRM in voice communication in that band, and we are confident of much new 10-meter progress by having an A-3 ('phone) allocation there.

At our earnest recommendation the Commission made these changes effective in June but necessarily delayed the effective date of the remainder of the new regulations until October 1st, to provide time for compliance and for making the rather extensive arrangements necessary to inaugurate the new system. For over a year the Commission has been working on revised amateur regulations, intended not only to repair some deficiencies but to effect economies in administration. It goes without saying that A.R.R.L. kept in close touch with that situation and was frequently consulted as the plans were shaped. The new regs, we feel sure you will agree, are generally satisfactory and in most respects a distinct step forward. In making changes primarily for economy's sake it was constantly kept in mind that nothing must be done to weaken the position of amateur radio or lower its standards, and that there were many changes advantageous to us that could readily be made. Many an idea was examined that would provide additional economy, only to abandon it because of its adverse effect upon us as a group. Yet economy there had to be, for we have grown to big proportions while the Commission's budget, like that of every government department, has been drastically cut. For over a year A.R.R.L. has energetically sponsored the idea of combining the station and operator license in one document that would result from one application and one examination and have a life of three years. The recent increase in the life of existing licenses to three years was the first step towards this result, but at present the twenty inspectors issue operator licenses while at Washington nine people do nothing but issue amateur station licenses. Even without renewals they get a hundred of them a day, even this midsummer, and in middle June we passed the 40,000 mark. They estimate that during the past year an amateur license was issued every four minutes of government working time! Simplification here would clearly result in great economy and at the same time save us the nuisance of perpetually having to fill out new forms. We have been much pleased, then, to see the A.R.R.L. combination scheme adopted as the central theme of the new deal in amateur licensing.

Before we look into that in detail, however, let us take a general bird's-eye view of the new regs, particularly their technical fundamentals. At the end of this article QST prints the complete new text. It has been extensively changed and deserves careful reading. Yet its broad fundamentals are very much the same. There is no change in our basic frequency assignments. There are no changes in our communication regulations. One very important change occurs in the power-supply regulation. Sponsored by the A.R.R.L. Board of Directors, this rule (382) provides that after October 1st only filtered direct-current supply may be used on all stages of transmitters in the 160-meter, 80-meter, 40-meter and 20-meter bands. This new rule, for example, prohibits the use of unfiltered 60-cycle supply and 500-cycle alternators on the last stages of transmitters, it bars the attempt to get "equivalent d.c. effects" by the use of self-rectifying a.c. transmitters, and it prohibits the use of any tone modulation anywhere in these bands. We have definitely "gone d.c." Every amateur is under the duty of seeing to it that his supply is d.c. by the first of October.

This does not apply to the frequencies above 28 mc., where every encouragement to further development is offered. Tone modulation (A-2) may be employed here, to take advantage of
super-regen reception. In fact, for the first time in our lives amateur mobile stations are permitted in the very high frequencies under certain restrictions. Amateur mobile stations may operate aboard any kind of aircraft in the 5-meter and 3.5-meter bands. Mobile is not authorized for autos, boats, trains or anything other than aircraft, however, and the 10-meter band is not included. See Rule 363.

A very interesting feature of the new rules is that a separate license is not necessary for this mobile operation, nor is a separate license necessary for a portable station. After October 1st every amateur station license not only authorizes the operation of a "fixed" amateur station at the specified address but also authorizes the holder to operate a portable station in any of the bands at his pleasure and to operate a portable-mobile station in aircraft (for amateur purposes only, of course) on the highest-frequency bands. The only requirement is that advance notice be given the district inspectors in which operation will occur, stating when and where operation will occur. It is provided, however, that such stations must report themselves every thirty days, lest they take on the aspect of a second fixed station. This is important, because hereafter the home station and the portable (and the aircraft mobile, if any) will all operate under the same call. The portable and the aircraft e.w. stations, however, identify themselves by following their call three times with the break sign (--- ---) and the numeral of the amateur call area in which operating; phone stations make a suitable announcement. See Rule 384. They must also log their location at each transmission.

Speaking of notifying the district inspector, it is important to note that this refers to the twenty districts where the F.R.C. now has inspectors and not to the old districts on which our calls are based. The 9th district is no longer that group of states in which amateur calls contain the numeral 9. The latter is now known simply as the 9th amateur call area, while the 9th district is now a strip of the Texas gulf coast with its headquarters in Galveston. For detailed list see page 38 of QST for last December, or the Handbook or License Manual. For portable operation it is now necessary to notify each of the twenty inspectors in whose districts operation will take place. But the numeral following the break-sign to indicate portable operation is not the district number—it is the number of the call area, 1 to 9. You should study this paragraph carefully and familiarize yourself with the new numbering scheme.

Another feature worth pointing out is a change affecting remote-control stations. The new rules contemplate that in normal cases the antenna and the apparatus will be at the same address. Rule 215 permits exceptions but each such case will be handled separately by the Commission on its merits, and they have canceled the old provision that permitted distant-control up to five miles without special authority.

All the privileges and the restrictions provided in the new regs apply to every existing station license on October 1st. Our station licenses prescribe that they are subject to the rules and regulations, and when the latter are changed from time to time the changes apply without modification of the licenses themselves.

Now for the licensing procedure. First it should be said that existing licenses, for both station and operator, are going to be continued in force until one or the other of them expires, whichever is first. In general that means that those of us with licenses to-day continue with no change in our papers until our operator license expires. Then we act under the new procedure. Also, if we have to apply for a modification, as for a change of address, we come under the new system. And of course it applies after October 1st for all newcomers.

If you were asked to get up a new system for amateur licensing you would take account of existing evils and try to correct them. You'd provide a scheme that made it easy for a qualified and active amateur to get his authorization and keep it. You'd make it tough for non-amateurs to get an amateur license and for fellows who abandon the game from continuing to pose as amateurs by retaining station calls for years. You'd provide a reasonable but honest standard of qualification and you'd deny the amateur right to those who couldn't meet that reasonable standard. You'd make it easier for the sincere amateur to qualify, harder for the unworthy. That is the general purpose and effect of our new rules. They go a long way towards achieving it. We'll say right here that they have their inadequacies and their imperfections, including a few provisions that we downright dislike but were unable to get changed before the Commission went on summer recess.

We are promised, though, that anything that shows up as unfair or an unreasonable hardship in procedure, after the regulations are put to test, will be remedied. Now let's see what we have.

Hereafter amateur examinations are going to be held only in 32 cities. One or two days a week there will be amateur exams in the 20 district offices: Boston, New York, Philadelphia, Baltimore, Norfolk, Atlanta, Miami, New Orleans, Galveston, Dallas, Los Angeles, San Francisco, Portland (Ore.), Seattle, Denver, St. Paul, Kansas City, Chicago, Detroit and Buffalo. Every Thursday there will be examinations in Washington. Every three months, on staggered preannounced schedules to be published in QST, there will be exams in Schenectady, Winston-Salem, Nashville, San Antonio, Oklahoma City, Des Moines, St. Louis, Pittsburgh, Cleveland, Cincinnati and Columbus (Ohio). Now let us draw circles of 125 miles airline radius around those 32 cities. Every applicant living within one

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of those circles must appear in person before the inspector for examination for a new license, or for a renewal if he has been inactive his last three months. (If an amateur complies with the stipulation of minimum activity given in Rule 402 he may get renewals without reexamination; and the Commission will relax the personal-appearance requirement in worthy Chair-Warmer cases.) The personal appearance may be at any of the 32 cities, not necessarily in the district in which one resides. Applicants living more than 125 miles from the closest examining point are entitled to take the test by mail, but may appear in person if they prefer. Every applicant must qualify in code at 10 words per minute and pass an examination on apparatus and regulations. There is no truth to the rumor that a 5-meter amateur 'phone may be operated under a 3d-class radiotelephone operator’s license, without code knowledge. Summarizing this paragraph, we have personal examination in 32 cities, with compulsory appearance for all within 125 miles airline, and mail examination for those outside these circles.

Now for another fundamental: Hereafter the holder of a station license must qualify as an amateur operator and must own or control the apparatus. No longer can an unqualified person take out a station license by promising that it will be operated by a licensed operator. No more of this business of a company getting around the regulations by having their apparatus licensed in the name of an individual. The only exception is for the amateur (non-government) stations of Army and Navy reserve units, which may get licenses in the name of the commanding officer. Clubs may still get licenses in the name of a trustee but he must be a qualified operator. Operators without stations can get operator licenses, but there will be no more separate station licenses.

Next basic point: Most of the amateurs of the country live within 125 miles of an examining city. When they appear the inspector tests their code, gives them the examination, but sends the papers ungraded to Washington. Remaining amateurs take the test by mail and send the papers direct to Washington. There a central examining board will grade all the papers from all the exams with a uniform system of marking. When the applicant passes he will get a combination 3-year station and operator license direct from Washington (or only an operator license if that is all he has applied for). The inspectors will only give the examinations, not mark them. There will be only one combination application form for applying for both station and operator privileges, only one set of questions to fill out, and of course only one exam. At the moment of writing it is believed that the combination license will be in the form of a card, station authority on one side, operator authority on the other.

Now a real fundamental: We abandon the terms Temporary, First Class, Extra First Class, Unlimited 'Phone. Instead, every license will provide three blank places where it may be certified by the Commission for Class A, Class B, or Class C privileges, depending upon the application and upon eligibility and qualifications. Let us look at these classifications, commencing with Class B because it is basic.

Class B is about the same as the present First Class. The amateur appears in person (and he must if he lives within the 125-mile radius) and is given the exam by the inspector. Like the present First Class, the license carries every amateur right except to the use of the two restricted telephony bands, 3000–4000 and 14,150–14,250 kc. The examination will be new, on a new theory. Instead of exhaustively determining everything the applicant knows, it will take small cross-sections or test slices of his knowledge at various places through the required field. To accomplish this, several hundred completely different sets of 10 questions each are being prepared in sealed envelopes. Not even the inspector will know what set of questions an applicant gets. If he can answer any ten of several thousand questions satisfactorily, it can be assumed that he knows his stuff without necessarily demonstrating his entire knowledge. The new exam for Class B will include some 'phone questions, since every such amateur is given general 'phone privileges, but the questions will not be of the Unlimited caliber. In general, the new exam will be simpler and shorter but it will more effectively determine the applicant’s qualifications than the present system.

Class A carries unlimited privileges; that is to say, it includes the present “unlimited 'phone.” To be eligible for it the applicant must have been a licensed amateur operator for at least one year, as at present required, and must appear in person. The test includes the Class-B requirements plus extra material on 'phone as at present. There will be new questions for this exam too.

Class C involves a real change in licensing policy. It takes the place of the old Temporary but changes the theory. The policy used to be to give a temporary to an applicant who barely had the ability to pass the skimmest possible test, relying upon calling him up for personal examination in a very short while and determining then whether he was actually qualified. Originally limited to one year and non-renewable, lack of examining facilities made it necessary to renew temporaries, with the result that thousands of unqualified operators were enjoying the same privileges that their brethren within the old 100-mile circles had to work to get. The new Class-C policy is intended to require the same qualifications of those amateurs who cannot be examined personally as those who appear before an inspector. Presumed qualified when they pass, they then get three-year licenses. Class C, then, is the same as Class B except that the applicant must
live more than 125 miles from any examining point and takes the examination by mail. The privileges are the same as Class B except that the Commission reserves the right to compel any Class-C holder who gets into trouble to appear for personal examination any time during the life of his license. Failure to appear or failure to pass will result in cancellation and inability to get another Class-C license.

To get the Class-C ticket the applicant writes his inspector and receives forms and a set of examination questions in a sealed envelope. The examination is the same as a Class-B applicant must pass. To insure square shooting, the envelope may be opened only by a witness, who must remain present while the examination is taken and be willing to certify under oath that he opened the envelope and that the candidate answered the questions unaided, of his own knowledge, without recourse to notes or texts. The code examination must be administered by another licensed operator who certifies under oath that he has examined the candidate and that he can copy at least 10 words a minute. Following printed instructions the completed papers are then sent direct to the Commission at Washington for grading and the issuance of licenses.

Now let's summarize this procedure, at least for common cases:

If you live within 125 miles airline of one of the 32 examining points:

Write or visit the inspector of the district in which you live, asking for application blanks and the date when examinations will be held in the city at which you wish to appear.

Fill out and file the application and appear at the specified time for personal exam. First the inspector gives you the code test. When you pass that he gives you the written test.

The inspector certifies that you passed the code test and forwards all the papers to Washington. Washington examines the application and grades the papers, and if all is OK the combination license comes direct to you.

If you live more than 125 miles airline from any of the 32 examining points:

Write the inspector of the district in which you live. He will send you application blanks, a sealed envelope containing the examination questions, and instructions for handling the latter.

Following these instructions, get someone of legal age to open the envelope and witness your writing of the examination. The witness must then make oath that he opened the envelope and that you gave yourself the examination without any assistance. Get in touch with a licensed operator (who may also be your witness) who will give you a code test and make oath thereon.

All the papers being completed, forward them direct to the F.R.C. at Washington. Thereafter the action is the same as above; Washington examines, grades, issues.

In either case, if you are already a licensed operator and are applying only for a station license, when you file your forms send along your existing operator license for cancellation; your new license will be a combination one, without reexamination as to operator.

As to renewals after October 1st: No amateur station license expires before January 6, 1935, so renewal applications after October will come about through operator expirations. If you have a Temporary it will be necessary for you, when it expires, to take the Class-B or Class-C examination, depending upon where you live. If you have a First Class license and have been inactive, you will have to be reexamined for Class B or Class C, again depending where you live. If you have met the minimum-activity specification of Rule 402 you do not have to take the examination. Depending upon where you live, you are eligible for Class B or Class C without reexamination, simply filing the application forms. In any of these cases you get the new combination license which replaces your old station license as well as renews your operator authorization.

The chap who now has a station license but isn't an operator may get the new combination license if he qualifies as an operator. And for the operator not interested in a station license there will be a simpler application minus the questions about the station.

The portion of the exam dealing with radio theory and practice may be escaped by Class-A, Class-B or Class-C applicants if within five years they have held a commercial operator license of Radiotelephone Second Class or higher or have possessed unlimited amateur 'phone privileges. They need only reprove their code ability and pass an exam on radio laws, treaties and regulations dealing with amateur radio.

Both the apparatus part of the exam and the code test may be eliminated for Class-B and Class-C applicants if within five years they have held a commercial operator license of Radiotelegraph Third Class or higher or have possessed an Amateur Extra First Class ticket. They need only pass that part of the exam relating to radio laws, treaties and regulations affecting amateurs.

Another item about portables and portable-mobiles: The Commission issues only the one license. If you avail yourself of the right to use a portable or an aircraft-mobile, you must provide yourself with a photostat copy of your station license. The photostat copy of the station license is OK for any of the stations you may have, but it is not accepted in the case of the operator authority. Let's see how this works out. Suppose you have a portable and want to run some tests between it and your own home station. Two operators are necessary, yourself and a friend. You have a photostat copy of your station license. If you want to take the portable into the field,
leave the photostat at the home station to authorize its operation and take your original combination license along with you, since that is your only operator authorization. If you want to operate the home station, send the photostat along with the portable. Your friend of course has his own license with him in either event, to act as operator of either station. Whenever you operate anybody else’s station, have your original combination license with you, and see that the other fellow’s original or photostat copy is on hand to authorize the station operation. If, when you operate somebody else’s station and have your original with you for that purpose, another fellow is operating your own rig, be sure you have left a photostat copy back home for him and that he has his own license with him.

Much of the foregoing paragraph applies at once to everybody, even though it may be years before we all possess combination licenses. We can operate portables after October 1st whether we have a separate license for it or not. Photostat copies of station licenses are acceptable, but the operator must always have his operator license with him, even if it is an old extended Department-of-Commerce license.

Hereafter licenses may be renewed under reasonable provisions but in Rule 402 is a specifica­tion of minimum activity if the station call is to be retained. Inactive stations cannot indefinitely hold licenses. Within the last three months before renewal the station must have been in commission and have communicated with at least three other stations. And an operator must have been similarly active.

It isn’t amiss here to call attention to Rule 24. We’re going to have some enforcement, we now judge, with a rather particular attempt to see that our new regulations are complied with. Ten of the offices are being equipped with new AGS examiners to facilitate rapid monitoring and these offices are obliged to spend a minimum of two hours a day patrolling the amateur bands. When violations are noted the amateur is sent a “discrepancy report” which requires him to file an explanation with the Commission at Washington at once, with disciplinary action the expected result in cases without adequate explanation. Law-abiding amateurs will be glad to see recalcitrants hounded into line; it will make a better game for all of us. We think that we should all take care to be found in full compliance with the new regs after October 1st, with particular care to the business of d.c. plate supplies below 14,000 kc.

And now for the text itself. We include a few excerpts from general regulations where they apply to amateur stations, then our revised rules.

This article of interpretation, while adequate we hope, cannot cover all the details. Again we urge every amateur familiarize himself with the wording of the new rules.

FEDERAL RADIO COMMISSION

Rules and Regulations Governing Amateur Radio Stations

1. Each application for an instrument of authorization shall be made in writing on the appropriate form prescribed by the Commission for the purpose. Separate application shall be filed for each instrument of authorization. The required forms except as provided in Rule 408 for amateur applicants, may be obtained from the Commission or from the office of any Inspector. For a list of such offices and related geographical districts, see paragraph 30.

2. (2) Each application for amateur facilities shall be filed in accordance with the following instructions:

(a) Applications for amateur station and/or operators’ licenses from applicants residing within 125 miles of Washington, D.C., a radio district office of the Commission, or an examining city (see Rule 30); One copy to the Inspector-in-Charge of the Radio District in which the applicant resides. (b) Applications for amateur station and/or operators’ licenses from applicants residing more than 125 miles from Washington, D.C., a radio district office of the Commission, or an examining city (see Rule 30); One copy direct to the Federal Radio Commission, Washington, D.C., in accordance with the instructions specifically set forth on the application form.

14. Each application for new license, where a construction permit is not prerequisite thereto, shall be filed at least 60 days prior to the contemplated operation of the station.

16. Unless otherwise directed by the Commission, each application for renewal of license shall be filed at least 60 days prior to the expiration date of the license sought to be renewed.

20. The transfer of a radio station license, or the right granted thereunder, without consent of the Commission shall be substance in itself for the denial or revocation of any application for its renewal. Amateur station licenses and call signals are not transferable.

22. The Commission may grant special authority to the licensee of an existing station authorizing the operation of such station for a limited time in a manner, to an extent, or for a service other or beyond that authorized in the license.

24. Any licensee receiving official notice of a violation of Federal law, the Commission’s rules and regulations, or the terms and conditions of a license, within three days from such receipt send a written reply direct to the Federal Radio Commission at Washington, D.C. The answer to each notice shall be complete in itself and shall not be presented or altered by reference to other communications or answers to other notices. If the notice relates to some violation that may be due to the physical or electrical characteristics of the transmitting apparatus, the answer shall state fully what steps, if any, are taken to prevent future violations, and if any new apparatus is to be installed, the date such apparatus was ordered, the name of the manufacturer, and promised date of delivery.

26. If the notice of violation relates to same lack of attention or improper operation of the transmitter, the name and license number of the operator in charge shall be given.

27. All station licenses will be issued so as to expire at the hour of 3 a.m., eastern standard time. The normal license periods and expiration dates are as follows:

(a) The licenses for amateur stations will be issued for a normal license period of three years from the date of expiration of said license or the date of granting a new license or modification of a license.

28. Insofar as practicable, call signals of radio stations will be designated in alphabetical order from groups available for assignment, depending upon the class of station to be licensed. Because of the large number of amateur stations, calls will be assigned thereto in regular order and requests for particular calls will not be considered.

29. Call signals of stations will be deleted in each of the following cases:

(a) Where an existing instrument of authorization has expired and no application for renewal or extension thereof has been filed.

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The separation between the transmitter and the remote control station shall not exceed five miles by airline.

214. The person manipulating the transmitting key of a manually operated radio-electronic apparatus or amateur trans- 

mitting station shall be a regularly licensed operator. The licenses of other stations operated under the constant 

supervision of duly licensed operators in another persons, whether licensed or not, to transmit by voice or otherwise, in accordance with the types of emission specified by the respective licensees.

220. Licenses of stations other than broadcast stations are authorized to carry on such routine tests as may be 

required for the proper maintenance of the stations, provided, however, that these tests shall be so conducted as not to cause interference with the service of other stations.

221. (1) The original of each station license, except amateur, portable and portable-mobile stations shall be 

posted by the licensee in a conspicuous place in the room in which the transmitter is located. In the case of amateur, 

portable, and portable-mobile stations the original license, or a photocopy thereof, shall be similarly posted or 

kept in the personal possession of the operator on duty.

(2) The original license of each station operator, except 

amateur and aircraft radio station operators, and operators 

of portable and portable-mobile stations, shall be posted 

by the owner or operator of the room or building in which 

the station is or may be located. When a station is in 

motion, and continues to operate stations in accordance with the class of license held for a period not to exceed thirty days, but in no case beyond the date of expiration of the license.

231. (a) The term "station" means all of the radio-trans- 

mitting apparatus; provided, however, that these tests shall be so conducted as not to cause interference with the service of other stations.

(b) The term "portable station" means a station so 

located as to be used continuously for the purpose of 

conducting commercial operators' examinations only: (See Rules 2, 404, and 408.)

(c) The term "portable-mobile station" means a station 

operated under a single instrument of authority.

(d) The term "station license" means a station license 

which the transmitter is located. In the case of amateur, 

portable, and portable-mobile stations the original license, or a photocopy thereof, shall be similarly posted or 

kept in the personal possession of the operator on duty.

232. (1) The term "portable station" means a station so 

located as to be used continuously for the purpose of 

conducting examinations only: (See Rules 2, 404, and 408.)

(2) The term "portable-mobile station" means a station 

operated under a single instrument of authority.

233. (a) The term "station" means all of the radio-trans- 

mitting apparatus; provided, however, that these tests shall be so conducted as not to cause interference with the service of other stations.

(b) The term "portable station" means a station so 

located as to be used continuously for the purpose of 

conducting examinations only: (See Rules 2, 404, and 408.)

(c) The term "portable-mobile station" means a station 

operated under a single instrument of authority.
372. Amateur stations may be used for the transmission of experimental radiotelegraphy, type A-1 emission. Type A-2 emission may be used in the following additional bands of frequencies, allocated exclusively for use by amateur stations:

- 1,710 to 2,000 kc, 28,000 to 30,000 kc.
- 4,900 to 5,300 kc, 56,000 to 60,000 kc.
- 7,000 to 7,300 kc, 400,000 to 401,000 kc.

373. All bands of frequencies so assigned may be used for radiotelegraphy, type A-1 emission. Type A-2 emission may be used in the following additional bands of frequencies only:

- 28,000 to 30,000 kc.
- 56,000 to 60,000 kc.
- 400,000 to 401,000 kc.

374. The following bands of frequencies are allocated for use by amateur stations using radiotelephony, type A-3 emission:

- 1,800 to 2,000 kc.
- 56,000 to 60,000 kc.
- 28,000 to 28,500 kc, 400,000 to 401,000 kc.

375. Provided the stations shall be operated by a person who holds an amateur operator's license endorsed for class A privileges, an amateur station may use radiotelephone, type A-3 emission, in the following additional bands of frequencies:

- 3,500 to 4,000 kc.
- 14,150 to 14,250 kc.

376. The following bands of frequencies are allocated for use by amateur stations for television, facsimile, and picture transmission:

- 1,715 to 2,000 kilocycles.
- 56,000 to 60,000 kilocycles.

377. Transmissions by an amateur station may be on any frequencies assigned to the station by the commission, subject to the following restrictions:

- The operator of an amateur station shall not engage in experimental radiotelephone, facsimile, or picture transmission below 14,400 kilocycles, shall use adequately filtered direct-current power supply for the transmitting equipment, to minimize frequency modulation and to prevent the emission of broad signals.

378. Licenses of amateur stations are authorized to use a maximum power input of one kilowatt to the plate circuit of the final amplifier stage of an oscillator-amplifier transmitter or to the plate circuit of an oscillator transmitter. An amateur station shall establish its assigned call at least once during each fifteen minutes of operation and at the end of each transmission. In addition, at least once during an amateur portable experimental station shall transmit immediately after the call of the station, the Break Sign (BT) followed by the number of the amateur call assigned to the station. The call sign shall be included in the station's call. For example:

Example 1: Portable amateur station operating in the third amateur call area in the state of New York: W1ABC W1ABC W1ABC DE W2DEF W2DEF W2DEF HT3 HT3 HT3 K

Example 2: Fixed amateur station answers the portable amateur station: W2DEF W2DEF W2DEF DE W1ABC W1ABC W1ABC K

Example 3: Portable amateur station calls a portable amateur station: W3GHI W3GHI W3GHI DE W4JKL W4JKL W4JKL GT4A GT4A GT4A K

379. In the event that the operation of an amateur radio station causes general interference to the reception of bona fide communications, the station may be requested by the Commission to cease such operation or frequencies as cause such interference. Licenses of an amateur station shall keep an accurate record of all communications in which the station is engaged.

380. Each licensee of an amateur station shall keep an accurate record of all communications in which the station is engaged. This information shall be made available upon request by the Commission.

381. An amateur station may be operated only by a person holding a valid amateur operator's license, and only to the extent provided for by the class of privileges for which the operator's license is endorsed.

382. An applicant possessing only an operator's license, that he desires, as follows:

Class A: To be eligible for examination for the Class A amateur operator's privileges, the applicant must have been a licensed amateur operator for at least one year and must personally appear at one of the Commission's examining offices, and take the supervisory written examination and code test. (See Rules 2 (2) a, 30 and 408.) Examinations will be conducted at Washington, D. C., on Thursday of each week, and at each radio district office of the Commission during the three-month period prior to the date of submitting the application, or (2) in the case of an applicant possessing only an operator's license, that he has similarly communicated with amateur stations during the same period. Proof of such communication must be included in the application by stating the call letters of the stations with which communication was carried on and the time and date of each communication. The applicant will be ineligible for a license for a period of ninety days.

383. There shall be but one main class of amateur operator's license to be known as "amateur class" but each such license shall be limited in scope by the signature of the applicant possessing only an operator's license and by the signature of the applicant possessing both an operator's and an amateur operator's license, the applicant possessing both licenses shall be limited in scope by the signature of the applicant possessing only an operator's license and by the signature of the applicant possessing both licenses, except that the Commission may require the licensee to appear at an examining point for a supervisory written examination and practical code test during the license term. Failing to appear for examination for the supervisory written examination may result in having such proof cancelled and the holder of such proof will not be issued another license of the Class C privileges.

384. The scope of examinations for amateur operators' licenses shall be based on the class of privileges the applicant desires, as follows:

Class A: To be eligible for examination for the Class A amateur operator's privileges, the applicant must have been a licensed amateur operator for at least one year and must personally appear at one of the Commission's examining offices, and take the supervisory written examination and code test. (See Rules 2 (2) a, 30 and 408.) Examinations will be conducted at Washington, D. C., on Thursday of each week, and at each radio district office of the Commission during the three-month period prior to the date of submitting the application, or (2) in the case of an applicant possessing only an operator's license, that he has similarly communicated with amateur stations during the same period. Proof of such communication must be included in the application by stating the call letters of the stations with which communication was carried on and the time and date of each communication. The applicant will be ineligible for a license for a period of ninety days.

385. The applicant's ability to send and receive in plain language messages in the Continental Morse Code (5 characters to the word) at a speed of not less than 10 words per minute.

386. The technical knowledge of amateur radio apparatus, both telegraphic and telephonic, to be examined by the supervisor.


(Continued on page 74)

September, 1933 25
Ten-Meter Band Still Holding Up

JUST before August QST appeared there was a week in which mighty few 28-mc. signals came through and we were starting to get squeamish about our ballyhoo. As this is being written QST has been out about a week and W9's are complaining of lack of stations to keep them busy. We hear new signals on the band every night — that is, when the band isn't completely dead. Consequently, we have very few reports of new results this month. Scattering DX records filter through though nothing reliable in the way of solid communication.

Before going into reports we should like to state the guideposts we use to determine whether signals will come through on 28 mc. The signals we refer to now are those which are between 800 and 1100 miles away which come through consistently. This following premise may change when real DX signals bend back to earth on this band. When signals within 500 miles are very strong on 14-me., signals from 800-1100 miles will be heard on 28 me. When these same signals on 14 me. are coming through at just average strength, the signals on 28 me. will be quite weak and erratic. The weather does not seem to affect the signals on this band in that we hear signals there regardless of local weather at the time. Another excellent time for signals to come through on 28 me. is when harmonics of 14-mc. signals are heard. The time of day when signals come through best in Hartford is between 5 and 7 p.m. E.S.T. On occasions signals have been heard between 9 and 11 a.m. but invariably the hours of the afternoon have been absolutely dead. This seems to hold in most cases save that some of the W9's have reported a weak signal or two during the middle of the afternoon.

SCATTERING DX REPORTS

On July 16th W6CAL heard W2TP at two different times which is the first transcon signal we have heard about this year. W8TI was reported by AC2BHH in China on the last of numerous tests but the signal only stayed in for about 4 minutes and has never been heard since. W9DZX has been reported in Germany but confirmation of this work is still lacking. The only international work we have heard of is the QSO K4SA had with W1CCZ during the month. K4SA has heard W2TP and a few of the W9's and has been reported in U. S. by other stations. From NY1AB and G2OA via 14 me. we learn that the Europeans are having conditions comparable to ours, hearing their signals at the same time of day we do — just before sundown. They are keeping ears open for American stations but still have heard nothing.

REPORTED RESULTS THIS MONTH

W1CUN with a pair of 45's in push pull got on the air on July 29th and worked W9CLH and W9GFZ and heard W9CES. The receiver at W1CUN is a 57 detector and 27 audio. W9KEP in Kansas City, Mo., has worked W2TP and W1SZ. W9FFQ has worked W1CCZ, W1DF, W1SZ and W2TP. W4MR in Greensboro, N. C., put a transmitter on the air on July 29th and was heard in the middle west and in Hartford on the 29th and 30th with a steady xtal signal. VE2AC of Thetford Mines, P. Q. promises to be active once more on the 28-mc. band. Blais is

THE LOW-POWERED 28-MC. SET AT OK1AW

another member of the old 28-mc. gang and spent a great deal of time transmitting and listening when the conditions were very unfavorable (as it turned out) for work on the 10-meter band. In the past VE2AC has tasted the fruits of European DX on this band.

W9EL of Kansas City, Mo., is at present listening on 28-mc. and has heard W2CTO, W2TP and W1SZ.

May we ask once more that any station hearing a signal on 28-mc. band should feel duty bound

(Continued on page 60)
Featherweight Sets for the Ultra-High Frequencies
Planning and Constructing Small Transmitters and Receivers

By Ross A. Hull, Associate Editor

It is one thing to build a successful transmitter or receiver on a wide expanse of breadboard when weight and bulk are matters of no earthly consequence. Assembling similar equipment in the least possible space, particularly when there is a weight ogre looking one in the eye, is another problem — particularly if the set is to work well upon completion.

Last month we decided to build some diminutive ultra-high frequency gear to take with us on our vacation at the National Soaring Meet at Elmira, N. Y. We were interested not in new circuits or methods but simply in building some effective transmitters and receivers with the least possible bulk and weight. A recital of the problems encountered and a brief description of the apparatus evolved may be of interest to amateurs anxious to build ultra-light gear for the thousand and one applications within the scope of the 56- and 28-mc. bands.

In the modern soaring plane ("glider," to some folks) there is very little room to spare. One has the impression that the pilot is inserted in his cockpit with the aid of a shoe-horn. At any rate, apparatus to be within his grasp for adjustment must be extremely small. The apparatus not requiring adjustment during flight (power supplies and transmitter) do not require quite such rigorous treatment but even they must be kept down in size and weight. How small, how light, how simple could such gear be made — those were the questions.

A POCKET-SIZE RECEIVER

With no engine noise to overcome in the ‘plane, a single tube, we decided, would be sufficient for the receiver if only it could be made to operate really effectively. This led to a survey and trial of all the known single-tube super-regenerative circuits. Careful comparisons revealed that the circuit of Fig. 2 provided considerably greater sensitivity and signal volume than any of the simpler circuits that depended on grid blocking for the interruption frequency. It was considered the ideal circuit, notwithstanding the necessity for additional components — particularly the interruption frequency coils. Examination will show that the signal-frequency portion of the circuit is exactly similar to that used in our previous super-regenerative sets. The interruption-frequency coils $L_1$ and $L_2$, instead of being connected to a separate interruption-frequency oscillator tube, are inserted in the plate and grid circuits of the detector tube, so permitting it to do the double job of oscillating at the interruption frequency and super-regenerating at the signal frequency.

The receiver in its final form is illustrated in Figs. 1, 3 and 4. In its planning, consideration was given not only to size but to the accessibility of every component and connection; hence the "U" shaped frame. Measuring $3\frac{1}{4}$ by $4\frac{1}{4}$ by $1\frac{3}{16}$ inches, this frame is bent from a strip of $\frac{1}{16}$-inch aluminum. Sharp bends at the corners result from scoring the aluminum deeply at those points. The entire assembly is mounted on the frame, permitting the receiver to be adjusted or serviced after slipping off the "U" shaped cover. In Fig. 3, the Type 30 tube can be seen at the top, its wafer-type socket supported from the frame with machine screws and $\frac{3}{16}$-inch long bakelite tubing spacers. Immediately below the tube socket are to be seen the inductances $L_1$, $L_2$, $L_3$ and the condensers $C_1$, $C_2$, $C_3$.
well. In the receiver, this tuning condenser is mounted to and insulated from the frame by a small piece of bakelite. It is placed at the end of the set opposite the knob so as to allow space for the essential insulated coupling. Straddling the \( \frac{1}{4} \) inch bakelite shaft is the interruption frequency coil unit. Under the latter, and under the drive shaft, are the two 0.002-µfd. midget fixed condensers connected in parallel to form \( C_4 \). The two "tip-jacks" for connection of the 'phones can be seen close under the knob. They are mounted in a strip of bakelite bolted to the frame. Remaining items are the gridleak, placed between the interruption frequency coils and the tuning condenser, and the insulated antenna terminal in the frame above the tuning coils.

The reverse side of the set, shown in Fig. 4, gives a more accurate idea of the placement of these parts and reveals, in addition, the radio-frequency choke wound on a stub of \( \frac{1}{4} \) inch bakelite rod.

The cover for the set is bent from \( \frac{1}{4} \) inch thick aluminum. It is drilled to accommodate the tuning condenser shaft and is held in place by one long machine screw, the head of which can be seen at the rear of the set in Fig. 1. The inside of the cover is protected against electrical contact with the components of the set by having its surfaces covered with ordinary writing paper and lacquered. All the aluminum, incidentally, was given a bath in strong lye solution, washed in water and then lacquered with clear Duco.

The operation of the receiver should present no problem other than the adjustment of coils to give the desired band coverage. The lack of the characteristic rushing noise which accompanies normal functioning will indicate either a faulty component or incorrect wiring. There are no half measures in these receivers; they either work well or not at all. This particular circuit, unlike the others tried, operates satisfactorily with just 45 volts of plate supply. This is obtained either from a pair of 1-lb. 22½-volt "B" batteries or from a string of the very small No. 700 Eveready flashlight batteries mounted in a revamped cartridge belt and connected in series. For filament supply, two ordinary flashlight cells are used with a 16-ohm fixed resistor in series.

We do not suggest for a moment that this receiver is the ultimate in small receivers. We have given it a very extended description, though, because we believe it to be a very practical and widely useful gadget for any ultra-high-frequency experimenter to possess. Our experience with it has shown the desirability for at least two minor modifications, both of which we have made since the photographs were taken. First, small bakelite blocks fitted with machine screws and nuts have been provided to serve as terminals for
the two halves of the tuning inductance. In this way, the use of either 56- or 28-mc. coils is made possible. Secondly, a different type of tuning knob has been fitted with its indicating arrow on the rim contacting the receiver frame. This permits accurate setting and re-setting of the tuning control. If we were to build other receivers of the same general type, we would give serious thought to the possible addition of an audio amplifier (making the set twice its present thickness). Also, we would make an endeavor to use the W.E. "N" or "peanut" tubes, which are much smaller than the 30's.

THE COMPANION TRANSMITTER

The small transmitter, companion for this receiver, need not be described in detail because of its similarity in mechanical respects and because of the routine conventionality of its circuit, which Fig. 5 reveals as a straight TNT with a pentode modulator. There is certainly nothing in it to justify special mention.

The frame on which the components are assembled measures 5 1/4 inches along the axis of the tubes, 5 inches high and 1 3/4 inches wide. As in the receiver, all equipment is mounted to this frame. In Fig. 6, the oscillator tube is at the top, supported far enough from the closed end of the frame to allow room for the small Cardwell tuning condenser. The modulator tube below it is also mounted away from the frame end to make room for the G. R. sockets for the plate tank coil and the radio frequency choke. Needless to say, both the plate tank sockets and the tuning condenser are well insulated from the metal frame. The plate choke, microphone transformer and battery cable socket (a UY tube socket) occupy the lower side of the frame. Because of their small size and low weight, push-pull output replacement transformers for midget broadcast receivers were used for the microphone transformer and speech choke. The type designed for use between a pair of Type 47 tubes and speaker was found particularly suitable. The speaker winding serves as the primary of the microphone transformer and is, of course, disregarded in the speech choke. To be seen projecting from the left side of the set is the plate tank and antenna coil (the latter inside the coil form). This unit was arranged externally so that the frame of the set would not have to be expanded unduly and so that a reasonably large and "low-loss" plate tank could be used.

The operation of this transmitter is perfectly straightforward and its adjustment should be well within the capabilities of anyone able to build it. Careful adjustment of the grid coil is essential. The plate current of the unloaded oscil...
The interruption frequency oscillator of a super-regenerative receiver is functioning as a modulator for reception and that it might readily be switched to operate as a modulator for transmission. Study of the wiring will show that $L_1$ and $Ch.$ are really two plate chokes in series—one functioning at the interruption frequency, the other at speech frequencies. The grid circuit of the modulator, containing both the tuned circuit $L_0, C_4$ and the modulation transformer secondary, is also capable of operation at both interruption and speech frequencies. Changing from reception to transmission involves shorting the 'phones, reducing the oscillator grid-leak resistance and shorting the interruption oscillator plate coil. In our particular set, this switching is accomplished with a modified miniature toggle switch. Some larger and more readily available

FIG. 8 — THE CIRCUIT OF THE TRANSCEIVER ILLUSTRATED IN Figs. 9 AND 10

C1 — Five-plate midget variable condenser.
C2 — 100-µfd. midget fixed condenser.
C3 — 0.002-µfd. midget fixed condenser.
C4 — 0.002-µfd. midget fixed condenser.
R1 — 50,000-ohm half-watt fixed resistor.
R2 — 3-megohm half-watt fixed resistor.
R3 — 25,000-ohm half-watt fixed resistor (found necessary to prevent “howling” of the modulator as a result of proximity of $Ch.$ and $T$).

$L_1$ — Two turns of No. 16 wire ½" diameter mounted between $L_1$ and $L_2$.
$L_0, L_4$ — Each 4 turns of No. 16 wire ½" diameter with turns spaced 1/4".
$L_6$ — Sickles interruption frequency coil unit.
RFC — Similar to choke specified for midget receiver.
$Ch.$, $T$ — Similar to those specified under Fig. 5.

were wired into the battery unit with flexible leads running from there to the cockpit of the 'plane. Both, of course, could be provided for on the transmitter unit itself.

AND A "PERISCOPE" TRANSCEIVER

The third small unit illustrated is a "transceiver" which, despite its extremely low power, proved thoroughly effective in communication over distances up to about 8 miles. Because it was designed to fit in an old British Army periscope case (which few amateurs are likely to possess) it would be futile to enter into lengthy discussion of the mechanical features of the set. It is shown just as an example of one convenient type of construction which could be adapted to suit similar "containers" which may be available. In this instance, the transceiver proper occupies the large end of the case, the "A" and "B" batteries being slipped down into the narrow end. The battery leads emerge from the case on the sloping wall, then being plugged into the row of three "tip-jacks" to be seen on the right top side of unit illustrated in Fig. 10.

The circuit, shown in Fig. 8, requires careful consideration. It is an arrangement (devised two years ago) based on the knowledge that the interruption frequency oscillator of a super-regenerative receiver is functioning as a modulator for reception and that it might readily be switched to operate as a modulator for transmission.
Switch might well be used in cases where space is not so strictly limited.

With 90 plate volts, the total plate current is of the order of 7 ma. with the oscillator loaded. This, with only 60 ma. of filament current, permits the rig to be operated very economically.

In closing, we wish to make an earnest plea that amateurs should consider these circuits and illustrations not as something to be rigorously copied but as suggestions of possible use in the development of new and better equipment. There is an enormous field of usefulness for small ultra-high-frequency transmitters and receivers — a field in which the amateur is to make many contributions. The contributions can hardly be made, however, without original and generally constructive work on the part of the amateur himself.

Wholesale copying of the other fellow's gear will never do any good.

World's Fair Exhibit

Travel and transport — and communications . . . keynotes of modern civilization. Visiting the amateur radio exhibit at the Chicago World's Fair one sees them personified, symbolized. At the 35th street entrance loom the famous Royal Scot, peer of British trains, and beside it an American cousin from the Baltimore and Ohio. A cavalcade of the epoch-making trains of history leads one to the Travel and Transport Building, filled with a myriad of examples of modern transportation.

The amateur radio exhibit is on the second floor. One leaves the escalator to pass before a huge sign reading, "Denmark," and another heralding, "Irish Free State," with the exhibits of these countries spread forth beneath them. To the right can be had a balcony view of the main floor. Texaco's trim little low wing monoplane, No. 13, floats in mid-air, with the Canadian exhibit to the left, and a colorful display of safety glass to the right. Just beyond the balcony are the red letters blazoning "Amateur Radio."

The exhibit itself was described in cursory detail last month . . . the color scheme, the exhibitors, the personnel. It is a fitting tribute to amateur radio, and a splendid exposition of what our art actually means. One need only watch the endless parade of persons, obviously not amateurs, yet all obviously intensely interested, passing along the rows of exhibits, peering through the wire screens surrounding the transmitters and operating position, asking questions, filing messages, buying souvenir booklets and Handbooks and seizing on every opportunity to learn more of what it is all about, to realize the significance of the exhibit.

The adjoining lounge room, reserved for the use of amateurs and their friends, is continually occupied. Cards on the walls indicate a wide attendance from every district; on August first the log showed licensed amateurs to a total of 1457 had witnessed the exhibit. Every district was represented, and many a foreign prefix — including that of OM1CB in late July. . . . The exhibit is not yet finished — despite the more than a year of effort that has been put into it. New things are constantly being added; the latest is a four-stage c.e. 56-mc. transmitter, in beautifully built rack and panel style, a part of the work W9HBB, W9CSB, W9JO and W9FPP are doing on this band. Every amateur who has not yet seen the exhibit should make every effort to do so, for it represents an unmistakable contribution to the amateur radio of this country.

— C. B. D.

Strays

The government's economy program has removed some old friends from their parts in radio administration. In the July "cut" there were lost to us Edwin W. Lovejoy, inspector since 1920 and since late 1928 the supervisor at Seattle; and Wm. E. Downey, since 1918 the second in charge of the field inspection administration, once the old Department of Commerce radio division. We are sorry to see these old friends separated from the service; we wish them well and hope to continue seeing them in radio.

Copies of the "Shure Technical Bulletin," a publication of Shure Brothers Company, 337 West Madison St., Chicago, microphone makers, are available to QST readers without charge on request. The first two titles issued are "Condenser vs. Two-button Microphones" and "Field Problems in Microphone Placement," both containing interesting and useful information.

Bulletin 11, 19 and 25 of the Ward Leonard Electric Co., Mt. Vernon, N. Y., describe in detail Vitrohm and Ribflex resistors, their mountings and enclosures. The "Ribflex" resistors are made to a new design which increases the rating of resistors of a given physical size by providing rapid heat radiation.

The new General Radio Type 637-P knob is the "nertz" for receivers like the National FB-series superhet and the Hammarlund Comet Pro. The large diameter, 2⅛ inches, and deep indentations around the circumference make two-finger tuning a reality and the hand does not become fatigued even after a long stretch of DX-hunting. Similar knobs also can be obtained in 1⅛- and 1½-inch diameters, these types being known as the 637-G and 637-A respectively.
Amateur Radio at the National Soaring Meet

SHOULD anyone wish to spend a vacation immersed in divers amateur radio activities, Elmira, N. Y., during the National Soaring Meet is the right place to do it. This, of course, is no new discovery. Readers of QST will recall that, for several years past, amateur radio has played an important part in the annual meet; that last year, 1,094 messages were handled by the Elmira Radio Amateur Association operators over their 56-mc. duplex radio telephone net during the two weeks of activity.

This year, because of unfavorable weather con-

ditions for soaring, the meet had a narrow escape from becoming a radio camp instead of a glider contest. Chief activity, of course, was the installation and maintenance of radiophone stations at the Elmira airport and at "Hill 6" — the ridge chosen for the glider encampment and the scene of most of the flying activities. Last year, 56 mc. was used for this link but because of a high intervening ridge, a relay station was found necessary. This year, the newly-opened 28-mc. 'phone band was put to use and highly satisfactory direct contact was made possible. For the two weeks of the contest, the Elmira group sacrificed sleep, eats, vacations and comfort to maintain continuous duplex contact for the convenience of officials and pilots of the Soaring Association. As in past years this communication system proved completely reliable and positively invaluable.

But on this occasion, amateur radio at the meet was not limited to communication between the hills and the airport. As amateurs attending the contest have long thought, radio should not be kept on the ground when there are sailplanes in the air — if for no other reason than that a motorless plane is the ideal location for an ultrahigh-frequency station. The Elmira fellows saw, this year, that there was action to suit the thought. Armed with a special aircraft license and much lightweight equipment supplied by Prof. R. E. Franklin of Ypsilanti, Mich., and the writer, they proceeded to demonstrate that duplex radiotelephone communication between a sailplane and ground is not only entirely practical but of genuine value to the sailplane pilot. And did we all have fun!

Most important of the problems faced was that none of the sailplane pilots had radio operators' licenses — a condition which had to be remedied by the inauguration of "The Elmira Outdoor Hay-Wire Radio School." Befuddled on "Hill 6," the interested pilots were drilled in the complexities of radio regulations, operating procedure and elementary technicalities to the point where a third-class commercial ticket was simply a matter of flying to Buffalo and passing the examination. High enough tribute can hardly be paid Mr. Warren Eaton, president of the Soaring Association; Prof. R. E. Franklin and Mr. N. H. MacDowell for their willingness to go through the rigmarole in the interests of amateur radio despite intense preoccupation with the general conduct of the soaring meet.

Unfortunately, only a few pre-

(Continued on page 64)
New Intermediate-Power Transmitting Tubes

Types RK-18, 800 and 830 Announced by Manufacturers

By George Grammer, Assistant Technical Editor

WHILE tube manufacturers have been vying with one another to be the first to get into production on the whims of this and that set designer, there is one person who has had to take such crumbs as might come his way — Mr. John Q. Ham. Of the multitudinous types that have been announced in the past three years, those that really filled any need in amateur radio can almost be counted on the fingers of one hand — a few receiving tubes of improved characteristics, the 46 with its versatile heater-type companion, the 69, and some low-voltage mercury-vapor rectifiers. Some of the rest have been useful occasionally, especially the battery-operated varieties for portables, but the great majority have made no dent in the consciousness of amateurs in general, nor is there any good reason why they should have.

But now we have some real news: Three new types that fill the gap between the 10 and the 203-A or 852! Not duplicates, but three different designs all having about the same power output rating as oscillators or r.f. power amplifiers. These are the Raytheon RK-18, the RCA-Radiotron 800, and the Sylvania 830. Unfortunately we can give complete data only on the RK-18 in this issue; the last two were announced just at press time and, aside from the usual filament and plate ratings given farther along, our information on them is incomplete. More about them in later issues.

The Raytheon RK-18, the design of which was decided upon after Raytheon representatives had consulted A.R.R.L. Headquarters on the question of what kind of tube amateurs needed, is a double-ender which looks somewhat like a miniature 204-A, as the photograph shows. The grid and filament connections are brought out to a standard 4-prong base — made of Isolantite to keep down losses at high frequencies — on one end, with the plate connection coming out the other end. The photograph shows a binding post on the plate socket, although there is a possibility that this may be changed to a cap, later. The filament is thoriated tungsten, which means that the RK-18 is really "hard" and which does away with the grid-emission troubles that make the small tubes with oxide-coated filaments so unstable at 400 volts or more. The plate is sand-blasted molybdenum, which shows some color when the dissipation is nearing the rated value — a good feature in a transmitting tube because it gives a sure indication of overloading or inefficiency.

The ratings on the RK-18 are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament voltage</td>
<td>7.5 volts</td>
</tr>
<tr>
<td>Filament current</td>
<td>1.4 amperes</td>
</tr>
<tr>
<td>Plate voltage, maximum</td>
<td>1000 volts</td>
</tr>
<tr>
<td>Safe Plate Dissipation</td>
<td>40 watts</td>
</tr>
<tr>
<td>Amplification factor</td>
<td>18</td>
</tr>
<tr>
<td>Plate resistance</td>
<td>6000 ohms</td>
</tr>
<tr>
<td>Mutual conductance</td>
<td>3900 microhmhos</td>
</tr>
</tbody>
</table>

Inter-electrode Capacitances:
- Grid to plate: 5 µfd.
- Grid to filament: 3.8 µfd.
- Plate to filament: 2 µfd.

The operating data on the tube as a Class-A amplifier are given below. Because of the high mu the undistorted power output is not as great as would be obtained from a lower-mu tube operating at the same plate voltage.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate voltage</td>
<td>750 1000 maximum</td>
</tr>
<tr>
<td>Grid Bias voltage</td>
<td>-30 -40 volts</td>
</tr>
<tr>
<td>Plate current</td>
<td>34 36 ma.</td>
</tr>
<tr>
<td>Load resistance</td>
<td>9300 13500 ohms</td>
</tr>
<tr>
<td>U. P. O.</td>
<td>5.4 8.5 watts</td>
</tr>
</tbody>
</table>

AS AN OSCILLATOR OR R.F. POWER AMPLIFIER

For r.f. use the following nominal ratings have been put on the tube:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate voltage</td>
<td>750 modulated</td>
</tr>
<tr>
<td>Plate current</td>
<td>1000 unmodulated</td>
</tr>
<tr>
<td>Safe plate dissipation</td>
<td>40 watts</td>
</tr>
<tr>
<td>Max. r.f. grid current</td>
<td>5 amperes</td>
</tr>
<tr>
<td>Typical operation: Es = 1000.</td>
<td></td>
</tr>
<tr>
<td>Power Output</td>
<td>50 watts</td>
</tr>
</tbody>
</table>

The recommended grid-leak resistance is 15,000 ohms. Under operating conditions, with the tube delivering power to a load, a d.c. grid current of 10 milliamperes will provide the necessary bias.

The amount of r.f. power that can be taken from a tube depends to a large extent on how the circuit is handled. If the tube is excited properly and the circuit is well designed, the tube effi-
ciency can be made quite high—as high as 80% for a separately excited amplifier, somewhat less for a self-excited oscillator. It should be no trick at all to get 50 watts from the tube without exceeding the conservative plate voltage and plate current ratings given above.

Actual tests show that the REAS is an excellent high-frequency tube. A sample tube used as a neutralized doubler on 28 me. gave an output of more than 30 watts with 700 volts on the plate—all that was available at the moment—at a 1200 plate current of about 100 milliamperes. The same input on 14 me. lighted up a 60-watt lamp used as a dummy load almost to normal brilliancy, with the tank circuit still plenty "hot." The grid current was 15 milliamperes, bias approximately 200 volts, a combination which works the tube at high efficiency.

CLASS-B MODULATOR CHARACTERISTICS

Figs. 1 and 2 are curves indicating the performance of the RK-18 as a Class-B audio amplifier at plate voltages of 750 and 1000 with various values of load resistance. A study of the curves shows that the tubes are not hard to excite—the driving power required at the optimum operating conditions is well within the capabilities of a single 2A3 or a pair of 45's in push-pull—and that large outputs can be obtained. This is the natural result of the high plate voltages at which the tube can be used. It is possible to obtain 100 watts of audio power from a pair of tubes while still working within the plate current and plate dissipation ratings. Hardly any 'phone man needs to be told that 100 watts of audio power will fully modulate 200 watts of r.f. input—and 200 watts input on the modulated stage makes a transmitter that will do some business on the air.

The table below gives some suggested operating conditions. In the first column, the tubes are worked at their full plate-current rating at 750 volts, the output power being slightly more than 70 watts. In the second column, an output of 65 watts is obtained at the same plate voltage with a greater step-down ratio in the input transformer, which lessens the grid distortion. This set of conditions is just about right to modulate a pair of RK-18's in an r.f. amplifier drawing maximum plate current at the same plate voltage. The third column is for operation with 1000 volts on the plate.

<table>
<thead>
<tr>
<th>CLASS-B OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate voltage</td>
</tr>
<tr>
<td>Grid bias voltage</td>
</tr>
<tr>
<td>Load resistance per tube *</td>
</tr>
<tr>
<td>Power output (two tubes)</td>
</tr>
<tr>
<td>Peak grid voltage</td>
</tr>
<tr>
<td>Peak grid swing</td>
</tr>
<tr>
<td>Peak plate current (two tubes)</td>
</tr>
<tr>
<td>Average plate current at full output (two tubes)</td>
</tr>
<tr>
<td>No-signal plate current (two tubes)</td>
</tr>
<tr>
<td>Average grid current at full output (two tubes)</td>
</tr>
<tr>
<td>Driver input transformer turns ratio; pri. to 3/4 sec.:</td>
</tr>
<tr>
<td>With one 2A3</td>
</tr>
<tr>
<td>With p.p. 45's</td>
</tr>
</tbody>
</table>

The output transformers now available for the smaller Class-B tubes probably are not capable of handling the larger power output of a pair of RK-18's, certainly not at the 1000-volt rating. (Continued on page 68)

* Multiply by 4 for two tubes.
**First Annual Field Day Report**

The first Field Day was pronounced an unqualified success, according to about 50 accounts of station participation received. The gang who took part are looking forward to more similar occasions for the practical testing of portable (potential emergency) equipment, combined with a good time for all.

Portables were operated from all conceivable locations, and on almost all amateur frequency bands. Maximum activity took place on the 7- and 3.5-mc. bands, with about \( \frac{1}{2} \) as much activity on 14 mc. and 56 mc., and with some scattered use of the 1.7-mc. band. In addition to power limitations (2 to 50 watts), participants reported insect and weather hazards. Suitcase rigs with but a single watt input were popular though some sets were “portable by truck” instead. Plate power was provided from B-bats, motor-car B-power packs, dynamos, Diesel driven generators and filtered spark-coil step-up devices. The London Ontario club drove a 1200-volt machine (with ill. winding) from a 2-cylinder gas engine.

W4PAW, kept on the air continuously for the 27 hours of the test at Indian Rocks Beach, Fla. by six operators, ran up the most outstanding score and tops the list. W9ZAZAL and operators of the Central Illinois Radio Club (40 watts on p.p. '10s) at Bloomington Ill. used 7 and 4 mc. and placed second. W2BPP, Boyd Phelps and YF, and Phil Jensen at Minneapolis won third honors using both 3.5 and 7 mc. and a 150 watt crystal job on roller castors made to fit a car trailer and constitute a radio central for smaller portables in emergency. The Astoria Amateur Radio League took W7BTT to the summit of Saddle Mountain, 6000 feet high. VE3JT and VE3GT “set up” 50 miles from Toronto between two elm trees using '71A and Utah car-pack. In spite of a sudden gale and YL QRM it was a success, according to about 50 accounts of station participation received. Of course many took part who did not report; nevertheless the results shown in the reports indicate the effort successful, both from the viewpoint that practical building and testing of emergency communication equipment was furthered, and that the new amateur station regulations make every licensee a potential operator of portable equipment, every amateur should now take steps to make himself ready to render constructive service in any time of emergency. Many portables will undoubtedly be ready to test before our next Field Day Emergency Test.

So we believe that a forward looking step has been taken in inaugurating this annual affair. Of course many took part who did not report; nevertheless the results shown in the reports indicate the effort successful, both from the viewpoint that practical building and testing of emergency communication equipment was furthered, and that the new amateur station regulations make every licensee a potential operator of portable equipment, every amateur should now take steps to make himself ready to render constructive service in any time of emergency.

**FIELD-DAY PARTICIPATION**

<table>
<thead>
<tr>
<th>CLUB Scores</th>
<th>Points</th>
<th>Sets</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9ZZAL: Central Illinois Radio Club</td>
<td>98</td>
<td>15</td>
<td>1470</td>
</tr>
<tr>
<td>W2BPP: London Amateur Radio Club</td>
<td>35</td>
<td>22</td>
<td>770</td>
</tr>
<tr>
<td>W9ZAZAL: Rockwood Short Wave Radio Ass'n</td>
<td>37</td>
<td>12</td>
<td>444</td>
</tr>
<tr>
<td>W5BXX: Abilene Radio Club</td>
<td>24</td>
<td>12</td>
<td>298</td>
</tr>
<tr>
<td>W9ZAV: Boone Valley Radio Club</td>
<td>19</td>
<td>10</td>
<td>190</td>
</tr>
<tr>
<td>W9ZBP: Victoria Short Wave Club</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W9ZBL: Southern Minnesota Radio Ass'n</td>
<td>5</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>WSHUC: W9AIW (50 watts on 7032 and 1.7 foc.)</td>
<td>663</td>
<td></td>
<td>1856</td>
</tr>
<tr>
<td>W4PAW: W4AX-W4BT-W40W-B4AW</td>
<td>62</td>
<td>28</td>
<td>1856</td>
</tr>
<tr>
<td>W9ZAS: Mr. Boyd Phelps and YF (7 and 3.5 mc.)</td>
<td>63</td>
<td>22</td>
<td>1396</td>
</tr>
<tr>
<td>W9ZHI: W9ES-BEL-IHW (Fr. 40 on 7 and 14 mc.)</td>
<td>53</td>
<td>26</td>
<td>1378</td>
</tr>
<tr>
<td>W9ZAW: W9AJW (50 watts on 7032 and 1.7 foc.)</td>
<td>52</td>
<td>26</td>
<td>1352</td>
</tr>
<tr>
<td>W9AZR: (70 TWT, 22 watts on 7 mc.)</td>
<td>51</td>
<td>22</td>
<td>1152</td>
</tr>
</tbody>
</table>

| W9MKI: VE3GT 635; W9MLK 619; W9FCD 432; W9CNX 418; W9AAL 141; W9ZAZP 246; W4PH 293; W87Z 216; W9KJ 180; W9PB 183; W8ZZAO 152; W9KI 102; W9WLC 100; W9RI 76; W9RSO 66; W9ZBC 93; W87ZC 36; W9FCD 36; W9FCL 33; W9HT 24; W9QG 6; W9ZBB 134; W9ZBB 16; W9ZBB 2; W9ZBW 2. |

*Club stations. The call signal of the leading individual operator is otherwise listed, where several club member-stations were put on the air at a club outing.*

from the standpoint that an enjoyable operating activity was made possible. There is hardly space for more than a résumé of the highlights here, but the enthusiasm greeting our first Field Day augurs well for future similar occasions. What shall we call our next Field Day to give it more of a “preparedness for emergency” significance? Suggestions will be welcomed. Bearing in mind that the new amateur station regulations make every licensee a potential operator of portable equipment, every amateur should now take steps to make himself ready to render constructive service in any time of emergency. Many portables will undoubtedly be ready to test before our next Field Day Emergency Test. Is your portable equipment independent of interruptions of power service? Are you ready for the next tests?

— F. E. H.
Sharp Cut-off Low-Pass Filters to Eliminate Broadcast Interference
By Frederick C. Everett, W8CMY *

Some amateurs, especially those operating in the 1715-kc. band, have been having difficulty with low-pass filters installed on broadcast receivers to prevent interference. Either the cut-off is made so low that it causes a loss of sensitivity at the high-frequency end of the b.c. set, or else it is made so high that it does not properly eliminate the 'phone station. On the other hand, wave taps are usually more expensive to build and more prone to get out of adjustment when installed in a neighbor's set, both difficulties being attributable to the variable tuning element.

Because of these facts, the filter presented herewith should be of interest. It has a very sharp cutoff and an attenuation "notch" which resonates at the frequency to be eliminated. Typical characteristic curves of an ordinary low-pass filter and one of this type are shown in Fig. 1. As a further advantage, it uses smaller coils and condensers than the more general type of low-pass filter. The fixed condensers are 250 µfd.

![Fig. 1—Comparative Curves of Ordinary Low-Pass Filter and Sharp Cutoff Filter of the Type Described in the Text](image)

Other types of filters are usually more expensive to build and more prone to get out of adjustment when installed in a neighbor's set, both difficulties being attributable to the variable tuning element.

Because of these facts, the filter presented herewith should be of interest. It has a very sharp cutoff and an attenuation "notch" which resonates at the frequency to be eliminated. Typical characteristic curves of an ordinary low-pass filter and one of this type are shown in Fig. 1. As a further advantage, it uses smaller coils and condensers than the more general type of low-pass filter. The fixed condensers are 250 µfd.

![Fig. 2—Circuit Diagram of Sharp Cutoff Filter](image)

<table>
<thead>
<tr>
<th>Type</th>
<th>$L_1$</th>
<th>$L_2$</th>
<th>$L_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38</td>
<td>28</td>
<td>19</td>
</tr>
<tr>
<td>B</td>
<td>40</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

**Coil Specifications**

<table>
<thead>
<tr>
<th>Microhenries</th>
<th>Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>38</td>
<td>29</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

*Electrical Engineer, 411 Palmwood Ave., Delta, Ohio.*
On Twisted-Pair Feeders

When the article on “Twisted-Pair Feeders” was published in our July issue, we rather had a hunch that if any of the gang had been using this type of doublet for transmitting we’d be hearing from them. That is exactly how things have turned out — and as a result we have some more dope on terminating the line at the antenna. Here is a letter from George W. E. Shields, W2VY:

“Noticed your article on twisted feeders in July QST and as I have been using this feed system for the past three years I am taking the liberty of offering a suggestion.

“The main problem in using this type feed system is matching the line impedance with that of the radiating system. After a number of tests, I have found that the best impedance match is obtained by the following method. Insulate the center of the radiator for two feet, then open the twisted feeders for two feet, thereby forming a triangle two feet on each side.

“To my knowledge this feed system for transmitters was first used by W2AV and myself on transmitters of 500 watts power on 40 meters. Later on I installed this system at W3BQP, 15 watts power on 80 meters, and at W2BJ, 300 watts power on 40 meters. W2AV has also used this type of feed on 20 meters.

“For tuning I have found that a combination of series parallel tuning (see Fig. 3) gives the best results.

“In conclusion I can say that this type feed system has given better results and service, at W2AV and my own station W2VY, than any Zepp feeders previously used.”

In another letter Ray Farwell, W2BJ, describes the same system except that the sides of the triangle at the antenna are each 17 inches instead of two feet. In W2BJ’s case the unspread feeders became noticeably hot with an input of one kilowatt to the final stage. The heating stopped after the “V” was installed.

Preventing Oscillation in R. C. Amplifiers

S. J. Preston, B.A., writing in “World-Radio,” points out that a resistance-coupled audio amplifier can give trouble from motorboating even when decoupling resistors and condensers are used. This trouble can be eliminated by choosing a grid blocking condenser and grid leak for the following stage such that their time constant is equal to that of the plate resistor and by-pass condenser. If this is not done, there is a chance that the gain at low frequencies will rise to such an extent that regeneration and oscillation can take place.

![FIG. 3 — A TWISTED-PAIR FEEDER WITH IMPEDANCE-MATCHING TRANSFORMER AT THE ANTENNA END](image)

This drawing also shows the system used by W2VY, W2BJ and others to couple the feeders to the transmitter.

Fig. 4A is the usual resistance-capacity arrangement when a decoupling resistor, $R_d$, is used. Now $R_d$ is usually high enough not to affect the by-passing operation of $C$. We then have a plate load consisting of $R$ and $C$ in series, the impedance of which combination varies inversely with frequency (see Fig. 4B) so that at low frequencies the gain becomes so great that if there is positive feedback, even though small, the amplifier starts to motorboat. This tendency could be eliminated by making $C$ very large or by reducing $R_d$, but doing the latter would affect the decoupling and get one into more feedback trouble.

When $R_d$ is large enough to be neglected the equivalent circuit will be as in Fig. 4C and $E_0$ will be equal to

\[
E_0 = \frac{R}{r_a} C_1 \frac{1 + jaCR}{1 + jaC_1 R_1} \times E_{\text{input}}
\]

so that if $C_1 R_1$ and $CR$ are equal, $E_0$ will be constant at all frequencies. (Continued on page 64)
Amateur Radio STATIONS

K6GAS, Honolulu, Hawaii

If the halftone on this page does justice to the original photograph, K6GAS will look like a mighty pleasant station in which to pound brass. The station is located on top of Puunui Hill and overlooks the city of Honolulu, Diamond Head and Waikiki Beach, so there is plenty of scenery if DX goes bad. The owner of W6GAS is Henry S. Lau, who also operates W6FUC in Los Angeles.

The rack-and-panel transmitter in the corner of the room is a five-stage crystal outfit winding up with a pair of 852's in push-pull. Inputs up to 900 watts are used on c.w. This set is also laid out for 'phone operation in the 3900-ke. band. An auxiliary transmitter with a pair of 10's in the t.p.t.g. circuit is used for local work.

The photo shows a Pilot Super-Wasp receiver and the cabinet housing the speech amplifier on a low shelf above the operating table. Since this picture was taken a National FB-X receiver also has been installed. Just to the left of the table is a portable transmitter and receiver fitted out in a carrying case and operating under the call K6GMQ.

W9GEX, Fond du Lac, Wis.

Like many another ham, H. B. Stover of W9GEX has fixed up a radio shack in the basement of his home where, he says, "all the mus from experiments can be dropped on the floor without too much comment from the OW!" None of the mus is visible in the photograph, however — the station looks to be highly practical and up-to-date.

The transmitter starts out with a 47 crystal oscillator, followed by a 47 doubler which has its output tank split to feed the following push-pull amplifier, a pair of 10's. This in turn excites a pair of 852's in push-pull. The power input to the final stage is in the neighborhood of 800 watts. Through the use of plugs and jacks, grid and plate currents can be measured on all stages. The crystals — two on 3.5 and one on 7 mc. — are kept at constant temperature by a home-made oven mounted on the front of the transmitter panel. The oven was described on page 33, June, 1933, QST. The transmitter power supplies occupy the lower part of the assembly; a 500-volt supply handles all the small tubes and a 2200-volt job with a mercury-arc rectifier takes care of the 852's.

On the table at the right is a single-signal receiver built as described in August and September QST's of last year, using a National SW-5 as the basic unit. Toward the back is the monitor, and on top of the receiver cabinet is a dynatron frequency meter.

W9GEX uses two antennas, one a half-wave 7-mc. Zepp and the other a semi-vertical half-wave 14-mc. Zepp.

QST for
Conducted by Clinton B. DeSoto

National:

With the expectation being that most of its time will be devoted to consideration of the broadcasting problem the North American Radio Conference opened its sessions on July 10th in Mexico City, Mexico. Preliminary meetings for the formulation of a United States policy at this regional conference were held for several months preceding, with Secretary Warner and General Counsel Segal, of the A.R.R.L., representing United States amateurs. Similar preparatory meetings were also held in Canada, where Canadian General Manager Reid was in touch with proceedings, and in Mexico, where the officials of the L.M.R.E. not only undertook to represent Mexican amateur radio, but were successful in obtaining appointment as governmental advisers to the conference delegation itself.

All during the preparatory sessions in all three countries, Union Headquarters at West Hartford was in close touch with President Julio Prieto and Secretary F. Castro Herrera, it finally being decided that the L.M.R.E. would act as the official accredited representative of the I.A.R.U. at the sessions. The unique position of Senors Prieto and Herrera, who are participating in both the technical and regulatory sessions of the meeting, is especially favorable to adequate representation of amateur rights.

With the United States, Canadian and Mexican delegations all attending the conference with the intention of retaining the present amateur bands and privileges, and with the broadcast wrangle known in advance to be the real point of the conference, it is practically certain that the agreement finally reached will continue in entirety the existing North American agreement so far as amateur matters are concerned.

The Federal Headquarters of the Wireless Institute of Australia has been changed from the state of Victoria (VK3) to that of South Australia. The new official headquarters address for all general correspondence and QSL is W. I. A., Box 284d, G. P. O. Adelaide, South Australia. The new federal officers are: president, R. B. Caldwell, VK5BP; vice president, R. D. Elliott, VK5RD; secretary, A. E. Williams, VK5BO; publicity officer, G. B. Ragless, VK5GR; QSL Manager, R. J. Bruce, VK5BJ; traffic manager, H. Bowman, VK5FM; contest manager, E. A. Barbier, VK5MD.

Among matters discussed at the convention was the general standard of the A.O.P.C. examination paper. It was moved to request that the standard of the technical paper be lowered, and that of the procedure paper increased. The A.R.R.L. Handbook was recommended to the P.M.G.’s Department as the standard; an amendment was then passed to include the Admiralty’s Handbook of Wireless Telegraphy. Reduction of the experimental license fee, increase in maximum power, non-consideration by the authorities of complaints by B.C.L.’s without modern receivers, were also urged. We are informed that presentation of these views to the Chief Inspector of Wireless resulted in the acceptance of all but the lowering in standard of the technical paper and the reduction in license fee.

DX:

"Bootleg" stations are bad enough. But when undercover operators go so far as to appropriate calls and intermediates belonging to other amateurs in other continents, their activities become intolerably objectionable. There have been flurries of this sort of thing in the past, but another has arisen, centering in the Bahamas and in South
America, concerning which all DX-anxious amateurs should be warned. We have in mind the operation of certain stations using VP2 calls—a rare creature, legitimately, these days—and one using the call ZCIA—Transjordania—an equally unusual country to be heard. All of these are false, the operators in many cases being thousands of miles away from the designated country. Such operation is totally unjustifiable, and the 

**THE HEINRICH HERTZ MEMORIAL STUDIO OF THE NORD DEUTSCHER RUNDFUNK**

Dr. A. Kofes, engineer who designed the studio and a leading German amateur, is seated at the left across from his wife, with John C. Strobel, W8ZW, in the center.

operator who engages in it is unworthy of any part of the term amateur.

DX conditions, especially on the 14-me. band, continue excellent, at least in New England. The band is alive until very late in the evening, while through the day a surprising range in signals is heard. On some afternoons things have gone dead between two and three, but usually the band recovered with plenty of DX as the ionosphere shifted with the day-night effect.

The 7-me. band is alive with contacts between the United States and the Antipodes, the best times being around the dinner hour in the evening in the country, or at breakfast time in Australia. According to Oscar Egenes, ZT5K, radio conditions in South Africa have again provided food for thought and sufficient phenomena to satisfy the most ardent of amateur experimenters. Changes are presented in diurnal sequence and the fact that 3.5 me. has become an almost useless frequency for communication over short distances came as a complete surprise to many. It has become necessary to exploit the 1750-ke. band, and tests are now being conducted with no small measure of success.

Just when we have penned these lines comes a letter from Yardley Beers, W3AWH, Trenton, N. J., saying, "I was very much interested and amazed to read your paragraph on 'DX' in the August I.A.R.U. section of QST. Had anyone purposely wanted to contradict the 'dope' I had collected here, he could not have improved on your paragraph very much" . . . ! He goes on to outline the absence of DX stations, the fact that Europeans have been coming in less well this year than during the past two years, the blanketing predominance of WS's, and quite general disagreement with the conditions we have been experiencing in New England and which have been confirmed by reports from other sections. He also suggests some interesting results in connection with opposite ways round, and "lop-sided" conditions, which we will hope to discuss next month.

**Travel:**

That letter from Payson R. Gould, W9DHP, in the correspondence section of the June issue of QST aroused not a little interest internationally. The traditional amateur hospitality is well known of course. It has long been a byword in the United States, and it now seems obvious that amateurs abroad are filled with very much the same spirit. Witness this quotation from a letter from J. Fleurbaey, ON4MOX, Kunststrat 124, St. Amandsberg-Ghent, Belgium: "... I will appreciate any visit of any W or VE ham, travelling to Belgium. Any amateur is welcome here, and I will do my best to make his stay in Ghent as agreeable as possible, thereby offering him to stay with me for a week or so . . . . Awaiting a fleet of W-VE hams, sincerely yours . . . ."

In these columns in the past we have many times published invitations from headquarters of national societies to visiting foreign amateurs to get in contact with them, with an assurance of full entertainment fare. Many amateurs intending to travel abroad have first written us requesting the names and addresses of the headquarters of such societies as these, as well as suggestions for visits to individual amateur stations en route. We have been glad to do all this, in the interests of more general international amity and association.

But if those of you who are interested in making such personal international gestures will advise us, so that we may pass along the good word to those amateurs making inquiries of us, our cooperation in the matter can be much more complete and satisfactory. We urge that all society headquarters, and all individual amateurs like M. Fleurbaey, who are receptive to arrivals from abroad and desirous of entertaining foreign ama-

(Continued on page 60)
THE COMMUNICATIONS DEPARTMENT

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

THE GENERAL TRAFFIC HOUR

The daily period, 6:30-8:00 p.m. (your local time) has been designated the "General Traffic Hour." All Official Relay Station appointees have been requested to keep this period, working general with all amateurs. Trunk Line Station appointees are likewise requested to work general during this period. In this manner operators who are unable to maintain regular schedules or whose operating time is limited may get on the air from 6:30-8:00 p.m. and clear their traffic through O.R.S. and T.L.S., who keep schedules on established traffic routes. Make use of this period so that delivery of traffic and dependability of service may be improved. Give your traffic to stations signing "ORS" or "TLS." "CQ TFC" will be the general call for the "traffic hour." Directional CQs will also be found useful during this period.

W9GAG tells us he got his license after just 4 months of copying W1MK's broadcast traffic to members, on regular schedule, for code practice. During this period no other source of code practice was used.

These Sun., Mon., Thurs., Fri., transmissions are sent by automatic transmitter at a rate of approximately 13 w.p.m. If a listener gets to hear this, he is easily able to take the 10 per required by examination, even allowing something for nervousness on such a "state occasion." W1MK o.b.o. schedules for September are as follows: Sundays, 8:30 p.m. and midnight E.S.T., 3825 and 7150 kcs.; Mondays, 8:30 and 10:30 p.m. E.S.T., 3875 and 7100 kcs.; Tuesdays, 8:30 p.m. and midnight E.S.T., 3825 and 7034 kcs.; Wednesdays, 8:30 and 10:30 p.m. E.S.T., 3825 and 7100 kcs.

VOQH

The Bartlett Northeastern Greenland Expedition (Morrisey — VOQH) may not be able to enter Hudson Bay this year due to the usual summer in Labrador, and consequent lateness of the ice flows. Bob Mor (of W2UN) operator of VOQH reported the Morrisey in mid-July anchored to an iceberg near Cape Chidley (northern tip of Labrador) waiting for the wind to change and open up the ice. Skeds were kept with W2NYV and VOZ.

Schooner Ramah, WCN, arrived at its destination in Mediterranean waters in late July. QBN and electrical storms accompanying the heat wave which swept the U.S.A. handicapped the transmission of traffic to W-laters by WCN, but Ed Brooks (WITL), WCN's operator, copied all personal traffic as sent on daily schedules from W1MK even when unable to make full acknowledgment by two-way QSO.

A Louisiana Ham Convention will be held in Alexandria September 16th and 17th. For further information write S.C.M. W. J. Wilkinson Jr., W5WF, 1624 Allen Ave., Shreveport, La.

Hams in West Virginia and nearby sections are requested to arrange schedules with WSCAY, U.S.N.R., station at Elkins (3700 and 7100 kcs.) or by writing R. V. Robinson, C.P.O., in charge Unit Six Section 3 U.S.N.R. for skeds for the three days of the Mountain State Forest Festival Oct. 5-7. The unit is arranging an amateur radio exhibit. A comfortable "ham hang" is being arranged and all amateurs who can visit at Elkins Oct. 5-7 are cordially invited. And please expedite traffic originating at WSCAY and other Elkins stations in early October.

W9USA-W9USB

Activities are still going strong at the World's Fair amateur stations, W9USA-W9USB. An average of 150 to 200 messages are handled daily. For the period June 15-July 15 a total of 3852 messages was handled, W9USA-USB is on the air 22 hours per day, the off period being from 2:00 to 5:00 a.m. On July 21st at 5:50 a.m. E.S.T., W9USA (W9EJC at the key) on 3630-kc. held a 4 minute QSO with VK4JU, Brisbane, Australia, break-in being used effectively; U.S.A., was R6 to 9 in Australia, and VK4JU R5 in Chicago.

A-1 Operator Club

The amateurs listed below have been "elected" to membership in the "A-1 Operator Club." This club has been organized to promote and encourage a high calibre of operating in the amateur bands. For complete data on qualifications and a list of the Charter Members see July QST, page 26. To become a member of the Club you must be nominated by at least two operators who already "belonging." W1BOF W9AGW W9DRO W9DOJ W9FEP W9EJY W9HJ W2AQ W2DRO W2DRO QEM W2KRC W9KRC W2DE W2TM JD W2AKM W9AKM W9ARC W9ASK W2APW W2ASOE W9AMK W9AMK W9EP W2AE W2AI W9EJ Y W9EJY W9EG W9CPE W9DJO W9DE W9BOF W9DOJ W9DRO W9EJY W9HJ W2AQ W2DRO W2KRC W9KRC W2DE W2TM JD W2AKM W9AKM W9ARC W9ASK W9AMK W9AMK W9EP W2AE W2AI W9EJ Y W9EJY W9EG W9CPE

Heard at W1BB: "— W1U ("Bob") at key", CQ'd and was called by W2DOG. W1YU evidently tuned onto W2DOG just as he was signing — QR5? de W1YU — whereupon W2DOG called again and communication was established — W1YU says, "I just got the tail end of the DOG, OM," Hi!

September, 1933
The following contribution by Mr. Don C. Wallace, W6AM, wins the G.D. article contest prize for this month.

"My traveling schedule for the Pacific Coast trip called for a stay in San Francisco between May 26 and June 7. On this trip, I chose the Fairmont Hotel, for the Fairmont Hotel is only six stories high, has a flat roof, two nice flagpoles, and is on the top of Nob Hill. Experience has shown that hotels of extraneous size are not satisfactory for portable operation, as the antenna is completely lost in the huge towers, elevator shafts, and other equipment on top of the hotel.

All of this is aside from the point, which is namely this: the portable W6ZZA was in San Francisco, and the Associated Radio Amateurs of San Francisco asked me to give a talk before their radio club Friday night, June 2, on the subject: "Emergency Transmitters for Disaster Use."

The evening of the scheduled meeting (June 2) came around, and I started downtown early so I could have a good dinner, then show up at the club meeting in the City Hall in ample time to chew the rag with the San Francisco hams before the meeting began.

As I stepped off the street car, the newsboys were running around flashing the usual evening extra, only I did notice that the extra had "Signal Hill Above." I bought a paper as oil fires are not uncommon on Signal Hill, which is near our home (Radio W6AM) in Long Beach. As I glanced through the article about Signal Hill, however, I did notice that a large explosion had taken place, and the refinery which had exploded was the nearest refinery to our home, i.e., about a mile and a half away.

According to the paper, homes had been flattened, windows broken at a distance of five miles, and the explosion felt in Pasadena and Los Angeles, distances as far as thirty miles away. Naturally I was very concerned, for our home had just gone through the Long Beach earthquake, the repairs being completed the day before I left on this San Francisco trip.

Instead of eating supper, I jumped the next car which was then going by, and upon arriving at the Fairmont Hotel said a "CQ LB." I probably was too excited on the first CQ LB to realize that the portable was at that time located about 400 miles from home.

Following this very welcome QSO, I then returned to the restaurant at which I had almost arrived, had supper, and then went up to the San Francisco radio club meeting. The copy of the extra in my pocket made a very good preface to the talk on: "Emergency Transmitters for Disaster Use."

Shortly thereafter I had the usual W6MA (Mrs. Don C. Wallace) QSO schedule with the following report: "W6ZZA to W6MA R-7 Hello Don. So far as I know nothing around here was hurt. That's remarkable when you think how close we are. I was down town at the time and I certainly was worried so many big windows were broken. We went over to see the ruins and houses nearby were simply shattered, much worse than by the earthquake. Two pairs of French doors blew into our house breaking the locks. The hill absorbed most of the shock for the refinery was just over the top of the other side. The children said it felt like an earthquake and school and they ran outside and saw huge pieces of timbers tanks flying through the air."

I probably was too excited on the first QSO LB to realize that the portable was at that time located about 400 miles from home.

Another interesting thing about this QSO was that W6HCIF is one of our very new amateurs. Whereas the old timers are always glad to help out too, there are not always enough old timers on to assure us of an immediate answer to a QSO home. I have found that the newcomers are the ones who usually answer these calls, for although there are almost 200 amateurs in Long Beach, it is quite a problem to find a time when a few of them are on end and actually turning their dials. This also shows the extreme value of keeping all types of amateurs on each of the bands, instead of trying to set up barriers so that new amateurs could not show up on any of the bands, where portable operation is extremely valuable and useful.

Following this very welcome QSO, I then returned to the restaurant at which I had almost arrived, had supper, and then went up to the San Francisco radio club meeting. The copy of the extra in my pocket made a very good preface to the talk on: "Emergency Transmitters for Disaster Use."

Relative Standings of the Ten Highest Sections—June—July

<table>
<thead>
<tr>
<th>Messages Per Station (25%)</th>
<th>Stations Reporting Traffic (25%)</th>
<th>QSO per Day (Traffic Reports) (25%)</th>
<th>Traffic Total (25%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. N. Y. 328</td>
<td>Los Angeles (4,600) * 92</td>
<td>Ariz. (324)</td>
<td>Ill. 524</td>
</tr>
<tr>
<td>N. N. 25</td>
<td>N. C. (1,100) * 63</td>
<td>Ill. (187)</td>
<td>Ill. 524</td>
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<tr>
<td>M. N. 25</td>
<td>Los Angeles (22) * 13</td>
<td>N. C. (160)</td>
<td>Ill. 524</td>
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<tr>
<td>Hawaii 1,460</td>
<td>Va. (150) * 56</td>
<td>N. C. (85)</td>
<td>Ill. 524</td>
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<tr>
<td>B. Tex. 256</td>
<td>Mich. (85) * 74</td>
<td>Tex. (152)</td>
<td>Ill. 524</td>
</tr>
<tr>
<td>S. Tex. 189</td>
<td>Ohio (85) * 64</td>
<td>Ohio (131)</td>
<td>Ill. 524</td>
</tr>
<tr>
<td>Calif. 143</td>
<td>Ohio (51) * 24</td>
<td>Ohio (119)</td>
<td>Ill. 524</td>
</tr>
<tr>
<td>Ark. 139</td>
<td>Ind. (39) * 31</td>
<td>Ind. (119)</td>
<td>Ill. 524</td>
</tr>
<tr>
<td>San Juan 137</td>
<td>Pa. (32) * 29</td>
<td>Pa. (119)</td>
<td>Ill. 524</td>
</tr>
</tbody>
</table>

**Standing Based on Average of All Four Ratings%**

<table>
<thead>
<tr>
<th>Section Communications Manager</th>
<th>Standing Based on Average of All Four Ratings%</th>
<th>Section Communications Manager</th>
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</thead>
<tbody>
<tr>
<td>California</td>
<td>1127</td>
<td>California</td>
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<tr>
<td>Michigan</td>
<td>917</td>
<td>Michigan</td>
</tr>
<tr>
<td>New York</td>
<td>952</td>
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<td>Illinois</td>
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<tr>
<td>Ark.</td>
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<td>Ark.</td>
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<td>San Juan</td>
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<tr>
<td>Pa.</td>
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<td>Pa.</td>
</tr>
<tr>
<td>Ill.</td>
<td>952</td>
<td>Ill.</td>
</tr>
</tbody>
</table>

**Attention is called to North Carolina's 63 traffic reports!**

ISSN085 claims the Banner this "round," making all four columns, and leading the Traffic Total rating. FBI Attention is called to North Carolina's 63 traffic reports! — a mighty fine figure for a small Section. The entire field organization dropped only 22 traffic reports, and that in mid-summer! The following Sections lead all other Sections in their columns, order figures being about the same:


**Relative Standings of the Ten Highest Sections—June—July**

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<tr>
<td>Calif.</td>
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<td>Calif.</td>
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<tr>
<td>Ark.</td>
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<td>San Juan</td>
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<td>Pa.</td>
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<td>Pa.</td>
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<tr>
<td>Ill.</td>
<td>952</td>
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Summer Radio
By W. Howard Moffat, W5CWC*

Hello CQ! W5CWC was located at Boy Scout Camp Binachi, 14 miles east of Meridian, Mississippi, in the pine woods. Our 75 meter 'phone rig used all amateurs in obtaining emergency information without delay in reporting distress cases may mean loss of life. Speed is essential. In some instances in the past radio amateurs have heard SOS is broadcast it is requested that the following procedure be followed by the vessel in distress: Approximately ten minutes after transmission of the original distress signal transmit distress message on the frequency "MO" and own radio call for three minutes. This will enable Coast Guard vessels and stations in the vicinity to obtain direction finder bearings and accurately plot the position of the distressed vessel. Information should include: (1) name and type vessel; (2) position, course and speed; (3) nature of trouble; (4) number of persons on board; (5) whether C.G. help is required.

The Coast Guard maintains ten administrative offices, and radio amateurs should report any emergency information at once on receipt to the nearest office addressing telegraphic or radio information to Coast Guard Boston -- Coast Guard New York (or similarly, Washington, D.C.; Norfolk, Va.; Fort Lauderdale, Fla.; Pittsfield, Ala.; Chicago, Ill.; Cleveland, O.; Seattle, Washington; San Francisco, Calif.).

Traffic Briefs
QRX (edited by F. H. Schnell, W9UZ), well known paper of the Volunteer Communication Reserve. 9th Naval District, has ceased publication due to economic conditions. QRX has done much to maintain a high morale among 9th District Reserve units and will be missed by its readers.

Here's a new kind of "thrill" -- W2ZZGZ visited W0USA, and after a fast trip to New York made a call on W5ENJ. He arrived there just in time to copy a message he had filed at W0USA! ... And W2ZZGZ while away on a trip through Pennsylvania sent a radiogram to his YL in White Plains, N. Y. Upon returning home several days later he raised a New Jersey station and was asked to take a message for White Plains. He took it with a laugh it, was the message he had sent to the YL! -- Hl.

BRASS POUNDERS' LEAGUE

(June 15th-July 14th)

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig.</th>
<th>Del.</th>
<th>Del. Total</th>
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<tr>
<td>W5CXL</td>
<td>118</td>
<td>427</td>
<td>1976</td>
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<tr>
<td>W5CWE</td>
<td>194</td>
<td>552</td>
<td>2000</td>
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<tr>
<td>W5CZY</td>
<td>207</td>
<td>233</td>
<td>1072</td>
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<tr>
<td>W5CZ</td>
<td>36</td>
<td>129</td>
<td>1966</td>
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<td>W5CQ</td>
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<td>W5CFS</td>
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<td>467</td>
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<tr>
<td>W5CJO</td>
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<tr>
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<td>366</td>
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<td>538</td>
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<tr>
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<td>1076</td>
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<tr>
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<tr>
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<tr>
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<td>W5CQ</td>
<td>122</td>
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<td>10</td>
<td>690</td>
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<tr>
<td>W5CQ</td>
<td>7</td>
<td>18</td>
<td>477</td>
</tr>
</tbody>
</table>

More-than-one-operator stations
W0USA 3128 258 176 3352
W0OW 117 20 1290 1466
W0HBE 322 202 608 1142
W0KVR 259 95 439 904
W0NC 95 31 636 752
W0NEQ 21 34 500 585
W0AK 47 15 446 512

These stations "make" the BPL with totals of 500 or over. Many "rare" extra credit for one hundred or more deliveries. The following one-operator stations "make" the HPL for delivering 100 or more messages: the number of deliveries are as follows: Deliveries total:

W5CY, 211 W5DWF, 128 W5NCH, 103
W5EJ, 192 W5DWM, 127 W5FKN, 102
W5AEX, 172 W5CQ, 112 W5JRK, 102
W5BUU, 157 W5BKS, 112 W5JFT, 100
W5MY, 135 W5PAM, 112 More-than-one-out.
W5PI, 123 W5NH, 109
W5PU, 126 W5NP, 108 W5LMK, 124
W5QW, 128 W5MN, 107

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 a hand to handle the traffic that will qualify you for B.P.L. membership also.

September, 1933 43
A.R.R.L. Official Broadcasting Stations

CREDIT information on expeditions, special tests and activities, new F.R.C. regulations concerning amateur operators and station licensing, etc., is sent regularly (new information each week) in the different amateur frequency bands by the following A.R.R.L. Official Broadcasting Stations. All stations listed have provided us with latest up-to-the-minute data on their work of sending this information addressed to all amateurs. The list is revised to include only active appointees. The following stations render amateur radio a distinct service. You will find stations in your own district, and neighboring districts in the list. Make a practice of listening regularly for the "QST" sent from one or more of these stations. Report results to the proper stations when you hear them, so the operators will know their transmissions are successfully received by you and their work appreciated and successful.


Traffic Briefs

The First Annual Vegreville (Alberta) Hamfest held June 24th and 25th under the auspices of the Vegreville Ham Club was a huge success. Those responsible for such a line affair are VE4KZ, VE4Q, VE4DG, VE4AO, VE4AO and other club members. License examinations were held under the direction of W. G. Allen, R. I. from Edmonton. About 35 hams attended the "test. Among those from Edmonton were VE4HJ, CT, JL, EC, EA, BW, BV, FR, BP and AH. Interesting talks were given by the R. L. VE4GT, VE4HM, and VE4AH. New candidates for club membership were put through an initiation that will be long remembered. VE4BV and VE4BW officiated. After the ceremony the "sacred symbols, the WOULD Heng and Rettyvitch were presented to the president of the Vegreville Club, VE4EZ, on behalf of the Edmonton Club. The usual hamfest activities brightened the affair, not least of these being a picnic lunch served by the OW's and YL's. Such an FB was enjoyed by all that next year's "test is already being planned.

William F. McFarland, W9EYT
1873-1933

With deep regret we must record the passing of Lt. Col. William F. McFarland, K.D.G., W9EYT, of Topeka, Kansas. Colonel McFarland had been connected with amateur radio for many years in numerous capacities and will be sorely missed by Kansas amateurs and his many associates. Present in A.R.R.L. organization he also was a former president of K.V.R.C., founder of the Kansas National Guard state radio net, Assistant to Kansas Adjutant General and Executive officer for 13th Field Artillery. His good Influence and counsel will be sorely missed.

THROUGH F. G. Williams, Sec'y, and W9AAJ we learn of a Hidden Transmitter Hunt held by the Peninsula Amateur Radio Club of Newport News and Hampton, Virginia. Six cars participated, including the car which held the transmitter. Three hours were given for finding the rig, which was located at an unknown point within a 300-foot radius. Prizes: Amateurs participating were W9BI, AGR, AKN, AAY, AJA, I, ADW, NE, MT, CDW. W9BAJ and W9AKR found the transmitter in one half hour, thereby winning first place. Second place was taken by the Hilton Village gang, which in one and one half hours located the "treasure"; this gang was only two miles from the hidden transmitter and was given full marks for the compass and map as well as National receiver and Jewett test act, plotted the position of the transmitter within 100 yards.

ATLANTIC DIVISION

Eastern Pennsylvania—Back to W3BSG-RF—Note SCM's new QRA on page 5. W3CSI, W3HKQ and ALX make BPL. W3CMF is going c.e. W3BQ visited W3ADE. W3AZY is DXing. W3AQN moved. W3NFA was camping with W3AUX. W3CWS schedules Camp Richards. W3BFH is rebuilding. W3ABZ reported via hand phone. W3AMR is reinstated ORS. W3CL was on active duty at Navy Yard. W3DAM and W3TS are after ORS. W3BBX is on 'phone. W3ABZ joined VCR. A photo was received from W3BWT. W3AAD is back on air. W3DQIUS is out after the "tribal." The York River Radio Club was outstanding in M & H hidden transmitter hunt, W3QV taking first, W3BUG second, prize. The Beacon Radio Club reports: W3BUK on 14 mc., W3BTF rebuilding or club, W3QV 4th place in new CW 'phone hunt, W3QV taking first, W3CMF is I, BDA, FGA, CCD and VP are preparing for fall traffic. W3QY was in bad auto accident.

Traffic: W3ADE 15 AZY 3 AON 2 DZ 11 AMR 10 BQQ 555 AAY 57 CL 61 ADE 137 BIP 17 15 CR 170 HEY 87 ALX 411 ABZ 23 MC 137 DUG 328 BF 21 A2F 255 AQI 263 AID-BUK 1 BJ 6 ATR 4 W3CMF 4 FLA 75 CVS 328 EOH 5 118 134 CFP 3. MARYLAND-DELAWARE-DISTRICT OF COLOMBIA—SCM, F. L. Hudson, W2BAK—W2CJS, W3SN, RMJ: W3SM, 'phone RM: W3BWT, Chief RM. Your new SCM greets you. Kindly send future reports direct to W3BBAK, D.C.: W3CWX schedules W9USA. W3BWT makes W3CSI. W3SAO is pounding away. W3NR reports 56 mc. interest high, W3DLC handled Father's Day greetings. W3CPP reports for CWE, Md.; W3BND has c.e. rig, W3CJS is going to camp Ritchie. W3LA has 56 mc. phone, W3BGH was heard in Germany. Heat bothers W3CWS, W3CQS has Comin tics. W3BE works 3.5 and 7 mc. W3NRY is QRP. work. W3CIZ is heard often. W3BU has been helpful to CXX get DGD on air. Del.: W3DQQ gets out FB. W3CPS uses 01A as modulator. W3BBAK has full report.

Traffic: W3CWX 2521 BWT 543 ABD 248 BND 133 CBS 62 DGQ 41 BGI 28 WU 25 CZ 20 CCP 16 CDG 15
Rigor, W3QL - The South Jersey Radio Ass'n staged a "hidden transmitter hunt." W3VX, AQC, and XAF manned the transmitter. W3VY and W3WZ were on mobile. BWF and QL were "searchers," W3ZI made his annual trip with the Army. W3BWC and BFP are home again. W3APY reports Naval unit in P'ville. W3CLQ is with the WU. W3PC is QRL new Jr. Opr. Write W3HT for schedules. W3GDW hopes to make BPL. W3CWL got W3ARN reports Naval unit, in P'ville. W3APV reports Naval unit, in P'ville. W3CLQ schedules W9USA. W8A WX had as visitors: Wl8Z.

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W8ZZB. W8AUM visits BON and BAH. New rig at vacation in Mich. going on U.S.N.R. Cruise. W8AOA plays chess by radio. WSIAW. W8GKG handles W9USA traffic. WSEBY visits W9USA. WSEEP gets out I'<B. WSZZOC is looking for traffic. Electric line QRM at WSFNX.

DED-IFE 11 DUR

because the competish got too strong! WSDAQ, DLX station record. W8DVC is going to absorb some vitamin at e.amp. W8DFE is getting ready for the struggle.

W8BAC has good report. W8FFK hits state high total. W9IJH 93 NPN 65 ADY 57 HSH 3 HZV 1 AEQ 41 ELD 27 JO 20 ABH 10 GBB 4 R.R. track. WSIFE wants one fly-weight flag-pole sitter.

W8BYD, RN and FJX are operating on Jakes. W8BAH is going to fix AKN's antenna. W8QT blabbs "W8FAV's neighbors are going 56 meggie. WSAIU is pounding HFB has trouble with Venus. Say, Mrs. W8BMG, Harry has boys know! Yes, W8GQS, you have to report each month reports. W9HXB is on at Detroit Lakes, Minn. with portable NOQ. Work keeps W901M away from AXH 6 GFS 49 HPQ 3 MYP-FYB 10 HSF 6 DJU 1 LLY-NISZ 3 TS 11 MQW 5 HSK 10 KDD 9.

KENTUCKY — SCM. Carl L. Flammur. W9OX — W9UAH ammeters all records with total over 1000. W9DLG worked his 119th country. W9ACN is good OC. W9OX and BZL have new FBX's. Visitors keep dust off key. W9Q7D is looking for QRM on 20 M. W9OFM is converted to c.c. W9ERR is at Camp Knox with portable KFW. Work keeps W9CIM away from key. Hot WX forces W9FQQ to basement. W9KPT is rebuilding. Reducing builds W9BWJ's total. W9EBK is using a new transmitter. W9BGE is arguing with the RF. W9ELL lends AUI helping hand with traffic. W9FETT is visiting state hams. W9BAN makes a perfect gooseegg. RP of W1MK is pounding brass at W9OX.

Traffic: W8AUH 1003 DLG 181 OX 146 J1 56 CNE 38 PM 28 ERIH 34 HXG 18 CMM-FQ 14 KPT 10 BWW 9 KFW 7 EKB 6.

MICHIGAN — SCM. Kenneth F. Conroy, W8SYH — RMs: Chief RM, W8HEK, Upper Peninsula RM; W8BKG, Eastern Mich. RM; W8ZX, Detroit RM; and W8EVC, Eastern Mich. W8OVR bristles KDE into reporting. W8ARR had JRP on furlough with him. W8STW piles up a fine total. W9HXB has a job! W9SOS, EAI, JGQ, ALJ, W8BOJ and NPN make 1st reports. W8FAV and WPX chance may. W9AMB leads the state. W9HSK is going strong. W9IQQ had fine trip.


W8STOS — SCM. H. H. Kurth, W8FSS — W8AMB leads the state. W8EIK is going strong. W9IQQ is QRL school. W9DRD is on vacation. W8AZN will comply with new regs. W8AVM is back in Madison. W8WEEQ has couple 15 watters. W8GAE is life guard at Waukesha Beach. W8JVT is on at Janesville. W9IQW is collecting crystals. W9DQY invites SCM to visit him. W8WRL is going to World's Fair. W8FZD is trying to keep on the job. W8WAD and W8WAB are busy on a field set. W9MQA reports 5 hams at Watertown. W8BYB and UNX visited W9USA. W9UNQ is awaiting cool WX.


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DAKOTA DIVISION

Traffic: W8ABB 604 DNU 466 NYM/ATO 374 HSK 267 HMR 232 RMS 110 JWN 69 HYA 64 HGF 60 HTZ 50 DXV 49 IQW 10 DJT 22 GPO 31 LEG 2 HX 20 KJF 15 ERS 13 DJH-NOQ 9 FGX-IBY-MQA 8 KPO 7 GFC 15 JVIT 5.
emergency network for NPRR. W9FW was on ten days at Valley City.

Traffic: W9FTG 56 KBE 48 DGS 48 EQV 13 JSJ 8. SOUTHERN DAKOTA - SCM, Carroll B. Miller, W9DLK-GIO - WFTY says grasshoppers bad! W9CUJ took Extra Final exam. W6APB visited Aberdeen. W9GLK took exam. W9RQB visited ORJ and LQZ. W9DGR is teaching. W9WFO and W9YD are tuning up equipment. Field Day is in CCC Camp. W9RUI is with WNAX. W9AAJ will be football emergency network for NPRR. W9lFW was on ten days. W9TY says grasshoppers bad! W9CA U took Extra at Valley City.


Traffic: W9FCF 217 BN 116 61G 79 DEI 77 HOC 52 JPFH 16 GLE-BKX-EPJ 14 IAE 4 ZT 3 DH 2 BNN-NYS/KBIS-LDIQ 1. DELTA DIVISION

ARKANSAS - SCM, Henry E. Velte, W5ABA - The Delta Division Convention will be held Friday and Saturday, Oct. 20th and 21st at Hotel Gayoso, Memphis, Tenn. Registrat10n is $2.00 in advance or $2.50 at the door. Lees

Hudson Division

ARIZONA - SCM, B. E. Haight, W2UL - W2UL and ATM are doing nice traffic work. W2CFF pushes through to W9USA. W2AJD has port. BXS, W2DQT is breaking in YL for 'phone. W2FPH visited BLU and KW. W2EFG is on 3605 kc. W2ANJ enjoys traffic. W2DGM is at 100%. W2DGM took a nice scene from Camp. W2CXX is on 1.7-m. phone. W2FHIJ YL at W2CXX. W2EQC is on W2ETV ships for Paris. W2BLL has port. FDW. W2CVM reports for Tri States Radio Club: pres. W2ACI, vice-pres. W8A1C, secy. W2CVL, treasurer. W2CVC has for 3904 kc. W2BBZ is up and W2AQN's new QRA: Box 294, Pleasantville, N. Y. W2ACD spent vacation rebuilding. W2ACD went to Elmera Hamfest. W2JY is Daddy of two YLs and one OB. W2CAE steps off with a YF. W2DUG visited W9BHA. W2AKR is going strong. New calls: W2CCE, FUM, FXX. W2DWD reports for M.H.A.R.C. W2CO, SCM N.N.J., visited W2LJ. W2CJP is on 3.5 mc. F502 visited W2BHA and QSJ.

Traffic: W2UL 384 ATN 185 LFJ 130 CPTN 36 51 KXS 22 EBG 16 FHP-BIA 0 AN-GEO 4 BLL 1 CIP 40. NEW YORK CITY AND LONG ISLAND - SCM, E. L. Bausch, W2AZY -- W2FPH sends QSTs on 'phone nightly at 7 p.m. EST; on 14220.4 kc. W2PF just got back from Honeymoon. W2BNJ makes BPL. W2AGL tried 7 mc. W2CXY schedules his brother, W2FNY, at Camp Horshoe, N. Y. W2DBQ is conducting code class. W2BAS has new boiler. W2FBN is building Jan. QST receiver. W2QCN reports from W2LYI, is using S.U.N.R. W2CEB is studying for ORS. W2BES sends good reports. W2BPP is in QRL YLs. W2APT is WAC. W2CTLM gets X-D-C from self-excited MOPA. W2EYQ has new receiver. W2BES, BFG and JS3 are rebuilding. W2CEB wants to build tube fix for his PLY. W2DBQ is back up at W2CEH. W2CEA is trying to improve SW3. W2AOG and AGC were QRL painting shacks. W2BSIT built 1.7-m. phone. W2VL is trying 28 mc. Open grounds in L. I. Lighting Co. system causes W2AZW's 'phone to be modulated by 60 cycle hum. W2FDS has FB 3.9-m. 'phone. W2DNW and CIA work for same laundry. The Nassau Club plan trip to W1MK. Some of N.YC gang on 3.9 'phone are: W2BOF, QZ, CEL, FST, ALT, BOW. Somebody swiped W2EIO's crystal holder. A Jewell meter is missing from W2BV1. W2FDR has nifty 56 m. rig. W2CJJ holds down eastern L.I. W2BFG has necessary parts for 50 watt job. W2BXO is up for Nassau Co. Police. W2DBE, EMA, FBB, and EQY visited critical studies of W2CK1. Hi. W2EDW puts a terrific hole in 1.7 mc. with 400 watts 'phone. Nassau Collegiate Center offers a comprehensive radio engineering course free. Instructor is P. W. Somers, ex-W2UI, W1K. W2CNR built successful velocity meters. W2CHC can be heard sending OBS on 3904 kc. W2ELB has BCL trouble. Between heat and YLs W2AZV is in a daze. W2BSR is after DX. W2DQG added a pedent doubler. W2DUP, APE, BSK and EBB have gone to Lake Goorre. N. Y. W2CBO has gone to N. H. W2BML is QRL for 1.7-m. 'phone. W2AQN moved to Pleasantville, Septmber, 1933 47
Traffic: **W9ECG 088 KSY 03 IEL 88 BTG 24 DQV- EFO 20 KDO 15 FLG-BB 13 MUY 12 AHR 9 GBP 7 RGL-CFN 5 AWY-NOO-MYV 3 IPD-IGQ 2 NSD 1**

MISSOURI — SCM, C. R. Cannady, W9GYY — RMs, W9FTA and W9BMA. W9NBP BPls on deliveries. W9GIR held social in CUP room, St. Louis, On 3.5 mc; W9LLN, CCZ, LTH. W9NFP has 1.9 mc., phone. On 14 mc.; W9FAB. On 7 mc.; W9GUV, W9GTTK says too many questions in QRS applications! W9JJW sticks to one schedule. W9DOE puts new Zepz, W9HEU moved, L. D. L. — W9CDU, “Sure like new a.s. receiver;” W9GDI added ‘52. Too hot for radio at W9GDU, FTA and HWE, O.B.P. — W9PW is on 7 mc. W9BGE sends FOB report. Kansas City — W9EEP QSO’d W9TP on 28 mc. W9RR is organizing U.S.N.R. nets, W9PBI has new receiver. State News — W9TTY sends first traffic report. W9CRM changed to J. C. Hartley, W9GIV got first VK. W9ENP is QRL hard labor, Robert Henry of ARA sends first report “in years.” W9ASV schedules ZLAR and will continue traffic work. W9EDK will report regularly. W9AJU plans good A.A.R.S./U.S.N.R. year. W9KAZ has port. NHR, W9JAP applies for ORS. W9ELM visited Monett, Joplin, etc. W9MMT is first timer. W9GQY wants to report via W9KDF. W9RR visited Peoria, IL, gets in the shack. Hi. A real club has been started in Omaha, the “Amateur Radio Operator’s Club.” First meetings were held at “shack” of W9KJP. For details of W9PBI and W9LCH, W9FAB is QRL, hot wx. W9FUM is getting ready for St. Louis. W9GIR likes new “Comet Pro.” W9BDF is working in Rolla. W9PVM was visited by W9BXM, W9MT. W9EGT is at their new ORS location. 11 IAR, 1003 Tract, West Plains, Missouri, W9BCC is on vacation. W9HUG is QRL, hot wx. W9FUM is getting ready for St. Louis. W9GIR likes new “Comet Pro.” W9DUM comes back with traffic. W9ARR comes back with traffic. W9DIIN continues giving ‘51 royal traffic. W9EWO applies for ORS. W9LBM is on the job. W9HPA is new RMs. W9CQG is going to Chicago convention. W9BWF resigns ORS. W9CQY’s shack is at 95 degrees. W9IWT reports newly organized club in his town. W9BQN worked FX off coast of Java. W9FQY is rebuilding a mc. job.

Traffic: **W9ZAF 821 DUE 73 ABE 59 TFF 52 ACL 26 HIP 10 GXU 13 CGW 8 BPW 5 CYL 4.**

NEW ENGLAND DIVISION

**Connecticut** — SCM, Fred A. Ellis, Jr., W9CTI — RMs, W9CQO, W9PLO, W9GQA. W9GQA holds traffic banner. W9LGF is about recuperated. W9GQCL is leaving state. W9HAF wants to know why it takes so long for a message to come from Michigan to Kansas; exactly one month. W9XKU is responsible for six new repeaters. W9Vb, Kansas Radio Club has been organized. Meetings are held first and third Sundays in various cities. W9EMM has old job back in Tulsa. W9GQG is back with c.e. W9BPL had a number of hams call at his shack before the meeting of EKC in Frederick, to say his WAG, W9ABG, is doing fine as KB. W9QGQ is QRL old station seven days and dance orchestra six nights a week. W9MUT is new ORS. W9CFN is going to attend Convention in Chicago. W9BTG will attend I.R.E. convention. W9GGA is new Super, W9QGQ as CXY. W9MUG is experimenting. Starting with the convention in September the SCM will get out a bulletin for the clubs of the state. Secretaries please send me dope on your club activity every month for this Bulletin. We will also have a Bulletin containing important and spicy news for all those who report to the SCM each month. If you want this sheet, be sure to report. Don’t forget biggest and best convention yet, Topeka, Saturday and Sunday, Sept. 9th and 10th. W9LCH is rebuilding for ‘phone. W9BOY visited SCM.

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at Fort Devens. W'lGAG has new rig. W'lFEU, ECK and lB report for first time. W'lBJA is ready for Newburyport Congrats. W'lDFE's mast had an arlent with a light-QSL from Uncle Sam. V<1ESK for Nantucket to Falmouth. W'lABF is trying all ships on Atlantic.

is at camp with signal corps. W'lALP has a new jr. op! Radio Club. W'lDFS was away on trip. W'lJL reports Mullen, W'lASI- W'lBZO heads the traffieers, with AGA 250 watt final W'lBEF is tossing traffic for Lowell. traffic. W'lDZQ and DDC are on 56 me. W'lCEL is putting fact that she's a YL. W'lGEC QSO'ed 1.7-mc. 'phone. W'lBQE is in service business. W'lBTO 43 'phone.

CWP and BVR worked schedules with AR-8. W'lAJD lB REF 56 DFS 52 KH, BBY 46 ASI 44 BMW-FRO-RJA has been "A HAM since 1921." W'lCOT promises to be Hewinson, W'lASY-RB - AR-8, amateur station at Fort, HFO 4 BMM 3 BGL 2. W'lFAH swears by e.e. job. W'lEX operates on 3.5 me. the Cape. W'lAXS took his portable outfit to Maine. uses MOPA. W'IGKD, Woonsocket, reports for first time. W7AQP cancelled schedules. W7DSQ in hospital is kept in touch with home by BZA. W7CCR has new phone. W7BGQ is building 'phone. W7CTP is awaiting parts. W7BDJ is helping ZZA get going at C.C.C. camp. W7CZO is working with new ham and CSP. W7AVP is acting as emergency station for WUBJ which burned out recently. W7BRY sold out.

Traffic: W7FL 7 CCR 35 GTP 11 BDJ 2 BVE 42 AAT 40 BZA 7 CRH 13.

OREGON — SCM, Ray Cummins, W7ABZ-CBB — W7CJX is number one traffie man. W7AJX keeps schedules thru the summer. Visitors to SCM: W7CDI, BLN, LI, LY, AVY, BOO, BUB, CIV, and AJV. Neighbors cut down W7ALM's antenna. W7AOI is 'phone ORS. QNR is getting best of W7AMF. W7BWD is at Buncher Valley, Calif. with port. W7DCC, W7ANX ways A.A.R.S. sends totals. W7BD is keeping the SCM. W7WY leads the Section. W7CHH is building and DGX. W7CZY sends dope on Everett. W7AVM c.c. rig. W7BSX makes HPL. W7CNR wants schedule report.. W7CND has three stage c.c. rig. W7IG went on with Eastern Wash. W7LD would like to see a monthly traffie report.. W7CSP handles lumber for C.C.C. camps. W7BYR has port. DPS. W7BVE is building velocity mike. W7BSU and CHN are at Courad. W7CRH has transmitter trouble. W7ALF is up at KGE5. W7CQW is on again. W7AFS is after more power. W7BPM visited Somers gang. W7ATA and COX made a few changes.

Traffic: W7FL 7 CCR 35 GTP 11 BDJ 2 BVE 42 AAT 40 BZA 7 CRH 13.

WASHINGTON — Acting SCM, Stanley J. Belliveau, W7AYO — W7AQD schedules K7ANQ. W7UTE is getting rix in shape for fall. Poor WX knocked W7APR's scheduals haywire. W7ALE has been working o'timers on 7 me. W7RL is busy in Vancouver. W7AWF reports new station. DPU. W7ABU got traffic from Strawberry Festi­val. W7DGX keeps six schedules. W7DJJ reports new radio and DGX. W7CXY sends dope on Everett. W7AVM has W7E2XA final. W7DZ is in Taasota. W7BFL workied his first station, W7AFO has port. CDDN. W7CQW is new ORS. W7WY leads the Section, W7CRL is building c.c. rig. W7BSX makes BPL. W7CNI wants schedule with Eastern Wash. W7LD would like to see a monthly traffie drive. W7DHR is new reporter. W7SQ sends 60 report. W7CDN has three stage c.c. rig. W7IG went on

VERMONT — SCM, Roy L. Gale, W1BD — W1FPS is new ORS. W1DHD schedules ex-W1BDZ, now W1UGE. W1AXN has his outfit at camp. W1CHW and CFN visited SCM. W1AYP, and DPO called on ATF. W1CJY has new receiver. W1QDA has a new signal. W1GEU is at home. W1CGR is back at Lake Wallis.

Traffic: W1DHX 20 CGV 27 BD 1 D.

NORTHWESTERN DIVISION

ALASKA — SCM, Richard J. Fox. K7PQ — K7ATD sends last report. K7AHK and FF have new jobs. K7BQA sends first report. K7BHR and BWQ are active. K7CVI wants a visitor at BNW. K7DWA got unlimited 'phone. K7H is home at last. K7CQF is off for summer. K7DVR is new ham. K7FW is at Point Hope. K7KTO received two reports from N.Z. on 3.5 me. K7ACZ has also been heard on 3.5 me. K7AJS schedules K7AZ.

Traffic: K7TF 8 BAG 7 VH 13 BNW 31 ATD 37 CF 89 PQ 125 AZS 126 ARK 245 FP 388.

IDAHO — SCM. C. R. Tharppe, W7AYH-CKO-W7BCU is rebuilding. W7CM is IQL KFXD, Ben Wing, W7DDE, was fatally injured in plane crash July 4th. "Hot wx not much tfc" at W7BAA. W7BRU has port. CUB, W7CSP, handles lumber for C.C.C. camps. W7CBO is working with new ham and CSP. W7AVP is acting as emergency station for WUBJ which burned out recently. W7BRY sold out.

Traffic: W7FL 7 CCR 35 GTP 11 BDJ 2 BVE 42 AAT 40 BZA 7 CRH 13.

MONTANA — SCM, O. W. Viers, W7AAT-QT— W7FL reports. W7CT, RDZ and BKB are on 3.9-me. 'phone. W7AQN canned schedules. W7DSS in hospital is kept in touch with home by BZA. W7CCR has new phone. W7BGQ is building 'phone. W7CTP is awaiting parts. W7BDJ is helping ZZA get going at C.C.C. camp. W7BVR has port. DPS. W7BVE is building velocity mike. W7BSU and CHN are at Courad. W7CRH has transmitter trouble. W7ALF is up at KGE5. W7CQW is on again. W7AFS is after more power. W7BPM visited Somers gang. W7ATA and COX made a few changes.

Traffic: W7FL 7 CCR 35 GTP 11 BDJ 2 BVE 42 AAT 40 BZA 7 CRH 13.

WASHINGTON — Acting SCM, Stanley J. Belliveau, W7AYO — W7AQD schedules K7ANQ. W7UTE is getting rix in shape for fall. Poor WX knocked W7APR's scheduals haywire. W7ALE has been working o'timers on 7 me. W7RL is busy in Vancouver. W7AWF reports new station. DPU. W7ABU got traffic from Strawberry Festi­val. W7DGX keeps six schedules. W7DJJ reports new radio and DGX. W7CXY sends dope on Everett. W7AVM has W7E2XA final. W7DZ is in Taasota. W7BFL workied his first station, W7AFO has port. CDDN. W7CQW is new ORS. W7WY leads the Section, W7CRL is building c.c. rig. W7BSX makes BPL. W7CNI wants schedule with Eastern Wash. W7LD would like to see a monthly traffie drive. W7DHR is new reporter. W7SQ sends 60 report. W7CDN has three stage c.c. rig. W7IG went on

September, 1933

PACIFIC DIVISION

HAWAII—SCM, C. D. Slaten, K6CGG—EX-W6HIE is K6IQL. K6AU and IQ work same station. K6IQL will lose bachelor's status August fourth. K6MM says K6BUW is new 800, 1500 ke. KE9US is on 14 mc. KE9ST graduated from university. KE3EBR worked Egypt. K6GRV has gone to mainland. KE7FV went on visit to Big Island. KE9AB has been pushing traffic. KE9WQ and KE8GA make BFL. W6GBY is K6IQL. W6FWJ is C.C.C. op at Boise, Idaho. W6AIP moved to Riverside and is spending vacation at Tahoe. W6ASP broke collar bone. W6GGO is in C.C.G. service. Club meetings in Reno still drawing full house. Traffic: W6UO 33 AJP 34 HGL 28 GYX 13.

LOS ANGELES—SCM, Francis C. Martin, W6AAN—W6RQF handles death message. New ham at Yakima is YL-W7DUC, sister of BCS. W7OYO gets it just well on antenna is so crooked he can work around corners-hi. Traffic: W6HA 116 BSA 177 BMM 133 CSM 122 CNO 104 CBO 94 CLO 79 CRO 75 CRO 73 HOO 18 CQG 39 GQF-AJA 34 CRU 22 EDH 17 CIB 14.


SAN FRANCISCO—SCM, Byron Goodman, W6CAL—W6QFY 703 FBW 118 HCQ 59 DBB 25 QR 10 DSX 12 GOJ 19 CQI 25 CDX 8 DSX 19 AOD 9 HET 5 EEH-DHY 2 BSO 1.

SANTA CLARA VALLEY—SCM. Bruce Stone, W6AAM—All honors go to W6FQY this month. W6FQY is handling Pacific Coast arrangements of Transcontinental net. W6HCQ handled 59 with an '01A. W6DBB is new OBS. W6DSE can't work through local broad signals. W6QBR carried 7 schedules too on 1.75-mc. 'phone. W6CSF says 14 mc. FB. W6CDX takes traffic on 13 mc. and relays it on 3.5 mc. W6AD is new reporter. W6BEU finished 50 watt transmitter. W6DPI plays checkers over the air. W6BSO will be in S.F. Section until September. W6BMW has been fighting forest fires. W6DSZ, GQZ, UC, HTZ, and CUZ reported.


EAST BAY—Acting SCM, J. H. MacLaflerry, Jr., W6JRM—RM, W6AUI. W6CDA sends in a "fine one op" report. W6ZM went to C.C.C. for six months. W6BNB uses flex power. W6GWU wants your report on the 16th. PLEASE, W6BRT.

W6AQW has a nice "phone. W6AOJ was appointed Alt. D.N.C. for A.A.R.S. W6AN presides at Section meetings FB. W6CUG is back from second honeymoon (Same C.O.). W6ATU is new BPL tech. W6GMA is NBC technician. W6BMZ uses remote control. W6DUA is back from gold fields. W6AIR is C.C.C. op at Redding. W6EPC is handling 59 with an '01A. W6HS is rebuilding. W6DBS is active A.A.R.S. W6HIE has 1.7-mc. 'phone. W6FTR reports by radio. W6EH was second op at W6BYG. W6VPC is Alt. S.N.C. for A.A.R.S. W6EMA sends nice report. The Oakland Radio Club beer bust last month was a "howling success." All amateurs are cordially invited to attend meetings of East Bay Section held second and fourth Fridays at Central Trades School, Oakland.


SAN FRANCISCO—SCM, Byron Goodman, W6CAL—W6QFY 703 FBW 118 HCQ 59 DBB 25 QR 10 DSX 12 GOJ 19 CQI 25 CDX 8 DSX 19 AOD 9 HET 5 EEH-DHY 2 BSO 1.

take it with a smile. W6GS8 joined U.S.R. W6FFY keeps himself supplied with work. W6BDW is doing bookkeeping. W6S6S is busy on his computer. W6GGD has a port, at his summer cottage at Magilla.

W6F3K is changing final to inductive coupling. W6DG3 is coming on at 58 and 1.7 m. Phone W6AHU, BYB, sgt. 89th brigade HQ Co. W6JDO and JFO are still lives. W6BRG, BQW, and FGG visited Phoenix on '10s. Passed licenses: W6CVW is W6GDD has take it with a smile. W6GSS joined U.S.N.R. W6FYY is W6BDW has W6GDD's plate transmitter is shot. W6AOA and JB are on 58 mc. W6BTR has '01-A on 14 mc. W6B4E, PFA, AIF, AYH, and BVY are rebuilding. W6HVF has crystal trouble. A group of radio engineers, W6DWH, BG and JB recently rebuilt SCM's transmitter. W6GDD's antenna mast still stands. W6PGU, new ham in Walton-Salem, is getting out FB with pair '45s. W4OG, CJ, PA, and BVY visited World's Fair. W4AYH and ANZ get ORS. W4IF got his renewed. W6EAI sticks to 'Phone. W6AC is doing FB with '46. W6BVA is NOC's 200 pound "Ham."

W6AY is QRL moving. W6BIU is QRL fire-fighting.

W4AIS completed new rig. W4NC took part in ORS contest. W4CQF used to work old 4NV in the "good old days."

Every month W4ABT reports -- "QRL YL "! W4CQ completed new rig. W4GQZ is BC servicing. W4LY is on lots. W4HAJ is QRL moving. W4BYA is BC servicing. W4WY and BLZ are now ORS. W4DLR and SAW are BC servicing. W4AXN is on 14 mc. W4BHV has gone to Seattle.


SAN DIEGO - BCM, Harry Ambler, W6EOP - Total number reports keeps climbing.

SAN JOAQUIN VALLEY - SCM, G. H. Lavender, W4AVT - Number total reports keeps climbing.


ORTH CAROLINA - SCM, G. H. Wright, Jr., W4AVT - Number total reports keeps climbing.


Philippines - Acting SCM, N. E. Thompson, KAIH - KALLY has been transferred to Shanghai, China.

Traffic: KAIH 1142 LG 197 NA 121 TS 42 CO-JR 39 P3 37 JA 33 MR 22. OMYT 672.

Philippines - Acting SCM, N. E. Thompson, KAIH - KALLY has been transferred to Shanghai, China.

WEST VIRGINIA — SCM, C. S. Hoffman, Jr., WS6H — Congratulations to W6SEK for winning crystal given by GB to station having highest total, W6SEK and CMJ continue in the lead, W6TM-XDX is building S8. Super, W6FO is going to World's Fair Convention. W8BOW built new oee. W8GQQ is moving to Charleston. W8CDE is on 3900 kc. 'Phone, W8DFEC is building 50 watt rig. W5EL and BOW plan on going to Chicago. W8DPO worked W8FPI is Bluefield Radio Club station. W5EWM is rebuilding. W8AYK applied for ORS. The SCM appreciates vote given him for reelection. Please note SCM's new QRA on page 5. New stations: W9LVL, K8BDJ, H9JU.


ROCKY MOUNTAIN DIVISION

COLORADO — SCM, T. R. Becker, W9BTO — The Denver Radio Club had a field day July 23; a good time was had by all. QRN finally "got" W9SEK. W9BYY is making new super. W9GDN returned from cruise to Hawaii. W9GDN is busy making dollars — W9LYE is increasing power — W9MEQ is building S8. Super, W9ELO is going to World's Fair Convention. W8BOW built new oee. W8GQQ is moving to Charleston. W8CDE is on 3900 kc. 'Phone, W8DFEC is building 50 watt rig. W5EL and BOW plan on going to Chicago. W8DPO worked W8FPI is Bluefield Radio Club station. W8EWM is rebuilding. W8AYK applied for ORS. The SCM appreciates vote given him for reelection. Please note SCM's new QRA on page 5. New stations: W9LVL, K8BDJ, H9JU.


SOUTHEASTERN DIVISION

ALABAMA — SCM, L. D. Elwell, W4HPK — High traffic man is W4BSN. W4AAQ says new receiver came too late for better type of operation. W4BBT is Mobile Bulletin FB. W4BJA gets out FB with 45. W4APU is now to be the Bulletin. W4BRA is new ham. W4BY and BAK are experimenting on skin effects. W4DX is traveling. W4DPD has gone to Miss. W4RXK sends some FB dope. W4BGZ has new oee. rig, W4LT and BWG are active on 39.0 kc. 'Phone. W4BYP heaps plenty of DX. W4BHT has a bit of traffic. The call W4CQQ has been issued the Mobile Club. W4OA is building receiver for Mobile Club. W4GL is now ORS. W4CHL sends report on ORS section. W4CCP is the call for Mobile Club. W4BSL reports one TTT, OW and a dynamic YL Jr. W4BWM is anxious to handle traffic. W4AP uses 3.9 and 14.2 mc. 'Phone, W4AUS finds WX hot in shack. W4FPU is back in Anniston. W4BBO is building higher power. W4FTT is changing his level mod. W4TPG got an "OFA. W4AQM won an "X" cut crystal at Birmingham Club. W4BFA has gone to Texas.


EASTERN FLORIDA — SCM, Ray Atkinsen, W4NN — W4VP reports W4ASR, BDM, BQD, BUM and BZM active at Daytona Beach. W4GR is building c.e. rig. W4PRH is now W4CR. W4BLS plans low power 'phone. W4CAM is new traffic man. W4AI is operating KLF, "X, 8.S. First Othalet. " W4BCFZ applies for ORS. W4RZL says "WX slows up traffic." W4DT and AGP have 56 mc. jobs. W4AGK, NN and ANY are building 28 mc. 'Phones, W4PBDL and ZU visited Sarasota. W4AEB has 8. W4LS (phone) is doing nice traffic work. W4BAM (phone) worked all but 2nd district in five hours on 3.9 mc. Heard "Dixie" on the music box from W4DU's 'Phone. The gang at Camp Foster included: W4GS, ASQ, QA, CBE, ZF, CFF, CBW, BGG and NF.


WESTERN FLORIDA — SCM, Eddie Collins. W4MS-ZEP — R. M. W4ACB-PCN. W4BJSK was on vacation. W4GBQ has new c.c. rig. W4HGA is preparing progress with c.e. W4QXQ is getting SW3. W4AVS has antenna trouble. W4CQQ is our newest ham. W4CFF is getting out of receiver. W4ZZAO is QRL NAS. W4UW will soon have W6NO parking. W4FPI raises K6 on CQ. W4QUS is shifting to Vertical. W4GTA of Atlanta is trying to get P.A. to perk. Mrs. W41MS takes a turn at orchestra regularly. W4AUA schedules W4PCN. W4MS is trying to get P.A. to perk. Mrs. W4MS takes a turn at orchestra regularly.

Traffic: W4NN 8 AZP 3 BFD 5 AQY 8 KB 18.

GEORGIA-SOUTH CAROLINA-CUBA-B3ELE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, Chas. W. Davis. W4PM — W4CQF handled his traffic from Savannah Boy Scout camp at Parris Island, S. C. with W4GL and W4BSN. W4PM has 8 schedules. W4AUS has nice traffic. W4ANU wants 7 mc. schedules. New ORS: W5IT, IA and ARY. W5CIF QSO'd a K6. W5AIC has QRM. W5BXY is c.e. W5AKM reports traffic. W5BCW notified 60 off-freq. stations this month. W5AJG is working on 14 mc. W5CYU has "45 TNT. W5JA, DO and BFI report by radio. W5CPT has portable DNL. W5CPB's portable is DNT. W5BYF visited W5USA. W5BBG has new commercial license. W5AHT had his appendix manuced for W5QGJ and W5PFI is OQing. W5QA worked 250 miles on 3.9 'phone with .8 watt. W5CAV wants ORS. W5BBZ will have portable at C.C.C. Camp. W5AW will be on at T.N. camp. W5CIL W4BSN builds 14 mc phone. W5GL is going to Canada. W5RWN reports for Emis. W5CBK, CQG, D6Q, BCTU, CTA and DAA are new reporters. New section bulletin is the "Nipper." Report each month and it will be mailed to you. Let's hear from more 'phone men.

OKLAHOMA — SCM, Emil Gied, W6VQ — W6CEZ is Oklahoma's star trafficflier. W6BDX is pluggin' away. W6CJZ rebuilt. W6CUX sends first report. W6BBK's license expired. W6CCA wants Panhandle traffic. W5AND worked KSQ, W5BAT and AMC are active. W5BVJ is c.e. W5BAR and DE7 have e.c. rigs. W5BLO changed QRA. W5AKX is new ORS. W5ATJ is on 7 me. WP5B finds 14 mc. WP5AU has 1st class radiotelephonic ticket.

Traffic: W5CEZ 187 BXO 66 BMJ 56 AMC 83 DET 33 C1Z 16 BKK 15 CUX 10 VQ 4 CCA 3 AND 2.
SOUTHERN TEXAS — SCM, D. H. Calk, W5BHO — W5OW schedules K5AA, W5RI and AUL. W5AUC bought AAI's transmitter. W5DEE and DAC are new calls. W5AQX is going in for raising chickens. W5BNK is P27-X. W3AWX and W5CBO are Cadets at Randolph Field. W5CEQ worked a K6. W50CH worked a ZL and 2 VRS. W6CNX works VK7. W6CSS operates A6H. W6H2O has new receiver. W5BKS reports W5H2Q as visitor. W5MN schedules AUL and JH1. W55L schedules W5USA. W5AZ2 reports from Monroe, La. W5BJN reports traffic is. W5BVG was on vacation. W5CWV sends first report. W5AFQ was on vacation. W5PV schedule W5BYQ and W5H6. W5CUX sends first report. W5ATQ is "nertz" to Physics. W5CZ and W5R6C is in school. W5AXY is "naer PCT" is "BON-E-E CROUND." W5CTW is DXing. W5FVW is proud owner of WAC.

Traffic: W5BQW sends first report. W5CGM is on vacation. W5CUB is in Maine. W5BKH is QRL. W5BKL is building a c.c. W5BAR and DET have e.c. rigs. W5BOE changed license expired. W5CCA wants Panhandle traffic. W5AND W5BNT is coming on with '03A. W5MP wants traffic. W5BQI and AMC are active. W5BJV is QRL.


QUEBEC DIVISION

QUEBEC — SCM, John C. Stadler, V62AP — 2FG is trying traffic. 2GF has gone to Arctic. 2EE has new YL op. 2A8 and HU are new hams. 2BB is building receivers. 2CO finally got that VE. 2DX is on 14-mc. phone. 2DM has c.e. 2BQ is on from Rapide Blanche. Forty hams and YLs from Montreal and Ottawa attended picnic at Lacroute. Congrats to 2HG for handling it so well. 2BO is building another boat. 2EH is on 1.7-mc. phone. 2EM has an understudy station at the country place. 2GC is trying to QRO. 2BE is getting new mast. 2AX has taken up 'phone.

Traffic: V6ECO 4 CA 5 FG 14 BB 36 CX 4 AP 3.

VANALTA DIVISION

ALBERTA — SCM, C. H. Harris, VE4HM — Edmonton gang took part in SB hamfest at Vegreville. Lethbridge boys also had real hamfest. 4A4H and 4A8A are experimenting plane to ground 56 mc. transmission. 4FR is remodeling shelet. 4BW is c.e. 4EC has gone north operating. 4HL has a YL. YF at home. On vacation. 4MU was relieved by 3CV at 9DY on account of sickness. 56 me. 5HP fell in a bees nest! 5AL visited 5CT. 5IA is "BLONDE Crazy." 5AA is "FIBER". 5NB turns in first reports. 5FY is enjoying DX. 5HS is using 1920 power. 4FU is still vigilant. 4CP sticks to 7 me. 4VC wants to hear from N.B. gang interested in B.S.G. W55C visited 'CV, 'BW and 'EA. 5KH's Dad operates 5GG. 5PD is building another boat. 5MO has an understudy station at the country place. 5BC is "E BRIDGE " to handle schedules. 5NB gets d.c. reports. 4EJ is moving to B.C. 4LX has good outfit. 4DQ is trying in 3X8. 460 puts out dandy signal. 4BA is building c.e.

Traffic: VE4ALX 3 MG 10 EO 8 FJ 5 HM 4 NB 3A-DQ 2.

BRITISH COLUMBIA — SCM, J. K. Cavinsky, VE5AL — B.C.A.R.A. is talking of staging convention. 5HT worked Europe. 5HR had emergency work when Government Cables between Savary Island and Mainland went out. With assistance of 5BL daily schedules were kept on 1.7 mc. assisting government officials and police for period of a month while cable was replaced. Heard that 5HP fell in a bee's nest! 5AI visited 5CT. 5IA is new station. 5FY is enjoying DX. 5HS is using 1920 receiver.

Traffic: VE6HI 12 BU 11 EU 20 CR 65 BR 54 GS 81 AL 8 GI 41 A12 DI 398 EB 19 FF 43 AC 45.

PRAIRIE DIVISION

MANITOBA — SCM, Reg Strong, VE4GC — 4DJ worked 3 VK, 3 ZL, and 2 K5. MBWA welcomed a visit from 5JQ. 4IP heard K5 on 3.5 mc. 4FP is reducing power. 4PU is still vigilant. 4VP shifts to 7 mc. 4VC starts with FB signal. 4CS is working on '48s. 4NT is interested in 'phone. 4KU has fifty parking. 4NF is on vacation. 4FB, LT, FT, and KX are thinking of 1.7 mc. 4MY is at the Bench. 4CD will be on 'phone soon. 4PP, CI, MV and GC comprise local 1.7-me. phone group. 4UL is looking for higher power. 4DK holds out on 3.5 mc.


SASKATCHEWAN — SCM, Wilfred Skiaie, VE4EL — 4ND and 4R have MOPAs. 4L5's station is IL. 4L5 comes through FB. 4D4 gets out on 'phone. 4EM is preparing for full. 4BF has an Assis. Op. 4EJ worked Chi. and Peace with portable on 390V. 4A6A is building 1.7-me. phone. 4M5 has nice sig. 4GR looks for traffic. 4CC helps 4DJ, new ham, and had visit from 4KV. 4KR has ladder mast. 4EJ visited KB, BK, KV. 4AU reports reception poor. 4BB has trouble with eq. 4CA worked a XL. 4DL and 4AC are QRL hamfest. 4MA and 4MN turn in first reports.

Traffic: VE4GR 36 BB 31 AT-MN 20 EL 17 AU 12 CC 5 FF 4 MA 1.
1933 Sweepstakes Contest

Bridgeport, Conn.

Editor, QST:

Every amateur operator on this continent has his own particular time for operating at his greatest enjoyment. Some can operate their stations whenever they please, others must reserve a certain time each week or month to do their operating. The latter must do their operating within these periods or go without.

The Sweepstakes Contest this year surpassed all former Sweepstakes in size and accomplishments.

Let us suppose that W9— is a busy business man who just loves to push the key but can do so only once a month, and this for only a week at a time, because of pressing matters of business. He would like the Sweepstakes to take place during "his" week so that he could shoot at the prize for his section.

If a vote were taken by all the expectant participants in the coming Sweepstakes Contest as to the time they would prefer it held, might we not strike a period of time wherein the majority of operators will be satisfied as to the date of the contest?

I don't think a vote has ever been taken in this respect for former Sweepstakes. I think that this idea would benefit hundreds of amateurs and it would certainly provide the date when the greatest number of operators could enter the All-Section Sweepstakes Contest of 1933.

— Chas. Alvin Taylor, W1DOV

Fellows who have preferences on this subject are invited to express them on QSL cards addressed to A.R.R.L. Communications Department, 38 LaSalle Road, West Hartford, Conn.

— Editor

Use the QSL Bureaus

Valley, N.S.W., Australia

Editor, QST:

In the last American mail, I received a number of QSL cards. On two of these were added messages asking me to write local hams who had neglected to QSL, while another complained, "What's wrong with you chaps, don't you ever QSL?" In regard to the first, I happen to know two out of the three chaps mentioned have been off the air for two years. It costs us 30/- (about $7.50) a year for our amateur license and a lot of the boys have had to do without their hobby owing to present conditions, but that does not stop those parasites who use a fellow's call as soon as they know he is off the air. I have received cards from numerous hams whom I have never worked, some of them complaining bitterly about the time it takes me to QSL!

In regard to cards, I have sent to W's, when they have not been sent direct they have always been sent to the District QSL Managers*, so perhaps a stamped, addressed envelope sent to the local QSL Manager would clear up a lot of the misunderstanding...

On looking up my log I find I have worked 72 W stations in the last three months and so far I have 12 cards to prove it. So it is easily seen that the QSL problem is an international one.

Had I sent all my W cards away separately it would have cost me roughly $3.50 in stamps alone — quite an item — but by making use of the QSL Bureaus it only amounts to a fraction of that cost.

The regular publication of the addresses of QSL Bureaus is the only solution applicable to all countries. . . If local radio publications could be induced to publish or reprint this information it would be a great help to the ham who is willing to QSL but cannot, owing to lack of information.

— A. P. Reynolds, VK8AP

Rotten Relaying

Highland Park, Mich.

Editor, QST:

Some time ago one of my family left for a visit to the west coast. Upon her departure, I thought of sending a radiogram to her friend telling of her leaving; thinking, of course, the message would arrive in plenty of time. So that night, I sat at the key determined to get that message off. First station raised was a W6 who, when asked to QSP said, "sorry but QRM too bad." Next was a W6 who was leaving the air. Soon after I raised three 9's who gave various excuses. . . . About that time, I began to get disgusted, so quit for the night.

(Continued on page 58)

* See page 34, August, 1933, QST, for complete list. Incidentally, amateurs outside the United States need not send their cards direct to District QSL Managers, but can send them direct to A.R.R.L. Headquarters for regular distribution. — Editor.
THE FB-7 AMATEUR RECEIVER

It is not merely to save room on the operating desk that the FB-7 has an external power supply, nor is it an accident that the FB-7 chassis is designed to accommodate a Single-Signal Unit. Many an amateur now operates his FB-7 with the same power supply he purchased for his first National Receiver, and many an FB-7 in use today will become an FB-X later.

For it is basic in National's policy to offer the amateur not only superlative products, but also a flexibility in design and a wholehearted cooperation in merchandising that will enable him to keep abreast of a rapidly developing art with the minimum of equipment obsolescence and expense.

NATIONAL COMPANY, INC., MALDEN, MASS.
A complete line of Graphite Anode Tubes by Sylvania

Hygrade Sylvania Corporation, through its newly established Electronics Department, is now in production on a complete new line of transmitting tubes which are revolutionary in design. They employ the new graphite anode structure conceived and perfected by the engineering organization of Hygrade Sylvania Corp. To the many inherent good features of the Sylvania line, the graphite anode adds the following major advantages:

1. High plate dissipation without overheating. This is a direct result of the high thermal emissivity of graphite.
2. Lower operating temperature at the anode. This results in a lower operating temperature of the other electrodes, thereby preventing secondary and primary emission from the grid.
3. Uniformity of characteristics. The physical properties of graphite permit exact processing. Graphite does not warp under high temperatures and the mechanical dimensions of the anode remain constant. Proper relation between tube elements retained in this manner, preserve the normal electrical characteristics of the tube.
4. Long life. Comparative freedom from gas is another important effect of the graphite anode and the high vacuum obtainable results in longer tube life.

A process developed in the Electronics Laboratory of Hygrade Sylvania Corporation enables us to treat carbon in such a manner that it is reduced to pure graphite with all amorphous carbon and other impurities removed.

Early this year Hygrade Sylvania Corp. established a separate new plant in Clifton, N. J., for the design and production of radio transmitters, transmitting tubes, industrial power tubes, and custom-built electronic devices. This plant contains most modern research and manufacturing facilities. Unhampered by obsolete dies, processes and routine, Hygrade Sylvania has been able to go exclusively now to this revolutionary new design.
NEW...

A 40-Watter—the 830—by Sylvania

With Graphite Anode Structure $12.50

Just the tube for that new 40, 20 or 10 meter transmitter. This is the tube, in between the 210 and the 50-watter, that you’ve been waiting for all the years. And it goes in a standard UX socket.

CHARACTERISTICS of the TYPE 830

<table>
<thead>
<tr>
<th>Characteristic</th>
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<tbody>
<tr>
<td>Filament Voltage</td>
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<tr>
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<td>2.15 Amps.</td>
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<td>Maximum Overall Length</td>
<td>5 7/8&quot;</td>
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CLASS "A" SERVICE

<table>
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<tr>
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<tbody>
<tr>
<td>Maximum Operating Plate Voltage</td>
<td>450 V</td>
</tr>
<tr>
<td>Maximum Plate Dissipation</td>
<td>17 Watts</td>
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OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>Characteristic</th>
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</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
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</tr>
<tr>
<td>Grid Voltage</td>
<td>-15.0 -26 -35</td>
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<tr>
<td>Load Resistance</td>
<td>9300 8800 8000</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>8.0 8.0 8.0</td>
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<tr>
<td>Plate Resistance</td>
<td>4500 4250 4000</td>
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<tr>
<td>Mutual Conductance</td>
<td>1740 1900 2000</td>
</tr>
<tr>
<td>Plate Current</td>
<td>15.0 17.5 20.0</td>
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<tr>
<td>Undistorted Power Output, Watts</td>
<td>.35 1.1 2.0</td>
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CLASS "B" R.F. SERVICE

<table>
<thead>
<tr>
<th>Characteristic</th>
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<tbody>
<tr>
<td>Maximum Operating Plate Voltage</td>
<td>750 V</td>
</tr>
<tr>
<td>Maximum D.C. Plate Current</td>
<td>60 Ma.</td>
</tr>
<tr>
<td>Maximum R.F. Grid Current</td>
<td>6 Amps.</td>
</tr>
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</table>

OPERATING CONDITIONS

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<thead>
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<tr>
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<tr>
<td>Grid Voltage, Neg.</td>
<td>70 V</td>
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<tr>
<td>Power Output (Peak at 100% Mod.)</td>
<td>12 Watts</td>
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CLASS "C" SERVICE

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<tr>
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<tr>
<td>Maximum D.C. Plate Current</td>
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</tr>
<tr>
<td>Maximum D.C. Grid Current</td>
<td>18 Ma.</td>
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<td>Maximum R.F. Grid Current</td>
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OPERATING CONDITIONS

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<td>Power Output</td>
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DIRECT INTERELECTRODE CAPACITANCES

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<tbody>
<tr>
<td>Cgp</td>
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<tr>
<td>Csf</td>
<td>4.9 mmf</td>
</tr>
<tr>
<td>Cpf</td>
<td>2.2 mmf</td>
</tr>
</tbody>
</table>

See your dealer. If he cannot supply you send your order direct to us.

Hygrade Sylvania Corporation

Hygrade Lamps  ELECTRONICS DEPARTMENT  Sylvania Tubes

CLIFTON  FACTORIES  NEW JERSEY

SALEM, MASS.  EMPORIUM, PA.  ST. MARYS, PA.  CLIFTON, N. J.

Say You Saw It in QST—It Identifies You and Helps QST
For seventeen years, QST has published the current history of Amateur Radio. A file of QSTs is the world’s most complete record of the development of short-wave radio communication. QSTs of several years ago are fascinating reading today. QSTs of today will be fascinating reading in years to come. Don’t let your files get scattered. As time goes on they will acquire more and more sentimental and intrinsic value. It is easy to keep your current files of QST complete—to replace lost copies in the future may be impossible. Many old issues of QST bring high prices today. This will be just as true of today’s issues in future years. In order that devotees to the art may keep their QSTs—protect them against loss or damage—the League buys special binders. They are offered to readers of QST at a modest cost. Each binder accommodates twelve issues of QST and the index. The binders are sturdy, cloth covered, deep maroon in color, excellent in appearance and cleverly designed to take each issue as it is received and hold it firmly without mutilation. Don’t delay. Order today a binder for your 1933 copies—and enough binders to accommodate the file of QSTs which you have already accumulated.

$1.50 Each—Postpaid Anywhere

THE AMERICAN RADIO RELAY LEAGUE, INC.
WEST HARTFORD CONNECTICUT

Next day I gave the message to a friend near by who was working 14 mc. He tried for two days to get it off and got two of the best replies I ever heard. One was, “sorry OB but never have handled a msg and don’t want to break my record of four years standing.” The other, after hearing the message was important said, “Why don’t you send it by wire where important messages belong”? The fourth day we gave it to a high-powered local but don’t know yet what sort of luck he had. At any rate, the party arrived over a month ago and the message will probably get there next month, if at all.

Now what kind of a game is this, fellows? Are we just playing like kids or are we trying to make something of ham radio? At times this traffic handling seems to be a joke but it doesn’t have to be if we take it seriously enough.

— C. R. Funk, WSGWA

W6HG with his 210 on 40 meters was heard by PL-423 in Poland on the same morning that he received an R8 report from JZ2CL. It is interesting to speculate on the possible paths taken by the signal to reach Poland, especially considering the time of day. A globe shows a whole lot more than a map.

If that two-year-old 7-mc. crystal hasn’t the sock it once had, borrow a reading glass and examine the edges for nicks. The output of some 7-mc. plates is considerably reduced by nicks too small to be observed without magnification unless you have unusually sharp eyes. This effect is noticeable to a lesser extent on 3.5-mc. plates if X cut; rough edges have no apparent effect on the operation of Y-cut plates. However, the majority of 7-mc. crystals are X cut and the 7-mc plates are the ones affected the most. Refinishing the edges is a simple job and oftentimes will double the output.

— W6BCX

An author in the esteemed Satempost describes a dentist making an X-ray: “He put the plate in her mouth and focused the cone. The rich, salty smell of static filled the office.”

Rich and salty, eh? Well, you can have your salted static as likes it that way. For us nothing will ever take the place of good old fried electrons, with.

Results of the Fifth International Relay Competition will appear in October QST. Final check-ups have been made and the material is being prepared for the printer as this issue goes to press. The scores of approximately 1000 stations will be listed in the results!
Fall and the New Deal are with Us
Offers a wide variety of apparatus at Special Prices. Buy NOW and Save

**Jewell Meters**
Brand new, of course, with regular factory guarantee. At these sensational prices, quick action is imperative, as the quantity is limited. Portable models. Pat. 57-0-12 v. D.C. $13.50, Pat. 57-0-7.5 v. - 0-150v. D.C. List price $12.50, Special $2.95

Pat. 57 Dual range 40 amp. 50v. List $15, Special. $4.50

Pat. 77 - 0-150v. A.C. $12 list Pat. 77 - 0-8 amp. A.C. $4.90

Pat. 77 - 3 range 0-3v. - 0-15v. - 0-150v, List $15, Spec. $5.50

Pat. 77-0-80v. List $10, Spec. $2.50

Pat. 140 - D.C. flush mount; flange 2 7/8" dia. case 2"dia. 7.5v. -150v. 75 ohm per v. List $9.50, Spec. $1.95

**GORDOS TRANSMITTING TUBES**
Regular guarantee
203-A Carbon plate. $13.50 852 Carbon plate. $17.50 866 Heavy duty. $2.45

**COLLINS TRANSMITTERS**
Another popular line added to our stock. Write us for information and bulletin.

**DEFOREST**
503-A 511 and 545 tubes, now manufactured under R.C.A. supervision, each. $15

**Navy Type Telegraph Key**
List $3.00 Navy knob - 7/8" tinsel contacts. The balance $1.45 with Regular Knob $1.10

**FEDERAL**
F-108-A - 175 watt tube, ideal for ultra high frequency use. $34.50

**LEEDS TRANSMITTERS**
Pat. 57-0-12 v. D.C. $13.50 Pat. 57-0-7.5 v. - 0-150v. D.C. List price $12.50, Special $2.95 Pat. 77-0-150v. A.C. $12 list Pat. 77-0-8 amp. A.C. $4.90 Pat. 77-3 range 0-3v. - 0-15v. - 0-150v, List $15, Spec. $5.50 Pat. 77-0-80v. List $10, Spec. $2.50 Pat. 140 - D.C. flush mount; flange 2 7/8" dia. case 2"dia. 7.5v. -150v. 75 ohm per v. List $9.50, Spec. $1.95

**Western Electric Tubes**
Limited quantity brand new, in original cartons. 205-D; 205-E: $2.45 102-G; Special each.

**Universal Microphones**
and stands at lowest prices. Model W lapel single button ... $1.75 Model X double button ... $8.88 Model X single button ... $4.41 Model BB ... $14.70 Model X desk stand ... $2.05 Special floor stand nickel plated $5.88 Suspension Springs. 8 for ... 25c All other Universal products reduced to above proportions

**LEEDS Hard Drawn Solid Copper Enamel Antenna Wire**
No. 14 - 100 ft. $2.40 No. 12 - 100 ft. $2.50 No. 10 - 100 ft. $2.90 No. 8 - 100 ft. $4.10 In lengths 10 to 1000' - size and quantity guar.

**Soft Drawn Copper Tubing**
1/16" per foot, $0.02/4" 4/16" per foot ... $0.04 1/32" per foot, $0.03 any length

**Bruno Velocity Microphone Kit**
Frequency response 30 to 14000 cycles. Substantially free from resonance peaks. Easy to assemble, not critical in adjustments. Special. $5.88 Condenser Microphone Kit. $2.94

**KENYON SPECIALS**
Quality mounted unaced units. Double button mike trans. $8.85 Push pull input ... $7.75 Push pull output 245 or 250 plates to 500 ohm line and 15 ohm voice coil ... $3.85 Power transformers 730 v. c.t. at 100 M.A. 2 1/2v. 4 amp. - 2 1/2v. 12 amp. 5v. 2 amp. ... $17.50 KR-5. 1100v. c.t. - 150 M.A. 2 7/8v. 2 amp. ... $17.50 1 1/2v. 1 amp. ... $3.75 We can still supply filament transformers as advertised in previous issues. Everything is Kenyon always on hand.

**TUNE IN ON TEN! with the NATIONAL HFC**
852 Carbon plate $7.50, Special $4.25

**LEEDS SPECIAL TRF 6 tube BCL receiver designed especially for use with the HFC; with beat oscillator for CW. Complete in cabinet with tubes, phone jack, dynamic speaker.**

The SW-3, T R F ham receiver available in three models.
23v. A.C. tubes 6v. A.C. - D.C. 2v. dry cell Amateur band spread coils. $2.79 National FB 7A ... $31.16 National FBXA ... $42.92 All coil ranges. $5.88 Leeds S and 10 M. Super Regenerator, described in Aug. issue. Without cabinet. $9.85. With cabinet. $10.85

**GENERAL RADIO SPECIALS**
267-K $19.85, condenser ... $7.75 267-M $19.85 condenser with ver- nier. ... $9.95 374-N S. 1 P. $10.85 metal end plates ... $1.25 277 cell forms $.25 each; 3 for ... $.65

We can still supply the chokes, filters, condensers and bleeder resistors as advertised last month.

**The New Deal applies to business too. We always sell at the lowest prices consistent with good business practice. We cannot guarantee to maintain these prices, and thus we must increase the costs of basic and manufactured products. Order Early and SAVE.**

**LEEDS TRANSMITTERS**
45 Vesey Street, New York City New York Headquarters for Transmitting Apparatus

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

We do not publish a catalog; quotations on all short wave equipment furnished by return mail. 10% deposit required with all C D orders.
Used

with the flying telephone

Western Electric's new 282A screen grid transmitting tube was designed to meet rigid specifications of flying equipment: compactness, mechanical strength, operating dependability under varying conditions of atmospheric pressure and power supply. It is ideal for amateurs' use—covering their entire frequency range.

Hard glass is used so that high energy dissipation and wide frequency range operation may be had without sacrifice of life. Terminal arrangement insures adequate insulation under all conditions. Low internal impedance and adequate emission from thoriated tungsten filament make possible higher power output at comparatively low plate voltages.

The screen grid eliminates delicate adjustments in changing operating frequencies. Complete modulation may be accomplished with relatively low audio power by varying screen grid bias.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Filament Voltage</td>
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</tr>
<tr>
<td>Filament Current, Amperes</td>
<td>3</td>
</tr>
<tr>
<td>Average Plate Resistance, Ohms</td>
<td>70,000</td>
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<tr>
<td>Average Mutual Conductance, micromhos</td>
<td>1,430</td>
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<tr>
<td>Average Amplification Factor</td>
<td>100</td>
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<tr>
<td>Approximate Direct Inter-electrode Capacities:</td>
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<tr>
<td>Plate to Control Grid</td>
<td>0.2 MmF</td>
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<tr>
<td>Plate to Filament and Screen Grid</td>
<td>6.8 MmF</td>
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<tr>
<td>Control Grid to Filament and Screen Grid</td>
<td>12.2 MmF</td>
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<td>Maximum Plate Voltage, D. C.</td>
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<td>Maximum Plate Dissipation, Watts</td>
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<td>Maximum Screen Grid Potential, Volts</td>
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<td>Maximum Screen Grid Dissipation, Watts</td>
<td>9</td>
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<tr>
<td>Maximum Overall Length</td>
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<tr>
<td>Maximum Diameter</td>
<td>2 7/16&quot;</td>
</tr>
</tbody>
</table>

For booklet describing this and 25 other Western Electric tubes for amateur use, write to Graybar Electric Co., Graybar Building, New York, N. Y.

Western Electric

RADIO TELEPHONE BROADCASTING EQUIPMENT

Distributed by GRAYBAR Electric Co.

Plate Supplies to Conform to the New Regulations

(Continued from page 13)

should all have equal capacities so the voltage will divide evenly across all units in the string. A further safety precaution is to shunt each one with a 500,000-ohm resistor, as shown in Fig. 3, to help out on equalizing voltages. The 1-watt

I. A. R. U. News

(Continued from page 40)

Special:

We give mention this month to "QSO," the official organ of the Reseau Belge. Appearing monthly, each issue contains sixteen large pages, well printed, with an attractive cream-colored cover. The subjects treated range from quite advanced technical information on current amateur practice to personal items, cartoons, and district notes. The President's Corner usually contains items of interest to international amateurs. The magazine is printed in French. The annual foreign membership of the Reseau Belge, which includes a subscription to "QSO," is 10 belgas, or about $2.00 at current rates of exchange. The address is 33 rue Alphonse Renard, Bruxelles, Belgium.

Ten-Meter Band Still Holding Up

(Continued from page 38)

to send a QSL card to the station heard, as well as reporting this reception to the Experimenters' Section, QST.

And still no signals have been reported from the west coast to any part of the U. S., and we are not certain that many stations are active in that part of the country. If this is the case we should certainly like to suggest that this is ideal experimental stamping ground for the W6 or W7 who has tired of fleetly QSOs on our popular bands for he will find 28 me. to hold charm that other bands do not possess.

A report from W8FFQ just received mentions reception of W6CBQ with strength of R7 at 11:15 p.m. C.S.T. on July 26th.

NEW HIGH FREQUENCY TUBES

Tubes which are between the "50-watter" and the 10 are being developed by several manufacturers. These tubes are essentially high-frequency tubes and will undoubtedly be about on the market when this issue of QST hits the field. The RK-18 which is the Raytheon addition is described elsewhere in QST and samples have been used at W1DF and W1SZ.

C. C. R.

Diga que se lo ha leído en QST — Así se dará Vd. a conocer y ayudará a la vez a QST
As Fixed as the NORTH STAR
is the unswerving dependability of
CARDWELLS

Put the same faith in Cardwell Condensers that the navigator has in the North Star, for that faith will always be well founded.

The name CARDWELL never has stood, and never will stand, for anything less than the Finest.

The roll of CARDWELL users contains many names inseparably associated with notable achievements—famous Amateurs, scientists, explorers, communication companies, noted manufacturers, the Army, Navy, Signal Corps and Coast Guard—a distinguished company, by whose example you may profitably be guided.

Any reliable supplier should cooperate with you to enable you to get what you want. He can get CARDWELLS for you if he does not keep them in stock. Get what you want—insist on CARDWELLS. Order direct from us if your dealer will not supply you, or let us tell you where you may buy.

CARDWELL MIDWAY "FEATHERWEIGHT" CONDENSERS, RECEIVING and TRANSMITTING
CARDWELL "STANDARD" MODELS FOR RECEIVERS and MEDIUM POWER TRANSMITTERS
CARDWELL 16-8 TRANSMITTING CONDENSERS FOR LARGER TRANSMITTERS
CARDWELL HIGH VOLTAGE CONDENSERS FOR COMMERCIAL, RADIO-TELEGRAPH and BROADCASTING STATIONS
CARDWELL S-2244 OIL DIELECTRIC FIXED CONDENSERS FOR HIGH FREQUENCY FURNACES and TUBE BOMBARDERS
THERE'S A CARDWELL FOR EVERY TUBE, PURPOSE and POCKETBOOK

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

"THE STANDARD OF COMPARISON"

Say You Saw It in QST — It Identifies You and Helps QST
HAS WRITTEN a fascinating new book that every radio amateur ought to have. It's called "Life's Place in the Cosmos" but don't let that worry you—it's right down the ham's alley. First you're interested in it because H. P. M. wrote it and you'd like to know what he thinks about. He does think, and he can write most entertainingly about it. Anybody has all the right to run away from this book if he suspects it is some fanciful rubbish on the cosmic significance of life, or something of that sort. But it isn't—it's about the cosmos and what makes it tick. It isn't a textbook, either—it's a lively readable human narrative of the facts and fancies of man's newer knowledge, in the sort of philosophy that all of us like to do. H. P. M. gives you the newer science in a way you'll like and understand, he takes up the case of our different planets in turn and analyzes the possibility of life's existence there and the chances for QSO by ham radio, with the new astronomy he takes you to distant star clusters and spiral nebulae and explains the unbelievable workings of the cosmos of island universes—where we came from, why we're here, what's going on around us—and all of it in the language of a practical amateur. With the interest you have, as a radio amateur, in the world of physics, we know that you'll never regret the purchase of Mr. Maxim's new book.

Profusely illustrated with some of the best astronomical photographs ever taken

$2.50
POSTPAID ANYWHERE

EDWIN VALENTINE MITCHELL, Inc.
AUTHORIZED DISTRIBUTOR to the RADIO AMATEUR
29 Lewis Street Hartford, Conn.

pigtail resistors should be big enough. Those who prefer to wind their own chokes will find plenty of data in The Radio Amateur's Handbook.

It doesn't look like such a tough proposition to get an adequate filter. The fellows whose transmitters now comply with the old regulations will not find the new regs a very great hardship, because they already have a low-power end that can go on the air if rectifiers and filters for the high-power stages cannot be installed immediately. The ones that need to be toned down a bit are those birds with very raw a.c. and so-called r.a.c. on self-excited transmitters that wander all over the map, in defiance of regulations that have been in existence a long time.

Southeastern Division Convention

(Continued from page 10)
of the Birmingham Amateur Radio Club. The best of cooperation is being given to make this convention one of the outstanding affairs and your support by attending is asked. Good talks, entertainment and good fellowship are guaranteed. The fee is $3.00 with special rates for the ladies. Write S. Jeff Bayne, RFD 9, Box 124, Birmingham, Ala.

<table>
<thead>
<tr>
<th>Date</th>
<th>Schedule Station</th>
<th>Date</th>
<th>Schedule Station</th>
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<tbody>
<tr>
<td>Sept. 1 B</td>
<td>W9XAN</td>
<td>Oct. 4 A</td>
<td>W6XK</td>
</tr>
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<td>Oct. 6 BB</td>
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<td>Oct. 7 A</td>
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<td>Sept. 9 HX</td>
<td>W9XAN</td>
<td>Oct. 8 C</td>
<td>W6XK</td>
</tr>
<tr>
<td>Sept. 10 C</td>
<td>W6XK</td>
<td>Oct. 13 A</td>
<td>W6XK</td>
</tr>
<tr>
<td>Sept. 15 A</td>
<td>W6XK</td>
<td>Oct. 15 C</td>
<td>W1XP</td>
</tr>
<tr>
<td>Sept. 17 C</td>
<td>W1XP</td>
<td>Oct. 18 A</td>
<td>W1XP</td>
</tr>
<tr>
<td>Sept. 20 A</td>
<td>W1XP</td>
<td>Oct. 20 B</td>
<td>W6XK</td>
</tr>
<tr>
<td>Sept. 22 B</td>
<td>W9XAN</td>
<td>Oct. 25 BB</td>
<td>W1XP</td>
</tr>
<tr>
<td>Sept. 27 BB</td>
<td>W6XK</td>
<td>Oct. 27 B</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Sept. 29 B</td>
<td>W9XAN</td>
<td>Oct. 30 B</td>
<td>W6XK</td>
</tr>
</tbody>
</table>

STANDARD FREQUENCY SCHEDULES

<table>
<thead>
<tr>
<th>Time (p.m.)</th>
<th>A</th>
<th>B</th>
<th>Sched. and Freq. (kc.)</th>
<th>Time (p.m.)</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00</td>
<td>7000</td>
<td>4:00</td>
<td>7000</td>
<td>14,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00</td>
<td>7000</td>
<td>4:00</td>
<td>7000</td>
<td>14,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:16</td>
<td>7200</td>
<td>4:16</td>
<td>7200</td>
<td>14,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:32</td>
<td>7200</td>
<td>4:32</td>
<td>7300</td>
<td>14,300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:40</td>
<td>7300</td>
<td>4:40</td>
<td>7300</td>
<td>14,400</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The time specified in the schedules is local standard time at the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time.

TRANSMITTING PROCEDURE

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

Dite che l'avete visto nel QST — Ciò vi identifica ed aiuta QST
PURE DC

EVERY INCH A BATTERY

NATIONAL CARBON COMPANY, INC.

GENERAL OFFICES: NEW YORK, N. Y.
UNIT OF UNION CARBIDE AND CARBON CORPORATION

Say You Saw It in QST — It Identifies You and Helps QST
RADIO FREQUENCY CHOKEs

TYPE R-152

An Isolantite-mounted choke for medium- and high-power transmitters, with a continuous universal winding divided in five tapered sections. Metal base for mounting, insulated for 10,000 volts.

- Inductance: 4 mH
- Distributed Capacity: 1 mmf.
- D.C. Resistance: 10 ohms
- Continuous Current Rating: 6 amps.
- Intermittent Current Rating: 8 amps.
- List Price: $2.25

(TYPE R-100)

An Isolantite-mounted choke for H.F. receivers and low-power transmitters, with a continuous universal winding divided in four universal-wound sections. For pigtail connection or standard resistor mountings.

- Inductance: 2.5 mH
- Distributed Capacity: 1 mmf.
- D.C. Resistance: 50 ohms
- Current Rating: 125 mils.
- List Price: $0.75

(Www.5000-Kc. Transmission

The 5000-kc. transmissions of the Bureau of Standards' station, WWV, are given every Tuesday continuously from 12:00 noon to 2:00 p.m., and from 10:00 p.m. to midnight, E.S.T. The accuracy of these transmissions is to better than 1 cycle (one in five million).

J. J. L.

West Gulf Division Convention

Hotel Hilton, San Angelo, Texas, October 13th and 14th

THe San Angelo Radio Club extends a cordial invitation to all amateurs to attend the Seventh Annual West Gulf Division Convention. A fine program is being prepared with plenty of entertainment for every one.

Further information may be obtained from Ray M. Samberson, Chairman, P.O. Box 153, San Angelo, Tex.

Amateur Radio at the National Soaring Meet

(Continued from page 51)

ity of flea-powered ultra-high-frequency sets for communication of this type (by directing sailplanes flying in formation, for instance). The lack of any prolonged or long-distance soaring prevented full exploitation of the sailplane as the ideal ultrahigh frequency station location for DX work. We had to content ourselves with duplex communication over distances up to 8 miles — the greatest DX flown by one of the radio-equipped ships. At the next meet, though, we amateurs will be there with a bunch of distance records all ready to be pegged up.

R. A. H.

Experimenters' Section

(Continued from page 87)

Now, the trick is to make them equal. If $R$ is 250,000 ohms and $C$ is 0.5 µf, $C'$ is 0.25, and if $C$ is 0.06 µf and $R'$ is 2 megohms, $C'/R'$ is also about 0.125, and you can use as big a decoupling resistance as other considerations will allow, without getting boominess or motorboating.

Decoupling circuits are likely to cause undue low-frequency gain in choke- or transformer-coupled circuits unless something else causes a loss of low-frequency gain at the same time.

H. S. Gowen, VE3MQ, Stratford, Ont.
Log Books. Bound with heavy paper covers. 8½ x 10¾. Contains 39 log pages, and same number of blank pages for miscellaneous notes. Also list of Q sigs, message number sheet and sheet of cross-section paper. 40c each or 3 for $1.00. Postpaid.

Message Blanks. Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size 8½ x 7¼. Put up in pads of 100 sheets. One pad postpaid for 35c or 3 pads for $1.00.

A.R.R.L. Letterheads. Write your radio letters on League stationery—it identifies you. Lithographed on 8½ x 11 heavy bond paper. Postpaid. 100 sheets, 50c; 250 sheets, $1.00; 500 sheets, $1.75.

Message Delivery Cards. Neatest, simplest way to deliver a message to a near-by town. On U. S. stamped postals 2c each. On plain cards (for Canada, etc.) 1c each postpaid.

The American Radio Relay League—West Hartford, Conn.
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

Super-Regeneration?

The inveterate experimenter of experimenters, John L. Reinartz, has been working recently with an unusual type of receiver which might be called for the moment "super-regenerative" but which uses a "squegging" or squealing ultra-high frequency oscillator to supply the interruption frequency. The feature of particular interest in the receiver is its apparent ability to give well-defined amplification of c.w. signals in marked contrast to the usual super-regenerator which operates satisfactorily only on modulated signals.

The Reinartz lay-out consists of a normal autodyne receiver fitted, as it happens, with a screen-grid detector and pentode audio amplifier. The interruption frequency unit comprises a Type 53 tube arranged as a unity-coupled ultra-high frequency oscillator operating in the vicinity of 56 mc. The grid-leak of this oscillator is made variable and, in operation, is increased in value to the point where the oscillator "squeals." This condition can be checked by listening to the oscillator with a normal 56-mc. super-regenerative receiver, in which case the output is revealed as a conglomeration of audio beats and "hash."

Coupling between this "squegging" oscillator and the receiver is obtained in Reinartz's experimental rig merely by feeding oscillator and receiver from the same power supplies and by placing the oscillator on the table in the immediate vicinity of the receiver. Careful orientation of the oscillator tank coil with respect to the receiver grid coil usually is necessary.

The regenerative receiver is adjusted so that "quiet" oscillation is obtained at maximum setting of the regeneration control. Upon application of the output of the ultra-high frequency oscillator, regeneration in the receiver appears to be increased, full-throated squealing then being possible at maximum regeneration setting. Below this squealing point is where Reinartz then operates the set, obtaining, in the process, considerable amplification of c.w. signals. To date, experiment on the receiver has not been carried to the point where its operation is fully understood. We suggest the idea, however, as one of undoubted interest to the advanced worker.

— R. A. H.
**TYPICAL GROSS VALUES!!**

**THE NEW “20-W JR.” Crystal Controlled Transmitter Kit, $10.95**

This efficient little transmitter is very low priced, making it possible for anyone to use crystal control at last, and the cost is such that most people can get the parts together for a self excited rig of their own. The “20-W Jr.” is simple to wire and get on the air and the inexperienced operator will have success with it. The size of the transmitter is only 6" x 7½" and is therefore an excellent point for portable use. A low milliammeter is provided for tuning purposes, the transmitter and jacks are provided for this purpose, for each stage. The plug-in crystal holder is supplied with the kit at no additional cost. The “20-W Jr.” uses one 20 MHz crystal oscillator, one 40 as buffer or doubler and two 40’s in the amplifier. One of these two tubes is supplied with the kit, the other 20, 40, or 50 meters, 50 cents extra for the set of 160 meter coils. When ordering mention your choice of coils.

<table>
<thead>
<tr>
<th>Type</th>
<th>80 or 160 meter Crystal</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5 cut crystals supplied for only $2.75 if purchased with the “20-W Jr.” kit. Hoyt milliammeter if purchased with the kit, only $1.25. Power Supply Kit, $6.95.</td>
<td></td>
</tr>
</tbody>
</table>

**The “EAGLE” Three-Tube Short Wave Receiver**

Only finest material used throughout — employs one ‘32 R.F., one ‘32 Detector and one ‘33 Pentode wave receivers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Secondaries</td>
<td>$1.95</td>
</tr>
<tr>
<td></td>
<td>Thord. No. T-2458 double 18 H 250</td>
<td>$6.50</td>
</tr>
<tr>
<td></td>
<td>Thord. 15 H 250 MA</td>
<td>$3.50</td>
</tr>
<tr>
<td></td>
<td>Watt 8½” Lonll with Variable Sliders</td>
<td>$6.50</td>
</tr>
<tr>
<td></td>
<td>Special 10-12 Volt 7.5 ampere filaments are fed from 2.5 volt 10 amperes for 866’s</td>
<td>$2.50</td>
</tr>
<tr>
<td></td>
<td>High Grade filaments shielded in metal cases, center tapped secondaries. 2.5 volt 10 amperes for 866’s</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

**MONITOR USES FULL SIZE DRY CELLS**

A real advantage for continuous monitoring. Again Jerry may say this is SOME job, has back of panel vorter dial, aligned to get the proper filament size and windings as above — at 300 MA having 720 volts each side of C.T. Special $6.00

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 V</td>
<td>6 amp.</td>
<td>$10.00</td>
</tr>
<tr>
<td>1200 V</td>
<td>5 amp.</td>
<td>$8.00</td>
</tr>
<tr>
<td>900 V</td>
<td>4 amp.</td>
<td>$6.00</td>
</tr>
<tr>
<td>750 V</td>
<td>3 amp.</td>
<td>$4.00</td>
</tr>
<tr>
<td>600 V</td>
<td>2 amp.</td>
<td>$3.00</td>
</tr>
<tr>
<td>500 V</td>
<td>1 amp.</td>
<td>$2.00</td>
</tr>
<tr>
<td>450 V</td>
<td>½ amp.</td>
<td>$1.50</td>
</tr>
</tbody>
</table>

**SOLID ENAMELED ANTENNA WIRE**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>.155&quot;</td>
<td>$1.25</td>
</tr>
<tr>
<td>.165&quot;</td>
<td>$1.50</td>
</tr>
<tr>
<td>.185&quot;</td>
<td>$1.75</td>
</tr>
<tr>
<td>.205&quot;</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

**EXTRA SPECIAL**

- **Sangamo 5000 Volt 0.002 condensers** | $5.00 |
- **Baldwin Type ‘C’ Mica Dia, Phones 3.75** | $10.00 |
- **Acme 4, S.W. coils only** | $15.00 |
- **E-S Brade'yStats 50000 ohm for C** | $5.00 |

**GROSS SPECIAL POWER TRANSFORMER**

For use with 33 tube will give an output of 500 volts D.C. at 50 MA with choke input. Run your entire R.F. and Class B detectors. No. 14 (any length) per 100 ft. | $1.25 |

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2&quot;</td>
<td>$1.00</td>
</tr>
<tr>
<td>1.1&quot;</td>
<td>$0.90</td>
</tr>
<tr>
<td>1.0&quot;</td>
<td>$0.80</td>
</tr>
<tr>
<td>0.9&quot;</td>
<td>$0.70</td>
</tr>
<tr>
<td>0.8&quot;</td>
<td>$0.60</td>
</tr>
</tbody>
</table>

**NEW SYLVANIA CARBON PLATE TUBES**

- **203A’s** | $16.50 |
- **852’s** | $22.50 |

**BLACK SHRIVELED SHIELD BOXES**

- **Length** | **Height** | **Width** | **Price** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>$2.50</td>
</tr>
<tr>
<td>9&quot;</td>
<td>9&quot;</td>
<td>9&quot;</td>
<td>$2.95</td>
</tr>
</tbody>
</table>

**HOYT ANTENNA METERS**

Hot wire antenna meters, 1½, 3 and 5 ampere ranges. Why do without antenna meters when you can buy them at this Special price?

**GUARANTEED TUBES**

Heavy Duty isolante type top 866... 2.15
888 or 871... 1.75
85 and 74 A... 1.25
751 Phoenix... 0.90
750 Phoenix... 0.90
740 Phoenix... 0.90
700 Phoenix... 0.90

**MONITOR USES FULL SIZE DRY CELLS**

Three Tubes Tested In Your Receiver... $3.00

**TYPICAL GROSS VALUES!!**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**20% deposit with all C. D. orders. Remit by M. O. Include Postage.**
New Intermediate-Power Transmitting Tubes

(Continued from page 84)

Transformers can be made at home by following the procedure outlined in December, 1931, QST, the turns ratio being determined by the load into which the transformer is to work. The input transformers have to handle only a few watts and will present no particular difficulty. The design given in December, 1931, QST for a pair of 45 drivers can be used by reducing the secondary turns to conform to the ratios given above.

The Sylvania 830

The 830 is a hussy tube which looks a good deal like a 203-A but has a standard four-prong base, the pin connections being the same as those of the 10. The characteristics are in fact a good deal like those of the 10 — but the tube is built to stand higher voltages and higher plate currents. To make this possible the 830 has a heavy thoria-1 ated filament and an isolantite base. The plate is graphite — the same type of construction that is a feature of the newer 203-A — 211 — 845 group of tubes. Here are the ratings:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament voltage</td>
<td>7.5 volts</td>
</tr>
<tr>
<td>Plate voltage</td>
<td>750 volts</td>
</tr>
<tr>
<td>Maximum r.f. grid current</td>
<td>6.4 ma.</td>
</tr>
<tr>
<td>Power output</td>
<td>35 watts</td>
</tr>
<tr>
<td>Interelectrode capacitances</td>
<td></td>
</tr>
<tr>
<td>Grid to plate</td>
<td>0.3 pF.</td>
</tr>
<tr>
<td>Plate to filament</td>
<td>1.0 pF.</td>
</tr>
<tr>
<td>Grid to plate</td>
<td>1.0 pF.</td>
</tr>
</tbody>
</table>

The RCA-800

The RCA-800 is a smaller edition of the 852. Although it has an ordinary pear-shaped bulb, only the filament connections are brought out to the standard 4-prong base. The plate and grid leads go to a pair of caps set like horns on the top of the bulb. As a result of this construction the interelectrode capacities are very low and the tube can stand fairly high voltages. The filament is thoriated tungsten. The following tentative ratings have been placed on the 800:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament voltage</td>
<td>7.5 volts</td>
</tr>
<tr>
<td>Plate voltage</td>
<td>1000 volts</td>
</tr>
<tr>
<td>Max. plate current</td>
<td>35 ma.</td>
</tr>
<tr>
<td>Power output</td>
<td>35 watts</td>
</tr>
<tr>
<td>Interelectrode capacitances</td>
<td></td>
</tr>
<tr>
<td>Grid to plate</td>
<td>0.3 pF.</td>
</tr>
<tr>
<td>Plate to filament</td>
<td>1.0 pF.</td>
</tr>
<tr>
<td>Grid to plate</td>
<td>1.0 pF.</td>
</tr>
</tbody>
</table>

The tube has been rated conservatively at 35 watts output on frequencies up to 60 megacycles. It will oscillate at 200 mc. (1.5 meters) in regular circuits. From the characteristics it appears that the 800 also will be well suited to Class-C audio; no curves are available at this writing, however, so definite design information will have to be left for a later issue.

1 "High-Power Performance from the Small 'Phone Transmitter," QST, December, 1931.
SEE YOUR DEALER

Type BC3, supplied within 5 Kcs, $5.75; or your choice from dealer's stock, $4.95.

BCX type, unmounted X-cut crystals—your choice from dealer's stock, $4.50.

Quartz crystals manufactured to your frequency and tolerance from 20 Kcs to 15 Mcs.

Member NRA—We Do Our Part

The NEW BLILEY CRYSTAL
gives accurate frequency control

Here is a new shaped X-cut quartz crystal with greater power output;
Mounted in the new BC3 molded bakelite holder, with polished chromium electrodes;
Incorporating tube-pin plug-in arrangement for any 5-prong socket;
Giving increased efficiency, lightness, compactness, and featuring the exposed heat ‘radiating’ electrode.
It is mountable in any direction...such as panel, sub-panel or baseboard.
The BC3 unit oscillates on a single frequency...no wide frequency changes peculiar to Y-cuts.
Supplied to your exact specified frequency (in Kcs) and temperature in the 40, 80 and 160 meter bands.
Maximum frequency tolerance, mounted in your transmitter, now only 0.03%.
Guaranteed fully satisfactory—and yet the $6.85 price is only

Complete BLILEY PIEZO-ELECTRIC CO.
227 Union Station Building
ERIE, PA.

REMEMBER

ALUMINUM BOX SHIELDS Genuine "ALCOA" stock, silvered finish, 5 x 9 x 1 $1.65. 10 x 6 x 1 $2.45. Ask Size to Order. SOMETHING NEW! Your call letters or any marking for your panel, on BLACK aluminum ribbon. Looks like engraving on bakelite. $6 each, sample, $8.

For condenser or velocity mike 1½ mils. $5 net. 2½ ft. 3½ ft. 4 section r.f. choke, 25c. ½ watt Neon lamp, 35c.

New Master Teleplex on demonstration.

BLAN, the Radio Man, Inc. 177 Greenwich St. New York City

Do You Want to Be a Good Fast Radio Operator?

It's Easy with The NEW MASTER Code Teaching Machine

Instead of struggling along for months in a hit-or-miss fashion, you can now become a GOOD FAST OPERATOR in half the time and with half the effort. We furnish Complete Code Course and lend you the New Master Teleplex. We pick you up at your present speed. Guide you step by step. TELEPLEX has instructed more students in code in the past ten years, than all other systems combined...it is the only instrument ever produced that will record your own sending in visible dots and dashes, and then repeat it to you audibly on headphones...enables you to make your own records. Provides unlimited practice material at whatever speed required...used by U. S. Army and Navy; R. C. A., A. T. & T. Co., and principal schools. Get started now! Only a few minutes' practice each day is necessary.

Write for folder Q-21 giving full particulars

TELEPLEX COMPANY
76 Cortlandt Street
New York, N. Y.

Radio Operating Radio Servicing—

Prepare for the new Government Radio Operating license examinations; Radio Operator, Marine and Broadcasting, Also Radio Amateur Telegraph and Telephone. Resident courses. Write for booklet "Opportunities in Radio."

West Side YMCA Trade & Technical Schools
4 West 63rd Street, New York City

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

BLILEY CRYSTAL
Full size view of BC3 HOLDER

69
American's Outstanding Value

A $16.25 Outfit at $4.95

Postpaid on receipt of remittance or sent C.O.D. plus charges

Here is what you get in the most amazing value ever offered to Amateurs, Public Address and Sound Equipment organizations.

1. Lifetime Model 6 D. B. Mike, List $10.00. Sold separately at $7.50.
2. Lifetime Model 6 Stand, List $3.50. Sold separately at $1.75.
3. Shielded Matching Transformer, $3.75. Sold separately at $1.45.
4. 8 Feet — 3 Conductor Cable, $4.50.

LIFETIME MODEL No. 6 Double Button Microphone is ruggedly constructed — beautifully finished in bright polished aluminum, is 5 1/2" in diameter and 3 1/2" thick overall. Has a gold plated stretch diaphragm of special construction, gold plated contact buttons, 200 ohms each, the very finest carbon granules, and has a frequency of between 40 and 3500 cycles with 4.5. From all over the land hams tell us that this mike "is the best regardless of price," "exceeds all expectations," you're doing a great thing for the hams," "delighted with its performance," etc. ORDER THIS OUTFIT TODAY — with complete assurance that if you do not consider it the greatest value you have ever received — send it back immediately and your money will be promptly refunded.

Send for our literature of other outstanding values in Microphones and Electronic-Dynamic Sound Equipment.

The LIFETIME CORP.
6224 Dorr St.
Toledo, Ohio

If you want to be a High Speed, Expert Operator write CANDLER for Free Advice

GET YOUR SPEED where the Champions got theirs

CANDLER Scientific Method, High Speed Telegraphing


John C. S. Code Guild, Regular Daily Practice Schedules on Short Waves. = Get Details

WALTER H. CANDLER
World's Only Code Specialist, Instructs You Personally

Candler System Co., Dept. 5-c
6343 South Kedzie Ave.
Chicago, Illinois

Delta Division Convention
Hotel Gayoso, Memphis, Tenn., Oct. 20–21

The Memphis Amateur Radio Club is sponsoring the Third Delta Division Convention and extends a cordial invitation to all radio amateurs. Fee now, $2.00 — at the desk $2.50. For reservations and further information address Mr. E. C. Frase, Jr., 2001 Felix Ave., Memphis, Tenn.

A New Continuously-Variable Auto-Transformer

HERETOFORE, the problem of compensating for line-voltage changes has been met by the use of rheostats or tapped transformers. Both have their disadvantages; a rheostat can only regulate voltage downward and introduces a power loss which is sometimes appreciable, while a tapped transformer does not give smooth voltage control and necessitates an interruption of the current when taps are changed. These inconvenient features have been overcome in the design of a continuously-variable auto-transformer recently introduced under the name of “Variac.”

The Variac has a toroidal core wound with a single layer of wire over which a brush contact slides. Although the brush short-circuits adjacent turns in its travel, the circulating current is not great because the potential difference between turns is only of the order of one-half volt and the material of which the contact brush is made, carbon, introduces enough resistance to limit the current flow. The heat generated is quickly radiated by the metal brush holder. The output voltage can be regulated closely because of the small potential difference between turns.

Output voltages from zero to 180 volts can be obtained from a 115-volt source simply by turning the dial on the Variac. The dial scale is calibrated in 5-volt steps and the output voltage can be set to within 2.5 volts without metering provided the input voltage is 115 and the rated load current, 5 amperes, is not exceeded. The instrument will obviously be useful as a primary regulator for filament transformers, as a line-voltage compensator, or as a primary plate-power control for transmitters.

The Variac is made by the General Radio Company, Cambridge, Mass. It can be obtained in either table- or panel-mounting styles.
The Silver Single-Signal Super

For the advanced, serious amateur and discriminating professional, the type 5A S-S. Super has been developed—with improvements.

It uses no plug-in coils, but with individually shielded r.f., detector and electron-coupled oscillator coils selected by a good switch, tunes from 1500 to 25000 kc. It has band spread ... at any desired point in its range. It has a variable-selectivity crystal filter ... not a makeshift addition but built right into the circuit. It has an electron-coupled beat oscillator, and it uses the new 2A7 detector—electron-coupled signal oscillator tube. It has manual and automatic volume control. It is fully A.C. operated, has its own dynamic speaker, and headphone jack, of course. Yet it is only 17½" long, 10½" deep and 7" high, in its rugged steel cabinet.

And it’s priced low ... lower than non-cry•tal types.

If you didn't hear and see Mac Silver describe and demonstrate it at the convention, send for all the dope on the most advanced receiver made today, and, of course, all details of the McMURDO SILVER, Inc., 1739 Belmont Ave., Chicago

---

EASTERN RADIO INSTITUTE, INC.
Founded 1913
Offers courses in Marine Operating, Broadcasting, Aviati
on Radio, Servicing, Advance Service, Television
and Public Address.
899 BOYLSTON STREET
BOSTON, MASS.

CONDENSERS FOR EVERY PURPOSE
A complete line of oil and electrolytic
transmitting condensers described in
our new 1933 Catalog. Sent free on
request. Write for your copy now.
CORNELL-DUBILIER CORP.
4377 Bronx Blvd. New York City

TRANS-
RECEIVERS!
A small compact 5-meter radio-
phone unit that becomes a trans-
mitter or a receiver at the turn
of a switch. Dimensions 4½ x
5¼ x 6 inches. Uses one type
‘30 and one type ‘33 tube, and
is completely enclosed in an
attractive aluminum case. Has
worked over 50 miles with but
90 volts of plate battery.

$10 MAKES YOU $1,000,000
A simple, sure way to make your station look like a million dollars—
invest in a broadcast type relay rack and panels. And we have what
it takes to make your station sound like $1,000,000. Five-watt power
crystals, non-stretching hard drawn enameled aerial wire, Edison storago
B batteries, QST design reactors, power and pie wound class B trans-
formers, silicon steel, the old reliable mercury arc. Complete trans-
mitters you'll be proud to own. Our list tells the story.
RECTIFIER ENGINEERING SERVICE
4837 ROCKWOOD RD.
CLEVELAND, OHIO

RADIO ENGINEERING
RCA Institutes offers a combined course of high
standard embracing all phases of Radio. Prac-
tical training with modern equipment at New
York and Chicago schools. Also specialized courses and
Home Study Courses under new "No obligation" plan.
Illustrated catalog on request.
RCA INSTITUTES, INC. Dept. ST-9
75 Varick St., New York 1154 Merchandise Mart, Chicago
Recognized Standard in Radio Instruction Since 1909

AMATEURS
West of
Rocky Mountains
We can supply all parts for
the new circuits
Send for your Catalog of
Nationally Advertised
Transmitting and Receiving Parts
at LOWEST PRICES
Amateurs' Headquarters of the West
RADIO SUPPLY CO.
H. A. Demarest, President
912-914 So. Broadway Los Angeles, California
(W6FBI located in Building)

Say You Saw It in QST——It Identifies You and Helps QST
Auto radio is playing the "center ring" these days. Wise dealers and servicemen are using CENTRALAB suppressors because they do not (like some suppressors) take heavy toll of gas consumption.

Central Radio Laboratories — Milwaukee

ELECTRAD AMPLIFIERS Have Tone Fidelity

Five models, using an improved direct-coupled circuit, the newest-type tubes, and ranging from 1.6 watts to 21.9 watts of undistorted power output. Electrad Amplifiers are exceptionally efficient, economical in operation, and have a marvelous, lifelike tone.

List prices are from $32.50 to $195.00, without tubes.

Write Dept. Q-9 for Complete Catalog

ELECTRAD

ELECTION NOTICES

(Continued from page 18)

duties and authority of the Canadian General Manager; and By-Laws 23, 24, 25 and 28, providing for his nomination and election. Copy of the constitution and by-laws will be mailed any member upon request.

2. Voting will take place between November 1 and December 20, 1933, on ballots which will be mailed from the headquarters office in the first week of November. The ballot will list the names of all eligible candidates nominated for the position by League members residing in Canada.

3. Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in the Dominion of Canada have the privilege of nominating any Canadian member of the League as a candidate for Canadian General Manager. The following form for nomination is suggested:

(Place and date)

Executive Committee,
American Radio Relay League,
West Hartford, Conn.

Gentlemen:
We, the undersigned members of the A.R.R.L. residing in the Dominion of Canada, hereby nominate

..............


(Signatures and addresses)

The signers must be Canadian members of the League in good standing. The nominee must be a Canadian member of the League in good standing, and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1933. There is no limit on the number of petitions that may be filed, but no member shall append his signature to more than one petition.

4. Mr. Alex Reid, VE2BE, of St. Lambert, P. Q., is the present Canadian General Manager.

5. This election is the constitutional opportunity for members to put the man of their choice in office as the Canadian member of the A.R.R.L. Board of Directors. Members are urged to take the initiative and file nominating petitions immediately.

For the Board of Directors:
K. B. Warner, Secretary.
West Hartford, Conn., August 1, 1933.

Strays

The Tool-Box Transceiver

In connection with the 56-mc. transceiver described in August QST, W1CTW informs us that failure to secure oscillation may result with the grid-leak connections shown in Fig. 1 of the article. The two resistors, R1 and R2, should be connected from the lower end of L2 to ground (through the switch), instead of directly from grid to ground as shown in the diagram.
It's another of those League publications you simply can't do without—

Information—ideas—suggestions. Practical tips, brainstormst that worked, money-saving dodges, time-saving thoughts. . . . A whole book full of them!

HINTS AND KINKS FOR THE RADIO AMATEUR

(No. 10 in the A.R.R.L. series entitled The Radio Amateur's Library)

For years hams have told us that one of the most practical and valuable features of QST is the Experimenter's Section. But—try to recall when it was you saw that swell (but, alas, only dimly remembered) suggestion for band-spreading, or a click filter, or break-in. What was needed, we were told, was a compilation of all the best ideas, brought under one cover, segregated by subjects, and indexed. And here it is—an intensely practical book, filled out with selected additional material, with dozens of valuable and workable ideas gleaned from the practical station experience of successful amateurs. Chapters on workshop ideas, receivers, transmitters, amateur, phone QRM elimination, keying, power supply, and so on.

An ever-present help in time of trouble, and worth its weight in crystals when you are desperate for an idea.

80 pages in attractive paper covers. Price: 50 cents (no stamps, please), postpaid anywhere.

THE AMERICAN RADIO RELAY LEAGUE, INC., West Hartford, Conn., U.S.A.
Our Regulations Are Revised
(Continued from page 8)


Class B. The requirements for Class B amateur operators' privileges are similar to those for the Class A, except that no experience is required and the questions on radio-
telephone apparatus are not so comprehensive in scope.

Class C. The requirements for Class C amateur operators' privileges shall be the same as for the Class B except the examination will be given by mail. To be eligible for this class of privileges, an applicant must reside more than 125 miles (airline) from Washington, D. C., a radio district office of the Commission, or an examining city. (See Rules 2 (b), 30 and 408.)

405. An applicant for any class of amateur operator's privileges who has held a radiotelephone second class operator's license or similar equivalent grade license, or who has been accorded unlimited amateur radiotelephone privileges, within five years of the date of application may only be required to submit additional proof as to code ability and/or knowledge of the laws, treaties, and regulations affecting amateur licensees.

406. An applicant for the Class B or C amateur operator's privileges who has ever held a radiotelegraph third class operator's license or higher, or an equivalent commercial grade license, or who has held an amateur extra first class license within five years of the date of application may be accorded a license by passing an examination in laws, treaties, and regulations affecting amateur licensees.

407. An applicant for the Class C amateur operator's privileges must have his application signed in the presence of a notary public by a licensed radiotelegraph operator other than an amateur operator possessing only the Class B class privileges or former temporary amateur class license, attesting to the applicant's ability to send and receive messages in plain language and Morse code (6 characters to the word) at a speed of not less than ten words per minute. The code certification may be omitted if the applicant can show proof of code ability in accordance with the preceding rule.

408. Forms for amateur station and/or operator license shall be obtained by calling or writing to the Inspector-in-Charge of the radio inspection district in which the applicant resides. Upon completion of the forms they shall be sent back to the same office where the final arrangements are made for the examination: Provided, however, in the case of applicants for the Class C amateur operator's privileges, the forms and examination papers when completed shall be mailed direct to the Federal Radio Commission, Washington, D. C.

409. The percentage that must be obtained as a passing mark in each examination shall be at least 75 out of a possible 100. No credit will be given in the grading of papers for experience or knowledge of the code. If an applicant answers only the questions relating to laws, treaties, and regulations affecting amateur licensees, he shall be accorded the right to omit other subjects because of having held a recognized class of license, a percentage of 75 out of a possible 100 must be obtained on the examination in the code.

410. An amateur station license shall be issued so as to run concurrently with the amateur operator's license and both licenses shall run for three years from the date of issuance. If either the station license or the operator's license is modified during the license term, both licenses shall be reissued for the full three-year period. If, however, if an operator's license is modified only with respect to the class of operator's privileges, the old license may be endorsed in which case the expiration date will not change.

411. No applicant who fails to qualify for an operator's license will be reexamined within ninety days from the date of the previous examination.

412. Any attempt to obtain an operator's license by fraudulent means or by attempting to impersonate another, or by copying or divulging questions used in examinations, will constitute a violation of the regulations for which the licensee may suffer suspension of license or debarment from further examination for a period not exceeding two years at the discretion of the licensing authority.

413. Any license applying for a duplicate license to replace an original which has been lost, mutilated, or destroyed, shall submit an affidavit to the Commission attesting to the facts regarding the manner in which the original was lost. Duplicates must be issued in form identical to the original, and will be marked "duplicate" on the face of the license.

414. Licenses are not valid until the oath of secrecy has been executed and the signature of the licensee affixed thereto.

415. All examinations, including the code test, must be written in longhand by the applicant.

416. The following is a list of the amateur call areas, shewing the territory embraced in each area.

[We omit the well-known list of the nine call areas. — Ed.]
HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature or interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any kind character will be accepted, nor can any special typographical arrangement, such as all or part underlining or boldfacing, etc., be used. Each word must tend to make an advertisement stand out from the others.

(3) Advertisements in the classified columns are payable in advance. The rate is 15c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or counter checks accepted. No cancellation or refund allowed.

(5) Closing date for Ham-Ads is the 26th of the second month preceding the publication month.

(6) A special rate of 70c per word will apply to advertising which is clearly indicated by a message in capital letters, "Radio manufacturers" or "Radio apparatus for sale or trade." This advertisement must be non-commercial in nature and is placed and signed by a member of the American Radio Relay League.

(7) Special discount rates are available for any ad in this column if by a member of the American Radio Relay League takes the 70c rate. An attempt to deal in apparatus or commodity for profit, except as noted in paragraph (6) above, and commercial and takes the 15c rate. Provisions of paragraph (1), (2), (3) 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¢. Kilding, Kent, Ohio.


WANTED — prices on low power 160 meter phone.


WANTED, Jewell 444 set analyzer or similar for cash. Write W4AGH-PDC, Lum­berton, N. C.

QUALITY standards, SELL ham set cheap. W5CMS, Itasca, Texas.

SELLS xtal controlled transmitter, UV801 final stage, $345. W2BQ

CONVENTIONS. Free announcements in R/G.

QSL cards, two color, cartoons, message blanks, stationery, snappy service. Write for free samples to-day, W1WEB, 16 Stearns Ave., Lowell, Mass.

ESCO 1000 volt 300 watt mc, filament and plate, two 203As. First $35. Want 852As, superior receiver. WSAN0.

PAST and slow relays, 50¢ each. Send stamp for list. R. W. Squires, 11300 Hermosa, Chicago.


CryStalS: SELL for cash, 1000 volt 250 watt motor generator, d.c. $55.

SUSPENDED publications wanted. R/G.

NATIONAL ACSW3 with power supply, 100, 80, 40, 20 meter coils wobbles very little. Full set overclock takes it. Ted Goodison, 300 E. Edward St., Union, N. Y.

WANTED — complete station equipment for power cw. W8JRQ, 3029 Orchard St., Waco, Tex.

FORSALE: Pilot super-wasp d.c. with coils. $10. New SW3, $20. 50 or 60 volt coils, $5. 100 volt coils, $10. 212Dw—$20.00. 212Ds—$16.00. Cardwell 166Bs—$20.00. Fast and slow relays, 50¢ each.

TELEPLEX with tapes and codes, $10. Ernest Lang, 411 Bergencine Ave., Union City, N. J.

WANTED — station equipment for power cw. W8JRQ, 3029 Orchard St., Waco, Tex.

TRANSFORMER headquarters. 4,50--0-450, 200ma. 5V-4A, $25. 750--0-750, 150ma. 15V-3A, $40. 1500--0-1500, 75ma. 30V-1A, $125. 300--0-300, 50ma. 60V-½A, $100.

INDEX — your index is yours for $1. Will be allowed. W3BHG.


WANTED — complete station equipment for power cw. W1WEB, 16 Stearns Ave., Lowell, Mass.


GUARANTEED crystals. $1.50. W8EGR.

QSLs, $50 per 100. Samples. 2143 Indiana Ave., Columbus, Ohio.

SELL trade tubes, 212Ds, 211Es, 214Js, 212Ds, 211Es, 211Ds, 276As, 249As, 560s.

SUSPENDED publications wanted. R/G.

FOR SALE: Pilot super-wasp d.c. with coils. $10. New SW3, $20. 50 or 60 volt coils, $5. 100 volt coils, $10. 212Dw—$20.00. 212Ds—$16.00. Cardwell 166Bs—$20.00. Fast and slow relays, 50¢ each.

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WANTED — complete station equipment for power cw. W8JRQ, 3029 Orchard St., Waco, Tex.

TRANSFORMER headquarters. 4,50--0-450, 200ma. 5V-4A, $25. 750--0-750, 150ma. 15V-3A, $40. 1500--0-1500, 75ma. 30V-1A, $125. 300--0-300, 50ma. 60V-½A, $100.

INDEX — your index is yours for $1. Will be allowed. W3BHG.


WANTED, Jewell 444 set analyzer or similar for cash. Write full details. W8EGR.

SELL xtal controlled transmitter, UV801 final stage, $345. W2BQ.

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PAST and slow relays, 50¢ each. Send stamp for list. R. W. Squires, 11300 Hermosa, Chicago.


CryStalS: SELL for cash, 1000 volt 250 watt motor generator, d.c. $55.
FOR sale — Universal double button, Fifty push-pull and forty-five push-pull amplifiers, super wasp receiver. Glenn Watt, Chanute, Kans.

WANTED: complete transmitters, 20, 75 and 150 watt; six 50-watt sockets at $85; transformer for "fifty," $3.50; several 869s, 210s, etc. Stamp for lists. Howard, 5520 Lake St., Chicago (Phone Austin 1185).

WANTED — meters, receivers, transmitting parts. What have you? W8ER.


HAMS attention — draw up that panel job. Identify those dials, meters, jacks, switches, with etched name-plates, nickel finish. Send 65 stamp for list and sample. Curley, 5WHZU, 15253 Monticello St., Detroit, Mich.

WILL trade Gibson L-4 guitar, excellent condition, for pair of 852s, 860s, or larger. John MacAllister, 3212 Chambers St., Sioux City, Iowa.

CLASS B transformers — for 46s, $4.95 pair. Universal transformers for 2 or 4 46s, 210s, etc., $7.75 pair, 70 Watts of audio from 46s. Write for details. W8UD, Douglas, Mich.

WAC, 505 watt, 4 stage, tシャル panel type transmitter, A-1 condition. Sell tubes and everything complete, $60. Photo. W9ARL.


QSLS, 75¢ a 100, two colors. W9DHG. 1816 5th Ave., N., Minneapolis, Minn.


TRADE, seli: RCA 211s, 304As, 851s, 861s, 212As, d.e.-a.c. converters, SW5s, meters, anything, W9ARA.


CRYSTALS, x or y cut finished quartz, 1750 to 4000 kc, 10-cc. requested frequency c.o.d. $2.50, $2.50. Plug-in holders, $1.23. Schueler Radio Service, Sandusky, Ohio.


TRADE, sell: RCA 211s, 304As, 851s, 861s, 212As, d.e.-a.c. converters, SW5s, meters, anything, W9ARA.

PORT ARTHUR COLLEGE
FORT ARTHUR, TEXAS

save yourself 50c a year (newstand copies cost $3)
set your copy of QST first
be sure of getting your copy (newstands often sold out)
be eligible for appointment or election to A.R.R.L. offices
be eligible to sign petitions for your Director, your representative on the A.R.R.L. Board
be eligible to vote for Director and Section Comm. Manager (only A.R.R.L. members receive ballots)
leam the strength of your support to the organization which represents YOU at Madrid, at Washington — at all important radio conferences
have YOUR part in the A.R.R.L. which has at heart the welfare of all amateurs

Use the application blank on page 64 of this issue.
Your Nearest Dealer
Is Your Best Friend

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 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.

Patronize the dealer nearest you — You can have confidence in him

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<tr>
<th>CHICAGO, ILLINOIS</th>
<th>NEW ORLEANS, LOUISIANA</th>
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<tbody>
<tr>
<td>Chicago Radio Apparatus Company</td>
<td>Rose for Radio</td>
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<tr>
<td>415 South Dearborn Street</td>
<td>129 Camp Street</td>
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<tr>
<td>Dependable Radio Equipment</td>
<td>Complete stock quality radio parts</td>
</tr>
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<td>Established 1921</td>
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<tr>
<th>CHICAGO, ILLINOIS</th>
<th>PHILADELPHIA, PENNSYLVANIA</th>
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<tr>
<td>Mid-West Radio Mart</td>
<td>Eugene G. Wile</td>
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<tr>
<td>520 S. State Street</td>
<td>10 S. Tenth Street</td>
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<tr>
<td>All standard lines carried in stock</td>
<td>Complete Stock of Quality Merchandise</td>
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<tr>
<th>CLEVELAND, OHIO</th>
<th>PITTSBURGH, PENNSYLVANIA</th>
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<tr>
<td>Northern Ohio Laboratories</td>
<td>Cameradio Company</td>
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<tr>
<td>2073 West 85 Street</td>
<td>603 Grant Street</td>
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<tr>
<td>Wholesale Distr. for National, Hammarlund, Thordarson, Cardwell</td>
<td>Tri-State &quot;Ham&quot; Headquarters</td>
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<th>CLEVELAND, OHIO</th>
<th>PROVIDENCE, RHODE ISLAND</th>
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<tr>
<td>Radio Servicemen's Supply Co.</td>
<td>W. H. Edwards &amp; Company</td>
</tr>
<tr>
<td>206 Prospect Street</td>
<td>32 Broadway, Room 23</td>
</tr>
<tr>
<td>Wholesale Distributors catering to Amateurs, Dealers, Servicemen</td>
<td>A full line of reliable Amateur Equipment &amp; Supplies</td>
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<tr>
<th>DENVER, COLORADO</th>
<th>ST. LOUIS, MISSOURI</th>
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<tr>
<td>Inter-State Radio &amp; Supply Co.</td>
<td>Walter Ashe Radio Company</td>
</tr>
<tr>
<td>1639 Tremont Place</td>
<td>1100 Pine Street</td>
</tr>
<tr>
<td>Amateur Radio Headquarters in the Rocky Mountain Region</td>
<td>W9FIS in charge of the oldest and largest parts store in St. Louis</td>
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<th>DETROIT, MICHIGAN</th>
<th>ST. PAUL, MINNESOTA</th>
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<tr>
<td>Radio Specialties Company</td>
<td>Lew Bonn Company</td>
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<tr>
<td>171 E. Jefferson Avenue</td>
<td>2484 University Avenue</td>
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<tr>
<td>Ham Supplies — National &amp; Hammarlund Sets and Parts</td>
<td>Rex L. Munger, W9LIP, Sales Engineer</td>
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<td>Radio Wholesaler</td>
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<tr>
<th>HARTFORD, CONNECTICUT</th>
<th>SAN FRANCISCO, CALIFORNIA</th>
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<tr>
<td>Radio Inspection Service Company</td>
<td>Offenbach Electric Company, Ltd.</td>
</tr>
<tr>
<td>227 Asylum Street</td>
<td>1452 Market Street</td>
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<tr>
<td>Complete line of guaranteed parts</td>
<td>&quot;The House of a Million Radio Parts&quot;</td>
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<tr>
<th>KANSAS CITY, MISSOURI</th>
<th>SPRINGFIELD, MASSACHUSETTS</th>
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<tr>
<td>Burstein-Applebee Company</td>
<td>T. F. Cushing</td>
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<tr>
<td>1012-14 McGee Street</td>
<td>345 Worthington Street</td>
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<tr>
<td>&quot;Specialists&quot; in supplies for the Amateur and Serviceman</td>
<td>An amateur, endeavoring to sell good parts</td>
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<tr>
<th>KANSAS CITY, MISSOURI</th>
<th>SYRACUSE, NEW YORK</th>
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<tr>
<td>Radio Laboratories</td>
<td>Roy C. Stage, W8IGF</td>
</tr>
<tr>
<td>1515 Grand Avenue</td>
<td>Complete stock of standard Ham &amp; BCL parts</td>
</tr>
<tr>
<td>Amateur Headquarters — Complete Stock — Quality Parts</td>
<td>Standard Discounts. Free technical service by W8AO \W</td>
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<tr>
<th>MANCHESTER, NEW HAMPSHIRE</th>
<th>MILWAUKEE, WISCONSIN</th>
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<tr>
<td>Radio Service Lab. of N. H.</td>
<td>Radio Parts Company, Inc.</td>
</tr>
<tr>
<td>Amateur Supply Headquarters for New Hampshire</td>
<td>332 West State Street</td>
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<tr>
<td>Amateur discounts allowed</td>
<td>Complete stock Nationally Known products</td>
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<tr>
<th>MILWAUKEE, WISCONSIN</th>
<th>NEWARK, NEW JERSEY</th>
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<tr>
<td></td>
<td>Kaltman &amp; Romander</td>
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<tr>
<td></td>
<td>69 Court Street</td>
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<tr>
<td></td>
<td>Drop in for an over-counter QSO</td>
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This advertisement is paid for by the firms listed above. Qualified dealers are invited to apply for rates, etc., to Advertising Department, QST.

Say You Saw It in QST — It Identifies You and Helps QST
You Are Protected When You Buy From QST Advertisers

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

Quoted from QST's advertising rate card.

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

• See Editorial April issue of QST

For Your Convenience
QST'S
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